REGISTRATION REPORT

Part B
Section 8
Enfironmental Fate

Detailed summary of the risk assessment

Product code: ADM.4651.H.1.A (former A18032E)
Product name: NIKITA
Chemical active substances:
Dicamba, 312.5 g/kg
Mesotrione, 150 g/kg
Nicosulfuron, 100 g/kg

Central Zone
Zonal Rapporteur Member State: Poland

CORE ASSESSMENT
(Authorisation)

Applicant: ADAMA Agan
Submission date: January 2021
MS Finalisation date: March 2022 (initial Core Assessment)
June 2022 (final Core Assessment)

Version history

When	What
June 2020	dRR submitted by the Applicant
May 2021	Update by the Applicant of the reports: [^{14}C]-Nicosulfuron: Adsorption/Desorption in Soil Groundwater monitoring for nicosulfuron and 6 metabolites in maize growing regions of Italy.
September 2021	Update by the Applicant with additional information of analysis of correlation between sorption of nicosulfuron and all soil parameters; PECgw calculations were updated with new soil correlation evaluation results. These new calculations include multi-year evaluations.
March 2022	Initial zRMS assessment The report in the dRR format has been prepared by the Applicant, therefore all comments, additional evaluations and conclusions of the zRMS are presented in grey commenting boxes. Minor changes are introduced directly in the text and highlighted in grey. Not agreed or not relevant information are ~~struck through and shaded for transparency~~.
June 2022	Final report (Core Assessment updated following the commenting period). No additional information or assessments after the commenting period.

ADAMA use the code ADM.4651.H.1.A for the formulation but for consistency the former Syngenta code A18032E is used throughout the dRR.

Table of Contents

8 Fate and behaviour in the environment (KCP 9)

8.1 Critical GAP and overall conclusions

Table 8.1-1: Critical use pattern of the formulated product

1	2	3	4	5	6	7	8	9	10	11			12	13	14	15
					Application					**Application rate**						**Conclusion**
Use-No. (e)	**Member state(s)**	**Crop and/ or situation** (crop destination / purpose of crop)	**F, Fn, Fpn G, Gn, Gpn or I**	**Pests or Group of pests controlled** (additionally: developmental stages of the pest or pest group)	Method / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applications (days)	kg or L A18032E/ ha a) max. rate per appl. b) max. total rate per crop/season	g or kg as/ha Dicamba a) max. rate per appl. b) max. total rate per crop/season	g or kg as/ha Mesotrione a) max. rate per appl. b) max. total rate per crop/season	g or kg as/ha Nicosulfuron a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min / max	**PHI** (days)	**Remarks:** e.g. g safener/synergist per ha	Groundwater
Zonal uses (field or outdoor uses, certain types of protected crops)																
1	Poland	Maize (ZEAMX)	F	Annual/perennial grass and broadleaved weeds	Foliar, spraying, overall	- / BBCH 12-14 Spring	a) 1 b) 1	n.a.	a) 0.4 b) 0.4	a) 125 b) 125	a) 60 b) 60	a) 40 b) 40	200-300	n.a.	Tank-mixed adjuvant needed (e.g. Adigor with 1.0 - 1.5 L/ha, STYK (alternative and exclusive ADAMA name: INSERT) with 0.2 L/ha, Olejan with 1.5 L/ha)	R Triennial application
2	Poland	Maize (ZEAMX)	F	Annual/perennial grass and broadleaved weeds	Foliar, spraying, overall	- / BBCH 12-14 Spring	a) 1 b) 1	n.a.	a) 0.4 b) 0.4	a) 125 b) 125	a) 60 b) 60	a) 40 b) 40	200-300	n.a.	Application in tank mix with 0.8 L/ha, Efica 960 EC	R Triennial application
Interzonal uses (use as seed treatment, in greenhouses (or other closed places of plant production), as post-harvest treatment or for treatment of empty storage rooms)																
None																
Minor uses according to Article 51 (zonal uses)																
None																
Minor uses according to Article 51 (interzonal uses)																
None																

* Use number(s) in accordance with the list of all intended GAPs in Part B, Section 0 should be given in column 1

** F: professional field use, Fn: non-professional field use, Fpn: professional and non-professional field use, G: professional greenhouse use, Gn: non-professional greenhouse use, Gpn: professional and non-professional greenhouse use, I: indoor application

Explanation for column 15 "Conclusion"

A	Safe use
R	Further refinement and/or risk mitigation measures required
C	To be confirmed by cMS
N	No safe use

Remarks table:

(1) Numeration necessary to allow references

(2) Use official codes/nomenclatures of EU

(3) For crops, the EU and Codex classifications (both) should be used; where relevant, the use situation should be described (*e.g.* fumigation of a structure)

(4) F: professional field use, Fn: non-professional field use, Fpn: professional and non-professional field use, G: professional greenhouse use, Gn: non-professional greenhouse use, Gpn: professional and non-professional greenhouse use, I: indoor application

(5) Scientific names and EPPO-Codes of target pests/diseases/ weeds or when relevant the common names of the pest groups (e.g. biting and sucking insects, soil born insects, foliar fungi, weeds) and the developmental stages of the pests and pest groups at the moment of application must be named

(6) Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench
Kind, e.g. overall, broadcast, aerial spraying, row, individual plant, between the plants - type of equipment used must be indicated

(7) Growth stage at first and last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-8263-3152-4), including where relevant, information on season at time of application

(8) The maximum number of application possible under practical conditions of use must be provided

(9) Minimum interval (in days) between applications of the same product.

(10) For specific uses other specifications might be possible, e.g.: g/m³ in case of fumigation of empty rooms. See also EPPO-Guideline PP 1/239 Dose expression for plant protection products

(11) The dimension (g, kg) must be clearly specified. (Maximum) dose of a.s. per treatment (usually g, kg or L product / ha).

(12) If water volume range depends on application equipments (e.g. ULVA or LVA) it should be mentioned under "application: method/kind".

(13) PHI - minimum pre-harvest interval

(14) Remarks may include: Extent of use/economic importance/restrictions

Several risk assessments of this dRR are based on the worst case GAP for C-EU with a higher application rate and are therefore more conservative compared to the applied GAP in Poland.

Table 8.1-2: Assessed (critical) uses during approval of dicamba concerning the Section Environmental Fate (EFSA Journal, 2011)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Use-No. *	Member state(s)	Crop and/or situation (crop destination / purpose of crop)	F, Fn, Fpn G, Gn, Gpn or I **	Pests or Group of pests controlled (additionally: developmental stages of the pest or pest group)	**Application**				**Application rate**			PHI (d)	Remarks: e.g. g safener / synergist per ha
					Method / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applications (d)	kg or L product/ha a) max. rate per appl. b) max. total rate per crop/season	g as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max		
1	EU (N & S)	Maize	F	Dicotyledon weeds incl. *Chenopodium spp. Convolvulus spp. Polygonum spp.*	overall spray	Post-emergence until BBCH 16	a) 1 b) 1	-	-	a) 360 b) 360	100-500	-	Period between treatment and harvest is > 100 d, no PHI is applicable [1] [2]
2	EU (N & S)	Pasture	F	Dicotyledon weeds incl. *Chenopodium spp. Convolvulus spp. Polygonum spp.*	overall spray	Spring / summer	a) 1-2 b) 1-2	6 weeks	-	a) 480 b) 960	100-500	14	[1] [2][3]

* Use number(s) in accordance with the list of all intended GAPs in Part B, Section 0 should be given in column 1

** F: professional field use, Fn: non-professional field use, Fpn: professional and non-professional field use, G: professional greenhouse use, Gn: non-professional greenhouse use, Gpn: professional and non-professional greenhouse use, I: indoor application

[1] Dicamba has the potential for long-range transport through the atmosphere.

[2] A detailed quantification of a group of unidentified transformation products, found in one soil incubation, was not available, therefore there are no assessments for the environmental compartments for any potentially formed soil transformation products from this group.

[3] The environmental exposure and risk assessment available for pasture covers only those situations when the pasture is already established.

Table 8.1-3: Assessed (critical) uses during approval of mesotrione concerning the Section Environmental Fate (EFSA Journal, 2016)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Use-No. *	Member state(s)	Crop and/or situation (crop destination / purpose of crop)	F, Fn, Fpn G, Gn, Gpn or I **	Pests or Group of pests controlled (additionally: developmental stages of the pest or pest group)	Application				Application rate			PHI (d)	Remarks: e.g. g safener / synergist per ha
					Method / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applications (d)	kg or L product/ha a) max. rate per appl. b) max. total rate per crop/season	g as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max		
1	EU N&S	Maize	F	annual broadleaved weeds and some annual grasses such as Echinochloa crus-galli	Foliar spray application using a hydraulic vehicle-mounted spray equipment	BBCH 12-18	a) 1 b) 1	-	-	a) 150 b) 150	200-400	-	-

* Use number(s) in accordance with the list of all intended GAPs in Part B, Section 0 should be given in column 1

** F: professional field use, Fn: non-professional field use, Fpn: professional and non-professional field use, G: professional greenhouse use, Gn: non-professional greenhouse use, Gpn: professional and non-professional greenhouse use, I: indoor application

Table 8.1-4: Assessed (critical) uses during approval of nicosulfuron concerning the Section Environmental Fate (EFSA Scientific Report, 2007)

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Use-No. *	Member state(s)	Crop and/or situation (crop destination / purpose of crop)	F, Fn, Fpn G, Gn, Gpn or I **	Pests or Group of pests controlled (additionally: developmental stages of the pest or pest group)	**Application**				**Application rate**			PHI (d)	Remarks: e.g. g safener / synergist per ha
					Method / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applications (d)	kg or L product/ha a) max. rate per appl. b) max. total rate per crop/season	g as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max		
1	various	maize	F	weeds	spray application	BBCH 12-18	1	-	-	a) 60 b) 60	200-400	-	-

* Use number(s) in accordance with the list of all intended GAPs in Part B, Section 0 should be given in column 1

** F: professional field use, Fn: non-professional field use, Fpn: professional and non-professional field use, G: professional greenhouse use, Gn: non-professional greenhouse use, Gpn: professional and non-professional greenhouse use, I: indoor application

8.2 Metabolites considered in the assessment

Table 8.2-1: Metabolites of <u>dicamba</u> potentially relevant for exposure assessment

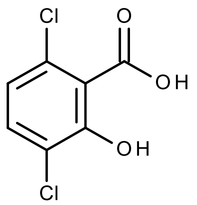
Metabolite	Molar mass (g/mol)	Chemical structure	Maximum observed occurrence in compartments (%)	Exposure assessment required due to
NOA414746 (DCSA) 3,6-dichloro-2-hydroxybenzoic acid	207		Soil: > 10 % of a.s. Water: > 10 % of a.s. Sediment: < 5 % of a.s.	PEC$_{S}$: not covered by EU assessment PEC$_{GW}$: not covered by EU assessment PEC$_{SW/SED}$: not covered by EU assessment

Table 8.2-2: Metabolites of <u>mesotrione</u> potentially relevant for exposure assessment

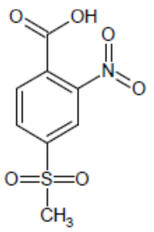
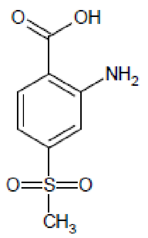
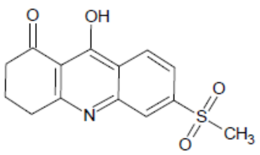
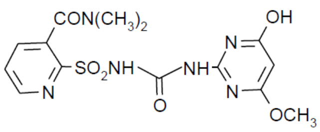
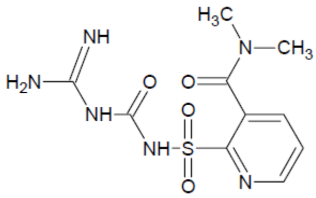
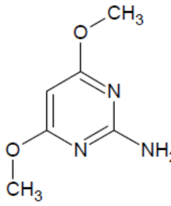
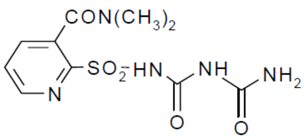
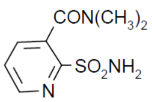
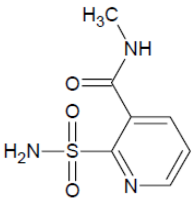
Metabolite	Molar mass (g/mol)	Chemical structure	Maximum observed occurrence in compartments (%)	Exposure assessment required due to
NOA437130 (MNBA) 4-(methylsulfonyl)-2-nitrobenzoic acid	245		Soil: > 10 % of a.s (aerobic laboratory degradation and soil photolysis studies) Water: > 5 % of a.s. in 1 measurement Sediment: < 5 % of a.s.	PEC$_{S}$: not covered by EU assessment PEC$_{GW}$: not covered by EU assessment PEC$_{SW/SED}$: not covered by EU assessment
NOA422848 (AMBA) 2-amino-4-(methyl-sulfonyl) benzoic acid	215		Soil: > 5% of a.s. in 2 sequential measurements (aerobic laboratory degradation studies and soil photolysis studies) Water: > 10 % of a.s. Sediment: > 5 % of a.s. in 2 sequential measurements	PEC$_{S}$: not covered by EU assessment PEC$_{GW}$: not covered by EU assessment PEC$_{SW/SED}$: not covered by EU assessment
SYN546974 9-hydroxy-6-(methyl-sulfonyl)-3,4-dihydro-acridin-1(2H)-one	291		Soil: - Water: > 5 % of a.s. in 2 sequential measurements Sediment: > 10 % of a.s.	PEC$_{SW/SED}$: not covered by EU assessment

Table 8.2-3: Metabolites of <u>nicosulfuron</u> potentially relevant for exposure assessment

Metabolite	Molar mass (g/mol)	Chemical structure	Maximum observed occurrence in compartments (%)	Exposure assessment required due to
HMUD 2-{[(4-hydroxy-6-methoxypyrimidin-2-yl)carbamoyl] sulfamoyl}-N,N-dimethylpyridine-3-carboxamide	396.4		Soil: > 10 % of a.s (aerobic laboratory degradation studies) Water: > 10 % of a.s. Sediment:> 5 % of as in 2 sequential measurements	PEC$_{S}$: not covered by EU assessment PEC$_{GW}$: not covered by EU assessment PEC$_{SW/SED}$: not covered by EU assessment

Metabolite	Molar mass (g/mol)	Chemical structure	Maximum observed occurrence in compartments (%)	Exposure assessment required due to
AUSN 2-[carbaminidoyl-carbamoyl)sulfamoyl]-N,N-dimethyl-pyridine-3-carboxamide	314.3		Soil: > 10 % of a.s Water: > 5 % of a.s. and maximum of formation not yet reached at the end of the study Sediment:< 5 % of as but maximum of formation not yet reached at the end of the study	PEC_S: not covered by EU assessment PEC_{GW}: not covered by EU assessment $PEC_{SW/SED}$: not covered by EU assessment
ADMP 4,6-dimethoxy-pyrimidin-2-amine	155.2		Soil: > 5 % of as in 2 sequential measurements (field dissipation trial) Water: - Sediment: -	PEC_S: not covered by EU assessment PEC_{GW}: not covered by EU assessment $PEC_{SW/SED}$: not covered by EU assessment
UCSN 2-[(carbamoyl-carbamoyl)sulfamoyl]-N,N-dimethyl-pyridine-3-carboxamide	315.3		Soil: > 10 % of a.s. (aerobic laboratory degradation studies) Water: > 5 % of a.s. and maximum of formation not yet reached at the end of the study Sediment:< 5 % of as	PEC_S: not covered by EU assessment PEC_{GW}: not covered by EU assessment $PEC_{SW/SED}$: not covered by EU assessment
ASDM N,N-dimethyl-2-sulfamoylpyridine-3-carboxamide	229.2		Soil: > 10 % of a.s Water: > 5 % of a.s. and maximum of formation not yet reached at the end of the study Sediment:< 5 % of as	PEC_S: not covered by EU assessment PEC_{GW}: not covered by EU assessment $PEC_{SW/SED}$: not covered by EU assessment
MU-466	215.1		Soil: - Water: > 0.1 µg/L in the leachate of lysimeter studies Sediment: -	PEC_{GW}: not covered by EU assessment

zRMS comments:

Information regarding metabolites of particular active compounds provided in Tables 9.1-6 to 9.1-8 above is in line with data reported in:

- EFSA Journal 2011;9(1):1965 for dicamba,
- EFSA Journal 2016;14(3):4419 for mesotrione,
- EFSA Scientific Report (2007) 120 for nicosulfuron.

Specific formation fractions and/or maximum occurrence of particular metabolites has been considered in the exposure assessment presented in this report.

8.3 Rate of degradation in soil (KCP 9.1.1)

Dicamba

As illustrated in the Table 8.2-1, the major dicamba metabolites in soil is DCSA (NOA414746). All other metabolites shown in the degradation pathway of dicamba in soil (Figure 8.3-1) are considered to be minor metabolites.

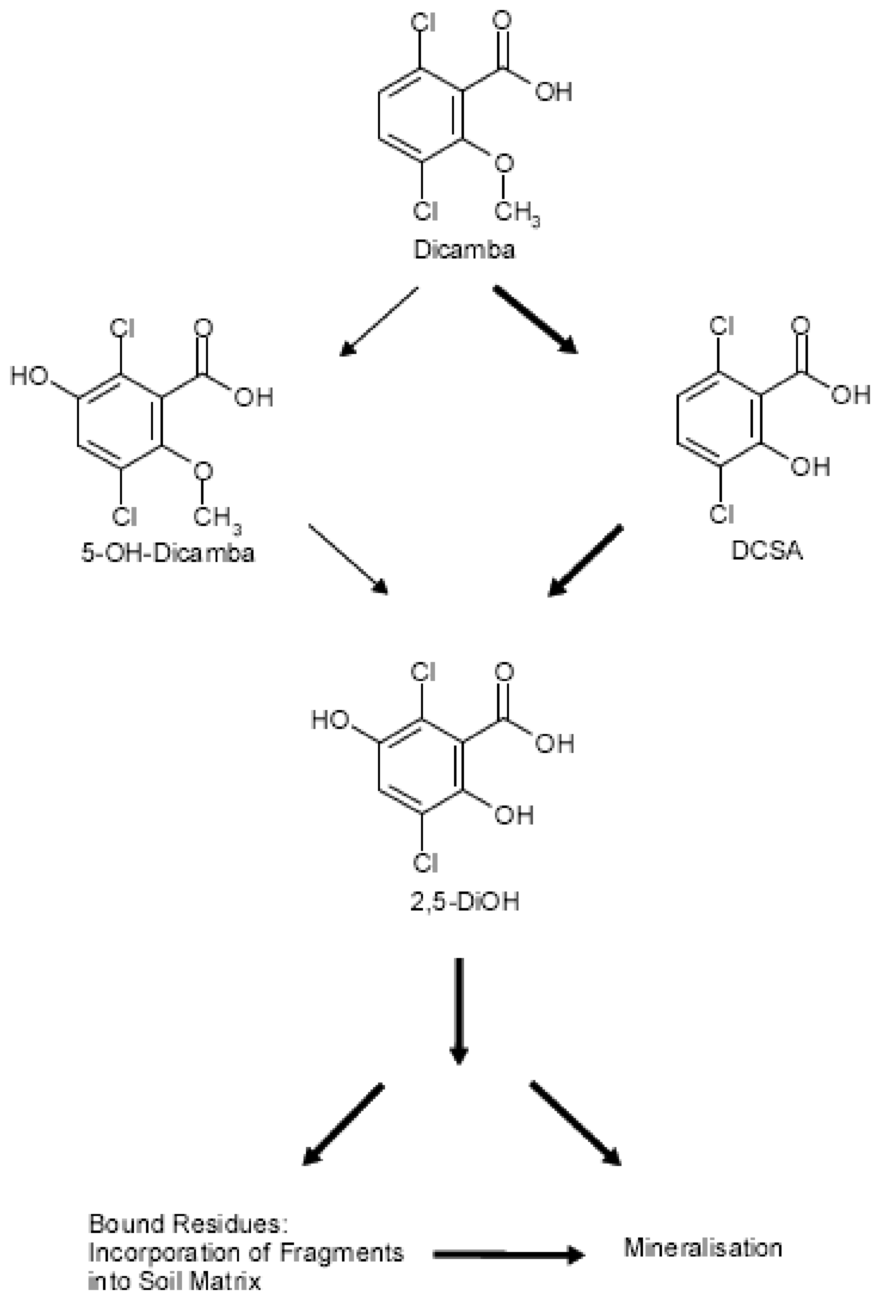


Figure 8.3-1: Proposed pathway of dicamba in soil

Mesotrione

As illustrated in the Table 8.2-2, the major mesotrione metabolites in soil are MNBA and AMBA (Figure 8.3-2).

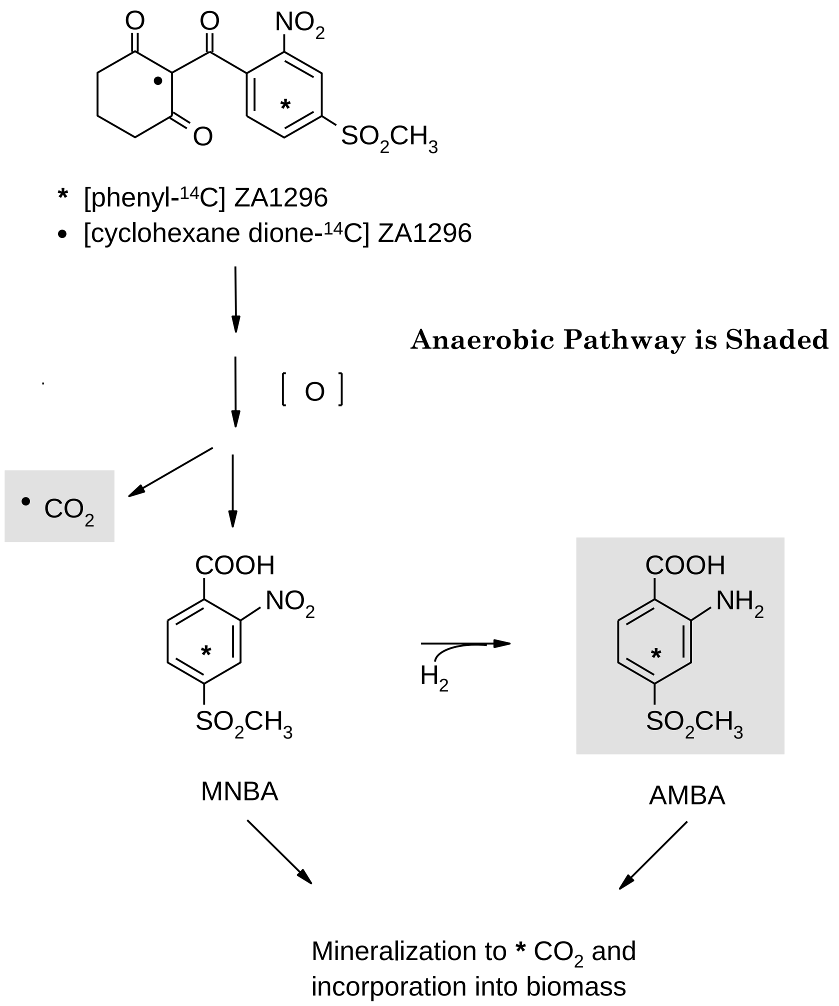
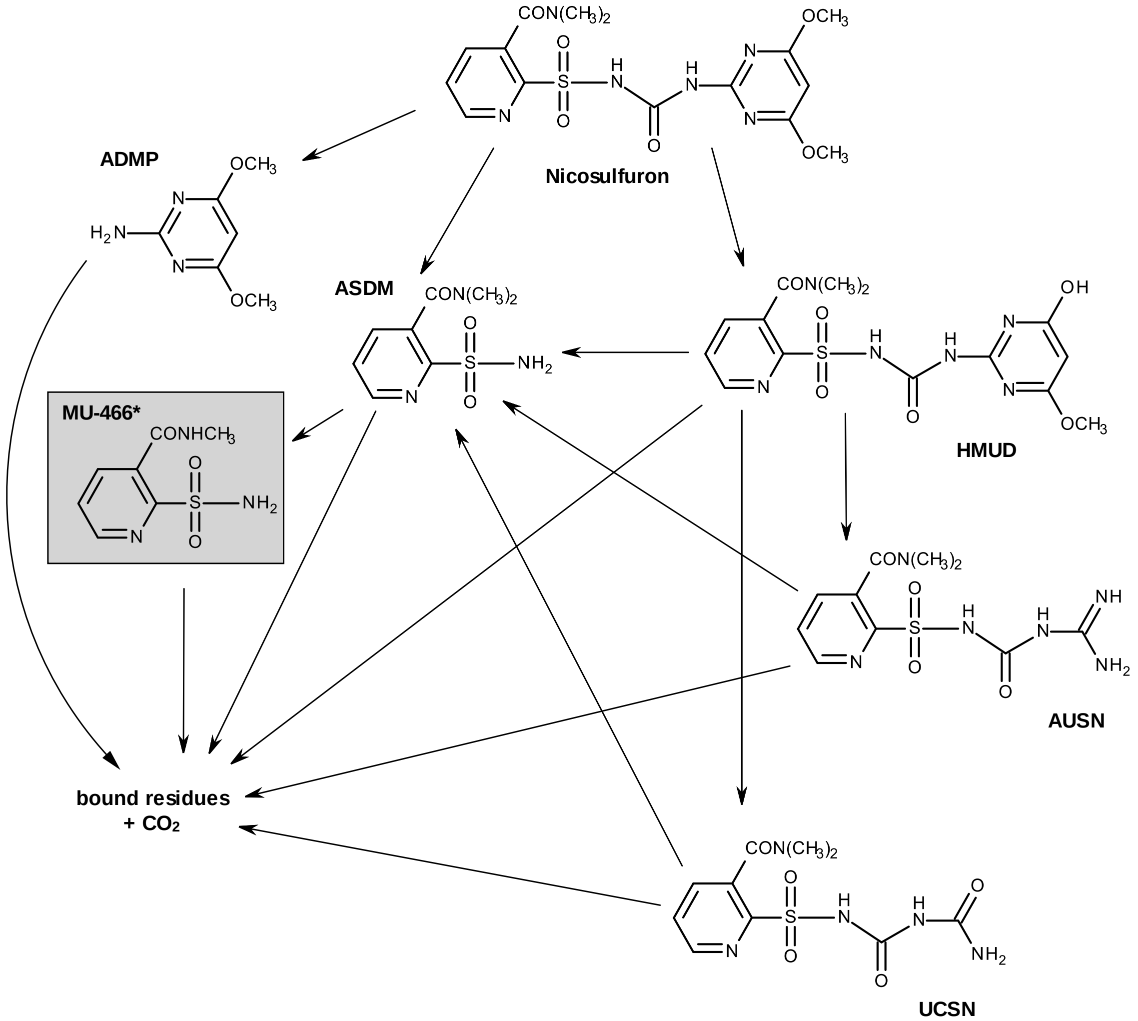


Figure 8.3-2: **Proposed pathway of mesotrione in soil**

Nicosulfuron

As illustrated in
Table 8.2-3, the major nicosulfuron metabolites in soil are HMUD, AUSN, ADMP, UCSN and ASDM (Figure 8.3-3). The metabolite MU-466 shown in the degradation pathway of nicosulfuron was only found in relevant amounts in the leachate of lysimeter studies (see chapter 8.5.4); it is considered to be a minor metabolite in soil.



* MU-466 was not found in the route and rate of degradation studies (only in the leachate of lysimeter studies), but appears to be a product of the degradation of ASDM.

Figure 8.3-3: Proposed pathway of nicosulfuron in soil

Studies on degradation in soil with the formulation were not performed, since it is possible to extrapolate from data obtained with the active substance.

8.3.1 Aerobic degradation in soil (KCP 9.1.1.1)

8.3.1.1 Dicamba and its metabolites

Studies on the aerobic degradation rates of dicamba and its metabolite DCSA (NOA414746) are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of dicamba (EFSA Journal, 2011).

Table 8.3-1: Summary of aerobic degradation rates for dicamba - laboratory studies

Dicamba, Laboratory studies, aerobic conditions										
Soil name	**Soil type [a]**	**pH [a]**	**t. (ºC)**	**Soil moisture**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2/10kPa**	**Chi^2 (%)**	**Kine-tic model**	**Evaluated on EU level / Reference**
BBA 2.2	loamy sand	5.5	20	40% MWHC	3.2	10.8	3.2	13.0	SFO	Yes, EFSA (2011)
Gartenacker	loam	7.3	20	40% MWHC	3.3	11.0	3.3	13.1	SFO	Yes, EFSA (2011)
Pappelacker	sandy loam	7.4	20	40% MWHC	4.2	13.9	4.1	10.1	SFO	Yes, EFSA (2011)
Borstel	loamy sand	5.8	20	40% MWHC	5.5	18.4	4.6	9.7	SFO	Yes, EFSA (2011)
Elliot	silt loam	5.1	23	75% FC	3.9	12.8	4.9	16.2	SFO	Yes, EFSA (2011)
Geometric mean (n=5)							4.0			
pH-dependency:							No			

[a] No details on test method available

Table 8.3-2: Summary of aerobic degradation rates for NOA414746 (DCSA) - laboratory studies

NOA414746, Laboratory studies, aerobic conditions											
Soil name	**Soil type [a]**	**pH [a]**	**t. (ºC)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C pF2/10kPa**	**f.f.**	**r^2**	**Kinetic model**	**Evaluated on EU level / Reference**
BBA 2.2	loamy sand	5.5	20	40	10.5	n.a.	10.5	0.84	0.99	SFO [b]	Yes, EFSA (2011)

[a] No details on test method available
[b] kinetically derived considering continuous formation from the parent

Table 8.3-3: Summary of aerobic degradation rates for NOA414746 (DCSA) - laboratory studies

NOA414746, Laboratory studies, aerobic conditions										
Soil name	**Soil type [a]**	**pH [a]**	**t. (ºC)**	**Soil moisture**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2/10kPa**	**Chi^2 (%)**	**Kine-tic model**	**Evaluated on EU level / Reference**
BBA 2.2	loamy sand	5.5	20	40% MWHC	12 [b]	39.8 [b]	12 [b]	9.5	SFO [b]	Yes, EFSA (2011)
Gartenacker	loam	7.3	20	40% MWHC	9.0 [b]	30.1 [b]	9.0 [b]	21.4	SFO [b]	Yes, EFSA (2011)
Pappelacker	sandy loam	7.4	20	40% MWHC	6.4 [b]	21.3 [b]	6.3 [b]	7.6	SFO [b]	Yes, EFSA (2011)
Borstel	loamy sand	5.8	20	40% MWHC	10.8 [b]	35.9 [b]	9.1 [b]	9.9	SFO [b]	Yes, EFSA (2011)
Elliot	silt loam	5.1	23	75% FC	9.7 [b]	32.3 [b]	12.1 [b]	8.9	SFO [b]	Yes, EFSA (2011)
Geometric mean (n=5)							9.4			
pH-dependency:							No			

[a] No details on test method available
[b] Calculated from day of maximum formation (peak-down)

zRMS comments:

Soil degradation data for dicamba and its metabolites are in line with EU agreed endpoints as reported in EFSA Journal 2011;9(1):1965.

8.3.1.2 Mesotrione and its metabolites

Studies on the aerobic degradation rates of mesotrione and its metabolites MNBA, AMBA are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of mesotrione (EFSA Journal, 2016).

Table 8.3-4: Summary of aerobic degradation rates for mesotrione - laboratory studies

Mesotrione, Laboratory studies, aerobic conditions										
Soil name	**Soil type [a]**	**pH (H_2O)**	**t. (ºC)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2/10kPa**	**Chi^2 (%)**	**Kinetic model**	**Evaluated on EU level / Reference**
ERTC	sandy loam	6.4	20	19[b]	11.6	38.5	8.2	18	SFO	Yes, EFSA (2016)
Toulouse	loam	7.7	20	25[b]	4.3	14.3	4.0	16.4	SFO	Yes, EFSA (2016)
Pickett Piece	clay loam	7.1	20	28[b]	5.3	17.7	5.3	6.5	SFO	Yes, EFSA (2016)
721	clay loam	5.6	25	28[b]	20.2	67.1	32.3	4.1	SFO	Yes, EFSA (2016)
722	silty clay loam	5.7	25	30[b]	10.3	34.2	16.5	3.9	SFO	Yes, EFSA (2016)
723	silt loam	5.4	25	26[b]	17.6	58.5	28.2	3.4	SFO	Yes, EFSA (2016)
724	loamy sand	4.8	25	14[b]	23.8	78.9	31.1	4.3	SFO	Yes, EFSA (2016)
725	loam	5.8	25	25[b]	6.1	20.3	9.5	7.6	SFO	Yes, EFSA (2016)
727	clay loam	5.1	25	28[b]	20.8	69.2	32.4	6.4	SFO	Yes, EFSA (2016)
728	sandy loam	5.9	25	25[b]	7.2	24	9.7	5.6	SFO	Yes, EFSA (2016)
729	silt loam	5.6	25	26[c]	12.7	42.2	20.3	1.6	SFO	Yes, EFSA (2016)
730	clay loam	5.3	25	28[b]	17.1	56.9	26.9	8.9	SFO	Yes, EFSA (2016)
731	silty clay loam	6.1	25	30[b]	14.1	46.9	22.6	1.0	SFO	Yes, EFSA (2016)
732	silty clay loam	5.0	25	30[b]	14.0	46.4	22.4	5.3	SFO	Yes, EFSA (2016)
741	silty clay loam	5.7	25	30[b]	28.7	95.3	44.3	4.5	SFO	Yes, EFSA (2016)
742	silty clay loam	7.2	25	34.4[c]	9.7	32.1	15.5	5.5	SFO	Yes, EFSA (2016)
Richmond (Vispetto & Tovshteyn, 1997)	silt loam	6.2	25	32.04[c]	13.2	44.0	14.68 (average DT_{50} of 15.5 & 13.9 d given identical soil descriptions in 2 studies)	3.1	SFO	Yes, EFSA (2016)
Richmond (Subba-Rao, 1996)	silt loam	6.2	25	32.04[c]	11.8	39.3		4.9	SFO	Yes, EFSA (2016)
Richmond (Miller, 1997)	silt loam	6.1	20	32.04[c]	14.2	47.2	11.5	4.6	SFO	Yes, EFSA (2016)
Geometric mean/Median (n=18)							---			
pH-dependency:							Yes - degradation increases with increasing pH. DT_{50} = -9.766 * pH + 77.692 r^2 = 0.4687 (non-log)			

[a] No details on test method available
[b] Obtained from the tabulated FOCUS default values (FOCUS 2014)
[c] measured at pF2

Table 8.3-5: Summary of aerobic degradation rates for MNBA - laboratory studies

MNBA, Laboratory studies, aerobic conditions										
Soil name	**Soil type [a]**	**pH (H_2O)**	**t. (ºC)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2 / 10kPa**	**Chi² (%)**	**Kinetic model**	**Evaluated on EU level / Reference**
722	silty clay loam	5.7	25	30[c]	0.6	1.89	1.0	10	SFO	Yes, EFSA (2016)
725	loam	5.8	25	25[c]	0.5	1.5	0.8	10.8	SFO	Yes, EFSA (2016)
728	sandy loam	5.9	25	25[c]	5.1	16.97	6.9	3.1	SFO [b]	Yes, EFSA (2016)
729	silt loam	5.6	25	26[d]	1.66	5.52	2.7	3.88	SFO	Yes, EFSA (2016)
730	clay loam	5.3	25	28[c]	2.81	9.35	4.4	14.17	SFO	Yes, EFSA (2016)
731	silty clay loam	6.1	25	30[c]	15.7	52.3	25.2	1.6	SFO	Yes, EFSA (2016)
ERTC	sandy loam	6.4	20	19[c]	6.2	20.7	4.4	21.89	SFO [b]	Yes, EFSA (2016)
Toulouse	loam	7.7	20	25[c]	5	16.65	4.6	13.08	SFO [b]	Yes, EFSA (2016)
Richmond (Subba-Rao, 1996)	silt loam	6.2	25	32.04[d]	1.1	3.67	1.3	11.2	SFO	Yes, EFSA (2016)
Richmond (Miller, 1997)	silt loam	6.1	20	32.04[d]	6.3	21.03	5.1	20.13	SFO [b]	Yes, EFSA (2016)
Geometric mean/Median (n=10)							3.4			
pH-dependency:							No			

[a] No details on test method available
[b] Calculated from day of maximum formation (peak-down)
[c] Obtained from the tabulated FOCUS default values (FOCUS 2014)
[d] measured at pF2

Table 8.3-6: Summary of aerobic degradation rates for AMBA - laboratory studies

AMBA, Laboratory studies, aerobic conditions										
Soil name	**Soil type [a]**	**pH (H_2O)**	**t. (ºC)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2 / 10kPa**	**Chi² (%)**	**Kinetic model**	**Evaluated on EU level / Reference**
Wisborough	clay	4.9	20	41.26	7.8	-	3.7	5.52	DFOP DT_{90}/3.32	Yes, EFSA (2016)
Wisconsin	silt loam	6.4	20	40.0	33	109	23.5	7.98	DFOP K_2	Yes, EFSA (2016)
East Anglia	sandy loam	7.9	20	34.94	58.7	195	47.4	3.66	DFOP K_2	Yes, EFSA (2016)
Spinks	loamy sand	6.7 [a]	20	-	10.2	34	9.7	6.94	FMOC	Yes, EFSA (2016)
Richmond	silt loam	6.2	25	32.04	13.6	45.2	16.0	14.8	SFO	Yes, EFSA (2016)
Richmond	*silt loam*	*6.1*	*20*	32.04	*> 1000*	*> 1000*	*> 1000*	*26.6*	*SFO*	Yes, EFSA (2016)
Geometric mean/Median (n=5)							14.5			
pH-dependency:							No			

[a] No details on test method available
Italics - outlier

zRMS comments:

Soil degradation data for mesotrione and its metabolites are in line with EU agreed endpoints as reported in EFSA Journal 2016;14(3):4419.

MWHC data presented in Table 8.3-6 for metabolite AMBA were taken from the RAR for mesotrione Vol.3, Section B.8 (RMS-UK, 2015) and not the LoEP.

8.3.1.3 Nicosulfuron and its metabolites

Studies on the aerobic degradation rates of nicosulfuron and its metabolites HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of nicosulfuron (EFSA Scientific Report, 2007).

Table 8.3-7: Summary of aerobic degradation rates for nicosulfuron - laboratory studies

Nicosulfuron, Laboratory studies, aerobic conditions											
Soil name	**Soil type (USDA)**	**Label**	**pH (H_2O)**	**t. (°C)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2/10kPa** [b]	**r^2**	**Kinetic model**	**Evaluated on EU level / Reference**
Le Noron	loam [a]	pyridine	5.3 [a]	20	46.3	20.0	66.4	13.3	0.986	1st order non-linear	Yes, EFSA (2007)
Le Noron	loam [a]	pyrimidine	5.3 [a]	20	46.3	26.3	87.4	17.4	0.901	1st order non-linear	Yes, EFSA (2007)
Mean								**15.3**			
Les Evouettes	silt loam [a]	pyridine	6.1 [a]	20	54.6	40.5	134.4	33.2	0.981	1st order non-linear	Yes, EFSA (2007)
Les Evouettes	silt loam [a]	pyrimidine	6.1 [a]	20	54.6	33.1	110.1	27.1	0.993	1st order non-linear	Yes, EFSA (2007)
Mean								**30.1**			
Speyer 2.1	sand [a]	pyridine	6.0 [a]	20	21.1	35.1	116.6	30.6	0.989	1st order non-linear	Yes, EFSA (2007)
Speyer 2.1	sand [a]	pyrimidine	6.0 [a]	20	21.1	46.3	154.0	40.4	0.974	1st order non-linear	Yes, EFSA (2007)
Mean								**35.5**			
Speyer 2.3	sandy loam [a]	pyridine	6.6 [a]	20	31.4	26.7	88.8	20.3	0.985	1st order non-linear	Yes, EFSA (2007)
Speyer 2.3	sandy loam [a]	pyrimidine	6.6 [a]	20	31.4	23.3	77.2	17.7	0.992	1st order non-linear	Yes, EFSA (2007)
Mean								**19.0**			
Pappel-acker	loamy sand	pyrimidine	7.0	20	40	7.0	23.4	**5.7**	0.960	SFO	Yes, EFSA (2007)
Karolinen-hof	sand	pyrimidine	7.2	20	40	13.2	43.9	**12.6**	0.992	SFO	Yes, EFSA (2007)
Otzberg	silt loam	pyrimidine	7.2	20	40	18.9	62.8	**14.3**	0.991	SFO	Yes, EFSA (2007)
Geometric mean (n=7)								16.4			
pH-dependency:								No			

[a] No details on test method available
[b] Values in bold used to calculate geometric mean DT_{50}

Table 8.3-8: Summary of aerobic degradation rates for HMUD - laboratory studies

HMUD, Laboratory studies, aerobic conditions												
Soil name	**Soil type [a]**	**Label**	**pH [a]**	**t. (ºC)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C pF2/10kPa**	**f.f. k_{dp}/k_f**	**St. (r^2)**	**Kinetic model**	**Evaluated on EU level / Reference**
Les Evouettes	silt loam	pyri-dine	6.1	20	54.6	30.8	102.2	25.2	0.00752	0.983	Modelmaker based on SFO formation and decline from parent	Yes, EFSA (2007)
Les Evouettes	silt loam	pyri-midine	6.1	20	54.6	27.4	90.0	22.4	0.00786	0.930		Yes, EFSA (2007)
Geometric mean (n=2)								23.8				
pH-dependency:								n.a.				
The DT_{50} for HMUD are 2 values from 2 parent labels for 1 soil. Whereas for the other metabolites more than 1 soil was tested. The notifer calculated these using first-order kinetics in Modelmaker based on formation of HMUD and its subsequent degradation (HMUD formation fraction used was 0.00752 and 0.00786 respectively).												

[a] No details on test method available

Table 8.3-9: Summary of aerobic degradation rates for AUSN - laboratory studies

AUSN, Laboratory studies, aerobic conditions										
Soil name	**Soil type [a]**	**pH (KCl)**	**t. (ºC)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2/10kPa**	**St. (r^2)**	**Kinetic model**	**Evaluated on EU level / Reference**
Collembey	loamy sand	7.6	20	40	73.8	245.1	60.0	0.894	1st order non-linear	Yes, EFSA (2007)
Speyer 2.2	loamy sand	6.0	20	40	218.2	724.8	192.3	0.907	1st order non-linear	Yes, EFSA (2007)
Les Evouettes	loam	7.3	20	40	101.4	336.9	65.2	0.856	1st order non-linear	Yes, EFSA (2007)
Worst case (n=3)							192.3			
pH-dependency:							n.a.			

[a] No details on test method available

Table 8.3-10: Summary of aerobic degradation rates for ADMP - laboratory studies

ADMP, Laboratory studies, aerobic conditions										
Soil name	**Soil type [a]**	**pH (KCl)**	**t. (ºC)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2/10kPa**	**St. (r^2)**	**Kinetic model**	**Evaluated on EU level / Reference**
Collembey	loamy sand	7.6	20	40	2.9	9.5	2.4	0.995	1st order non-linear	Yes, EFSA (2007)
Speyer 2.2	loamy sand	6.0	20	40	6.1	20.4	5.4	0.980	1st order non-linear	Yes, EFSA (2007)
Les Evouettes	loam	7.3	20	40	11.3	37.7	7.3	0.970	1st order non-linear	Yes, EFSA (2007)
Geometric mean (n=3)							4.5			
pH-dependency:							n.a.			

[a] No details on test method available

Table 8.3-11: Summary of aerobic degradation rates for UCSN - laboratory studies

UCSN, Laboratory studies, aerobic conditions										
Soil name	**Soil type [a]**	**pH (KCl)**	**t. (ºC)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2/10kPa**	**St. (r^2)**	**Kinetic model**	**Evaluated on EU level / Reference**
Collembey	loamy sand	7.6	20	40	126.2	419.3	102.6	0.993	1st order non-linear	Yes, EFSA (2007)
Speyer 2.2	loamy sand	6.0	20	40	307.5	1021.7	271.0	0.962	1st order non-linear	Yes, EFSA (2007)
Les Evouettes	loam	7.3	20	40	229.3	761.7	147.5	0.942	1st order non-linear	Yes, EFSA (2007)
Worst case (n=3)							271.0			
pH-dependency:							n.a.			

[a] No details on test method available

Table 8.3-12: Summary of aerobic degradation rates for ASDM - laboratory studies

ASDM, Laboratory studies, aerobic conditions										
Soil name	**Soil type [a]**	**pH (KCl)**	**t. (ºC)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2/10kPa**	**St. (r^2)**	**Kinetic model**	**Evaluated on EU level / Reference**
Collembey	loamy sand	7.6	20	40	90.5	300.8	73.6	0.995	1st order non-linear	Yes, EFSA (2007)
Speyer 2.2	loamy sand	6.0	20	40	268.5	892.1	236.6	0.933	1st order non-linear	Yes, EFSA (2007)
Les Evouettes	loam	7.3	20	40	114.8	381.4	73.8	0.992	1st order non-linear	Yes, EFSA (2007)
Worst case (n=3)							236.6			
pH-dependency:							n.a.			

[a] No details on test method available

Table 8.3-13: Summary of aerobic degradation rates for MU-466 - laboratory studies

MU-466, Laboratory studies, aerobic conditions										
Soil name	**Soil type [a]**	**pH ($CaCl_2$)**	**t. (ºC)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C, pF2/10kPa**	**St. (r^2)**	**Kinetic model**	**Evaluated on EU level / Reference**
Uffholtz	silty clay loam	5.74	20	40	89.5	297	66.3	0.943	1st order non-linear	Yes, EFSA (2007)
Speyer 2.1	sand	6.2	20	40	84	279	75.5	0.975	1st order non-linear	Yes, EFSA (2007)
3A	loam	7.1	20	40	67.9	225.5	59.1	1.000	1st order non-linear	Yes, EFSA (2007)
Worst case (n=3)							75.5			
pH-dependency:							n.a.			

[a] No details on test method available

zRMS comments:
Soil degradation data for nicosulfuron and its metabolites HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 are in line with EU agreed endpoints as reported in EFSA Scientific Report, 2007.

8.3.2 Anaerobic degradation in soil (KCP 9.1.1.1)

For the currently intended product registration, application will take place only in spring or summer. In these seasons, anaerobic degradation is not considered a relevant breakdown process.

8.3.2.1 Dicamba and its metabolites

Studies on the anaerobic degradation rates of dicamba and its metabolite DCSA (NOA414746) are considered to be data provided in support of the active substance. The degradation of dicamba in soil under anaerobic conditions was not investigated.

zRMS comments:
In line with information presented in EFSA Journal 2011;9(1):1965, investigation of anaerobic soil degradation of dicamba was not required at the EU level.

8.3.2.2 Mesotrione and its metabolites

Studies on the anaerobic degradation rates of mesotrione and its metabolites are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of mesotrione, (EFSA Journal, 2016).

Mesotrione degradation in soil under anaerobic conditions was investigated in one study. Mesotrione was low persistent under these conditions. Metabolite AMBA reached 40.7% AR after 30 d. MNBA was not detected.

Table 8.3-14: Summary of anaerobic degradation rates for mesotrione - laboratory studies

Mesotrione, Laboratory studies, anaerobic conditions										
Soil name	**Soil type[a]**	**pH [a]**	**t. (°C)**	**MWHC (%)**	**DT_{50} (d)**	**DT_{90} (d)**	**DT_{50} (d) 20°C pF2/10kPa**	**r^2**	**Kinetic model**	**Evaluated on EU level / Reference**
Wisconsin cyclohexane-label	silt loam	6.2	25	---	4	14	---	0.98	first order (linear least squares fit of natural log of concentration vs. sampling interval)	Yes, EFSA (2016)
Wisconsin phenyl-label	silt loam	6.2	25	---	4	12	---	0.97	first order (linear least squares fit of natural log of concentration vs. sampling interval)	Yes, EFSA (2016)
Geometric mean/Median (n=2)							n.a.			
pH-dependency:							n.a.			

[a] No details on test method available

zRMS comments:
Anaerobic soil degradation data for mesotrione are in line with EU agreed endpoints as reported in EFSA Journal 2016;14(3):4419.

8.3.2.3 Nicosulfuron and its metabolites

Studies on the anaerobic degradation rates of nicosulfuron and its metabolites are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of nicosulfuron (EFSA Scientific Report, 2007).

Anaerobic degradation of nicosulfuron was investigated in two studies. Under anaerobic conditions, only little degradation of nicosulfuron occurred; degradation was slower than under aerobic conditions, and no novel breakdown products were identified. Thus, no half-lives were determined for nicosulfuron. Results indicated that anaerobic conditions prevented further degradation of either nicosulfuron or its metabolites (mineralisation max. 0.5% AR at 90 d). The following metabolites were found in the studies: HMUD (max. 17.2 % AR), AUSN (max. 19 % AR), UCSN (max. 6.1 % AR), ASDM (max. 3.3 % AR) and ADMP (4.8 % AR).

zRMS comments:
Anaerobic soil degradation information for nicosulfuron and its metabolites is in line with information provided in EFSA Scientific Report, 2007.

8.4 Field studies (KCP 9.1.1.2)

8.4.1 Soil dissipation testing on a range of representative soils (KCP 9.1.1.2.1)

8.4.1.1 Dicamba and its metabolites

Studies on the field dissipation rates of dicamba and its metabolite DCSA (NOA414746) are considered to be data provided in support of the active substance. Due to the short laboratory aerobic soil DT_{50}/DT_{90} for dicamba and DCSA (worst case 5.5/18.4 d for dicamba and 12/39.8 d for DCSA; n=5 each), field trials are actually not required. However, five field dissipation trials are available for dicamba which were evaluated in the Draft Assessment Report (2007). The results of these studies are given in the tables below and can be considered as data provided in support of the active substance.

Triggering endpoints

Table 8.4-1: Summary of aerobic degradation rates for dicamba - field studies: Triggering endpoints

Dicamba, Field studies – Triggering endpoints								
Soil type [a]	**Location**	**pH [a]**	**Depth (cm)**	**$DissT_{50}$ (d) Actual**	**$DissDT_{90}$ (d) Actual**	**r**	**Kinetic model**	**Evaluated on EU level / Reference**
Loamy sand (bare soil)	Les Barges, Vouvry, CH	7.6	0-30	9	30	n.a.	SFO	Yes, DAR (2007)
Clay loam (cropped)	Ditzingen, DE	6.9	0-40	2.9	10	0.995	Timme and Frehse (1st order function)	Yes, DAR (2007)
Silt loam (cropped)	Hauenebenstein DE	4.8	0-20	11	37	0.974	Timme and Frehse (1st order function)	Yes, DAR (2007)
Silt loam (cropped)	Loshausen, DE	6.7	0-10	1.8	6	0.971	Timme and Frehse (1st order function)	Yes, DAR (2007)
Silt loam (cropped)	Rosenberg, DE	5.9	0-60	1.8	6	0.948	Timme and Frehse (1st order function)	Yes, DAR (2007)
			Maximum (n=5)	11	37			

[a] No details on test method available

Table 8.4-2: Summary of aerobic degradation rates for DCSA (NOA414746) - field studies: Triggering endpoints

DCSA, Field studies – Triggering endpoints									
Soil type [a]	**Location**	**pH [a]**	**Depth (cm)**	**$DissT_{50}$ (d) Actual**	**$DissT_{90}$ (d) Actual**	**f.f.**	**r**	**Kinetic model.**	**Evaluated on EU level / Reference**
Loamy sand (bare soil)	Les Barges, Vouvry, CH	7.6	0-30	7.7	25.5	n.a.	n.a.	SFO	Yes, DAR (2007)
Clay loam (cropped)	Ditzingen, DE	6.9	0-40	10	31	n.a.	0.92	Timme and Frehse (consecutive 1st order)	Yes, DAR (2007)
Silt loam (cropped)	Hauenebenstein DE	4.8	0-20	10	29	n.a.	0.86	Timme and Frehse (consecutive 1st order)	Yes, DAR (2007)
Silt loam (cropped)	Loshausen, DE	6.7	0-10	n.a.	n.a.	n.a.	n.a.	n.a.	Yes, DAR (2007)
Silt loam (cropped)	Rosenberg, DE	5.9	0-60	n.a.	n.a.	n.a.	n.a.	n.a.	Yes, DAR (2007)
			Maximum (n=3)	10	31				

[a] No details on test method available

Modelling endpoints

Modelling endpoints from soil field dissipation studies are not available for dicamba and DCSA.

zRMS comments:

Field degradation data for dicamba and its metabolite are in line with information presented in dicamba monograph (2007).

8.4.1.2 Mesotrione and its metabolites

Studies on the field dissipation rates of mesotrione are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for the EU review of mesotrione (EFSA Journal, 2016). The data reproduced below are given for information however; the data have not been re-evaluated or considered for the risk assessment.

Triggering endpoints

Table 8.4-3: Summary of aerobic degradation rates for mesotrione - field studies: Triggering endpoints

Mesotrione, Field studies – Triggering endpoints									
Soil type [a]	**Location**	**pH [a]**	**Depth (cm)**	**$DissT_{50}$ (d) Actual**	**$DissT_{90}$ (d) Actual**	**Kinetic parameters**	**r^2**	**Kinetic model**	**Evaluated on EU level / Reference**
Clay loam (bare soil)	France	6.0	0-10	7	73	-	0.97	Timme and Frehse (sqrt 1st order - linear regression)	Yes, EFSA (2016)
Clay loam (bare soil)	Italy	6.1	0-10	5	59	-	0.93	Timme and Frehse (sqrt 1st order - linear regression)	Yes, EFSA (2016)
Sandy loam (bare soil)	Italy	8.0	0-10	4	39	-	0.92	Timme and Frehse (sqrt 1st order - linear regression)	Yes, EFSA (2016)
Sandy loam (bare soil)	Germany	6.2	0-10	7	78	-	0.95	Timme and Frehse (sqrt 1st order - linear regression)	Yes, EFSA (2016)

Mesotrione, Field studies – Triggering endpoints									
Soil type [a]	**Location**	**pH [a]**	**Depth (cm)**	**$DissT_{50}$ (d) Actual**	**$DissT_{90}$ (d) Actual**	**Kinetic parameters**	**r^2**	**Kinetic model**	**Evaluated on EU level / Reference**
Loam (bare soil)	Germany	5.8	0-10	/	/	-	/	Timme and Frehse (sqrt 1st order - linear regression)	Yes, EFSA (2016)
Loam (bare soil)	Germany	7.0	0-10	3	36	-	0.96	Timme and Frehse (sqrt 1st order - linear regression)	Yes, EFSA (2016)
Sandy clay loam (bare soil)	Germany	6.9	0-10	3	38	-	0.91	Timme and Frehse (sqrt 1st order - linear regression)	Yes, RAR (2015)
Maximum (n=6)				---	---				

[a] No details on test method available

Modelling endpoints

Modelling endpoints from soil field dissipation studies are not available for mesotrione or its metabolites.

zRMS comments:
Field degradation data for mesotrione are in line with EU agreed endpoints as reported in EFSA Journal 2016;14(3):4419. Information on r^2 was taken from the RAR for mesotrione Vol.3, Section B.8 (RMS-UK, 2015).

8.4.1.3 Nicosulfuron and its metabolites

Studies on the field dissipation rates of nicosulfuron and its metabolites are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for the EU review of nicosulfuron (EFSA Scientific Report, 2007). Due to the short laboratory aerobic soil DT_{50}/DT_{90} (worst case 46.3/154 d; n=7), field trials are actually not required for nicosulfuron. However, four field dissipation trials are available for nicosulfuron which have been submitted for EU review. The endpoints for nicosulfuron resulting from these studies are given in the table below and can be considered as data provided in support of the active substance.

The metabolites ADMP and ASDM were detected in these trials in maximum amounts of approximately 9.8 % AR (trial site 'Lanta') and 63.4 % AR (trials site 'St. Claire'), respectively, but it was not possible to calculate field dissipation rates.

Triggering endpoints

Table 8.4-4: Summary of aerobic degradation rates for nicosulfuron - field studies: Triggering endpoints

Nicosulfuron, Field studies – Triggering endpoints								
Soil type [a]	**Location**	**pH (KCl)**	**Depth (cm)**	**$DissT_{50}$ (d) Actual**	**$DissT_{90}$ (d) Actual**	**r^2**	**Kinetic model**	**Evaluated on EU level / Reference**
Sand (bare soil)	Flackenhorst, Germany	5.7	0-10	20.7	68.8	0.869	1st order non linear	Yes, EFSA (2007)
Silty clay loam (bare soil)	Hünfelden, Germany	7.1	0-10	63.3	210	0.919	1st order non linear	Yes, EFSA (2007)
Loam (bare soil)	St. Claire, North France	5.3	0-5	12	40	0.946	1st order non linear	Yes, EFSA (2007)
Clay loam (bare soil)	Lanta, South France	6.0	0-5	8.9	29.7	0.964	1st order non linear	Yes, EFSA (2007)
			Maximum (n=4)	63.3	210			

[a] No details on test method available

Modelling endpoints

Modelling endpoints from soil field dissipation studies are not available for nicosulfuron.

zRMS comments:

Field degradation data for nicosulfuron are in line with EU agreed endpoints as reported in EFSA Scientific Report, 2007.

8.4.2 Soil accumulation testing (KCP 9.1.1.2.2)

Dicamba

Following the proposed uses and given the rapid degradation observed in laboratory and field studies, only very low or negligible residues of dicamba are expected following harvest or sowing of succeeding crops. Therefore, no soil accumulation testing is required.

zRMS comments:

Accumulation of dicamba and its metabolite in soil is not expected due to lab DT_{50} values <60 days. This is confirmed by results of field dissipation studies, where DT_{50} for dicamba and metabolite DCSA were determined to be in range of 1.8-11 and 7.7-10 days, respectively.

Mesotrione

Following the proposed uses and given the rapid degradation observed in laboratory and field studies, only very low or negligible residues of mesotrione are expected following harvest or sowing of succeeding crops. Therefore, no soil accumulation testing is required.

zRMS comments:

Accumulation of mesotrione and its metabolites in soil is not expected due to lab DT_{50} values <60 days. This is confirmed by results of field dissipation studies, where DT_{50} for mesotrione were determined to be in range of 3-7 days.

Nicosulfuron

Following the proposed uses and given the rapid degradation of nicosulfuron observed in laboratory and field studies, only very low or negligible residues of nicosulfuron are expected following harvest or sowing of succeeding crops. Therefore, no soil accumulation testing is required for nicosulfuron. For metabolites with laboratory DT_{90} exceeding 1 year, accumulation was assessed by calculations (see chapter 8.7).

zRMS comments:

Accumulation of nicosulfuron in soil is not expected due to lab DT_{50} values <60 days. This is confirmed by results of field dissipation studies, where DT_{50} for nicosulfuron were determined to be in range of 8.9-63.3 days with mean of 19.3 days.

Potential for accumulation of metabolites ASDM, AUSN and UCSN in soil was considered in soil exposure calculations due to worst case laboratory soil DT_{50} values >200 days. No accumulation of remaining relevant soil metabolites is expected based on laboratory data.

8.5 Mobility in soil (KCP 9.1.2)

Studies on mobility in soil with the formulation were not performed since it is possible to extrapolate from data obtained with the active substance.

8.5.1 Dicamba and its metabolites

Studies on the mobility of dicamba and its metabolite DCSA (NOA414746) in soil are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of dicamba (EFSA Journal, 2011).

Table 8.5-1: Summary of soil adsorption/desorption for dicamba

Dicamba							
Soil name	**Soil type [a]**	**OC (%)**	**pH[a]**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level/ Reference**
Kenyon	loam	2.2	7.1	0.16	7.27	0.74	Yes, EFSA (2011)
Cook	clay loam	2.9	6.9	0.10	3.45	0.62	Yes, EFSA (2011)
Champaign	silt loam	2.5	5.1	0.53	21.2	0.80	Yes, EFSA (2011)
Winters	sediment loam	1.2	7.3	0.21	17.5	0.8	Yes, EFSA (2011)
Arithmetic mean (n=4)					12.36	0.74	
Geometric mean (n = 4)					9.82	-	
pH-dependency					No		

[a] No details on test method available

Table 8.5-2: Summary of soil adsorption/desorption for DCSA

DCSA							
Soil name	**Soil type [a]**	**OC (%)**	**pH[a]**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
Kenyon	loam	2.2	7.1	31.5	1432	0.72	Yes, EFSA (2011)
Cook	clay loam	2.9	6.9	7.0	242	0.80	Yes, EFSA (2011)
Champaign	silt loam	2.5	5.1	20.3	812	0.93	Yes, EFSA (2011)
Huron	sandy loam	0.4	8.1	2.5	628	0.79	Yes, EFSA (2011)
Winters	sediment loam	1.2	7.3	35.2	2930	0.77	Yes, EFSA (2011)
				Arithmetic mean (n=5)	1209	0.80	
				Geometric mean (n = 5)	877	-	
				pH-dependency	No		

[a] No details on test method available

zRMS comments:

Soil mobility data for dicamba and its metabolite DCSA are in line with EU agreed endpoints as reported in EFSA Journal 2011;9(1):1965. Geometric mean K_{FOC} values calculated by the Applicant are confirmed to be correct.

8.5.2 Mesotrione and its metabolites

Studies on the mobility of mesotrione and its metabolites MNBA, AMBA and SYN546974 in soil are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of mesotrione, (EFSA Journal, 2016).

Table 8.5-3: Summary of soil adsorption/desorption for mesotrione

Mesotrione							
Soil name	**Soil type (USDA)**	**OC (%)**	**pH (H_2O)**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level/ Reference**
Wisborough Green	silty clay loam	2.63	5.1	4.46	171	0.902	Yes, EFSA (2016)
Wisconsin	silt loam	1.58	6.2	0.74	47	0.921	Yes, EFSA (2016)
Toulouse	clay	1.79	6.5	1.25	70	0.915	Yes, EFSA (2016)
Garonne	loam	1.03	7.8	0.15	14	0.971	Yes, EFSA (2016)
Visalia	sandy loam	0.53	8.2	0.13	25	0.959	Yes, EFSA (2016)
Wisconsin	silt loam	1.28	6.1	0.61	48	0.947	Yes, EFSA (2016)
ERTC	sandy loam	0.58	6.4	0.33	57	0.950	Yes, EFSA (2016)
Pickett Piece	clay loam	3.31	7.1	0.97	29	0.932	Yes, EFSA (2016)
Garonne	loam	0.87	7.7	0.16	19	0.954	Yes, EFSA (2016)
Champaign (1:2 ratio)	silty clay loam	3.0 ~~1.7~~	4.4 ~~4.1~~	6.16	354	0.94	Yes, EFSA (2016)
				Arithmetic mean (n=10)	-	0.94	
				worst case	14	-	
				pH-dependency	Yes, sorption decreases as pH increases. $K_{FOC} = 8583.4\ e^{-0.785 * pH}$ $r^2 = 0.8977$ (log)		

Table 8.5-4: Summary of soil adsorption/desorption for MNBA

MNBA							
Soil name	**Soil type (USDA)**	**OC (%)**	**pH (H_2O)**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
Wisborough Green	silty clay loam	2.63	5.1	0.16	6.1	0.32	Yes, EFSA (2016)
Wisconsin	silt loam	1.58	6.2	0.05	3.2	0.61	Yes, EFSA (2016)
Worst case (n=2)					3.2	0.9 [a]	
pH-dependency					No		

[a] FOCUS default

Table 8.5-5: Summary of soil adsorption/desorption for AMBA

AMBA							
Soil name	**Soil type (USDA)**	**OC (%)**	**pH (H_2O)**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
Wisborough Green	silty clay loam	2.63	5.1	3.2	122	0.83	Yes, EFSA (2016)
Wisconsin	silt loam	1.58	6.2	0.71	44.9	0.85	Yes, EFSA (2016)
Toulouse	clay	1.79	6.5	0.91	51.0	0.85	Yes, EFSA (2016)
Garonne	loam	1.03	7.8	0.18	18.1	0.82	Yes, EFSA (2016)
Visalia	sandy loam	0.53	8.2	0.12	23.9	0.90	Yes, EFSA (2016)
Arithmetic mean (n=5)					52.0	0.85	
Worst case (n=5)					18.1	---	
pH-dependency					Yes, sorption decreases as pH increases. $K_{FOC} = 1865\ e^{-0.563\ *\ pH}$ $r^2 = 0.9062$ (log)		

Table 8.5-6: Summary of soil adsorption/desorption for SYN546974

SYN546974							
Soil name	**Soil type [a]**	**OC (%)**	**pH ($CaCl_2$)**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
Gartenacker	loam	1.8	7.2	30.63	1702	0.82	Yes, EFSA (2016)
18 Acres	sandy clay loam	2.2	5.7	220.07	10003	0.96	Yes, EFSA (2016)
Marysville	clay loam	1.6	7.6	432.49	27031	0.96	Yes, EFSA (2016)
Sarpy	silt loam	1.7	6.5	376.10	22124	0.88	Yes, EFSA (2016)
Seven Springs	loamy sand	0.6	5.2	19.56	3260	0.84	Yes, EFSA (2016)
Arithmetic mean (n=5)					13000	0.89	
pH-dependency					No		

[a] No details on test method available

zRMS comments:

Soil mobility data for mesotrione and its metabolites are in general in line with EU agreed endpoints as reported in EFSA Journal 2016;14(3):4419. Some minor corrections regarding %OC and pH in soil Champaign were made in Table 8.5-3 above.

8.5.3 Nicosulfuron and its metabolites

Nicosulfuron

Studies on the mobility of nicosulfuron are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of nicosulfuron (EFSA Scientific Report, 2007). These data are shown in Table 8.5-7.

Additional data were not required as a result of the review. However, in the DAR (2006) the RMS indicated that the adsorption of nicosulfuron might be pH dependant (with greater adsorption under alkaline conditions), whilst EFSA considered the adsorption to be clay dependent. To address this issue, ADAMA Syngenta have been given access to a Cheminova study (***Graham & Strachan, 2008***) in which additional adsorption values are available for nicosulfuron. The resulting endpoints of this study are given in Table 8.5-8, a study summary is provided in Appendix 2 of this document.

On the basis of these data together with the previous four data points in the EFSA conclusion, an organic carbon driven sorption approach (K_{FOC}) was considered as an appropriate option. All data were considered and **an overall geomean of 24.6 mg/L (n=14)**. In Figure 8.5-1, it can be seen that the correlation between k_d and organic carbon has a better visual fit compared to the correlation between k_d and clay. Justification of an organic carbon driven sorption process is based upon a correlation between the two parameters being indicated when the data are analysed using a Kendall's Tau test (German input decision tool v3.3).

As the correlation between clay content and k_d is similar to the correlation between organic carbon and k_d, Syngenta proposes to use organic carbon as the adsorption approach in groundwater modelling which provides a conservative assessment of potential for nicosulfuron and its metabolites (all non-relevant) to leach to groundwater.

Table 8.5-7: Summary of soil adsorption/desorption for nicosulfuron (EFSA Scientific Report, 2007)

Nicosulfuron								
Soil name	**Soil type [a]**	**Clay (%)**	**OC (%)**	**pH (KCl)**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level/ Reference**
Speyer 2.1	loamy sand	7.2	0.48	6.0	0.05	10.0	0.90	Yes, EFSA (2007)
Speyer 2.2	loamy sand	8.8	2.55	6.0	0.20	7.9	0.92	Yes, EFSA (2007)
Itingen II	silt loam	23.4	1.42	7.7	0.73	51.3	0.94	Yes, EFSA (2007)
Les Evouettes	loam	11.3	1.40	6.1	0.19	13.7	1.01	Yes, EFSA (2007)
Arithmetic mean (n=4)						20.7	0.93	
Geometric mean (n = 4)						15.4	-	
pH-dependency						see argumentation above		
Clay dependency						see argumentation above		

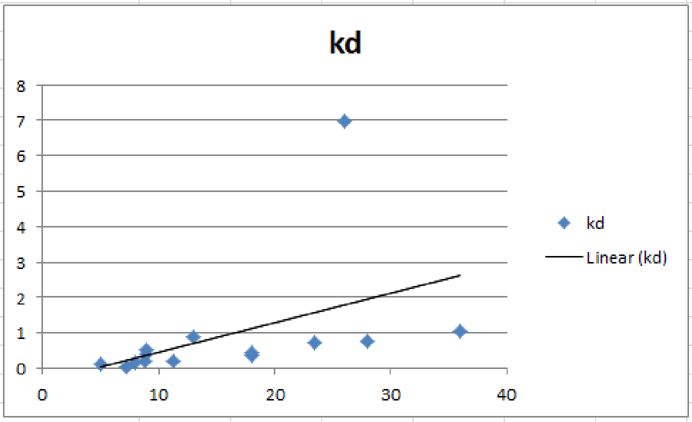
[a] No details on test method available

Table 8.5-8: Summary of soil adsorption/desorption for nicosulfuron (Graham & Strachan, 2008)

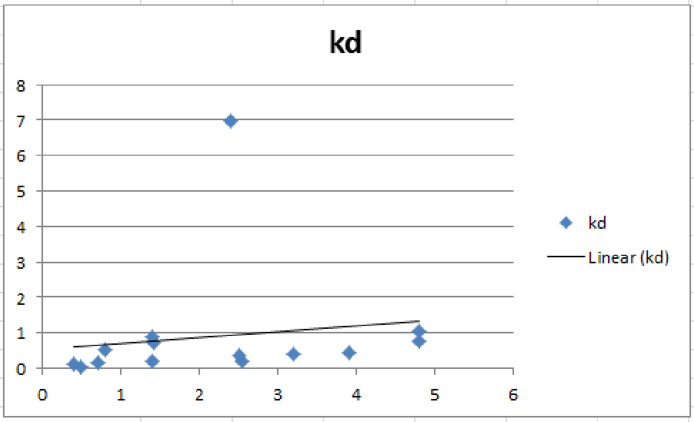
Nicosulfuron								
Soil name	**Soil type (USDA)**	**Clay (%)**	**OC (%)**	**pH ($CaCl_2$)**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
PT103	sandy loam	13	1.4	4.4	0.90	64	1.0019	No, Graham & Strachan, 2008
SK961089	clay loam	28	4.8	7.5	0.78	16	0.9325	No, Graham & Strachan, 2008
SK920191	clay loam	36	4.8	7.3	1.04	22	0.9503	No, Graham & Strachan, 2008
SK104691	silt loam	18	2.5	6.1	0.35	14	0.9158	No, Graham & Strachan, 2008
Matanuska	silt loam	9	3.2	4.7	0.42	13	0.9493	No, Graham & Strachan, 2008
SK566696	loamy sand	9	0.8	4.2	0.52	65	0.9545	No, Graham & Strachan, 2008
SK179618	loam / silt loam	18	3.9	5.0	0.46	12	0.9514	No, Graham & Strachan, 2008
Speyer 2.1	sand	5	0.4	5.1	0.11	27	0.9773	No, Graham & Strachan, 2008
TL 78517229	loamy sand	8	0.7	7.6	0.15	21	0.9554	No, Graham & Strachan, 2008
MCL	silt loam	26	2.4	5.6	6.99	291	0.9705	No, Graham & Strachan, 2008
Arithmetic mean (n=10)						55	0.9559	
Geometric mean (n=10)						29.7	-	
pH-dependency						see argumentation above		
Clay dependency						see argumentation above		

~~**Figure 8.5-1: Nicosulfuron: k_d correlations with clay and organic carbon**~~

Clay content	kd
7.2	0.05
8.8	0.2
23.4	0.73
11.3	0.19
13	0.9
28	0.78
36	1.04
18	0.35
9	0.42
9	0.52
18	0.46
5	0.11
8	0.15
26	6.99



organic carbon	kd
0.48	0.05
2.55	0.2
1.42	0.73
1.4	0.19
1.4	0.9
4.8	0.78
4.8	1.04
2.5	0.35
3.2	0.42
0.8	0.52
3.9	0.46
0.4	0.11
0.7	0.15
2.4	6.99



Metabolites of nicosulfuron

Studies on the mobility of the metabolites HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 in soil are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of nicosulfuron (EFSA Scientific Report, 2007). The data for the metabolites are shown in Table 8.5-9 to Table 8.5-14.

Table 8.5-9: Summary of soil adsorption/desorption for HMUD

HMUD								
Soil name	**Soil type (USDA)**	**Clay (%)**	**OC (%)**	**pH ($CaCl_2$)**	**K_D (mL/g)**	**K_{OC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
Speyer 2.2	sandy loam	8.1	2.3	5.6	0.12	5.07	n.a.	Yes, EFSA (2007)
Mechtildshausen	loam	17.57	1.28	7.37	0.14	10.75	n.a.	Yes, EFSA (2007)
Uffholtz	silt clay loam	34.04	2.67	5.42	0.02	0.88	n.a.	Yes, EFSA (2007)
Sawtry	clay	49.19	2.94	7.23	0.19	6.98	n.a.	Yes, EFSA (2007)
Bretagne 1	silt loam	17.40	2.11	5.7	0.08	2.83	n.a.	Yes, EFSA (2007)
Arithmetic mean (n=5)						5.30	n.a.	
Geometric mean (n=5)						3.9	-	
pH-dependency						No		

Table 8.5-10: Summary of soil adsorption/desorption for AUSN

AUSN								
Soil name	**Soil type (USDA)**	**Clay (%)**	**OC (%)**	**pH (H_2O)**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
Speyer 2.2	loamy sand	5.1	2.29	7.0	0.30	13.0	0.98	Yes, EFSA (2007)
Collombey	loamy sand	6.7	1.17	7.7	0.42	35.6	0.92	Yes, EFSA (2007)
Sisseln	sandy loam	15.9	1.557	7.8	0.61	39.0	0.98	Yes, EFSA (2007)
Vetroz	silt loam	19.4	4.05	7.3	0.90	22.3	0.96	Yes, EFSA (2007)
Arithmetic mean (n=4)						27.5	0.96	
Geometric mean (n=4)						25.2	-	
pH-dependency						Could not be clearly established		

Table 8.5-11: Summary of soil adsorption/desorption for ADMP

ADMP								
Soil name	**Soil type (USDA)**	**Clay (%)**	**OC (%)**	**pH (H_2O)**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
Speyer 2.2	loamy sand	5.1	2.29	7.0	1.17	50.9	0.84	Yes, EFSA (2007)
Collombey	loamy sand	6.7	1.17	7.7	0.71	60.4	0.82	Yes, EFSA (2007)
Sisseln	sandy loam	15.9	1.557	7.8	0.83	52.8	0.92	Yes, EFSA (2007)
Vetroz	silt loam	19.4	4.05	7.3	1.70	42.0	0.91	Yes, EFSA (2007)
Arithmetic mean (n=4)						51.5	0.87	
Geometric mean (n = 4)						51.1	-	
pH-dependency						No		

Table 8.5-12: Summary of soil adsorption/desorption for UCSN

UCSN								
Soil name	**Soil type (USDA)**	**Clay (%)**	**OC (%)**	**pH (H_2O)**	**K_D (mL/g)**	**K_{OC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
Speyer 2.2	loamy sand	5.1	2.29	7.0	0.02	1.1	n.a.	Yes, EFSA (2007)
Collombey	loamy sand	6.7	1.17	7.7	0.07	5.6	n.a.	Yes, EFSA (2007)
Sisseln	sandy loam	15.9	1.557	7.8	0.06	3.5	n.a.	Yes, EFSA (2007)
Vetroz	silt loam	19.4	4.05	7.3	0.09	2.1	n.a.	Yes, EFSA (2007)
Arithmetic mean (n=4)						3.1	-	
Geometric mean (n=4)						2.6	-	
pH-dependency						No		

Table 8.5-13: Summary of soil adsorption/desorption for ASDM

ASDM								
Soil name	**Soil type (USDA)**	**Clay (%)**	**OC (%)**	**pH (H_2O)**	**K_F (mL/g)**	**K_{FOC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
Speyer 2.2	loamy sand	5.1	2.29	7.0	0.05	2.3	0.82	Yes, EFSA (2007)
Collombey	loamy sand	6.7	1.17	7.7	0.08	6.7	0.81	Yes, EFSA (2007)
Sisseln	sandy loam	15.9	1.557	7.8	0.12	7.7	1.07	Yes, EFSA (2007)
Vetroz	silt loam	19.4	4.05	7.3	0.24	6.0	0.94	Yes, EFSA (2007)
Arithmetic mean (n=4)						5.7	0.91	
Geometric mean (n=4)						5.2	-	
pH-dependency						Could not be clearly established		

Table 8.5-14: Summary of soil adsorption/desorption for MU-466

MU-466								
Soil name	**Soil type (USDA)**	**Clay (%)**	**OC (%)**	**pH (H_2O)**	**K_D (mL/g)**	**K_{OC} (mL/g)**	**1/n (-)**	**Evaluated on EU level / Reference**
Speyer 2.2	sandy loam	8.1	2.3	5.6	0.07	3.05	n.a.	Yes, EFSA (2007)
Mechtildshausen	loam	17.57	1.28	7.37	0.14	10.73	n.a.	Yes, EFSA (2007)
Uffholtz	silt clay loam	34.04	2.67	5.42	0.04	1.32	n.a.	Yes, EFSA (2007)
Sawtry	clay	49.19	2.94	7.23	0.43	16.08	n.a.	Yes, EFSA (2007)
Bretagne 1	silt loam	17.40	2.11	5.7	0.17	6.50	n.a.	Yes, EFSA (2007)
Arithmetic mean (n=5)						7.54	-	
Geometric mean (n=5)						5.38	-	
pH-dependency						Could not be clearly established		

zRMS comments:

Soil mobility data for nicosulfuron presented in Table 8.5-7 are in line with EU agreed endpoints reported in EFSA Scientific Report (2007) 120. Geometric mean K_{FOC} value calculated by the Applicant is confirmed to be correct.

Soil mobility data for nicosulfuron metabolites are in line with EU agreed endpoints as reported in EFSA Scientific Report, 2007. Geometric mean K_{FOC}/K_{OC} values calculated by the Applicant are confirmed to be correct.

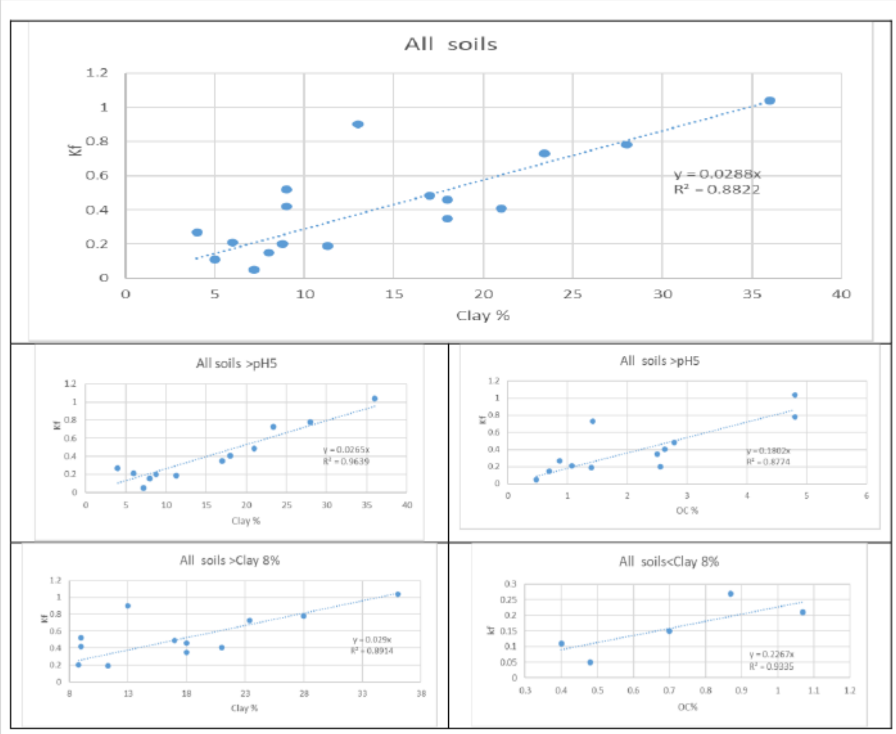
An additional soil adsorption study performed with nicosulfuron in line with OECD 106 has been submitted by the Applicant in support of the zonal evaluation of A18032E. Submission of the new active substance data was justified by uncertainty regarding correlation between sorption of nicosulfuron and soil pH indicated during the EU review. It should be, however, noted, that no data gap in this area has been identified in EFSA Scientific Report (2007) 120 and for this reason data reported in the LoEP are considered to be sufficient. Furthermore, in line with indications of SANCO/10328/2004-rev. 9 (October 2021), new active substance data may be considered at the product authorisation only in exceptional cases. This is also highlighted in the Working Document of the Central Zone in area of Section 8[1]:

> *[...] Note that according to the guidance document on the evaluation of new active substance data post approval (SANCO/10328/2004– rev 8, 24.01.2012) new active substance/metabolite data should not be considered unless they are necessary in order to show a safe use, they are needed as additional uses/crops are applied for authorisation, or they are "adverse" data. [...]*

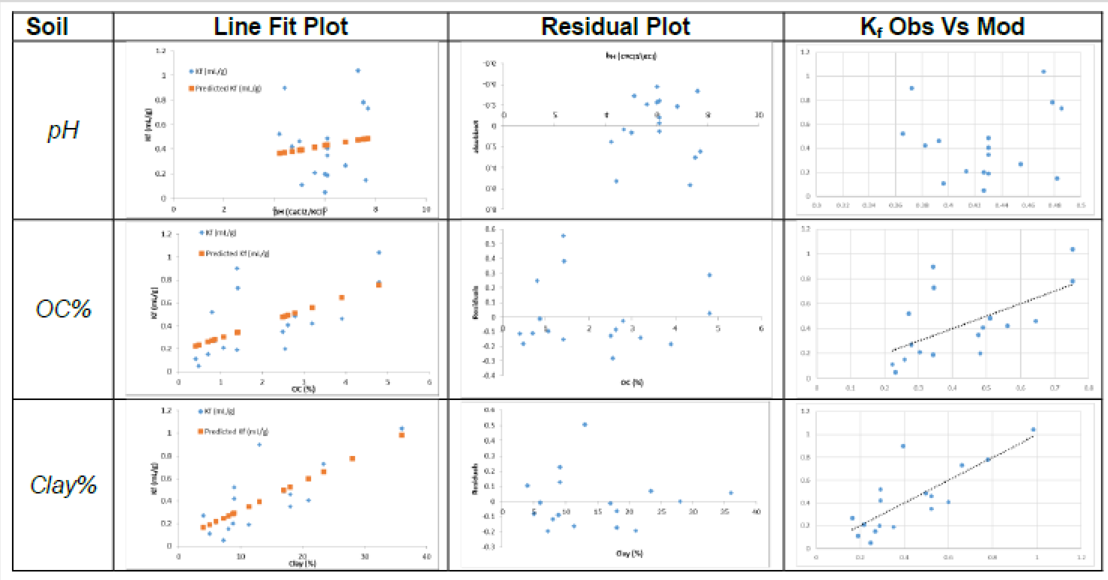
Therefore, before detailed evaluation of the study by Graham & Strachan (2008) was performed, the zRMS checked the results in order to decide if this new study is crucial to demonstrate safe use of A18032E.

The K_{FOC} derived by Graham & Strachan (2008) ranged from 15 to 90 mL/g (K_{FOC} of 307 mL/g determined in soil MCL is considered to be an outlier). Range of K_{FOC} values agreed at the EU level is similar (7.9-51.3 mL/g). When both datasets are combined, the geometric mean K_{FOC} of 24.5 mL/g may be calculated, which is only slightly higher than the currently EU agreed arithmetic mean of 20.7 mL/g, so no significant improvement of the K_{FOC} is observed (from the new data geometric mean should be calculated since new data must be handled in line with current requirements). Furthermore, additional analysis was provided by the Applicant in the position paper by Hardy & Agostini (2021) where dependence between nicosulfuron sorption and various soil parameters was investigated using the whole dataset (EU agreed and new soil sorption data). Plots below were copied from the position paper and represent dependence between soil sorption and pH, organic carbon and clay content.

[1] Working Document of the Central Zone in the Authorisation of Plant Protection Products, Section 8, Environmental Fate and Behaviour, Version 1, rev. 1, June 2018



Plots of significant correlations for nicosulfuron sorption (Kf) with clay and organic carbon



Regression model plots of nicosulfuron sorption (Kf) versus pH, organic carbon and clay content in soil

Regression analysis of nicosulfuron sorption (Kf) with soil properties is shown in table below.

ALL			**Soils >pH5**		
Reg Sing Factor	**R square**	**Sign F Anova**	Reg Sing Factor	**R square**	**Sign F Anova**
Clay	***0.621***	***0.000****	***Clay***	***0.9***	***0.00****
OC	0.363	0.01	***OC***	***0.644***	***0.002****
pH	0.017	0.616	pH	0.353	0.042
Soil >8% Clay			**Soil ≤8% Clay**		
Reg Sing Factor	**R square**	**Sign F Anova**	***Reg Sing Factor***	**R square**	**Sign F Anova**
Clay	***0.471***	***0.014****	Clay	0.087	0.631
OC	0.107	1.099	***OC***	***0.654***	***0.097****
pH	0.076	0.387	pH	0.338	0.304

Performed analyses do not indicate that sorption of nicosulfuron depends on soil pH. However, they confirmed conclusions already taken at the EU level that sorption of nicosulfuron in soil strongly depends on the clay content.

Overall, results of the performed analyses it may be concluded that the new active substance study by Graham & Strachan (2008) does not provide any new information that could change the conclusions already available in EFSA Scientific Report (2007) 120 and the currently EU agreed endpoints are considered sufficient for purposes of the exposure assessment following intended uses of A18032E. The new study is not crucial for this evaluation and should be dealt with during the EU renewal process. Its results are struck through in Table 8.5-8 above.

8.5.4 Column leaching (KCP 9.1.2.1)

Where undertaken, studies on column leaching are considered to be data provided in support of the active substance.

Dicamba

One column leaching study on dicamba with three soils has been reviewed under Council Directive 91/414/EEC. The results of the study indicate a negligible transport of dicamba and DCSA in the soil columns (<0.68% recovered as dicamba and/or DCSA in the leachates).

zRMS comments:

Information on column leaching for dicamba is in line with conclusions derived at the EU level.

Mesotrione

Column leaching studies for mesotrione were neither required nor performed.

zRMS comments:

Information on column leaching for mesotrione is in line with conclusions derived at the EU level.

Nicosulfuron

One column leaching study on nicosulfuron was conducted on three soils. In this study, the percentage of the applied radioactivity in the leachate varied between 62.9-92.2% ~~48-92 %~~ with the vast majority of the leachate corresponding to unchanged nicosulfuron with very low doses ~~(2.2-11.1 % AR)~~ of metabolites ADMP (<0.5%) and DMPU (<1%). In a second study, aged soil column leaching was investigated. The results showed that 55 % of the applied radioactivity was found in the leachate (50 % AR was nicosulfuron). Both studies have been reviewed under Council Directive 91/414/EEC.

zRMS comments:

Information on column leaching of nicosulfuron provided above was amended by the zRMS to comply with information reported in EFSA Scientific Report (2007) 120.

8.5.5 Lysimeter studies (KCP 9.1.2.2)

Where undertaken, lysimeter studies are considered to be data provided in support of the active substance.

Dicamba

One lysimeter study on dicamba has been reviewed under Council Directive 91/414/EEC. The study was performed with two undisturbed soil cores in Germany. Neither dicamba nor the metabolite DCSA was identified in leachates.

zRMS comments:
Information on lysimeter studies for dicamba is in line with conclusions derived at the EU level.

Mesotrione

Lysimeter studies for mesotrione were neither required nor performed.

zRMS comments:
Information on lysimeter studies for mesotrione is in line with conclusions derived at the EU level.

Nicosulfuron

Three lysimeter studies (each with 2 lysimeters) were performed for nicosulfuron in Germany and Switzerland. All studies have been reviewed under Council Directive 91/414/EEC. Maximum annual average concentrations found in the leachates of these trials were 0.17 µg/L for nicosulfuron, 0.03 µg/L for HMUD, 1.62 µg/L for AUSN, 0.94 µg/L for UCSN, 2.70 µg/L for ASDM and 0.14 µg/L for MU-466. Overall these results indicated that nicosulfuron and the metabolites AUSN, UCSN, ASDM and MU-466 have the potential to leach into groundwater at annual average concentrations above 0.1 µg/L.

zRMS comments:
Information on lysimeter studies for nicosulfuron is in line with conclusions derived at the EU level.

8.5.6 Field leaching studies (KCP 9.1.2.3)

Where undertaken, field leaching studies are considered to be data provided in support of the active substance.

Dicamba

Based on the laboratory results, higher tier field leaching studies were not considered necessary for dicamba and none were submitted during the respective EU reviews.

zRMS comments:
Information on field leaching studies of dicamba is in line with conclusions derived at the EU level.

Mesotrione

Field leaching studies for mesotrione were neither required nor performed.

zRMS comments: Information on field leaching studies is in line with conclusions derived at the EU level.

Nicosulfuron

Based on the laboratory results, higher tier field leaching studies were not considered necessary for nicosulfuron and none were submitted during the respective EU reviews.

zRMS comments: Information on field leaching studies of nicosulfuron is in line with conclusions derived at the EU level.

Groundwater monitoring studies

Dicamba

Groundwater monitoring data is not available for dicamba.

Mesotrione

Groundwater monitoring data is not available for mesotrione.

Nicosulfuron

~~A monitoring study on nicosulfuron was conducted by Schneider & Holzer (2014) from April 2010 through March 2014 at 20 locations in maize growing regions of Germany; a short summary of this study is provided in section 8.8.2.3, and a more extensive summary in AppendixA 2.2. A second monitoring study was conducted by Ferrari (2016) from May 2014 to March 2016 in five major representative regions of the key maize growing areas of Northern Italy; a summary of this study is given in Appendix A 2.3. Maximum concentrations found in groundwater in all trials are given below:~~

- ~~Nicosulfuron: < 0.05 µg/L~~
- ~~IN-J0290 (ADMP): < 0.10 µg/L.~~
- ~~IN-64859 (MU466): up to 0.17 µg/L at 1 location in Germany, < 0.10 µg/L at all other locations~~
- ~~IN-GDC42 (UCSN): up to 0.14 µg/L at 1 location in Germany, < 0.10 µg/L at all other locations~~
- ~~IN-37740 (HMUD): < 0.10 µg/L~~
- ~~IN-HYY21 (AUSN): max. 0.81 µg/L~~
- ~~IN-V9367 (ASDM): max 1.71 µg/L~~

zRMS comments: No studies on groundwater monitoring of nicosulfuron and its metabolites were provided during the EU review of nicosulfuron. In support of this submission the Applicant provided two monitoring studies performed in Germany and Italy. Before the evaluation of the studies by the zRMS was initiated, the Applicant was requested to submit analysis of representativeness of the study locations to Polish conditions to justify consideration of results of studies performed in Germany and Italy for purposes of authorisation of the product in Poland, being the only cMS for A18032E. Since no such analysis was provided, the studies were not evaluated by the zRMS and the risk to groundwater from nicosulfuron was addressed in standard FOCUS modelling. In case the Applicant would like to consider results of the groundwater modelling to change conditions of authorisation of A18032E in Poland, analysis indicated above must be provided.

8.6 Degradation in the water/sediment systems (KCP 9.2, KCP 9.2.1, KCP 9.2.2, KCP 9.2.3)

Studies on degradation in water/sediment systems with the formulation were not performed, since it is possible to extrapolate from data obtained with the active substance.

8.6.1 Dicamba and its metabolites

Studies on the mobility of dicamba and its aquatic metabolite DCSA (NOA414746) are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of dicamba (EFSA Journal, 2011).

Table 8.6-1: Summary of degradation in water/sediment of dicamba

Dicamba Distribution (max. water 96.5 % after 0 d, max. sediment 6.0 % after 7 d)										
Water / sediment system	**pH water / sed.**	**$DegT_{50}$ whole syst. (d)**	**$DegT_{90}$ whole syst. (d)**	**Kinetic model**	**$DissT_{50}$ water (d)**	**$DissT_{90}$ water (d)**	**Kinetic model**	**$DissT_{50}$ sed. (d)**	**Kinetic model**	**Evaluated on EU level / Reference**
Rhine	8.3 / 7.6	38	125 [a]	SFO	n.a.	n.a.	n.a.	n.a.	n.a.	Yes, EFSA (2011)
Pond	8.3 / 7.4	45	151 [a]	SFO	n.a.	n.a.	n.a.	n.a.	n.a.	Yes, EFSA (2011)
Geometric mean (n=2)		41	137 [a]							

[a] The values are considered as uncertain.

Table 8.6-2: Summary of degradation in water/sediment of DCSA

DCSA Distribution (max. water 26.9 %, max. sediment 4.5 %, max. whole system 31.4 %, all after 60 d)										
Water / sediment system	**pH water / sed.**	**$DegT_{50}$ whole syst. (d)**	**$DegT_{90}$ whole syst. (d)**	**Kinetic model**	**$DissT_{50}$ water (d)**	**$DissT_{90}$ water (d)**	**Kinetic model**	**$DissT_{50}$ sed. (d)**	**Kinetic model**	**Evaluated on EU level / Reference**
Rhine	8.3 / 7.6	57.7	192 [a]	SFO – linear regression	n.a.	n.a.	n.a.	n.a.	n.a.	Yes, EFSA (2011)
Pond	8.3 / 7.4	58.2	193 [a]	SFO – linear regression	n.a.	n.a.	n.a.	n.a.	n.a.	Yes, EFSA (2011)
Geometric mean (n=2)		57.9	193 [a]							

[a] The values are considered as uncertain.

zRMS comments:

Information on degradation of dicamba and its metabolite DCSA in water/sediment systems is in line with EU agreed endpoints as reported in EFSA Journal 2011;9(1):1965.

8.6.2 Mesotrione and its metabolites

Studies on the mobility of mesotrione and its aquatic metabolites MNBA, AMBA and SYN546974 are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of mesotrione, (EFSA Journal, 2016).

Table 8.6-3: Summary of degradation in water/sediment of mesotrione

Mesotrione Distribution (max. water 98.7 % after 0 d, max. sediment 4.3 % after 1 d)									
Water / sediment system (radiolabel)	**pH water**	**pH sed.**	**$DegT_{50}$ whole syst. (d)**	**$DegT_{90}$ whole syst. (d) [b]**	**$DissT_{50}$ water (d)**	**$DissT_{90}$ water (d) [b]**	**$DissT_{50}$/ $DissT_{90}$ sed. (d)**	**Kinetic model**	**Evaluated on EU level / Reference**
Basing (Phenyl)	7.86	7.86	2.6	8.6	2.5	8.3	n.a.	SFO	Yes, EFSA (2016)
Basing (Cyclohexane)	7.86	7.86	4.2	13.8	4.2	13.8	n.a.	SFO	Yes, EFSA (2016)
Virginia (Phenyl)	7.40	7.40	5.5	18.3	5.3	17.5	n.a.	SFO	Yes, EFSA (2016)
Virginia (Cyclohexane)	7.40	7.40	7.2	24.1	7.0	23.2	n.a.	SFO	Yes, EFSA (2016)
Calwich (Phenyl)	8.4/7.8 (aerobic/ anaerobic)	7.6	6.6	21.8	6.7	22.2	n.a.	SFO	Yes, EFSA (2016)
Swiss (Phenyl)	7.4/7.5 (aerobic / anaerobic)	6.1	11.1	36.7	11.0	37.0	n.a.	SFO	Yes, EFSA (2016)
Geometric mean (n=6) at 20 °C [a]			5.6	18.6	5.5	18.4	-		

[a] normalized using a Q10 of 2.58
[b] values presented in the RAR of mesotrione (2015)

Table 8.6-4: Summary of observed metabolites

Metabolite	**Maximum observed value in water/sediment system**	**Evaluated on EU level / Reference**
MNBA Water / sediment system	Max. in water 7.4 % after 3 d (Virginia Water aerobic system, phenyl radiolabel) Max. in sediment < 1 % (Virginia Water aerobic system, phenyl radiolabel) Max. in total system 7.4 % after 3 d (Virginia Water aerobic system, phenyl radiolabel)	Yes, EFSA (2016)
AMBA Water / sediment system	Max. in water 15.8 % after 46 d (Calwich Abbey aerobic system, phenyl radiolabel) Max. in sediment 8.8 % after 46 d (Calwich Abbey aerobic system, phenyl radiolabel) Max. in total system 24.6 % after 46 d (Calwich Abbey aerobic system, phenyl radiolabel)	Yes, EFSA (2016)
SYN546974 Water / sediment system	Max. in water 9.4 % after 29 d (Swiss Lake aerobic system, phenyl radiolabel) Max. in sediment 25.6 % after 102 d, study end (Swiss Lake aerobic system, phenyl radiolabel) Max. in total system 33 % after 29 d (Swiss Lake aerobic system, phenyl radiolabel)	Yes, EFSA (2016)

zRMS comments:

Information on degradation of mesotrione and its metabolites in water/sediment systems is in line with EU agreed endpoints as reported in EFSA Journal 2016;14(3):4419 and RAR for mesotrione Vol.3, Section B.8 (RMS-UK, 2015).

8.6.3 Nicosulfuron and its metabolites

Studies on the mobility of nicosulfuron and its aquatic metabolites HMUD, AUSN, UCSN and ASDM are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of nicosulfuron (EFSA Scientific Report, 2007).

Table 8.6-5: Summary of degradation in water/sediment of nicosulfuron

Nicosulfuron Distribution (max. water 96.4 % at day 0, max. in sediment 24 % after 14 d)										
Water / sediment system	**pH water / sed.**	**$DegT_{50}$ whole syst. (d)**	**$DegT_{90}$ whole syst. (d)**	**Kinetic model**	**$DissT_{50}$ water (d)**	**$DissT_{90}$ water (d)**	**Kinetic model**	**$DissT_{50}$ sed. (d)**	**Kinetic model**	**Evaluated on EU level / Reference**
River	- / 6.9	49.8	165.4	1st order non-linear	63.9	212.4	1st order non-linear	21.9	1st order non-linear	Yes, DAR (2006)
Pond	- / 6.9	33.2	110.2	1st order non-linear	66.2	219.9	1st order non-linear	8.8	1st order non-linear	Yes, DAR (2006)
Geometric mean (n=2)		40.7	135.0		65.0	216.1		13.9		

Table 8.6-6: Summary of observed metabolites

Metabolite	**Maximum observed value in water/sediment system**	**Evaluated on EU level / Reference**
HMUD Water/sediment system	Max. in water 14.1 % after 62 d (pond) Max. in sediment 5.7 % after 30 d (pond) Max. in whole water / sediment system 19.2 % after 62 d (pond)	Yes, EFSA (2007)
AUSN Water/sediment system	Max. in water 9.1 % after177 d (study end, river) Max. in sediment 2.4 % after 105 d (pond) Max. in whole water / sediment system 11.1 % after177 d (study end, river)	Yes, EFSA (2007)
UCSN Water/sediment system	Max. in water 5.4 % after 177 d (study end, river) Max. in sediment 1.4 % after 105 d (river) Max. in whole water / sediment system 6.5 % after 177 d (study end, river)	Yes, EFSA (2007)
ASDM Water/sediment system	Max. in water 6.9 % after 177 d (study end, river) Max. in sediment 4.4 % after 62 d (pond) Max. in whole water / sediment system 9.4 % after 177 d (study end, river)	Yes, EFSA (2007)

zRMS comments:

Information on degradation of nicosulfuron and its metabolites in water/sediment systems is in line with EU agreed endpoints as reported in EFSA Scientific Report, 2007.

8.7 Predicted Environmental Concentrations in soil (PEC_S) (KCP 9.1.3)

Unless otherwise stated, EU agreed endpoints refer to those stated in the EU review of dicamba (EFSA Journal, 2011), mesotrione (EFSA Journal, 2016) and nicosulfuron (EFSA Scientific Report, 2007).

8.7.1 Justification for new endpoints

EU agreed endpoints were used for PEC_S calculations of dicamba, mesotrione, nicosulfuron and their respective metabolites except for:

- The $DT_{50,soil}$ value of 28.7 days for mesotrione is based on maximum non-normalised DT_{50} values in the table of page 55 in EFSA conclusion (2016). Historically, a $DT_{50,soil}$ of 34.3 days was used to calculate the PEC_S for mesotrione. The differences in PEC_S are trivial when using these two DT_{50} values. The value 28.7 days was used and presented below following the final summary of rate of degradation in soil (aerobic) laboratory studies, page 55, in EFSA conclusion (2016) for consistency reason.

zRMS comments:

Consideration of the soil DT50 of 28.7 days for mesotrione has been agreed by the zRMS. For details, please refer to zRMS comments in point 8.7.2 below.

8.7.2 Active substance(s) and relevant metabolite(s)

The following PEC_S calculations for dicamba including metabolite DCSA (NOA414746), mesotrione including metabolites MNBA and AMBA and nicosulfuron including metabolites HMUD, AUSN, ADMP, UCSN and ASDM have not previously been reviewed. All calculations were performed using the ESCAPE v 2.0 model and example output files are shown in Appendix A 3.1. The application date for all simulations was set to the 1st of May.

Table 8.7-1: Input parameters related to application for PEC_S calculations

Use No.	1 + 2
Crop	Maize
Application rate (g as/ha)	Dicamba: 125 Mesotrione: 60 Nicosulfuron: 40
Number of applications/interval (d)	1 / -
Application timing	Early post-emergence
Crop interception (%)	25
Depth of soil layer (relevant for plateau concentration) (cm)	20 cm (tillage) [a]
Models used for calculation	ESCAPE v2.0

[a] Not relevant for dicamba and mesotrione, default value 5 cm was left in ESCAPE v2.0.

Table 8.7-2: Input parameter for active substance(s) and relevant metabolite(s) for PEC_S calculation

Compound	Molar mass (g/mol)	Formation fraction (-)	DT_{50} (d)	Value in accordance to EU endpoint / Reference
Dicamba	221.0	-	5.5 (max. lab., not normalised)	Yes, EFSA (2011)
DCSA	207.0	0.75	12.0 (max. lab., not normalised)	Yes, EFSA (2011)
Mesotrione	339.3	-	28.7 (max. lab., not normalised)	Yes, EFSA (2016)
MNBA	245	1.0 (from mesotrione)	15.7 (max. lab., not normalised)	Yes, EFSA (2016)
AMBA	215	0.25 (from MNBA)	58.7 (max. lab., not normalised)	Yes, EFSA (2016)
Nicosulfuron	410.4	-	63 (max. field, not normalised)	Yes, EFSA (2007)
HMUD	396.4	0.442 (from nicosulfuron)	30.8 (max. lab., not normalised)	Yes, EFSA (2007)
AUSN	314.3	0.687 (from HMUD)	218.2 (max. lab., not normalised)	Yes, EFSA (2007)
ADMP	155.2	0.214 (from nicosulfuron)	11.3 (max. lab., not normalised)	Yes, EFSA (2007)
UCSN	315.3	0.313 (from HMUD)	307.5 (max. lab., not normalised)	Yes, EFSA (2007)
ASDM	229.2	0.214 (from nicosulfuron)	268.5 (max. lab., not normalised)	Yes, EFSA (2007)

zRMS comments:

The application pattern presented in Table 8.7-1 assumed in soil exposure assessment for dicamba, mesotrione and nicosulfuron is in line with the intended use pattern and it is thus agreed. Crop interception of 25% is in line with FOCUS groundwater guidance (2014).

Input parameters for dicamba, mesotrione and nicosulfuron and its metabolites presented in Table 8.7-2 are in general in line with EU agreed parameters. As calculations were performed using ESCAPE modelling program, the kinetic formation fractions were used and it is in line with EU agreed values considered in the groundwater simulations.

It is noted that for mesotrione the maximum non-normalised laboratory DT_{50} of 34.3 days was recommended by the RMS for calculation of the soil exposure. However, the maximum non-normalised laboratory DT_{50} of 28.7 days is reported in the LoEP. The value considered by the Applicant is agreed by the zRMS as it represents worst case. Furthermore it has to be pointed out that due to lack of potential for accumulation in soil (DT_{50} <60 days for all considered compounds) the soil risk assessment is based on initial PEC_{SOIL} values. In addition to that, the evaluation of the risk of secondary poisoning based on 21 TWA PEC_{SOIL} was not triggered due to log Pow of all compounds being <3. Taking this into account, DT_{50} used in soil exposure has no impact on the risk assessment.

8.7.2.1 Dicamba and its metabolites

Given the DT_{50} and DT_{90} of dicamba are < 100d and 365d respectively, as shown in Section 8.3, calculations to estimate potential accumulation of dicamba and DCSA were not undertaken.

Table 8.7-3: PEC$_S$ for dicamba on maize

PEC$_S$ (mg/kg)		**Maize**	
		1 x 125 g a.s./ha	
		Actual	**TWA**
Initial		0.125	-
Short term	24h	0.110	0.118
	2d	0.097	0.111
	4d	0.076	0.098
Long term	7d	0.052	0.083
	14d	0.021	0.059
	21d	0.009	0.044
	28d	0.004	0.034
	42d	0.001	0.024
	50d	<0.001	0.020
	100d	<0.001	0.010
$PEC_{S,plateau}$		not relevant	-
$PEC_{S,accumulation}$ (= PEC_{act} + $PEC_{S\ plateau}$)		not relevant	-

PEC$_S$ of metabolites

Given the DT_{50} and DT_{90} of DCSA are < 100d and 365d respectively, as shown in Section 8.3, calculations to estimate potential accumulation of DCSA were not undertaken.

Table 8.7-4: PEC$_S$ for DCSA

Use pattern	**PEC$_S$ (mg/kg)**	**Single application**	**Multiple applications**
Maize (125 g a.s/ha)	Initial	0.0688 ~~0.047~~	-

zRMS comments:

The above calculations were independently validated by the zRMS using ESCAPE ver. 2 as a calculation tool, but with metabolite calculated individually using pseudo-application rate (68.84 g/ha) derived with consideration of the parent rate (125 g/ha), molar ratio (0.94) and peak occurrence (58.8%). This approach is commonly agreed among Member States in the Central Zone rather than ESCAPE simulation of parent and metabolite in parallel or sequence with consideration of the kinetic formation fractions.

For the parent the same PEC_{SOIL} values were obtained by the zRMS, but for the PEC_{SOIL} for metabolite was higher and for this reason Table 9.7-4 was amended accordingly.

Neither of compounds has potential for accumulation in soil and for this reason $PEC_{SOIL,INI}$ are relevant for the risk assessment.

8.7.2.2 Mesotrione and its metabolites

Given the DT_{50} and DT_{90} of mesotrione are < 100d and 365d respectively, as shown in Section 8.3, calculations to estimate potential accumulation of mesotrione were not undertaken.

Table 8.7-5: PEC_S for mesotrione on maize

PEC_S (mg/kg)		**Maize**	
		1 x 60 g a.s./ha	
		Actual	**TWA**
Initial		0.060	-
Short term	24h	0.059	0.059
	2d	0.057	0.059
	4d	0.055	0.057
Long term	7d	0.051	0.055
	14d	0.043	0.051
	21d	0.036	0.047
	28d	0.031	0.044
	42d	0.022	0.038
	50d	0.018	0.035
	100d	0.005	0.023
$PEC_{S,plateau}$		not relevant	-
$PEC_{S,accumulation}$ (= PEC_{act} + $PEC_{S\ plateau}$)		not relevant	-

PEC_S of metabolites

Given the DT_{50} and DT_{90} of MNBA and AMBA are < 100d and 365 d respectively, as shown in Section 8.3, calculations to estimate potential accumulation of these metabolites were not undertaken.

Table 8.7-6: PEC_S for MNBA

Use pattern	**PEC_S (mg/kg)**	**Single application**	**Multiple applications**
Maize (60 g a.s/ha)	Initial	0.0248 ~~0.012~~	-

Table 8.7-7: PEC_S for AMBA

Use pattern	**PEC_S (mg/kg)**	**Single application**	**Multiple applications**
Maize (60 g a.s/ha)	Initial	0.004	-

zRMS comments:

The above calculations were independently validated by the zRMS using ESCAPE ver. 2 as a calculation tool, but with metabolites calculated individually using pseudo-application rates derived with consideration of the parent rate, molar ratio and peak occurrence. This approach is commonly agreed among Member States in the Central Zone rather than ESCAPE simulation of parent and metabolite in parallel or sequence with consideration of the kinetic formation fractions.
The input data used for calculation of metabolite rates are given in table below.

Compound	**Molar mass [g/mol]**	**Molar ratio**	**Peak occurrence [%]**	**Parent appl. rate [g/ha]**	**Metabolite app. rate [g/ha]**
Mesotrione	339.3	-		60	-
MNBA	245	0.72	57.2	60	24.78
AMBA	215	0.63	9.7	60	3.69

For the parent the same initial PEC_{SOIL} values were obtained by the zRMS, while short- and long-term PEC_{SOIL} were slightly higher (difference at 3rd-4th decimal place) due to different DT_{50} assumed in calculations (i.e. EU agreed 34.3 days instead of 28.7 days assumed by the Applicant). However, the difference was observed at 3rd-4th decimal place and is considered to be of no importance, especially neither short- nor long-term PEC_{SOIL} are used for purposes of the risk assessment. Taking this into account, no corrections were made in Table 8.7-5.

For metabolite AMBA PEC_{SOIL} calculated by the zRMS was the same as this derived by the Applicant, while for metabolite MNBA the soil exposure obtained by the zRMS was higher and Table 8.7-6 was thus amended accordingly.

Neither of compounds has potential for accumulation in soil and for this reason $PEC_{SOIL,INI}$ are relevant for the risk assessment.

8.7.2.3 Nicosulfuron and its metabolites

Given the DT_{50} and DT_{90} of nicosulfuron are < 100d and 365d respectively, as shown in Section 8.4.1, calculations to estimate potential accumulation of nicosulfuron were not undertaken.

Table 8.7-8: PEC_S for nicosulfuron on maize

PEC_S (mg/kg)		**Maize**	
		1 x 40 g a.s./ha	
		Actual	**TWA**
Initial		0.040	-
Short term	24h	0.040	0.040
	2d	0.039	0.040
	4d	0.038	0.039
Long term	7d	0.037	0.039
	14d	0.034	0.037
	21d	0.032	0.036
	28d	0.029	0.034
	42d	0.025	0.032
	50d	0.023	0.031
	100d	0.013	0.024
$PEC_{S,plateau}$		not relevant	-
$PEC_{S,accumulation}$ (= PEC_{act} + $PEC_{S\ plateau}$)		not relevant	-

PEC_S of metabolites

Given the DT_{50} and DT_{90} of HMUD and ADMP are < 100d and 365d respectively, as shown in Section 8.3.1, calculations to estimate potential accumulation of nicosulfuron were not undertaken. Accumulation was considered for AUSN, UCSN and ASDM only.

Table 8.7-9: PEC_S for HMUD

Use pattern	**PEC_S (mg/kg)**	**Single application**	**Multiple applications**
Maize (40 g a.s/ha)	Initial	0.0056 ~~0.0043~~	-

Table 8.7-10: PEC_S for AUSN

Use pattern	**PEC_S (mg/kg)**	**Single application**	**Multiple applications**
Maize (40 g a.s/ha)	Initial	0.0082 ~~0.0054~~	-
	$PEC_{S,plateau}$ (20 cm) [a] with tillage after year 10	0.0009 ~~0.0010 [a]~~	-
	$PEC_{S,accumulation}$ [a] (= PEC_{act} + $PEC_{S\ plateau}$)	0.0091 ~~0.0064 [a]~~	-

$PEC_{SOIL,PLATEAU}$ calcualted with consideration of tillage depth of 20 cm

~~[a] Calculated as $PEC_{S,plateau}$ for 5 cm (given by ESCAPE) divided by 4.~~

Table 8.7-11: PEC$_S$ for ADMP

Use pattern	PEC$_S$ (mg/kg)	Single application	Multiple applications
Maize (40 g a.s/ha)	Initial	0.0015 ~~0.0004~~	-

Table 8.7-12: PEC$_S$ for UCSN

Use pattern	PEC$_S$ (mg/kg)	Single application	Multiple applications
Maize (40 g a.s/ha)	Initial	0.0034 ~~0.0027~~	-
	$PEC_{S,plateau}$ (20 cm) [a] with tillage after year 10	0.0007 ~~[a]~~	-
	$PEC_{S,accumulation}$ [a] (= PEC_{act} + $PEC_{S\ plateau}$)	0.0040 ~~0.0034 [a]~~	-

$PEC_{SOIL,PLATEAU}$ calcualted with consideration of tillage depth of 20 cm
~~[a] Calculated as $PEC_{S,plateau}$ for 5 cm (given by ESCAPE) divided by 4.~~

Table 8.7-13: PEC$_S$ for ASDM

Use pattern	PEC$_S$ (mg/kg)	Single application	Multiple applications
Maize (40 g a.s/ha)	Initial	0.0142 ~~0.0031~~	-
	$PEC_{S,plateau}$ (20 cm) [a] with tillage after year 10	0.0023 ~~0.0007 [a]~~	-
	$PEC_{S,accumulation}$ [a] (= PEC_{act} + $PEC_{S\ plateau}$)	0.0164 ~~0.0038 [a]~~	-

$PEC_{SOIL,PLATEAU}$ calcualted with consideration of tillage depth of 20 cm
~~[a] Calculated as $PEC_{S,plateau}$ for 5 cm (given by ESCAPE) divided by 4.~~

zRMS comments:

The above calculations were independently validated by the zRMS using ESCAPE ver. 2 as a calculation tool, but with metabolites calculated individually using pseudo-application rates derived with consideration of the parent rate, molar ratio and peak occurrence. This approach is commonly agreed among Member States in the Central Zone rather than ESCAPE simulation of parent and metabolite in parallel or sequence with consideration of the kinetic formation fractions.
The input data used for calculation of metabolite rates are given in table below.

Compound	Molar mass [g/mol]	Molar ratio	Peak occurrence [%]	Parent appl. rate [g/ha]	Metabolite app. rate [g/ha]
Nicosulfuron	410.4	-	-	40	-
HMUD	396.4	0.97	14.4	40	5.56
AUSN	314.3	0.77	26.8	40	8.21
ADMP	155.2	0.38	9.8	40	1.48
USCN	315.3	0.77	11	40	3.38
ASDM	229.2	0.56	634	40	14.16

Since metabolites AUSN, USCN and ASDM are expected to have potential for accumulation in soil, $PEC_{SOIL,PLATEAU}$ was calculated with consideration of the tillage depth of 20 cm, relevant for annual crops such as maize.

For the parent the same initial PEC_{SOIL} values were obtained by the zRMS, but for metabolites higher $PEC_{SOIL,INI}$ as well as $PEC_{SOIL,ACCU}$ (where relevant) were derived and Tables 8.7-9 to 8.7-13 were thus amended accordingly.

Parent compound and metabolites HMUD and ADMP have no potential for accumulation and for this reason $PEC_{SOIL,INI}$ are relevant for the risk assessment performed for these compounds. Metabolites AUSN, USCN and ASDM may accumulate in soil and for these compounds the soil risk assessment should be based on $PEC_{SOIL,ACCU}$.

8.7.2.4 PEC$_S$ of A18032E

Table 8.7-14: PEC$_S$ for A18032E on maize

Use pattern	Preparation	Application rate (g/ha)	Crop interception (%)	PEC$_{S,ini}$ (mg/kg) [a]
Maize, early post-emergence	A18032E	400	25	0.40

[a] Calculated as:

$$PEC_{S,ini}[mg/kg] = \frac{A \times (1 - I)}{z \times bd_{SOIL} \times 10}$$

Where:

A = application rate [g a.s./ha]
$PEC_{S,ini}$ = initial (maximum) concentration in soil [mg a.s./kg soil]
I = Interception [-]
z = soil mixing depth (5 cm) [m]
bd_{SOIL} = bulk density of the soil (1500 kg/m³) [kg soil/m³]

zRMS comments:

PEC_{SOIL} values for the formulated product are agreed by the zRMS and may be used in the risk assessment for soil organisms.

8.8 Predicted Environmental Concentrations in groundwater (PEC_{GW}) (KCP 9.2.4)

Unless otherwise stated, EU agreed endpoints refer to those stated in the EU review of dicamba, mesotrione, nicosulfuron and their respective metabolites.

8.8.1 Justification for new endpoints

In general, EU agreed endpoints were used for PEC_{GW} modelling of dicamba, mesotrione, nicosulfuron and their respective metabolites, except for:

- Sorption parameters for nicosulfuron: During EU review, it was not possible to clearly establish whether the sorption behaviour of nicosulfuron depends on pH. To address this issue, ADAMA ~~Syngenta~~ have been given access to a Cheminova study in which additional adsorption values are available for nicosulfuron (see Section 8.5.2). For modelling, mean values of all available sorption trials (i.e. EU endpoints and Cheminova endpoints) were used.

zRMS comments:

The new sorption data for nicosulfuron were not agreed by the zRMS. For details, please refer to zRMS comments in point 8.5.3.

8.8.2 Active substance(s) and relevant metabolite(s) (KCP 9.2.4.1)

The following PEC_{GW} modelling for dicamba including metabolite DCSA (NOA414746), mesotrione including MNBA and AMBA and nicosulfuron including metabolites HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 has not previously been reviewed and is provided in support of this assessment in Appendix 3 of this document. Calculations for some uses or compounds were done with higher rates than intended in the GAP for this product (see description in the table below).

Table 8.8-1: Input parameters related to application for PEC_{GW} calculations

Use No.	1 + 2
Crop	Maize
Application rate according to GAP (g as/ha)	Dicamba: 125 Mesotrione: 60 Nicosulfuron: 40
Application rate used in calculations (g as/ha) - risk envelope	Dicamba: 176 Mesotrione: 75 Nicosulfuron: 40
Number of applications / interval (d)	1 / -
Application timing	Early post-emergence
Crop interception (%)	25
Frequency of application	annual
Models used for calculation	FOCUS PEARL v4.4.4, FOCUS PELMO v5.5.3, FOCUS MACRO v5.5.4

Table 8.8-2: Application dates used for groundwater risk assessment

Use pattern	Scenario	Application dates (absolute)
Maize, early post-emergence application	Châteaudun	4-May
	Hamburg	8-May
	Kremsmünster	8-May
	Okehampton	28-May
	Piacenza	18-May
	Porto	4-May
	Sevilla	10-Mar
	Thiva	23-Apr

zRMS comments:

The application pattern presented in Table 8.8-1 assumed in simulation for nicosulfuron is in line with the intended use pattern of A18032E. For dicamba and mesotrione exaggerated application rates were considered in Applicants' groundwater modelling (176 and 75 g a.s./ha, respectively) covering the intended rates of these compounds (125 and 60 g a.s./ha, respectively). Crop interception of 25% is in line with FOCUS groundwater guidance (2014).

It is noted that the absolute application dates presented in Table 8.8-2 were set by the Applicant to 3 days after emergence. In the groundwater modelling reports (Ibrahim, 2017 and Nicolaisen, 2017) it was indicated that these application dates were selected based on recommendations of the tool AppDate (v2.0SE). However, according to indications of the most recent version of the tool (ver. 3.06 of June 2019), the application dates for maize at BBCH 12 are proposed to be set to 6-8 days after emergence. Furthermore, according to information available in the RAR for mesotrione Vol.3, Section B.8 (RMS-UK, 2015), the RMS efficacy experts indicated that application dates for maize at BBCH 12 should be set to 14 days after emergence.

In general, the zRMS is of the opinion that BBCH 12 will not be achieved within 3 days after emergence and too early application dates are proposed by the Applicant. Since it is not possible to deduce influence of this deviation on the obtained results, additional groundwater modelling were performed by the zRMS with consideration of the application dates suggested by AppDate ver. 3.06. New absolute application dates for scenarios relevant for Poland are presented in table below.

Use pattern	Scenario	Application dates (absolute)
Maize, early post-emergence application	Châteaudun	9-May
	Hamburg	12-May
	Kremsmünster	12-May

8.8.2.1 Dicamba and its metabolites

Table 8.8-3: Input parameters related to active substance dicamba and DCSA for PEC_{GW} calculations

Compound	Dicamba	DCSA	Value in accordance with EU endpoint / Reference
Molar mass (g/mol)	221	207	Yes, EFSA (2011)
Water solubility (mg/L)	6600 (25°C)	88000 (25°C)	Yes, EFSA (2011)
Saturated vapour pressure (Pa)	0	0	Worst case assumption
DT_{50} in soil (d)	4.0 (geomean, normalisation to 10 kPa or pF2, 20°C, n = 5)	9.4 (geomean, normalisation to 10 kPa or pF2, 20°C, n = 5)	Yes, EFSA (2011)
Transformation rate (1/d) for PELMO	0.1299651 to DCSA 0.0433217 to CO_2	0.0737391 to CO_2	Calculated
K_{FOC} / K_{FOM} (mL/g)	9.82 / 5.7 (geometric mean, n = 4)	877 / 509 (geometric mean, n = 5)	Yes, EFSA (2011)
1/n	0.74 (arithmetic mean, n = 4)	0.8 (arithmetic mean, n = 5)	Yes, EFSA (2011)
Plant uptake factor	0	0	Worst case assumption
Formation fraction	-	0.75 from dicamba	Yes, EFSA (2011)
Washoff factor (1/m)	not relevant	not relevant	-
Foliar DT_{50} (d)	not relevant	not relevant	-

Table 8.8-4: PEC_{GW} for dicamba and DCSA on maize with FOCUS PEARL 4.4.4 (R1520411-1, Real Llanderal, 2015)

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)	
		Dicamba	**DCSA**
Maize 176 g a.s/ha early post-emergence	Châteaudun	<0.001	<0.001
	Hamburg	<0.001	<0.001
	Kremsmünster	<0.001	<0.001
	Okehampton	<0.001	<0.001
	Piacenza	<0.001	<0.001
	Porto	<0.001	<0.001
	Sevilla	<0.001	<0.001
	Thiva	<0.001	<0.001

Table 8.8-5: PEC_{GW} for dicamba and DCSA on maize with FOCUS PELMO 5.5.3 (R1520411-1, Real Llanderal, 2015)

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)	
		Dicamba	**DCSA**
Maize 176 g a.s/ha early post-emergence	Châteaudun	<0.001	<0.001
	Hamburg	<0.001	<0.001
	Kremsmünster	<0.001	<0.001
	Okehampton	<0.001	<0.001
	Piacenza	<0.001	<0.001
	Porto	<0.001	<0.001
	Sevilla	<0.001	<0.001
	Thiva	<0.001	<0.001

Table 8.8-6: PEC_{GW} for dicamba and DCSA on maize with FOCUS MACRO 5.5.4 (R1520411-1, Real Llanderal, 2015)

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)	
		Dicamba	**DCSA**
Maize 176 g a.s/ha early post-emergence	Châteaudun	<0.001	<0.001

Table 8.8-7: Summary of maximum PEC_{GW} across all models for dicamba and DCSA (R1520411-1, Real Llanderal, 2015)

Use pattern	Substance	80th Percentile PEC_{GW} (µg/L)	Model and Version Number	Scenario
Maize 176 g a.s/ha early post-emergence	Dicamba	< 0.001	all models	all scenarios
	DCSA	< 0.001	all models	all scenarios

zRMS comments:

Input parameters presented in Table 8.8-3 and used in the groundwater modelling are in general in line with EU agreed endpoints with following exception:

- For dicamba and metabolite DCSA lower geometric mean K_{FOC} values were considered instead of arithmetic mean values reported in the LoEP. Lower K_{FOC} values represent worst case in terms of the leaching potential and in opinion of the zRMS this deviation is not expected to have significant impact on results of the groundwater modelling. However, in the independent ground water modelling the K_{FOC} of 12.36 and 1209 L/kg for dicamba and metabolite DCSA were used, respectively.

In simulations PUF value of 0 was assumed for all compounds, which is in line with recommendations of the most recent version of the FOCUS Groundwater Guidance (2014).

The performed calculations were independently validated by the zRMS in additional modelling using FOCUS

PEARL 4.4.4, PELMO 5.5.3 and FOCUS MACRO 5.5.4 with the same input parameters except of K_{FOC} values for dicamba and metabolite DCSA (EU agreed arithmetic mean values were used). The application dates suggested by AppDate ver. 3.06 were considered, as discussed in the commenting box in point 8.8.2 above. Results obtained by the zRMS were far below the threshold of 0.1 µg/L confirming Applicants' calculations.

Overall, no unacceptable leaching of dicamba and its metabolite is expected following application of A18032E according to the intended use pattern.

8.8.2.2 Mesotrione and its metabolites

Table 8.8-8: Input parameters related to active substance mesotrione and metabolites MNBA and AMBA for PEC_{GW} calculations

Compound	Mesotrione	MNBA	AMBA	Value in accordance with EU endpoint / Reference
Molar mass (g/mol)	339.3	245	215	Yes, EFSA (2016)
Water solubility (mg/L)	160* (20)	32400** (20)	23000** (20)	* Yes, EFSA (2016) ** Yes, RAR (2015)
Saturated vapour pressure (Pa)	0 (20)	0 (20)	0 (20)	Worst case assumption
DT_{50} in soil (d)	acidic soil [a]: 27.88 neutral soil [b]: 14.2 alkaline soil [c]: 0.54 (pH dependent: linear fit, lab. data, normalisation to pF2, 20 °C, n = 18)	3.4 (geomean, normalisation to pF2, 20°C, n = 10)	14.5 (geomean, normalisation to pF2, 20°C, n = 5)	Yes, EFSA (2016)
Transformation rate (1/d) for PELMO	acidic soil [a]: 0.025 to MNBA 0.000 to CO_2 neutral soil [b]: 0.0488 to MNBA 0.000 to CO_2 alkaline soil [c]: 1.284 to MNBA 0.000 to CO_2	0.051 to AMBA 0.153 to CO_2	0.048 to CO_2	Calculated
Conversion factor for MACRO	-	0.722 referring to mesotrione	0.158 referring to mesotrione [d]	Calculated
K_{FOC} / K_{FOM} (mL/g)	acidic soil [a]: 156.7/90.89 neutral soil [b]: 52.2/30.28 alkaline soil [c]: 17.39/10.09 (pH dependent: log fit, n = 10)	3.2/1.9 (pH independent, worst case, n=2)	acidic soil [a]: 105.6/61.3 neutral soil [b]: 48.02/27.9 alkaline soil [c]: 21.8/12.6 (pH dependent: log fit, n = 5)	Yes, EFSA (2016) K_{FOM} calculated as K_{FOC}/1.724
1/n	0.94 (arithmetic mean, n = 10 to be used for all pH scenarios)	0.9 FOCUS default	0.85 (arithmetic mean, n = 5 to be used for all pH scenarios)	Yes, EFSA (2016)
Plant uptake factor	0	0	0	Worst case assumption
Formation fraction	-	1 from parent	0.25 from MNBA	Yes, EFSA (2016)
Washoff factor (1/m)	not relevant	not relevant	not relevant	-
Foliar DT_{50} (d)	not relevant	not relevant	not relevant	-

[a] Acid value for pH 5.1 (10th percentile of EU maize growing area)
[b] Neutral value for pH 6.5 (50th percentile of EU maize growing area)
[c] Alkaline value for pH 7.9 (90th percentile of EU maize growing area)

Table 8.8-9: PEC$_{GW}$ for mesotrione and metabolites MNBA and AMBA on maize with FOCUS PEARL 4.4.4 (pH 5.1 / 7.9: R1520528-1, Ibrahim, 2017; pH 6.5: R1760183-1, Nicolaisen, 2017)

Use pattern	Scenario	80th Percentile PEC$_{GW}$ at 1 m Soil Depth (µg/L)								
		Mesotrione			MNBA			AMBA		
		pH 5.1	pH 6.5	pH 7.9	pH 5.1	pH 6.5	pH 7.9	pH 5.1	pH 6.5	pH 7.9
Maize, 1 x 75 g a.s./ha early post-emergence	Châteaudun	<0.001	0.003	<0.001	0.003	0.004	<0.001	<0.001	0.001	0.002
	Hamburg	0.002	0.010	<0.001	0.043	0.027	<0.001	0.010	0.011	0.005
	Kremsmünster	0.001	0.007	<0.001	0.009	0.008	<0.001	0.001	0.004	0.007
	Okehampton	0.003	0.016	<0.001	0.021	0.021	0.001	0.003	0.008	0.013
	Piacenza	0.002	0.003	<0.001	0.006	0.002	<0.001	0.001	0.002	0.002
	Porto	<0.001	0.001	<0.001	0.006	0.001	<0.001	<0.001	<0.001	<0.001
	Sevilla	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Thiva	<0.001	<0.001	<0.001	0.001	0.001	<0.001	<0.001	<0.001	<0.001

Table 8.8-10: PEC$_{GW}$ for mesotrione and metabolites MNBA and AMBA on maize with FOCUS PELMO 5.5.3 (pH 5.1 / 7.9: R1520528-1, Ibrahim, 2017; pH 6.5: R1760183-1, Nicolaisen, 2017)

Use pattern	Scenario	80th Percentile PEC$_{GW}$ at 1 m Soil Depth (µg/L)								
		Mesotrione			MNBA			AMBA		
		pH 5.1	pH 6.5	pH 7.9	pH 5.1	pH 6.5	pH 7.9	pH 5.1	pH 6.5	pH 7.9
Maize 75 g a.s./ha early post-emergence	Châteaudun	<0.001	0.001	<0.001	0.002	0.003	<0.001	<0.001	0.001	0.001
	Hamburg	0.002	0.007	<0.001	0.054	0.022	<0.001	0.007	0.007	0.002
	Kremsmünster	0.001	0.006	<0.001	0.013	0.010	<0.001	0.002	0.004	0.007
	Okehampton	0.003	0.018	<0.001	0.033	0.024	0.003	0.003	0.008	0.013
	Piacenza	0.003	0.006	<0.001	0.012	0.005	<0.001	0.002	0.003	0.003
	Porto	0.001	0.001	<0.001	0.013	0.002	<0.001	<0.001	<0.001	<0.001
	Sevilla	<0.001	<0.001	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001
	Thiva	<0.001	<0.001	<0.001	0.002	0.001	<0.001	<0.001	<0.001	<0.001

Table 8.8-11: PEC$_{GW}$ for mesotrione and metabolites MNBA and AMBA on maize with FOCUS MACRO 5.5.4 (pH 5.1 / 7.9: R1520528-1, Ibrahim, 2017; pH 6.5: R1760183-1, Nicolaisen, 2017)

Use pattern	Scenario	80th Percentile PEC$_{GW}$ at 1 m Soil Depth (µg/L)								
		Mesotrione			MNBA			AMBA		
		pH 5.1	pH 6.5	pH 7.9	pH 5.1	pH 6.5	pH 7.9	pH 5.1	pH 6.5	pH 7.9
Maize, 75 g a.s./ha, early post-emergence	Châteaudun	0.001	0.002	<0.001	0.003	0.003	<0.001	<0.001	0.001	0.002

Table 8.8-12: Summary of maximum PEC$_{GW}$ across all models for mesotrione and metabolites MNBA and AMBA (R1520528-1, Ibrahim, 2017; R1760183-1, Nicolaisen, 2017)

Use pattern	Substance	80th Percentile PEC$_{GW}$ (µg/L)	Model and Version Number	Scenario
Maize, 75 g a.s./ha early post-emergence	Mesotrione	0.012 0.018	PELMO v.5.5.3	Hamburg Okehampton, neutral soil
	MNBA	0.083 0.054	PELMO v.5.5.3	Hamburg, acidic soil
	AMBA	0.015 0.013	PEARL v.4.4.4 PELMO v.5.5.3	Hamburg Okehampton, neutral alkaline soil

zRMS comments:

All input parameters considered in the groundwater modelling for mesotrione and its metabolites were EU agreed values, so no additional information justifying used endpoints is deemed necessary and information presented in Table 8.8-8 is considered accurate and sufficient. It is noted that in the groundwater exposure section in EFSA Journal 2016;14(3):4419 soil DT_{50} of 5.4 days was indicated for alkaline soils. This, however, seems to be the typing error, as DT_{50} of 0.54 days is indicated in the LoEP for surface water modelling and this value was also calculated in the RAR for mesotrione Vol.3, Section B.8 (RMS-UK, 2015, page 97).

The zRMS had some concerns with regard to application dates assumed by the Applicant, as emergence +3 days seems to be too early to achieve BBCH 12. For this reason additional simulations were performed by the zRMS with consideration of relative application dates set to 14 days after emergence, in line with RMS proposal in the mesotrione RAR. Modelling was performed using PEARL 4.4.4 and PELMO 5.5.3. No simulations were performed using MACRO as from the above tables it is obvious that calculations with PEARL and PELMO give worst case results. Additional simulations were performed only for scenarios relevant for Poland (Châteaudun, Hamburg and Kremsmünster) since Poland is the only cMS indicated in the GAP table.

In simulations PUF value of 0 was assumed for all compounds, which is in line with recommendations of the most recent version of the FOCUS Groundwater Guidance (2014).

zRMS results are given in the below tables.

PEC_{GW} for mesotrione and metabolites MNBA and AMBA on maize with FOCUS PEARL 4.4.4 (pH 5.1 / 6.5 / 7.9), zRMS calculations

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)								
		Mesotrione			MNBA			AMBA		
		pH 5.1	pH 6.5	pH 7.9	pH 5.1	pH 6.5	pH 7.9	pH 5.1	pH 6.5	pH 7.9
Maize, 1 x 75 g a.s/ha early post-emergence	Châteaudun	<0.001	0.003	<0.001	0.003	0.004	<0.001	<0.001	<0.001	<0.001
	Hamburg	0.003	0.011	<0.001	0.048	0.034	0.001	0.011	0.015	0.009
	Kremsmünster	0.001	0.008	<0.001	0.009	0.008	<0.001	0.001	0.005	0.006

PEC_{GW} for mesotrione and metabolites MNBA and AMBA on maize with FOCUS PELMO 5.5.3 (pH 5.1 / 6.5 / 7.9), zRMS calculations

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)								
		Mesotrione			MNBA			AMBA		
		pH 5.1	pH 6.5	pH 7.9	pH 5.1	pH 6.5	pH 7.9	pH 5.1	pH 6.5	pH 7.9
Maize, 1 x 75 g a.s/ha early post-emergence	Châteaudun	<0.001	0.002	<0.001	0.004	0.004	<0.001	<0.001	0.001	0.001
	Hamburg	0.004	0.012	<0.001	0.083	0.036	<0.001	0.010	0.011	0.005
	Kremsmünster	0.002	0.010	<0.001	0.020	0.017	0.001	0.002	0.007	0.011

Calculations performed by the zRMS for later application dates resulted with higher groundwater exposure comparing to the Applicants' calculations. Nevertheless, calculated PEC_{GW} values were all below the threshold concentration of 0.1 µg/L for application rates of 75 g a.s./ha.

Since results of the groundwater modelling performed by the zRMS are higher, results of Applicants' calculations presented in Tables 8.8-9 and 8.8-10 above were struck through as not agreed. Results of MACRO simulations were retained as illustrative data confirming that modelling performed using PEARL and PELMO gives worst case results. Table 8.8-12 was amended accordingly to provide maximum PEC_{GW} values as calculated by the zRMS.

Overall, no unacceptable leaching of mesotrione and its metabolites is expected following application of A18032E according to the intended use pattern.

8.8.2.3 Nicosulfuron and its metabolites

Table 8.8-13: Input parameters related to active substance nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 for PEC_{GW} calculations

Compound	Nicosulfuron	HMUD	AUSN	ADMP	UCSN	ASDM	MU-466	Value in accordance with EU end-point / Reference
Molar mass (g/mol)	410.4	396.4	314.3	155.2	315.3	229.2	215.1	Yes, EFSA (2007)
Water solubility (mg/L)	9500 (25°C)	9500 par.value	9500 par.value	9500 par.value	9500 par. value	9500 par. value	9500 par. value	Yes, EFSA (2007)
Saturated vapour pressure (Pa)	0 (20°C)	0 (20°C)	0 (20°C)	0 (20°C)	0 (20°C)	0 (20°C)	0 (20°C)	Worst case assumption
DT_{50} in soil (d)	16.4 (geomean, n= 7) [a]	23.8 (geomean, n = 2) [a]	192.3 (maxi-mum, n = 3) [a]	4.5 (geomean, n = 3) [a]	271.0 (maxi-mum, n = 3) [a]	236.6 (maxi-mum, n = 3) [a]	75.5 (maxi-mum, n = 3) [a]	Yes, EFSA (2007)
Transformation rate (1/d) for PELMO	0.018681 to HMUD, 0.009045 to ASDM, 0.009045 to ADMP, 0.005494 to CO_2	0.020008 to AUSN, 0.009116 to UCSN	0.0036045 to CO_2	0.15403 to CO_2	0.0025577 to CO_2	0.000826 to MU-466, 0.002103 to CO_2	0.0091808 to CO_2	calculated
K_{FOC} (mL/g)	Depth dependent Kf values reported in EFSA (2007) ~~24.6 (geomean, n= 14)*~~	3.9 (geomean, n = 5) **	13[b,c] / 22.3[d] / 37.3[e] **	51.1 (geomean, n = 4)**	2.6 (geomean, n = 4)**	2.3[b,c] / 6.0[d] / 7.2[e] **	3.6[b] / 7.5[c,d] / 13.4[e] **	~~* EFSA (2007) + Graham & Strachan, 2008~~ ** Yes, EFSA (2007) (for depth dependent Kf valies, refer to zRMS comment below)
1/n	0.93 ** ~~0.952 (arithmetic mean, n = 14)*~~	0.9 (default) **	0.98[b,c] / 0.96[d] / 0.95[e] **	0.87 (arithmetic mean, n = 4)**	0.9 (default) **	0.82[b,c] / 0.94[d,e] **	0.9 (default) **	
Plant uptake factor	0	0	0	0	0	0	0	Worst case
Formation fraction	-	0.442 from parent	0.687 from HMUD	0.214 from parent	0.313 from HMUD	0.214 from parent	0.282 from ASDM	Yes, EFSA (2007)
Conversion factor for MACRO	-	0.427	0.545	0.081	0.249	0.120	0.265	Calculated
Washoff factor (1/m)	not relevant							-
Foliar DT_{50} (d)	not relevant							-

a Laboratory data, normalisation to 10 kPa or pF2, 20°C with Q_{10} of 2.2.
b pH dependent sorption; value specific for Hamburg, Okehampton and Porto scenarios
c pH dependent sorption; value specific for Piacenza scenario
d pH dependent sorption; value specific for Sevilla scenario
e pH dependent sorption; value specific for Châteaudun, Kremsmünster and Thiva scenarios

Table 8.8-14: PEC$_{GW}$ for nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 on maize with FOCUS PEARL 4.4.4 (CEA.1865, Carnall, 2017) – annual application

Use pattern	Scenario	80th Percentile PEC$_{GW}$ at 1 m Soil Depth (µg/L)						
		Nicosulfuron	HMUD	AUSN	ADMP	UCSN	ASDM	MU-466
Maize 40 g a.s/ha early post-emergence	Châteaudun	0.047	0.512	1.57	<0.001	1.16	1.26	0.060
	Hamburg	0.116	1.23	2.66	0.001	1.41	1.70	0.074
	Kremsmünster	0.075	0.547	1.32	0.001	0.801	0.894	0.036
	Okehampton	0.136	0.637	1.24	0.001	0.651	0.789	0.033
	Piacenza	0.023	0.280	2.08	<0.001	1.16	1.15	0.078
	Porto	0.010	0.178	1.01	<0.001	0.488	0.529	0.031
	Sevilla	0.001	0.043	1.53	<0.001	1.36	1.20	0.101
	Thiva	0.013	0.262	2.99	<0.001	2.27	2.13	0.149

Table 8.8-15: PEC$_{GW}$ for nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 on maize with FOCUS PELMO 5.5.3 (CEA.1865, Carnall, 2017) – annual application

Use pattern	Scenario	80th Percentile PEC$_{GW}$ at 1 m Soil Depth (µg/L)						
		Nicosulfuron	HMUD	AUSN	ADMP	UCSN	ASDM	MU-466
Maize 40 g a.s/ha early post-emergence	Châteaudun	0.028	0.393	1.70	<0.001	1.32	1.31	0.070
	Hamburg	0.094	0.871	2.16	0.001	1.13	1.31	0.061
	Kremsmünster	0.083	0.611	1.44	0.001	0.885	0.992	0.043
	Okehampton	0.133	0.613	1.21	0.001	0.666	0.777	0.034
	Piacenza	0.041	0.342	1.32	0.001	0.740	0.791	0.039
	Porto	0.011	0.159	1.06	<0.001	0.515	0.551	0.035
	Sevilla	0.001	0.051	1.34	<0.001	1.08	0.987	0.082
	Thiva	0.009	0.146	2.20	<0.001	1.69	1.58	0.113

Table 8.8-16: PEC$_{GW}$ for nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 on maize with FOCUS MACRO 5.5.4 (CEA.1865, Carnall, 2017)

Use pattern	Scenario	Frequency	80th Percentile PEC$_{GW}$ at 1 m Soil Depth (µg/L)						
			Nicosulfuron	HMUD	AUSN	ADMP	UCSN	ASDM	MU-466
Maize 40 g a.s/ha, early post-emergence	Châteaudun	Annual	0.023	0.261	1.33	<0.001	1.08	1.06	0.056

Table 8.8-17: Summary of maximum PEC$_{GW}$ across all models for nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 (CEA.1865, Carnall, 2017)

Use pattern	Substance	80th Percentile PEC$_{GW}$ (µg/L)	Model and Version Number	Scenario
Annual application				
Maize 40 g a.s/ha early post-emergence	Nicosulfuron	0.136	FOCUS PEARL 4.4.4	Okehampton
	HMUD	1.23	FOCUS PEARL 4.4.4	Hamburg
	AUSN	2.99	FOCUS PEARL 4.4.4	Thiva
	ADMP	0.001	FOCUS PEARL 4.4.4	Hamburg, Kremsmünster / Okehampton
	UCSN	2.27	FOCUS PEARL 4.4.4	Thiva
	ASDM	2.13	FOCUS PEARL 4.4.4	Thiva
	MU-466	0.149	FOCUS PEARL 4.4.4	Thiva

zRMS comments:

Input parameters for nicosulfuron metabolites presented in Table 8.8-13 are in line with EU agreed values

Input parameters for nicosulfuron presented in Table 8.8-13 are in general in line with EU agreed values. However, the Applicant considered geometric mean K_{FOC} value derived on the basis of the EU agreed values and results of the new soil adsorption study with nicosulfuron (Graham & Strachan, 2008). Since the new study confirmed conclusions already derived at the EU level on the basis of the standard dataset and no new information that would be useful to refine the groundwater exposure assessment performed for nicosulfuron was obtained from the study by Graham & Strachan (2008), the results of the study were rejected by the zRMS. For more detailed discussion, please refer to zRMS comments in point 9.5.3 above.

Since consideration of the geometric mean K_{FOC} in groundwater exposure assessment for nicosulfuron was not agreed by the zRMS, new modelling was performed by the zRMS using the EU agreed sorption data presented in table below. Remaining parameters were the same as these indicated in Table 8.8-13. Application dates suggested by AppDate ver. 3.06 were considered, as discussed in point 8.8.2 above. Simulations were performed only for scenarios relevant for Poland (Châteaudun, Hamburg and Kremsmünster) since Poland is the only cMS indicated in the GAP table.

Adsorption data for nicosulfuron used in the FOCUS groundwater modelling

Scenario	Horizon	Depth (cm)	Clay content (%)	$K_{F\ CLAY}$ Nicosulfuron (mL/g)	Degradation transformation factor
Châteaudun	1	0-25	30	0.78	1.0
	2	25-50	31	0.81	0.5
	3	50-60	25	0.65	0.5
	4	60-100	26	0.68	0.3
	5	100-120	26	0.68	0.0
	6	120-190	24	0.62	0.0
	7	190-260	31	0.81	0.0
Hamburg	1	0-30	7.2	0.19	1.0
	2	30-60	6.7	0.17	0.5
	3	60-75	0.9	0.02	0.3
	4	75-90	0.0	0.00	0.3
	5	90-100	0.0	0.00	0.3
	6	100-200	0.0	0.00	0.0
Kremsmünster	1	0-30	14	0.36	1.0
	2	30-50	25	0.65	0.5
	3	50-60	27	0.70	0.5
	4	60-100	27	0.70	0.3
	5	100-200	27	0.70	0.0

Results of zRMS calculations are presented below. PEC_{GW} values above 0.1 µg/L are highlighted in bold.

PEC_{GW} for nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 on maize with FOCUS PELMO 5.5.3, annual application

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)						
		Nicosulfuron	HMUD	AUSN	ADMP	UCSN	ASDM	MU-466
Maize 40 g a.s/ha early post-emergence	Châteaudun	<0.001	0.058	**1.431**	<0.001	**0.978**	**0.882**	0.082
	Hamburg	**0.149**	**0.451**	**2.061**	0.001	**1.101**	**1.198**	0.068
	Kremsmünster	0.003	**0.227**	**1.552**	0.000	**0.846**	**0.880**	0.059

PEC_{GW} for nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 on maize with FOCUS PELMO 5.5.3, biennial application

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)						
		Nicosulfuron	HMUD	AUSN	ADMP	UCSN	ASDM	MU-466
Maize 40 g a.s/ha early post-emergence	Châteaudun	<0.001	0.029	**0.807**	<0.001	**0.527**	**0.471**	0.044
	Hamburg	0.090	**0.210**	**0.987**	<0.001	**0.519**	**0.555**	0.031
	Kremsmünster	0.001	**0.116**	**0.798**	<0.001	**0.424**	**0.439**	0.030

PEC_{GW} for nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 on maize with FOCUS PELMO 5.5.3, triennial application, zRMS calculations

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)						
		Nicosulfuron	**HMUD**	**AUSN**	**ADMP**	**UCSN**	**ASDM**	**MU-466**
Maize 40 g a.s/ha early post-emergence	Châteaudun	<0.001	0.020	**0.494**	<0.001	**0.310**	**0.303**	0.026
	Hamburg	0.059	**0.150**	**0.634**	<0.001	**0.356**	**0.374**	0.023
	Kremsmünster	0.001	0.080	**0.546**	<0.001	**0.319**	**0.318**	0.023

PEC_{GW} for nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 on maize with FOCUS PEARL 4.4.4, annual application

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)						
		Nicosulfuron	**HMUD**	**AUSN**	**ADMP**	**UCSN**	**ASDM**	**MU-466**
Maize 40 g a.s/ha early post-emergence	Châteaudun	<0.001	**0.278**	**2.006**	<0.001	**1.183**	**1.228**	0.076
	Hamburg	**0.280**	**0.847**	**2.485**	0.003	**1.407**	**1.596**	0.075
	Kremsmünster	0.004	**0.426**	**1.493**	<0.001	**0.795**	**0.878**	0.046

PEC_{GW} for nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 on maize with FOCUS PEARL 4.4.4, biennial application

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)						
		Nicosulfuron	**HMUD**	**AUSN**	**ADMP**	**UCSN**	**ASDM**	**MU-466**
Maize 40 g a.s/ha early post-emergence	Châteaudun	0.000	**0.154**	**1.034**	<0.001	**0.553**	**0.583**	0.035
	Hamburg	**0.147**	**0.406**	**1.045**	0.001	**0.665**	**0.721**	0.036
	Kremsmünster	0.002	**0.234**	**0.770**	<0.001	**0.401**	**0.452**	0.023

PEC_{GW} for nicosulfuron, HMUD, AUSN, ADMP, UCSN, ASDM and MU-466 on maize with FOCUS PEARL 4.4.4, triennial application

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)						
		Nicosulfuron	**HMUD**	**AUSN**	**ADMP**	**UCSN**	**ASDM**	**MU-466**
Maize 40 g a.s/ha early post-emergence	Châteaudun	<0.001	**0.104**	**0.656**	<0.001	**0.376**	**0.396**	0.024
	Hamburg	0.091	**0.256**	**0.667**	0.001	**0.397**	**0.426**	0.022
	Kremsmünster	0.002	**0.160**	**0.553**	<0.001	**0.310**	**0.334**	0.018

Regardless of the modelling program used, unacceptable leaching of nicosulfuron was observed for annual applications. For biennial application PEC_{GW} for the parent calculated using PELMO 5.5.3 is below the threshold concentration of 0.1 µg/L, but simulations performed using PEARL 4.4. still indicate potentially unacceptable leaching. No unacceptable leaching is predicted by both models, when applications performed every third year are assumed.

Predicted concentrations of metabolites ADMP and MU-466 are below threshold of 0.1 µg/L in all scenarios and both models for annual application of nicosulfuron.

Concentrations of metabolites HMUD, AUSN, UCSN and ASDM are >0.1 µg/L regardless of the frequency of applications. Nevertheless, none of the metabolites is toxicologically relevant and for triennial applications their predicted concentration in groundwater is <0.75 µg/L and for this reason no further assessment is necessary.

The Applicant submitted additional groundwater modelling performed using FOCUS PELMO 6.6.4 and FOCUS PEARL 5.5.5 (Hardy & Agostini, 2021). It is, however, noted that these versions of the models are applicable for submissions provided from 1st of January 2022, while submission for A18032E was provided in 2021 and for this reason respective calculations should be performed using FOCUS PELMO 5.5.3 and FOCUS PEARL 4.4.4. It is further noted that in this additional modelling the results of the study by Graham & Strachan (2008) were

considered, while in opinion of the zRMS these new active substance data should not be taken into account in zonal evaluations since they do not provide any additional information enabling refinement of the groundwater exposure to nicosulfuron.
Initial review of the modelling performed using new version of the models demonstrated also that for modelling performed with FOCUS PEARL 5.5.5 the depth dependent sorption based on clay content was not considered and instead the maximum calculated Kf value based on geomean KFOC corrected for OC content was used. It seems, therefore, that the dependence between sorption and clay content was ignored in modelling performed with FOCUS PEARL 5.5.5.
Taking all this into account, the new modelling provided by the Applicant is considered not acceptable.

Overall, no unacceptable leaching of nicosulfuron and its metabolites is expected following application of A18032E according to the intended use pattern provided that in order to protect groundwater this or any other product containing nicosulfuron will be applied on the same field not more than once every third year.

~~**Higher Tier evaluation of groundwater leaching (environmental monitoring) for nicosulfuron**~~

~~A monitoring study on nicosulfuron was conducted by Schneider & Holzer (2014); a summary of this study is provided in Appendix A 2.2. Analysis of groundwater samples collected from April 2010 through March 2014 at 20 locations in maize growing regions of Germany following application of the product ACCENT® (750 g nicosulfuron/kg WG formulation) or KELVIN® (40 g nicosulfuron/L OD formulation) in the upgradient area of these monitoring points resulted in residues below the Limit of Quantitation of 0.05 µg/L (< LOQ) for nicosulfuron and metabolites IN-33740 (HMUD) and IN-J0920 (ADMP) (Schneider & Holzer, 2014). Residues for IN-GDC42 (UCSN), IN-64859 (MU466), IN-V9367 (ASDM) and IN-HYY21 (AUSN) were < LOQ at 15 locations. IN-64859 (MU466) was observed at 1 location with concentrations that ranged from < LOQ to 0.17 µg/L. IN-GDC42 (UCSN) was observed at 3 locations with concentrations that ranged from < LOQ to 0.14 µg/L. IN-V9367 (ASDM) was observed at 5 locations at concentrations which ranged from < LOQ to 1.71 µg/L. IN-HYY21 (AUSN) was observed at 4 locations at concentrations which ranged from < LOQ to 0.81 µg/L.~~
~~Since the metabolites found at > 0.1 µg/L, *i.e.*, IN-V9367 (ASDM), IN-HYY21 (AUSN), IN-GDC42 (UCSN) and IN-64859 (MU466), are toxicologically non-relevant, the use of products containing nicosulfuron is not likely to pose a threat to groundwater in Germany if the product is applied according to the label recommendations.~~
~~In addition, more recently, a two-year monitoring study on nicosulfuron was carried out by Ferrari (2016); see summary in Appendix A 2.3. Groundwater was sampled from established monitoring wells in Italy, in different regions typical of agricultural use of the active ingredient nicosulfuron. A groundwater monitoring study was originally requested as a condition of the first registration for DPX-MTH88 (Kelvin Duo – Reg. N. 15422) and the re-registration of the following products containing nicosulfuron straight (Accent – Reg. N. 13216, Victus – Reg. N. 13814) and nicosulfuron in mixture with rimsulfuron (Titus Mais Extra – Reg. N. 13186) in Italy. The results of the monitoring study showed that the concentrations for nicosulfuron, IN-37740 (HMUD), IN-J0290 (ADMP), IN-GDC42 (UCSN) and IN-64859 (MU466) were all below 0.10 µg/L, and the non-relevant metabolites IN-HYY21 (AUSN) and IN-V9367 (ASDM) had maximum concentration of 0.133 µg/L which is below the threshold of 0.75 µg/L and 10 µg/L.~~

zRMS comments:

In support of this submission the Applicant provided two monitoring studies performed in Germany and Italy. However, before the evaluation of the studies by the zRMS was initiated, the Applicant was requested to submit analysis of representativeness of the study locations to Polish conditions to justify consideration of results of studies performed in Germany and Italy for purposes of authorisation of the product in Poland, being the only cMS for A18032E. Since no such analysis was provided, the studies were not evaluated by the zRMS and the risk to groundwater from nicosulfuron was addressed in standard FOCUS modelling (see commenting box above).
In case the Applicant would like to consider results of the groundwater modelling to change conditions of authorisation of A18032E in Poland, analysis indicated above must be provided.

8.9 Predicted Environmental Concentrations in surface water (PEC_{SW}) and sediment (PEC_{SED}) (KCP 9.2.5)

Unless otherwise stated, EU agreed endpoints refer to those stated in the EU review of dicamba, mesotrione, nicosulfuron and their respective metabolites except for:

- The value for maximum occurrence of MNBA in water was 7.4% based on the summary table in page 65 of EFSA conclusion (2016). Historically, 7.9% was used in simulating metabolites surface water concentrations at STEP 1/2. The differences in PEC_{SW} are trivial when using these two maximum occurrence values. The value 7.4% was used and presented below following the final summary of water / sediment study, page 65, in EFSA conclusion (2016) for consistency reason.

8.9.1 Justification for new endpoints

EU agreed endpoints were used for $PEC_{SW/SED}$ modelling of dicamba, mesotrione, nicosulfuron and their respective metabolites except for:

- The value for maximum occurrence of MNBA in water was 7.4% based on the summary table in page 65 of EFSA conclusion (2016). Historically, 7.9% was used in simulating metabolites surface water concentrations at STEP 1/2. The differences in PEC_{SW} are trivial when using these two maximum occurrence values. The value 7.4% was used and presented below following the final summary of water / sediment study, page 65, in EFSA conclusion (2016) for consistency reason.

zRMS comments:

It is noted that the maximum occurrence of mesotrione metabolite MNBA in water of 7.4% is correct. Occurrence at 7.9% is relevant for the total system and it seems that in the summary table on page 65 of EFSA Journal 2016;14(3):4419 a typing error was made. Nevertheless, summary of input parameters used for calculation of surface water exposure to MNBA indicates that occurrence of 7.9% for the total system was taken into account (see EFSA Journal 2016;14(3):4419, page 80). Nevertheless, in opinion of the zRMS the difference between 7.4 and 7.9% is only marginal and will have no significant impact on obtained results.

8.9.2 Active substance(s), relevant metabolite(s) and the formulation (KCP 9.2.5)

The following PEC_{SW} / PEC_{SED} modelling for dicamba including metabolite DCSA (NOA414746), mesotrione including metabolites MNBA, AMBA and SYN546974, and nicosulfuron including metabolites HMUD, AUSN, ADMP, UCSN and ASDM has not previously been reviewed and is provided in support of this assessment in Appendix 3 of this document. Calculations for some uses or compounds were done with higher rates than intended in the GAP for this product (see description in the table below).

Table 8.9-1: Input parameters related to application for $PEC_{SW/SED}$ calculations

Use No.	1 + 2
Crop	Maize
Application rate according to GAP (g as/ha)	Dicamba: 125 Mesotrione: 60 Nicosulfuron: 40
Application rate used in calculations (g as/ha) - risk envelope	Dicamba: 132 Mesotrione: 75 Nicosulfuron: 40
Number of applications/interval (d)	1 / -
Application timing	Early post-emergence
Application window (relevant for STEP 1 and 2 only)	March – May
Application method	Ground spray
CAM (Chemical application method)	CAM 2 ('Appl. foliar linear')
Soil depth (cm)	4
Models used for calculation	FOCUS STEPS1-2 v.3.2, FOCUS SWASH v5.3, FOCUS PRZM v4.3.1, FOCUS MACRO v5.5.4, FOCUS TOXWA v4.4.3, SWAN v4.0.1

Table 8.9-2: FOCUS Step 3 Scenario related input parameters for $PEC_{SW/SED}$ calculations for the application of A18032E

Use pattern	**Scenario**	**Application window used in modelling**	
		First date of application window	**Last date of application window**
Maize, early post-emergence application	D3	06-May (126)	05-Jun (156)
	D4	11-May (131)	10-Jun (161)
	D5	11-May (131)	10-Jun (161)
	D6	21-Apr (111)	21-May (141)
	R1	04-May (124)	03-Jun (154)
	R2	02-May (122)	01-Jun (152)
	R3	02-May (122)	01-Jun (152)
	R4	11-Apr (101)	11-May (131)

zRMS comments:

The application pattern presented in Table 8.9-1 assumed in simulation for nicosulfuron is in line with the critical Central Zone GAP as presented in Table 8.1-1. For dicamba and mesotrione intended application rates (125 and 60 g a.s./ha, respectively) are covered by the risk envelope formed by the higher application rates assumed in simulations (176 and 75 g a.s./ha for dicamba and mesotrione, respectively), which are thus agreed.

It is noted that the beginning of the application window was set by the Applicant to 1 day after emergence. In the surface water modelling report (Ibrahim, 2017) it was indicated that these application dates were selected based on recommendations of the tool AppDate (v2.0bSE). However, according to indications of the most recent version of the tool (ver. 3.06 of June 2019), the beginning of the application window for maize at BBCH 12 is proposed to be set to 7 days after emergence. Furthermore, according to information available in the RAR for mesotrione Vol.3, Section B.8 (RMS-UK, 2015), the beginning of the application window was set by the RMS to 14 days after emergence. Nevertheless, in opinion of the zRMS, application windows should cover period before and after the expected date of application and the beginning of the application window should not be set as the exact date of expected application. Taking this into account, application windows proposed by the Applicant in Table 8.9-2 above are considered acceptable as including the expected application date and covering period before and after that date.

8.9.2.1 Dicamba and its metabolites

Table 8.9-3: Input parameters related to active substance Dicamba and DCSA for $PEC_{SW/SED}$ calculations STEP 1/2

Compound	Dicamba	DCSA	Value in accordance to EU endpoint / Reference
Molar mass (g/mol)	221	207	Yes, EFSA (2011)
Water solubility (mg/L)	6600 (25°C)	88000 (25°C)	Yes, EFSA (2011)
Saturated vapour pressure (Pa)	- [a]	- [a]	
Diffusion coefficient in water (m²/d)	- [a]	- [a]	
Diffusion coefficient in air (m²/d)	- [a]	- [a]	
K_{FOC} (mL/g)	9.82 / 5.7 (geometric mean, n = 4)	877 / 509 (geometric mean, n = 5)	Yes, EFSA (2011)
Freundlich exponent 1/n	- [a]	- [a]	
Plant uptake	- [a]	- [a]	
Wash-off factor from crop (1/mm)	- [a]	- [a]	
$DT_{50,soil}$ (d)	4.0 (geomean, normalisation to 10 kPa or pF2, 20°C, n = 5)	9.4 (geomean, normalisation to 10 kPa or pF2, 20°C, n = 5)	Yes, EFSA (2011)
$DT_{50,water}$ (d)	41.0 (whole system value)	49.4 (whole system value)	Yes, EFSA (2011)
$DT_{50,SED}$ (d)	1000	1000	FOCUS default value
$DT_{50,whole\ system}$ (d)	41.0 (geomean, n = 2)	49.4 (arithmetic mean, n = 2)	Yes, EFSA (2011)
Maximum occurrence observed (% molar basis with respect to the parent)	-	Soil: 58.8 Water: 26.9 Sediment: 4.5 Total system: 31.4	Yes, EFSA (2011)
Formation fraction in soil:	- [a]	- [a]	

[a] not required for Steps 1 & 2

$PEC_{SW/SED}$

Table 8.9-4: FOCUS Step 1-2 and 3 PEC_{SW} and PEC_{SED} for dicamba following single application of A18032E to maize (R1520411-2, Real Llanderal, 2015a)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 132 g a.s./ha, early post-emergence					
Step 1	---	44.7	-	-	5.41 ~~4.26~~
Step 2					
Northern Europe	Mar – May	4.38	-	-	0.54 ~~0.430~~
Southern Europe	Mar – May	7.64	-	-	0.94 ~~0.750~~
Step 3	not required				

Metabolite of dicamba

Table 8.9-5: FOCUS Step 1/2 PEC_{SW} and PEC_{SED} for DCSA following single application to maize (R1520411-2, Real Llanderal, 2015a)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 132 g a.s./ha, early post-emergence					
Step 1	---	17.5	-	-	172 ~~150~~
Step 2					
Northern Europe	Mar – May	1.89	-	-	18.6 ~~16.2~~
Southern Europe	Mar – May	3.58	-	-	35.6 ~~31.1~~
Step 3	not required				

zRMS comments:

The surface water exposure for dicamba and its metabolite was estimated in the modelling by Llanderal J. (2015a, Syngenta File No SAN837_11574), using respective FOCUS models.

The input parameters considered by the Applicant in surface water modelling for dicamba and its metabolite presented in Table 8.9-3 are in general in line with EU agreed endpoints with following exception:

- For dicamba and metabolite DCSA lower geometric mean K_{FOC} values were considered instead of arithmetic mean values reported in the LoEP. Lower K_{FOC} values represent worst case in terms of the surface water exposure via water column, but may lead to underestimation of exposure via sediment. Nevertheless, the difference between the EU agreed and used K_{FOC} is only slight and in opinion of the zRMS it is not expected to have significant impact on derived $PEC_{SW/SED}$ values. leaching potential and in opinion of the zRMS this deviation is not expected to have significant impact on results of the surface water modelling. Nevertheless, in the independent ground water modelling the K_{FOC} of 12.36 and 1209 L/kg for dicamba and metabolite DCSA were used, respectively

Calculations performed by the Applicant at Steps 1-2 for dicamba and its metabolite were independently validated in additional modelling performed by the zRMS with the same input parameters except of K_{FOC} values (EU agreed arithmetic mean values were used). Slightly different values were obtained - mostly lower PEC_{SW} and higher PEC_{SED}. Therefore, values presented in Tables 8.9-4 to 8.9-5 were amended accordingly when zRMS values were higher comparing to Applicants' results.

On request of the ecotoxicology expert, additional surface water modelling was performed for dicamba at Steps 3&4, since it was necessary for purposes of the combined aquatic risk assessment. Additional simulations were performed only for scenarios relevant for Poland (D3, D4 and R1) since Poland is the only cMS indicated in the GAP table. Step 4 simulations were deemed necessary only in R1 stream scenario and were performed for 5 m vegetated filter strip calculated using VFSmod, since this tool is acceptable in Poland. Results are presented in table below. Since PEC_{SED} were not necessary, they are not reported below.

FOCUS scenario	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route
Maize, 1 x 125 g a.s./ha, early post-emergence			
Step 3			
D3	ditch	0.656	Spray drift
D4	pond	0.026	Drainage
D4	stream	0.562	Spray drift
R1	pond	0.037	Runoff
R1	stream	1.184	Runoff
Step 4			
R1	stream	0.188	

8.9.2.2 Mesotrione and its metabolites

Table 8.9-6: Input parameters related to active substance mesotrione and metabolites MNBA, AMBA and SYN546974 for $PEC_{SW/SED}$ calculations STEP 1/2 and 3/4

Compound	Mesotrione	MNBA	AMBA	SYN546974	Value in accordance to EU endpoint / Reference
Molar mass (g/mol)	339.3	245	215	291	Yes, EFSA (2016)
Water solubility (mg/L)	160* (20)	32400** (20)	23000** (20)	160*** (---)	* Yes, EFSA (2016) ** Yes, RAR (2015) *** Not available, parent value
Saturated vapour pressure (Pa)	0 (20)	- [a]	- [a]	- [a]	Worst case assumption
Diffusion coefficient in water (m²/d)	4.3×10^{-5}	- [a]	- [a]	- [a]	FOCUS default
Diffusion coefficient in air (m²/d)	0.43	- [a]	- [a]	- [a]	FOCUS default
K_{FOC} (mL/g)	acidic soil [b]: 156.7 neutral soil [c]: 52.2 alkaline soil [d]: 17.39 (pH dependent: log fit, n = 10)	3.2 (worst case, n=2, pH independent)	acidic soil [b]: 105.6 neutral soil [c]: 48.0 alkaline soil [d]: 21.8 (pH dependent: log fits, n = 5)	8021 (geometric mean, n=5)	Yes, EFSA (2016)
Freundlich exponent 1/n	0.94 (arithmetic mean, n = 10 to be used for all pH scenarios)	- [a]	- [a]	- [a]	Yes, EFSA (2016)
Plant uptake	0	- [a]	- [a]	- [a]	Yes, EFSA (2016)
Wash-off factor from crop (1/mm)	0.05 (MACRO) 0.50 (PRZM)	- [a]	- [a]	- [a]	FOCUS default
$DT_{50,soil}$ (d)	acidic soil [b]: 27.88 neutral soil [c]: 14.2 alkaline soil [d]: 0.54 (pH dependent: linear fit, lab. data, normalisation to pF2, 20 °C, n = 18)	3.4 (geometric mean, n=10, lab. data, pH independent, normalisation to pF2, 20 °C)	14.5 (geometric mean, n=5, lab. data, pH independent, normalisation to pF2, 20 °C)	0.1 (FOCUS default value)	Yes, EFSA (2016)
$DT_{50,water}$ (d)	5.5 (geometric mean, n=6)	1000 (conservative default value)	1000 (conservative default value)	1000 (conservative default value)	Yes, EFSA (2016)
$DT_{50,SED}$ (d)	Step 1-2: 5.6 (whole system value) Step 3-4: 1000 (conservative default value)	1000 (conservative default value)	1000 (conservative default value)	1000 (conservative default value)	Yes, EFSA (2016)
$DT_{50,whole\ system}$ (d)	5.6 (geometric mean, n=6)	1000 (conservative default value)	1000 (conservative default value)	1000 (conservative default value)	Yes, EFSA (2016)
Maximum occur-rence observed (% molar basis with re-spect to the parent)	Soil: 100 Water: 100 Sed.: 4.3 Total sys.: 100	Soil: 57.2 Water: 7.4 Sed.: <1 Total sys.: 7.4	Soil: 9.7 Water: 15.8 Sed.: 8.8 Total sys.: 24.6	Soil: 0 Water: 9.4 Sed.: 25.6 Total sys.: 33	Yes, EFSA (2016)
Formation fraction in soil	-	- [a]	- [a]	- [a]	-

[a] not required for Steps 1 & 2
[b] acid value for pH 5.1
[c] neutral value for pH 6.5
[d] alkaline value for pH 7.9
alkaline value for pH 7.9

$PEC_{SW/SED}$

Table 8.9-7 contains the maximum PEC_{SW} and PEC_{SED} over all three parameter sets at Step 1-3. Detailed results for acidic, neutral and alkaline soils are presented in Table 8.9-8, Table 8.9-9 and Table 8.9-10. Besides standard PEC calculations, the TOXSWA time series output at Step 3 (and Step 4 if required) was analysed with the software tool EPAT v.1.1. The objective of the analysis was to determine the number of predicted exposure events exceeding a threshold concentration of 0.52 µg/L or 2.8 µg/L in edge of field waterbodies for each FOCUS surface water scenario and the magnitude, duration of and time between those events. The results of this evaluation (including graphs and tables with the statistical evaluation) can be found in the report summary in Appendix A 3.8.

Table 8.9-7: FOCUS Step 1-2 and 3 PEC_{SW} and PEC_{SED} for mesotrione following single application of A18032E to maize (Step 3: R1520528-2, Ibrahim, 2017a) – <u>maxima of calculations with pH dependent parameter sets</u>

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d-$PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence					
Step 1	---	25.1	-	8.94	32.4
Step 2					
Northern Europe	Mar – May	3.28	-	1.15	4.78
Southern Europe	Mar – May	6.17	-	2.17	9.18
Step 3					
D3	ditch	0.394	Spray drift	0.021	0.104
D4	pond	0.042	Drainage	0.039	0.080
D4	stream	0.339	Spray drift	0.034	0.064
D5	pond	0.023	Drainage	0.019	0.047
D5	stream	0.344	Spray drift	0.013	0.049
D6	ditch	0.396	Spray drift	0.022	0.114
R1	pond	0.057	Runoff	0.036	0.064
R1	stream	1.20	Runoff	0.050	0.281
R2	stream	1.61	Runoff	0.049	0.261
R3	stream	2.95	Runoff	0.105	0.513
R4	stream	3.12	Runoff	0.133	0.748

Table 8.9-8: FOCUS Step 1-2 and 3 PEC_{SW} and PEC_{SED} for mesotrione following single application of A18032E to maize (Step 3: R1520528-2, Ibrahim, 2017a) - <u>parameter set for acidic soils (pH 5.1)</u>

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d-$PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence – pH 5.1					
Step 1	---	21.4	-	7.57	32.4
Step 2					
Northern Europe	Mar – May	3.17	-	1.11	4.78
Southern Europe	Mar – May	5.98	-	2.10	9.18
Step 3					
D3	ditch	0.394	Spray drift	0.021	0.104
D4	pond	0.042	Drainage	0.039	0.080
D4	stream	0.339	Spray drift	0.034	0.064
D5	pond	0.023	Drainage	0.019	0.047
D5	stream	0.344	Spray drift	0.013	0.049
D6	ditch	0.396	Spray drift	0.022	0.114
R1	pond	0.057	Runoff	0.036	0.064
R1	stream	1.20	Runoff	0.050	0.281
R2	stream	0.877	Runoff	0.028	0.241
R3	stream	2.33	Runoff	0.093	0.513
R4	stream	2.67	Runoff	0.131	0.748

Table 8.9-9: FOCUS Step 1-2 and 3 PEC_{SW} and PEC_{SED} for mesotrione following single application of A18032E to maize (Step 3: R1520528-2, Ibrahim, 2017a) - <u>parameter set for neutral soils (pH 6.5)</u>

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d-$PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence – pH 6.5					
Step 1	---	24.1	-	8.56	12.2
Step 2					
Northern Europe	Mar – May	3.28	-	1.15	1.64
Southern Europe	Mar – May	6.17	-	2.17	3.15
Step 3					
D3	ditch	0.394	Spray drift	0.021	0.064
D4	pond	0.016	Spray drift	0.008	0.010
D4	stream	0.338	Spray drift	0.006	0.018
D5	pond	0.017	Spray drift	0.009	0.015
D5	stream	0.339	Spray drift	0.008	0.020
D6	ditch	0.395	Spray drift	0.021	0.068
R1	pond	0.037	Runoff	0.020	0.023
R1	stream	0.820	Runoff	0.031	0.111
R2	stream	1.61	Runoff	0.049	0.261
R3	stream	2.95	Runoff	0.105	0.403
R4	stream	3.12	Runoff	0.133	0.533

Table 8.9-10: FOCUS Step 1-2 and 3 PEC_{SW} and PEC_{SED} for mesotrione following single application of A18032E to maize (Step 3: R1520528-2, Ibrahim, 2017a) - parameter set for alkaline soils (pH 7.9)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d-$PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence - pH 7.9					
Step 1	---	25.1	-	8.94	4.25
Step 2					
Northern Europe	Mar – May	0.690	-	0.246	0.069
Southern Europe	Mar – May	0.690	-	0.254	0.069
Step 3					
D3	ditch	0.394	Spray drift	0.021	0.042
D4	pond	0.016	Spray drift	0.008	0.005
D4	stream	0.337	Spray drift	0.001	0.011
D5	pond	0.016	Spray drift	0.008	0.005
D5	stream	0.336	Spray drift	0.001	0.007
D6	ditch	0.394	Spray drift	0.020	0.042
R1	pond	0.016	Spray drift	0.010	0.006
R1	stream	0.270	Runoff	0.006	0.020
R2	stream	0.365	Spray drift	0.004	0.013
R3	stream	0.384	Runoff	0.017	0.040
R4	stream	0.272	Spray drift	0.011	0.028

FOCUS Step 4

Table 8.9-11 contains the maximum PEC_{SW} and PEC_{SED} over all three parameter sets at Step 4. Detailed results for acidic, neutral and alkaline soils are presented in the report summary in Appendix A 3.8.

Table 8.9-11: Global maximum PEC_{SW} values for mesotrione, following single application of A18032E according to surface water Step 4 (R1520528-2, Ibrahim, 2017a) – maxima of calculations with all pH dependent parameter sets

Vegetative filter strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Crop	**Scenario**	**PEC_{SW} (µg/L)**	**Dominant entry route**	**PEC_{SW} (µg/L)**	**Dominant entry route**	**PEC_{SW} (µg/L)**	**Dominant entry route**	**PEC_{SW} (µg/L)**	**Dominant entry route**	**PEC_{SW} (µg/L)**	**Dominant entry route**
Maize 75 g a.s/ha early post-emer-gence	D3 ditch	0.197	Spray drift	0.129	Spray drift	0.069	Spray drift	0.036	Spray drift	not calculated	
	D4 pond	0.042	Drainage	0.042	Drainage	0.042	Drainage	0.042	Drainage		
	D4 stream	0.170	Spray drift	0.143	Spray drift	0.077	Spray drift	0.068	Drainage		
	D5 pond	0.023	Drainage	0.023	Drainage	0.023	Drainage	0.023	Drainage		
	D5 stream	0.176	Spray drift	0.149	Spray drift	0.083	Spray drift	0.047	Spray drift		
	D6 ditch	0.199	Spray drift	0.131	Spray drift	0.070	Spray drift	0.038	Spray drift		
	R1 pond	0.053	Runoff	0.056	Runoff	0.025	Runoff	0.013	Runoff	0.014	Spray drift
	R1 stream	1.20	Runoff	1.20	Runoff	0.544	Runoff	0.284	Runoff	0.113	Spray drift
	R2 stream	1.61	Runoff	1.61	Runoff	0.708	Runoff	0.367	Runoff	0.154	Spray drift
	R3 stream	2.95	Runoff	2.95	Runoff	1.33	Runoff	0.697	Runoff	0.161	Spray drift
	R4 stream	3.12	Runoff	3.12	Runoff	1.42	Runoff	0.742	Runoff	0.114	Spray drift

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007); reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

Table 8.9-12: FOCUS Step 4: TWA PEC$_{SW}$ for mesotrione following single application to maize (R1520528-2, Ibrahim, 2017a) – maxima of calculations with all pH dependent parameter sets

		Mitigation options														
Vegetative strip (m) [a]		-			-			10 (L & M)			20 (L & M)			5(VFSmod)		
No spray buffer (m)		-			5			10			20			5		
Nozzle reduction (%)		50			-			-			-			-		
Use pattern	**Scenario**	**Time weighted average PEC$_{SW}$ (µg/L)**														
		2-d	**7-d**	**21-d**	**2-d**	**7-d**	**21-d**	**2-d**	**7-d**	**21-d**	**2-d**	**7-d**	**21-d**	**2-d**	**7-d**	**21-d**
Maize 1 x 75 g a.s/ha Early post-emergence	D3 ditch	0.105	0.031	0.011	0.069	0.021	0.007	0.036	0.011	0.004	0.019	0.006	0.002	not calculated		
	D4 pond	0.042	0.041	0.039	0.042	0.041	0.039	0.042	0.041	0.039	0.042	0.041	0.039			
	D4 stream	0.059	0.052	0.034	0.059	0.052	0.034	0.059	0.052	0.034	0.059	0.052	0.034			
	D5 pond	0.023	0.022	0.019	0.023	0.022	0.019	0.023	0.022	0.019	0.023	0.022	0.019			
	D5 stream	0.021	0.018	0.013	0.021	0.018	0.013	0.021	0.018	0.013	0.021	0.018	0.013			
	D6 ditch	0.103	0.032	0.012	0.068	0.022	0.009	0.037	0.013	0.006	0.020	0.008	0.005			
	R1 pond	0.050	0.043	0.034	0.052	0.046	0.036	0.023	0.020	0.015	0.012	0.011	0.008	0.013	0.011	0.008
	R1 stream	0.312	0.112	0.050	0.312	0.112	0.050	0.141	0.050	0.022	0.074	0.026	0.011	0.011	0.003	0.002
	R2 stream	0.493	0.143	0.048	0.493	0.143	0.048	0.217	0.063	0.021	0.112	0.033	0.011	0.008	0.002	0.001
	R3 stream	0.860	0.298	0.102	0.860	0.298	0.102	0.389	0.134	0.046	0.203	0.070	0.024	0.025	0.007	0.002
	R4 stream	1.21	0.345	0.132	1.21	0.345	0.132	0.548	0.157	0.060	0.287	0.082	0.031	0.011	0.003	0.001

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

Metabolites of mesotrione

The following three tables present the maxima over all pH dependent parameter sets for each metabolite (see Table 8.9-13 for MNBA, Table 8.9-14 for AMBA and Table 8.9-15 for SYN546974. Details for each parameter set are then given in Table 8.9-16 to Table 8.9-24.

Table 8.9-13: FOCUS Step 1-2 PEC$_{SW}$ and PEC$_{SED}$ for MNBA following single application to maize - maxima of calculations with all pH dependent parameter sets

Scenario FOCUS	**Waterbody**	**Max PEC$_{SW}$ (µg/L)**	**Dominant entry route**	**21 d- PEC$_{SW,twa}$ (µg/L)**	**Max PEC$_{SED}$ (µg/kg)**
Maize, 1 x 75 g a.s./ha, early post-emergence					
Step 1	---	11.6	-	11.6	0.373
Step 2					
Northern Europe	Mar – May	0.900	-	0.893	0.029
Southern Europe	Mar – May	1.76	-	1.75	0.056
Step 3	not required				

Table 8.9-14: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for AMBA following single application to maize - maxima of calculations with all pH dependent parameter sets

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence					
Step 1	---	5.39	-	5.35	5.13
Step 2					
Northern Europe	Mar – May	0.734	-	0.726	0.765
Southern Europe	Mar – May	1.36	-	1.35	1.43
Step 3	not required				

Table 8.9-15: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for SYN546974 following single application to maize - maxima of calculations with all pH dependent parameter sets

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence					
Step 1	---	0.800	-	0.622	49.8
Step 2					
Northern Europe	Mar – May	0.195	-	0.094	7.92
Southern Europe	Mar – May	0.195	-	0.162	14.5
Step 3	not required				

Table 8.9-16: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for MNBA following single application to maize - parameter set for acidic soils (pH 5.1)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence - pH 5.1					
Step 1	---	11.6	-	11.6	0.373
Step 2					
Northern Europe	Mar – May	0.900	-	0.893	0.029
Southern Europe	Mar – May	1.76	-	1.75	0.056
Step 3	not required				

Table 8.9-17: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for MNBA following single application to maize - parameter set for neutral soils (pH 6.5)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence - pH 6.5					
Step 1	---	11.6	-	11.6	0.373
Step 2					
Northern Europe	Mar – May	0.883	-	0.877	0.028
Southern Europe	Mar – May	1.73	-	1.72	0.055
Step 3	not required				

Table 8.9-18: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for MNBA following single application to maize - parameter set for alkaline soils (pH 7.9)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence - pH 7.9					
Step 1	---	11.6	-	11.6	0.373
Step 2					
Northern Europe	Mar – May	0.720	-	0.715	0.023
Southern Europe	Mar – May	1.40	-	1.39	0.045
Step 3	not required				

Table 8.9-19: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for AMBA following single application to maize - parameter set for acidic soils (pH 5.1)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence - pH 5.1					
Step 1	---	4.87	-	4.82	5.13
Step 2					
Northern Europe	Mar – May	0.729	-	0.720	0.765
Southern Europe	Mar – May	1.36	-	1.35	1.43
Step 3	not required				

Table 8.9-20: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for AMBA following single application to maize - parent parameter set for neutral soils (pH 6.5)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence - pH 6.5					
Step 1	---	5.21	-	5.17	2.50
Step 2					
Northern Europe	Mar – May	0.734	-	0.726	0.351
Southern Europe	Mar – May	1.36	-	1.35	0.654
Step 3	not required				

Table 8.9-21: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for AMBA following single application to maize - parent parameter set for alkaline soils (pH 7.9)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence - pH 7.9					
Step 1	---	5.39	-	5.35	1.17
Step 2					
Northern Europe	Mar – May	0.294	-	0.290	0.064
Southern Europe	Mar – May	0.482	-	0.477	0.105
Step 3	not required				

Table 8.9-22: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for SYN546974 following single application to maize - parameter set for acidic soils (pH 5.1)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence - pH 5.1					
Step 1	---	0.800	-	0.622	49.8
Step 2					
Northern Europe	Mar – May	0.195	-	0.094	7.92
Southern Europe	Mar – May	0.195	-	0.162	14.5
Step 3	not required				

Table 8.9-23: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for SYN546974 following single application to maize - parent parameter set for neutral soils (pH 6.5)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence - pH 6.5					
Step 1	---	0.800	-	0.622	49.8
Step 2					
Northern Europe	Mar – May	0.195	-	0.088	7.32
Southern Europe	Mar – May	0.195	-	0.150	13.3
Step 3	not required				

Table 8.9-24: FOCUS Step 1-2 PEC_{SW} and PEC_{SED} for SYN546974 following single application to maize - parent parameter set for alkaline soils (pH 7.9)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 75 g a.s./ha, early post-emergence - pH 7.9					
Step 1	---	0.800	-	0.622	49.8
Step 2					
Northern Europe	Mar – May	0.195	-	0.026	1.38
Southern Europe	Mar – May	0.195	-	0.027	1.42
Step 3	not required				

zRMS comments:

The surface water exposure for mesotrione and its metabolites was estimated in the modelling by Ibrahim L. (2017a, Syngenta File No ZA1296_10482), using respective FOCUS models.

In general, input parameters considered in the surface water modelling for mesotrione and its metabolites were EU agreed values, with following exceptions:

1. For metabolite MNBA maximum occurrence in water/sediment systems of 7.4% was considered, while it should be 7.9%. As already indicated in the zRMS comment in point 8.9.1, this deviation is considered to have no significant impact on obtained results.
2. For metabolite SYN546974 geometric mean K_{FOC} of 8021 mL/g was considered, while during EU renewal maximum K_{FOC} of 27031 mL/g was used. It is not fully clear why at the EU level the maximum K_{FOC} was used, as no dependence between sorption and soil pH was observed for this metabolite. Taking this into account, consideration of the mean value is justified. Nevertheless, in EFSA Journal 2016;14(3):4419 the arithmetic mean K_{FOC} of 13000 mL/g is reported, while the Applicant used the geometric mean value. In opinion of the zRMS this is acceptable, as being in line with current requirements concerning selection of K_{FOC} to be used for modelling purposes. Furthermore, geometric mean K_{FOC} of 8021 mL/g was calculated from the EU agreed values, so simple recalculation of EU agreed data is not considered to be deviation from EU endpoints.

Overall, input parameters presented in Table 8.9-6 considered by the Applicant are agreed by the zRMS.

In order to mitigate the risk, Step 4 simulations were performed with assumption of 5, 10 and 20 m spray drift buffer and 10 m and 20 m vegetated filter strips and 5 m VFSmod (for run-off scenarios) or 50% nozzle reduction.
The run-off reduction was assumed in line with FOCUS Landscape and Mitigation recommendations (FOCUS, 2007).

Applicants' modelling was independently validated by the zRMS using the same input data. Obtained results were in good agreement with these obtained by the Applicant and for this reason PEC_{SW}/PEC_{SED} values presented in Tables 8.9-7 to 8.9-12 for mesotrione and in Tables from 8.9-13 to 8.9-24 for metabolites may be used in the aquatic risk assessment.

8.9.2.3 Nicosulfuron and its metabolites

Table 8.9-25: Input parameters related to active substance nicosulfuron and metabolites for $PEC_{SW/SED}$ calculations STEP 1/2 and 3/4

Compound	Nicosulfuron	HMUD	AUSN	ADMP	UCSN	ASDM	Value in accordance to EU endpoint / Reference
Molar mass (g/mol)	410.4	396.4	314.3	155.2	315.3	229.2	Yes, EFSA (2007)
Water solubility (mg/L)	9500 (20°C)	9500 parent value	9500 parent value	9500 parent value	9500 parent value	9500 parent value	Yes, EFSA (2007)
Saturated vapour pressure (Pa)	8×10^{-10} (25°C)	-[b]	-[b]	-[b]	-[b]	-[b]	Yes, EFSA (2007)
Diffusion coefficient in water (m²/d)	4.3×10^{-5}	-[b]	-[b]	-[b]	-[b]	-[b]	FOCUS default
Diffusion coefficient in air (m²/d)	0.43	-[b]	-[b]	-[b]	-[b]	-[b]	FOCUS default
K_{FOC} (mL/g)	24.6* (geomean, n = 14)	3.9** (geomean, n = 5)	13** (worst case, n = 4)	51.1** (geomean, n = 4)	2.6** (geomean, n = 4)	2.3** (worst case, n = 4)	* EFSA (2007) data + Graham & Strachan, 2008 ** Yes, EFSA (2007)
Freundlich exponent 1/n	0.95 (arithmetic mean, n = 4)	-[b]	-[b]	-[b]	-[b]	-[b]	EFSA (2007) data + Graham & Strachan, 2008
Plant uptake	0	-[b]	-[b]	-[b]	-[b]	-[b]	Worst case
Wash-off factor from crop (1/mm)	0.05 (MACRO) 0.50 (PRZM)	-[b]	-[b]	-[b]	-[b]	-[b]	FOCUS default
$DT_{50,soil}$ (d)	16.4 (geomean, n= 7) [a]	23.8 (geomean, n = 2) [a]	192.3 (maximum, n = 3) [a]	4.5 (geomean, n = 3) [a]	271.0 (maximum, n = 3) [a]	236.6 (maximum, n = 3) [a]	Yes, EFSA (2007)
$DT_{50,water}$ (d)	65 (geomean, n = 2)	1000	1000	1000	1000	1000	Yes, EFSA (2007)
$DT_{50,SED}$ (d)	13.9 (geomean, n = 2)	1000	1000	1000	1000	1000	Yes, EFSA (2007)
$DT_{50,whole\ system}$ (d)	42.3 (worst case, n = 2)	1000	1000	1000	1000	1000	Yes, EFSA (2007)
Maximum occurrence observed (% molar basis with respect to the parent)	-	Soil: 14.4 Total system: 19.3	Soil: 26.8 Total system: 11.1	Soil: 7.2 Total system: 1×10^{-6}	Soil: 11 Total system: 6.5	Soil: 63.4 Total system: 9.4	Yes, EFSA (2007)

a Laboratory data, normalisation to 10 kPa or pF2, 20°C with Q_{10} of 2.2.
b not required for Steps 1 & 2

$PEC_{SW/SED}$

Table 8.9-26: FOCUS Step 1,2 and 3 PEC_{SW} and PEC_{SED} for nicosulfuron following single application of A18032E to maize (CEA.1863 & CEA.1864, Carnall, 2017a,b)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d-$PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 40 g a.s./ha, early post-emergence					
Step 1	---	13.3	-	-	3.21
Step 2					
Northern Europe	March-May	1.98	-	-	0.462
Southern Europe	March-May	3.61	-	-	0.859
Step 3					
D3	ditch	0.217	Drift	0.018	0.032
D4	pond	0.026	Drainage	0.025	0.027
D4	stream	0.184	Drift	0.015	0.012
D5	pond	0.019	Drift	0.017	0.014
D5	stream	0.183	Drift	0.009	0.008
D6	ditch	0.211	Drift	0.012	0.026
R1	pond	0.017	Runoff	0.015	0.010
R1	stream	0.453	Runoff	0.012	0.034
R2	stream	1.16	Runoff	0.035	0.136
R3	stream	1.65	Runoff	0.056	0.165
R4	stream	1.79	Runoff	0.074	0.226

FOCUS Step 4

Table 8.9-27: Global maximum PEC_{SW} values for nicosulfuron, following single application of A18032E according to surface water Step 4 (CEA.1864, Carnall 2017b)

Mitigation options				
Vegetative filter strip [a]		10 (L & M)	20 (L & M)	5 (VFSmod)
No spray buffer		10	20	5
Nozzle reduction (%)		-	-	-
Use pattern	**Scenario**	**PEC_{SW} (µg/L)**	**PEC_{SW} (µg/L)**	**PEC_{SW} (µg/L)**
Maize 1 x 40 g a.s/ha early post-emergence	D3 ditch	0.043	0.026	0.075
	D4 pond	0.026	0.026	0.026
	D4 stream	0.044	0.025	0.080
	D5 pond	0.016	0.014	0.018
	D5 stream	0.044	0.025	0.079
	D6 ditch	0.037	0.020	0.070
	R1 pond	0.009	0.005	0.008
	R1 stream	0.186	0.094	0.060
	R2 stream	0.511	0.265	0.082
	R3 stream	0.745	0.390	0.086
	R4 stream	0.815	0.427	0.061

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007); reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

Metabolites of nicosulfuron

Table 8.9-28: FOCUS Step 1 and 2 PEC_{SW} and PEC_{SED} for HMUD following single application to maize (CEA.1863, Carnall, 2017a)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 40 g a.s./ha, early post-emergence					
Step 1	---	4.39	-	-	0.171
Step 2					
Northern Europe	March-May	0.628	-	-	0.025
Southern Europe	March-May	1.19	-	-	0.046

Table 8.9-29: FOCUS Step 1 and 2 PEC_{SW} and PEC_{SED} for AUSN following single application to maize (CEA.1863, Carnall, 2017a)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 40 g a.s./ha, early post-emergence					
Step 1	---	3.84	-	-	0.498
Step 2					
Northern Europe	March-May	0.570	-	-	0.074
Southern Europe	March-May	1.11	-	-	0.144

Table 8.9-30: FOCUS Step 1 and 2 PEC_{SW} and PEC_{SED} for ADMP following single application to maize (CEA.1863, Carnall, 2017a)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 40 g a.s./ha, early post-emergence					
Step 1	---	0.340	-	-	0.174
Step 2					
Northern Europe	March-May	0.028	-	-	0.014
Southern Europe	March-May	0.055	-	-	0.028

Table 8.9-31: FOCUS Step 1 and 2 PEC_{SW} and PEC_{SED} for UCSN following single application to maize (CEA.1863, Carnall, 2017a)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 40 g a.s./ha, early post-emergence					
Step 1	---	1.80	-	-	0.047
Step 2					
Northern Europe	March-May	0.269	-	-	0.007
Southern Europe	March-May	0.520	-	-	0.014

Table 8.9-32: FOCUS Step 1 and 2 PEC_{SW} and PEC_{SED} for ASDM following single application to maize (CEA.1863, Carnall, 2017a)

Scenario FOCUS	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	21 d- $PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Maize, 1 x 40 g a.s./ha, early post-emergence					
Step 1	---	5.42	-	-	0.125
Step 2					
Northern Europe	March-May	0.805	-	-	0.019
Southern Europe	March-May	1.59	-	-	0.037

zRMS comments:

Input parameters considered in the surface water modelling for nicosulfuron and its metabolites were in general in line with EU agreed values, with following exceptions:

- For nicosulfuron the K_{FOC} of 24.6 mL/g was considered, while the value of 20.7 mL/g was indicated in the LoEP as the arithmetic mean K_{FOC}. In order to check the impact of lower K_{FOC} value on PEC_{SW}/PEC_{SED} results, additional modelling has been performed by the zRMS (see below).
- In the LoEP it is indicated that since some of the metabolites show pH dependency, as a worst case approach the lowest K_{FOC} values for all metabolites should be considered. However, it is not fully clear why it is presented for all metabolites, since only metabolites AUSN and ASDM show dependence between sorption and soil pH. Taking this into account consideration of the geometric mean K_{FOC} values for metabolites HMUD, ADMP and UCSN is agreed by the zRMS as being also in line with approach taken in groundwater modelling.
- Geometric mean K_{FOC} values for metabolites were calculated from the EU agreed values and used in the surface water modelling instead of higher arithmetic mean values reported in the LoEP. This is agreed by the zRMS since consideration of the lower K_{FOC} represents worst case in terms of exposure via water column (no risk assessment for sediment dwelling organisms was required).
- For the HMUD metabolite the geometric mean soil DT_{50} of 23.8 days was used instead of EU agreed values of 25.2 days. This deviation is considered to have no impact on the obtained results and is thus agreed by the zRMS.
- For metabolites DT_{50} in water and sediment of 300 days is given in the LoEP, while DT_{50} of 1000 days was used by the Applicant. This deviation is agreed by the zRMS as representing worst case and being in line with current default DT_{50} values indicated in FOCUS surface water guidance.

In order to mitigate the risk, Step 4 simulations were performed with assumption of 5, 10 and 20 m spray drift buffer and 10 m and 20 m vegetative filter strips and 5 m VFSmod (for run-off scenarios). The run-off reduction was assumed to be in line with FOCUS Landscape and Mitigation recommendations (FOCUS, 2007).

As already mentioned above, in order to check the impact of the shorter K_{FOC} value on the parent surface water exposure, additional surface water modelling has been performed by the zRMS. The input parameters in additional modelling were the same as indicated in Table 8.9-25, with exception of K_{FOC} value for the parent. Obtained results were in good agreement with Applicants' values and therefore PEC_{SW}/PEC_{SED} values presented in Tables 8.9-26 to 8.9-27 for nicosulfuron and in Tables from 8.9-28 to 8.9-32 for metabolites may be used in the aquatic risk assessment.

8.9.2.4 PEC_{SW} of A18032E

The table below presents PEC_{SW} calculations for the formulated product A18032E considering spray drift entries into the water body. Calculations were done with the original Rautmann drift values.

Table 8.9-33: Initial PEC_{SW} for A18032E following single application to maize

Formulation / compound	No. of applications	Maximum use rate (g A18032E/ha)	Drift reducing nozzles	Buffer	Drift [a]	PEC_{SW} (µg A18032E/L)
A18032E	1	400	0 %	1 m	2.77 %	3.69
				3 m	0.95 %	1.27
				5 m	0.57 %	0.760
				10 m	0.29 %	0.387
				15 m	0.20 %	0.267
				20 m	0.15 %	0.200
			50 %	1 m	1.39 %	1.85
				3 m	0.48 %	0.633
				5 m	0.29 %	0.380
				10 m	0.15 %	0.193
				15 m	0.10 %	0.133
				20 m	0.075 %	0.100
			75 %	1 m	0.69 %	0.923
				3 m	0.24 %	0.317

Formulation / compound	No. of applications	Maximum use rate (g A18032E/ha)	Drift reducing nozzles	Buffer	Drift [a]	PEC_{SW} (µg A18032E/L)
				5 m	0.14 %	0.190
				10 m	0.073 %	0.097
				15 m	0.050 %	0.067
				20 m	0.038 %	0.050
			90 %	1 m	0.28 %	0.369
				3 m	0.10 %	0.127
				5 m	0.057 %	0.076
				10 m	0.029 %	0.039
				15 m	0.020 %	0.027
				20 m	0.015 %	0.020

[a] drift value according to Rautmann at al. (2001)[2]

zRMS comments:

Recalculation of the surface water exposure to the formulated product performed by the zRMS using Spray Drift Calculator resulted with slightly lower PEC_{SW} values. Taking this into account, values obtained by the Applicant represent worst case and may be used in the aquatic risk assessment for the formulation.

[2] D. Rautmann, M. Streloke, M. Winkler (2001). New basic drift values in the authorisation procedure for plant protection products. In: R. Forster, M. Streloke: Workshop on Risk Assessment and Risk Mitigation Measures in the Context of the Authorization of Plant Protection Products (WORMM). Mitt. Biol. Bundesanst. Land-Forstwirtsch, Berlin-Dahlem, Heft 381

8.10 Fate and behaviour in air (KCP 9.3, KCP 9.3.1)

8.10.1.1 Dicamba and its metabolites

The fate and behaviour of dicamba in air are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of dicamba (EFSA Journal, 2011).

Table 8.10-1: Summary of atmospheric degradation and behaviour

Compound	Dicamba
Direct photolysis in air	Not studied - no data required
Quantum yield of direct phototransformation	No data – not required
Photochemical oxidative degradation in air	DT_{50} (d ~~h~~): 3.6 derived by the Atmospheric Oxidation Programme (AOP, ver 1.85) based on Atkinson model. OH (12 h) concentration assumed = 1.5×10^{6} OH x cm^{-3}
Volatilisation	Vapour pressure (Pa): 1.67×10^{-3} at 25°C Henry's Law Constant (Pa.m3/mol): 1.0×10^{-4} at 25°C
Metabolites	None

The vapour pressure at 25°C of the active substance dicamba is > 10^{-4} Pa. Hence the active substance dicamba is regarded as volatile (volatilisation from soil and plant surfaces). However, the potential for long range transport of dicamba through the atmosphere is not a critical issue as volatilisation of dicamba from soil and plant surfaces is negligible: Dicamba is expected to be transported mainly in the particulate phase which is likely to be 'rained out' and is not persistent in soil and water/sediment systems (**EFSA Technical Report, Approved 11 March 2016; Published 1 April 2016: Outcome of the consultation with Member States, the applicant and EFSA on the pesticide risk assessment for dicamba in light of confirmatory data**).

zRMS comments:

Vapour pressure of dicamba is greater than both trigger values (>10^{-4} Pa and >10^{-5} Pa for soil and plant surfaces, respectively), which indicates some potential to volatilisation. Furthermore, the DT_{50} in air is >2 days, indicating that dicamba may be potentially subject of short- and long-range transport.

Studies performed for purposes of Annex I listing demonstrated, however, that volatilisation of dicamba from plant and soil surfaces is negligible (0.12% and 0.07-1.15% after 24 hours from plant and soil surfaces, respectively) and for this reason contamination of the atmosphere by dicamba from the intended uses of A18032E is considered to be negligible.

Due to negligible volatilisation, dicamba is also not expected to be subject of the short- or long-range transport.

8.10.1.2 Mesotrione and its metabolites

The fate and behaviour of mesotrione in air are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of mesotrione, (EFSA Journal, 2016).

Table 8.10-2: Summary of atmospheric degradation and behaviour

Compound	Mesotrione
Direct photolysis in air	Not studied - no data requested
Quantum yield of direct phototransformation	Not reported
Photochemical oxidative degradation in air	DT_{50} (h): 17.635 (1.5 d) derived by the Atmospheric Oxidation Programme (AOP, ver 1.8) based on Atkinson model. OH (12 h) concentration assumed = 1.5×10^{6} OH/cm^{3}
Volatilisation	Vapour pressure (Pa): < 5.7×10^{-6} at 20°C (99.7% pure) Henry's Law Constant ($Pa.m^{3}/mol$): < 5.1×10^{-7} at 20°C
Metabolites	None

The vapour pressure at 20°C of the active substance mesotrione is < 10^{-5} Pa. Hence the active substance mesotrione is regarded as non-volatile. Therefore, exposure of adjacent surface waters and terrestrial ecosystems by the active substance mesotrione due to volatilization with subsequent deposition should not be considered.

zRMS comments:
Provided above information is in line with EU agreed data reported in EFSA Journal 2016;14(3):4419. Taking into account the low vapour pressure (<10^{-5} Pa) and DT_{50} <2 days, mesotrione and its metabolites are not expected to be subject to volatilisation and the long- or short-range transport. Taking this into account the contamination of the atmosphere from the intended uses of A18032E is considered to be negligible.

8.10.1.3 Nicosulfuron and its metabolites

The fate and behaviour of nicosulfuron in air are considered to be data provided in support of the active substance. All relevant detailed experimental information has been submitted for EU review of nicosulfuron (EFSA Scientific Report, 2007).

Table 8.10-3: Summary of atmospheric degradation and behaviour

Compound	Nicosulfuron
Direct photolysis in air	Not studied - no data requested
Quantum yield of direct phototransformation	No data submitted – nor required
Photochemical oxidative degradation in air	DT_{50} (h): 0.587 derived by the Atkinson model OH (12 h) concentration assumed = 1.5 x 10^{6} OH radicals / cm³, temperature and solar light intensity typically found at sea level
Volatilisation	Vapour pressure (Pa): < 8 x 10^{-10} at 25°C Henry's Law Constant (Pa.m3/mol): 1.48 x 10^{-11} at 20°C
Metabolites	None

The vapour pressure at 25°C of the active substance nicosulfuron is < 10^{-5} Pa. Hence the active substance nicosulfuron is regarded as non-volatile. Therefore exposure of adjacent surface waters and terrestrial ecosystems by the active substance nicosulfuron due to volatilization with subsequent deposition should not be considered.

zRMS comments:
Provided above information is in line with EU agreed data reported in EFSA Scientific Report, 2007. Taking into account the low vapour pressure (<10^{-5} Pa) and DT_{50} <2 days, nicosulfuron and its metabolites are not expected to be subject to volatilisation and the long- or short-range transport. Taking this into account the contamination of the atmosphere from the intended uses of A18032E is considered to be negligible.

Appendix 1 Lists of data considered in support of the evaluation

List of data submitted by the applicant and relied on

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner
KCP 8.5.3	Hardy I., Agostini F.	2021	Organic carbon and clay dependency of nicosulfuron adsorption in soils: correlation analyses based on three adsorption studies Battelle UK Ltd., UK, TH/19/001A ADAMA Doc ID 000109197 Not GLP not published	N	ADAMA
KCP 9.2.4.1/01	Llanderal J.	2015	Dicamba - A Leaching Assessment for Parent and One Soil Metabolite (DCSA) Using the FOCUS Groundwater Scenarios Following Spray Application to Maize in the EU Syngenta RIFCON GmbH, Hirschberg, Germany, R1520411-1 Not GLP not published Syngenta File No SAN837_11572 **This is CONFIDENTIAL INFORMATION ***	N	SYN (ADAMA has LoA)
KCP 9.2.5 / 01	Llanderal J.	2016	Dicamba - A Surface Water Assessment for Parent and Metabolite DCSA Using the FOCUS Surface Water Scenarios at Step 1 and 2 Following Spray Applications to Maize in Europe Syngenta RIFCON GmbH, Hirschberg, Germany, R1520411-2 Not GLP not published Syngenta File No SAN837_11574 **This is CONFIDENTIAL INFORMATION ***	N	SYN (ADAMA has LoA)

Data point	Author(s)	Year	**Title** **Company Report No.** **Source (where different from company)** **GLP or GEP status** **Published or not**	Vertebrate study Y/N	Owner
KCP 9.2.5 / 02	Ibrahim L.	2017a	Mesotrione - A European Environmental Fate Assessment for Parent Using the FOCUS Surface Water Models at Steps 3 to 4 Following Spray Application to Maize and an Analysis of its FOCUS Step 3 and 4 Exposure Patterns Using the EPAT Tool Syngenta RIFCON GmbH, Hirschberg, Germany, R1520528-2 Not GLP not published Syngenta File No ZA1296_10482 **This is CONFIDENTIAL INFORMATION ***	N	SYN (ADAMA has LoA)
KCP 9.2.5 / 03	Carnall J.	2017a	Nicosulfuron - A European Fate Assessment Using the FOCUS Surface Water Step 1-2 Tool Following Spray Application to Maize Syngenta Cambridge Environmental Assessments, United Kingdom, CEA.1863 Not GLP not published Syngenta File No ASF628_11334 **This is CONFIDENTIAL INFORMATION ***	N	SYN (ADAMA has LoA)
KCP 9.2.5 / 04	Carnall J.	2017b	Nicosulfuron - A European Fate Assessment Using the FOCUS Surface Water Scenarios at Step 3 and Step 4 Following Spray Application to Maize Syngenta Cambridge Environmental Assessments, United Kingdom, CEA.1864 Not GLP not published Syngenta File No ASF628_11312 **This is CONFIDENTIAL INFORMATION ***	N	SYN (ADAMA has LoA)

* Syngenta requests data confidentiality for these data. Disclosure of the information might undermine Syngenta commercial interests by providing access to Syngenta specific know-how.

List of data submitted or referred to by the applicant and relied on, but already evaluated at EU peer review

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner
Please note that majority of toxicity data for particular active compounds were taken from the EFSA conclusions and were thus evaluated at the EU level. For list of respective studies, please refer to Vol. 2 of the monograph for individual substances.					

List of data submitted by the applicant and not relied on

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner	Reason for rejection
KCA3 7.1.3.1	Graham, R. & Strachan, K.	2008	[^{14}C] Nicosulfuron: Adsorption / Desorption in Soil. Report-No.: 79 NIS Cheminova A/S GLP Unpublished ***Report No. 79 NIS is not submitted with this dossier but is available via Letter of Access from Cheminova.***	N	Cheminova (ADAMA has access (3 LOA))	New active substance data, not providing any new information deviating from the EU agreed parameters.
KCA3 7.5	Schneider, M. & Holzer, S.	2014	Groundwater monitoring for nicosulfuron and six metabolites in four representative regions in Germany. DuPont-28685 SGS Institut Fresenius GLP Unpublished ***Report DuPont-28685 is not submitted with this dossier but is available via Letter of Access from DuPont.***	N	DuPont (ADAMA is co-owner)	Requested analysis of representativeness of the study locations to Polish conditions to justify consideration of results of studies performed in Germany and Italy for purposes of authorisation of the product in Poland was not provided by the Applicant and relevance of results pf both studies for Poland could not be confirmed.
KCA3 7.5/01	Ferrari, F.	2016	Groundwater Monitoring for Nicosulfuron and 6 Metabolites in Maize Growing Regions of Italy Syngenta, CHEMINOVA A/S, Lemvig, Denmark, E.I. Dupont Nemours & Co., Inc., Wilmington, USA LABCAM s.r.l.- Centro di Saggio, Albenga, Italy, DuPont-40798 IM GLP not published Syngenta File No ASF628_11279	N	Cheminova, DuPont, SYN Joint ownership (ADAMA has access (1 LOA))	
KCP 9.2.4.1 / 02	Ibrahim L.	2017	Mesotrione - A Leaching Assessment for Parent and Metabolites MNBA and AMBA Using the PEARL 4.4.4, PELMO 5.5.3 and MACRO 5.5.4 Groundwater Models Following Spray Application to Maize Syngenta RIFCON GmbH, Hirschberg, Germany, R1520528-1 Not GLP not published Syngenta File No ZA1296_10472 **This is CONFIDENTIAL INFORMATION ***	N	SYN (ADAMA has LoA)	Not agreed application dates, higher results obtained by zRMS for more relevant assumptions.

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner	Reason for rejection
KCP 9.2.4.1 / 03	Nicolaisen	2017	Mesotrione - A Leaching Assessment for Parent and Metabolites MNBA and AMBA Using the PEARL 4.4.4, PELMO 5.5.3 and MACRO 5.5.4 Groundwater Models Following Spray Application to Maize (Simulations for Neutral Soil) Syngenta Crop Protection AG, Basel, Switzerland RIFCON GmbH, Hirschberg, Germany, R1760183-1 Not GLP not published Syngenta File No ZA1296_10590 **This is CONFIDENTIAL INFORMATION ***	N	SYN (ADAMA has LoA)	Not agreed application dates, higher results obtained by zRMS for more relevant assumptions.
KCP 9.2.4.1 / 04	Carnall J.	2017	Nicosulfuron - A Leaching Assessment for Parent and Soil Metabolites HMUD, AUSN, UCSN, ASDM, MU-466 and ADMP Using the FOCUS Groundwater Scenarios Following Spray Application to Maize in the EU Syngenta, Syngenta Cambridge Environmental Assessments, United Kingdom, CEA.1865 Not GLP not published Syngenta File No ASF628_11313 **This is CONFIDENTIAL INFORMATION ***	N	SYN (ADAMA has LoA)	Not agreed sorption data and application dates, higher results obtained by zRMS for more relevant assumptions.
KCP 8.8.3	Hardy I., Agostini F.	2021	Nicosulfuron - Predicted Environmental Concentrations in groundwater (PECgw) following application to maize in Europe using FOCUS PEARL 5.5.5 and FOCUS PELMO 6.6.4 Battelle UK Ltd., UK, TH/19/001B ADAMA Doc ID 00010970 Not GLP not published	N	ADAMA	Based on not agreed input parameters and performed using model versions not applicable for current evaluation of A18032E.

List of data relied on not submitted by the applicant but necessary for evaluation

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner
There were no data not submitted by the Applicant and relied on.					

Appendix 2 Detailed evaluation of the new Annex II studies

A 2.1 Graham & Strachan (2008)

Report No. 79 NIS is not submitted with this dossier but is available via Letter of Access from Cheminova.

Comments of zRMS:	The study does not provide any new information that could be used to refine the groundwater exposure to nicosulfuron. EU agreed data are deemed sufficient for purposes of exposure assessment resulting from application of A18032E. Study should be considered in the course of the EU renewal process of nicosulfuron. The summary below is struck through as being not validated by the zRMS.

Reference:	KCA 7.1.3.1
Report	Graham, R. & Strachan, K. (2008): [^{14}C] Nicosulfuron: Adsorption / Desorption in Soil. Cheminova A/S Unpublished report No.: 79 NIS
Guideline(s):	OECD Guideline 106 (January 2000)
Deviations:	No
GLP:	Yes
Acceptability:	Not evaluated, not required to finalise the exposure assessment (for details, please refer to point 8.5.3 of this document)

A 2.1.1 Materials and methods

Materials

The test material was: [Pyrimidine-5-^{14}C]-nicosulfuron, CFQ15201 Batch 1 (GE Healthcare), specific radioactivity 2 GBq/mmol, radiochemical purity >95 %.

The study was conducted with ten different soil types (seven from the UK, two from the US and one from Germany). All soils were air-dried, thoroughly mixed, 2 mm sieved and stored in the dark at room temperature (10 to 30 °C) prior to use. The study was designed specifically to investigate the effect of soil properties on the adsorption of nicosulfuron and the soils selected varied in the physicochemical properties generally considered responsible for absorptive capacity, namely; organic carbon, clay content, pH (for ionisable compounds) and cation exchange capacity (CEC). A summary of the physicochemical properties of the soils is provided in Table A 1. The soil textural classes are quoted on the basis of the United States Department of Agriculture (USDA) classification system.

Table A 1: Soil physiochemical properties

Soil name	Textural class	Organic carbon (%)	Clay content (%)	pH in 0.01M $CaCl_2$	CEC (mEq/100g)
PT103	Sandy loam	1.4	13	4.4	23.9
SK961089	Clay loam	4.8	28	7.5	41.6
SK920191	Clay loam	4.8	36	7.3	27.8
SK104691	Silt loam	2.5	18	6.1	17.9
Matanuska	Silt loam	3.2	9	4.7	29.7
SK566696	Loamy sand	0.8	9	4.2	11.4
SK179618	Loam/Silt loam	3.9	18	5.0	23.3
Speyer 2.1	Sand	0.4	5	5.1	13.8
TL 78517229	Loamy Sand	0.7	8	7.6	7.0
MCL	Silt loam	2.4	26	5.6	36.3

Study design

A soil:solution ratio of 1:1, w/v was used (10 g dry weight equivalent of soil and 10 mL solution) and an adsorption equilibrium time of 2 hours was found to be appropriate. [^{14}C] Nicosulfuron was shown to be stable over the time scale of the test and radioactivity could therefore be used to determine nicosulfuron concentrations.

The definitive adsorption and desorption studies were conducted in Teflon® centrifuge tubes in the dark at 20 ± 2 °C. Soil samples were pre-equilibrated with 0.01 M calcium chloride solution overnight. They were then treated with solutions of [^{14}C] nicosulfuron in acetonitrile to produce duplicate samples per soil, with initial concentrations in the aqueous phase of 10, 5, 1, 0.5 and 0.1 µg/mL. The percent of organic solvent in the final samples was kept as low as possible (0.2 %). The adsorption phase was followed by a single 2-hour desorption phase. Samples were mixed mechanically using an end-over-end mixer at a speed that ensured efficient mixing of the soil and solution. Centrifugation conditions were calculated to be sufficient to remove particles larger than 0.2 µm from the supernatant.

For each treated soil, the recovery of applied radioactivity was determined for the samples at the highest test concentration by radiochemical assay of the removed adsorption and desorption supernatants, an acetone extract of the soil and the combusted soil residue. Radioactivity was determined by LSC. Both aqueous supernatants and soil extracts obtained in stability tests were analysed by reverse phase HPLC. Chromatography using normal phase TLC was used to confirm the radiochemical purity of the test material.

A. 2.1.2 Results and discussions

Mass balance

Overall mean recoveries of applied radioactivity from each soil type in the 10 µg/mL samples were in the range 90 to 99 %. Adsorption supernatant recoveries ranged from 6 to 69 %, desorption supernatant recoveries ranged from 5 to 23 %, acetone extract recoveries ranged from 5 to 29 % and combusted residue recoveries ranged from 2 to 62 %.

Findings

Adsorption isotherms were calculated by linear regression analysis of the adsorption or desorption data according to the Freundlich equation.

Table A 2: Adsorption and desorption coefficients for nicosulfuron

Soil name	Adsorption			Desorption		
	K_F	K_{OC}	1/n	K_{DES}	$K_{OC,DES}$	1/n
PT103	0.90	64	1.0019	1.09	78	0.9999
SK961089	0.78	16	0.9325	0.91	19	0.9124
SK920191	1.04	22	0.9503	1.15	24	0.9406
SK104691	0.35	14	0.9158	0.42	17	0.9046
Matanuska	0.42	13	0.9493	0.59	18	0.9440
SK566696	0.52	65	0.9545	0.72	90	0.9589
SK179618	0.46	12	0.9514	0.57	15	0.9441
Speyer 2.1	0.11	27	0.9773	0.19	46	0.9616
TL-78517229	0.15	21	0.9554	0.21	30	0.9498
MCL	6.99	291	0.9705	7.38	307	0.9618

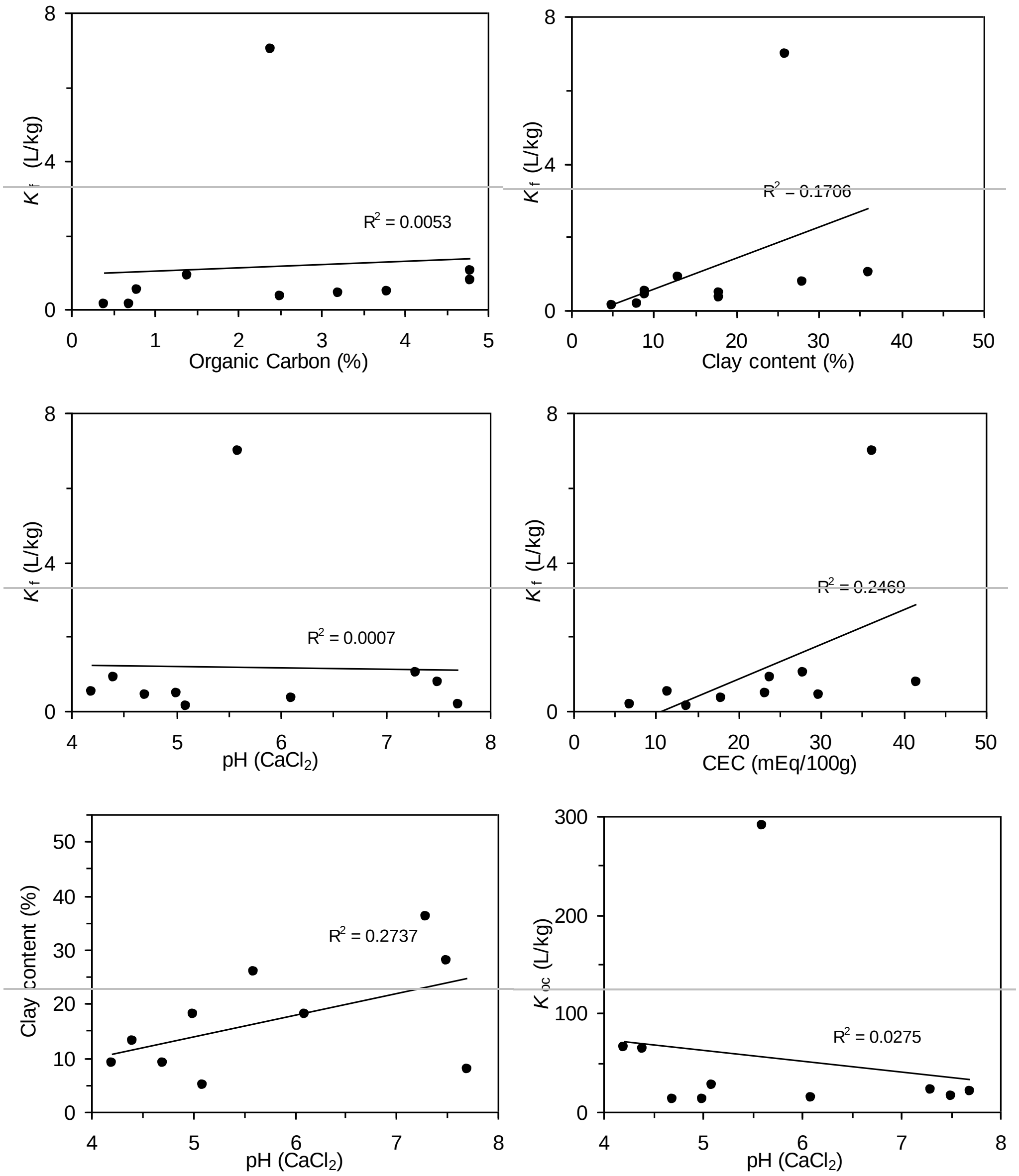
The Freundlich adsorption coefficients (K_F) ranged from 0.11 to 6.99 L/kg for the ten soils tested, demonstrating that the binding of nicosulfuron to soil exhibits considerable variability. The Freundlich adsorption coefficients related to organic carbon (K_{OC}) ranged from 12 to 291 L/kg. The Freundlich desorption coefficients were larger than those obtained for adsorption, with K_{DES} values ranging from 0.19 to 7.38 and $K_{OC,DES}$ values ranging from 15 to 307, indicating that once adsorbed, nicosulfuron is not readily desorbed. The Freundlich plots obtained showed good linearity with slopes generally close to unity, indicating that both adsorption and desorption of nicosulfuron is proportional to soil concentration over the range tested. The Freundlich exponent (1/n) ranged from 0.92 to 1.00 for adsorption and from 0.90 to 1.00 for desorption. The adsorbed and desorbed nicosulfuron concentrations are provided in Table A 3.

Table A 3: Adsorbed and desorbed nicosulfuron at each concentration

Soil name	Adsorbed concentration (µg/mL)					Desorbed concentrations (µg/mL)				
	10	5	1	0.5	0.1	10	5	1	0.5	0.1
PT103	5.3495	2.6670	0.5280	0.2551	0.0563	3.1340	1.6060	0.3217	0.1555	0.0329
SK961089	5.8475	2.8690	0.5403	0.2798	0.0514	3.7765	1.8575	0.3503	0.1753	0.0340
SK920191	5.0745	2.4565	0.4694	0.2370	0.0457	3.4525	1.7080	0.3304	0.1661	0.0319
SK104691	7.4110	3.6545	0.7286	0.3617	0.0701	3.9900	1.9520	0.4144	0.2173	0.0402
Matanuska	7.0865	3.5460	0.6926	0.3407	0.0685	4.2300	2.0360	0.4039	0.2042	0.0413
SK566696	6.9615	3.4350	0.6686	0.3266	0.0653	3.3535	1.7120	0.3256	0.1608	0.0333
SK179618	7.0485	3.5085	0.7037	0.3316	0.0664	4.1190	2.1015	0.4360	0.2009	0.0403
Speyer 2.1	9.5520	4.6570	0.9183	0.4536	0.0929	2.8980	1.3850	0.2819	0.1359	0.0275
TL 78517229	9.0095	4.5250	0.9409	0.4601	0.1358	3.0165	1.5495	0.3416	0.1684	0.0483
MCL	1.2855	0.6260	0.1208	0.0581	0.0113	1.1425	0.5593	0.1040	0.0501	0.0098

Additional analysis of the relationship between nicosulfuron adsorption and soil physicochemical properties was performed by the applicant and is provided in Figure A 1. The relationship between Freundlich adsorption coefficients (K_F) and organic carbon, clay content, pH and cation exchange capacity was examined. This analysis demonstrated that there is no correlation between nicosulfuron adsorption and any of the soil physicochemical properties examined, as the linear regression correlation coefficients (R^2) were all less than 0.25. In addition, the soils tested exhibited little correlation between clay content and pH (R^2 <0.28) allowing any separate correlation with clay content or pH to be established. Finally, the relationship between the Freundlich adsorption coefficients related to organic carbon (K_{OC}) and soil pH was examined. This also demonstrated no correlation (R^2 <0.03).

Figure A 1: Analysis of the relationship between nicosulfuron adsorption and soil properties



A.2.1.3 Conclusion

The Freundlich adsorption K_{OC} values for nicosulfuron were in the range 12 to 291, with 1/n values in the range 0.92 to 1.00. Adsorption coefficients did not correlate with organic carbon, clay content, pH or cation exchange capacity. Using mobility classes as defined by Hollis and McCall nicosulfuron is 'Moderately to Very Mobile' or has 'Medium to Very High mobility'.

A 2.2 Schneider & Holzer (2014)

Report DuPont-28685 is not submitted with this dossier but is available via Letter of Access from DuPont.

Comments of zRMS:	In support of this submission the Applicant provided two monitoring studies performed in Germany and Italy. However, before the evaluation of the studies by the zRMS was initiated, the Applicant was requested to submit analysis of representativeness of the study locations to Polish conditions to justify consideration of results of studies performed in Germany and Italy for purposes of authorisation of the product in Poland, being the only cMS for A18032E. Since no such analysis was provided, the studies were not evaluated by the zRMS and the risk to groundwater from nicosulfuron was addressed in standard FOCUS modelling (see point 8.8.2.3 of this report). The summary below is struck through as being not validated by the zRMS.

Reference:	KCA3 7.5/01
Report	Schneider, M. & Holzer, S. (2014): Groundwater monitoring for nicosulfuron and six metabolites in four representative regions in Germany. SGS Institut Fresenius Unpublished report no. DuPont-28685
Guideline(s):	Supplementary
Deviations:	No
GLP:	Yes
Acceptability:	Not evaluated by the zRMS

~~A.2.2.1 Materials and methods~~

~~Materials~~

~~Test item~~

~~Test item for analysis is nicosulfuron, which is the active ingredient in the commercial herbicidal product ACCENT® and KELVIN®. The six metabolites (IN-37740, IN-V9367, IN-J0920, IN-HYY21, IN-GDC42 and IN-64859) are formed during degradation in soil. The nicosulfuron containing product is used in conventional agricultural practice as a maize herbicide. ACCENT® contains 750 g nicosulfuron /kg and KELVIN® contains 40 g nicosulfuron/L. The maximum application rate in Germany is 45 g a.s. per ha (ACCENT®) or 40 g a.s. per ha (KELVIN®), only every two years on any one field. Applications were done in accordance with usual agricultural practice, using a conventional field crop sprayer.~~

~~Test sites~~

~~Table A 4: Summary of the characteristics of the monitoring regions~~

	~~Schleswig-Holstein~~	~~Muenster-Emsland~~	~~Suedliches Oberrheintal~~	~~Ostbayern Karst formation~~	~~Ostbayern Prealpine tertiary bassin~~
~~Geographic situation~~	~~Northern Germany Schleswig-Holstein Geest~~	~~North-Western Germany Muensterland/Emsland~~	~~South-Western Germany Upper Rhine Valley~~	~~Southern Germany Northern Bavaria~~	~~Southern Germany Southern lower Bavaria~~
~~Agricultural use~~	~~Intensive; maize, grains, potatoes~~	~~Intensive; maize, grains, potatoes~~	~~Intensive; maize, grains, specialised crops~~	~~Intensive; grains, maize~~	~~Intensive; maize, grains~~
~~Area with maize cultivation~~	~~131833 ha (2008)~~	~~305654 ha (2007/2008)~~	~~30667 ha (2007)~~	~~15336 ha (2007)~~	~~124521 ha (2007)~~
~~Climate~~	~~Oceanic climate~~	~~Oceanic to suboceanic climate~~	~~Transition from oceanic to continental climate~~	~~Continental climate~~	~~Continental climate~~
~~Precipitation/year~~	~~700-900 mm~~	~~700- 800 mm~~	~~600-900 mm~~	~~600-900 mm~~	~~600-950 mm~~
~~Mean annual temperature~~	~~7.5-9.5°C~~	~~8.5°C~~	~~9.5°C~~	~~8°C~~	~~8°C~~
~~Geology~~	~~Pleistocene sands~~	~~Pleistocene sands~~	~~Quaternary sands and gravels, in some cases with overlying strata consisting of alluvial clay or loess clay~~	~~Jurassis limestones~~	~~Pleistocene and quaternary sands, gravels, clays and marls~~
~~Aquifer~~	~~Porous aquifer~~	~~Porous aquifer~~	~~Porous aquifer~~	~~Hard rock aquifer~~	~~Porous aquifer~~
~~Annual rate of groundwater recharging~~	~~>200 to >300 mm~~	~~~200- 300 mm~~	~~Approx. 100-200 mm (possibly higher in areas of sprinkler irrigation)~~	~~<100 (loam cover) - 500 mm~~	~~<50 mm (Upper freshwater molasse) up to >200 mm (fluviatile gravels)~~
~~Depth to water table~~	~~1 to ~10 m~~	~~1 to ~15 m (mostly 1.5- 4 m)~~	~~<1 to >10 m~~	~~>10 m~~	~~1 to >10 m~~
~~Groundwater measurement points available~~	~~Yes State measurement net-work of LLUR (*State Agency for Agriculture, Environmental and Rural Areas of Schleswig-Holstein*~~	~~Yes State measurement network of the STUA Muenster (*Muenster State Office of the Environment* NLWK Lower Saxony (*Lower Saxony Office for Water Resources and Coastal Areas*~~	~~Yes State measurement network of LUBW, Baden-Wuerttemberg (*Baden-Wuerttemberg State Office for the Environment, Measurements and Environmental Protection)*~~	~~Yes State measurement network of LfU Bavaria (*Bavarian State Office for Environmental Protection)*~~	~~Yes State measurement network of the LfU Bavaria (*Bavarian State Office for Environmental Protection)*~~

~~**Table A 5: Summary of groundwater monitoring wells and hydrogeological situations**~~

~~Location~~	~~Distance of groundwater table to the soil surface (m)~~	~~Hydrological situation~~
~~*Schleswig-Holstein*~~		
~~Brekendorf~~	~~~5.5~~	~~Sand, silt, gravel (Pleistoncen / ground moraine sediments)~~
~~Alt-Bennebek~~	~~~1.5~~	~~Sand (Pleistoncen / glaciofluvatile sands)~~
~~Brelhotz~~	~~~1.5~~	~~Sand (Pleistoncen / moraine sediments)~~
~~Schlamersdort~~	~~~2~~	~~Sand, silt, gravel (Pleistoncen / ground moraine sediments)~~
~~*Muenster-Emsland*~~		
~~Vinnen-Ahmsen~~	~~~4~~	~~Sand / silt (Pleistoncen / glaciofluviatile and moraine sediments)~~
~~Flechum~~	~~~4~~	~~Sand / silt (Pleistoncen / glaciofluviatile and moraine sediments)~~
~~Dalum~~	~~~4~~	~~Sand (Pleistoncen / fluviatile sediments)~~
~~Veltrup~~	~~~2~~	~~Sand (Pleistoncen / glaciofluviatile sediments)~~
~~Ostbevern~~	~~~2.5~~	~~Sand (Pleistoncen / glacial moraine sediments)~~
~~Albersloh~~	~~~2~~	~~Sand (Pleistoncen / glacial moraine sediments)~~
~~*Suedliches Oberrheintal*~~		
~~Rheinau-Freistett~~	~~~3~~	~~Sands and gravels (Quanternary / fluviatile sediments)~~
~~Ichenheim~~	~~~3~~	~~Sands and gravels (Quanternary / fluviatile sediments)~~
~~Rheinhausen-Oberhausen~~	~~~4~~	~~Sands and gravels (Quanternary / fluviatile sediments)~~
~~*Ostbayern (Karst formation)*~~		
~~Parsberg~~	~~0~~	~~Karstified limestone (Jura / marine sediments)~~
~~Staadorf~~	~~0~~	~~Karstified limestone (Jura / marine sediments)~~
~~*Ostbayern (Prealpine tertiary basin)*~~		
~~Asing~~	~~~8~~	~~Gravel / sand (Quaternary / fluviatile terrace sediments)~~
~~Tabeckendorf~~	~~~3~~	~~Gravel / sand / silt (Quaternary – Holocene / fluviatile sediments and slope debris)~~
~~Postmuenster~~	~~~1~~	~~Sand (Quaternary / fluviatile terrace sediments)~~
~~Kricham~~	~~~9~~	~~Gravel / sand (Quaternary / fluviatile terrace sediments)~~
~~Glaslern~~	~~~2.5~~	~~Gravel / sand (Quaternary / fluviatile terrace sediments)~~

Figure A 2: Location of monitoring sites in Germany

Study design

Collection of samples

Collection of groundwater was done on a monthly basis for the first 2 years and every other month for years 3 and 4. The exact sampling dates are presented in the final reports.

All procedures were based on existing guidelines (DIN-, EN-standards) and ensure a contamination-free, representative, sampling of the shallow groundwater. This is achieved by the following procedures:

- The well cap will be cleaned with water / acetone / isopropanol before opening the seals.
- The seal (cap) of the monitoring was opened and the static groundwater level was measured with an electric depth gauge. The electric depth gauge was rinsed with tap water after each measurement.
- A submersible pump (*e.g.* Grundfos MP 1) with a flexible tube was installed in the well. The pump was lowered to a depth, which represents the middle of the well casing filled with groundwater or at least 3 meters below the ground water table if the well was deeper than 20 m.
- All components used were made from inert materials in order to minimise influences on the samples by the sampling procedure.
- Before taking the samples the stagnant water (about three times the well volume or one time the well volume at wells deeper than 20 m) was removed from the well. If during the sampling procedure no sufficient amount of ground water entered the well tube, it is sufficient

to pump until the stability of conductivity was achieved. This minimised potential risk of contamination/alteration of the samples.

- During pumping the well parameters were monitored on site. pH, conductivity, redox potential and water temperature were determined and recorded.
- Samples were filled into HDPE-bottles. At least two bottles were taken.
- After obtaining the samples, the tube material was discarded. For each monitoring well new tube material was used.
- The pump was rinsed with tap water after each sampling procedure.
- If the ground water level did not allow sampling with a pump, a bailer was used to gain the groundwater samples. In this case sampling was conducted without determination of water parameters (pH, conductivity, redox potential and water temperature).
- At locations with springs, the samples were taken by filling the samples bottles directly from the outflow of the spring or the related sampling point. The parameters pH, conductivity, redox potential and water temperature were determined from a bucket (material: stainless steel), also filled with water from the spring outflow.

Description of analytical procedures

Groundwater samples were acidified with formic acid and were analysed for nicosulfuron, IN-37740, IN-V9367, IN-J0920, IN-HYY21, IN-GDC42 and IN-64859 by high performance liquid chromatography with triple quadrupole mass spectrometric detection (LC-MS/MS). Two daughter ions of characteristic transitions of each analyte were registered. The method was based on DuPont Method DuPont-12059.

Analyte	Primary transition m/z → m/z	Confirmatory transition m/z → m/z
Nicosulfuron	411 → 213	411 → 182
IN-37740	397 → 213	397 → 106
IN-V9367	230 → 78	230 → 106
IN-J0290	156 → 57	156 → 100
IN-HYY21	315 → 213	315 → 86
IN-GDC42	316 → 106	316 → 213
IN-64859	216 → 135	216 → 108

The limit of quantification (LOQ) for the method was 0.05 µg/L for nicosulfuron and 0.10 µg/L for the metabolites. The validity of the concentration of the analytes within the groundwater samples was demonstrated by fortification experiments which were performed concurrently with the analysis of each sample set. Nicosulfuron and its metabolites were fortified at the LOQ and the level of actually measured concentrations. The results were considered as valid based on the following criteria:

- blank values were not higher than 30% of the LOQ
- mean recovery at each fortification level and for each matrix was in the range of 70-110%
- relative standard deviation for each fortification level was less or equal to 20%

A.2.2.2 Results and Discussion

During the monitoring period, residues for nicosulfuron in all samples were less than the Limit of Quantitation of 0.05 µg/L (<LOQ). Residues for the metabolites IN-37740 and IN-J0920 were also <LOQ (0.1 µg/L) in all samples. Metabolite IN-V9367, was not detected above 0.1 µg/L (LOQ) except from five monitoring points where it was observed at a maximum concentration of 1.71 µg/L. Metabolite IN-GDC42 was not detected above 0.1 µg/L (LOQ) except from three monitoring points where it was observed at a maximum concentration of 0.14 µg/L. Metabolite IN-HYY21 was not detected above 0.1 µg/L (LOQ) except from four monitoring points where it was observed at a maximum concentration of 0.81 µg/L. Metabolite IN-64859 showed a maximum concentration of 0.17 µg/L at one monitoring point and was less than LOQ (0.1 µg/L) at all other locations. The individual results from 718 samples are presented in Table A 6 through Table A 25.

~~**Table A 6: Results of analysis for nicosulfuron and 6 metabolites – Brekendorf (µg/L)**~~

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	0.12	< 0.1	0.12	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	0.11	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	0.11	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	0.11	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	0.11	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	0.13	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	0.11	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	0.14	< 0.1	0.11	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	0.16	< 0.1	0.12	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	0.11	< 0.1	0.12	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	0.11	< 0.1	0.12	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	0.12	< 0.1	0.11	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	0.16	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	0.13	< 0.1	0.12	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	0.20	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	0.20	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	0.16	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	0.11	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	0.12	< 0.1	0.10	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	0.12	< 0.1	0.11	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	0.15	< 0.1	0.12	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	0.12	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	0.11	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	0.12	< 0.1	0.15	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	0.17	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	0.17	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	0.22	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	0.21	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	0.25	< 0.1	0.11	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	0.16	< 0.1	0.10	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	0.19	< 0.1	0.10	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	0.27	< 0.1	0.13	0.12	< 0.1
Sep 2013	< 0.05	< 0.1	0.17	< 0.1	0.11	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	0.11	< 0.1	0.11	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	0.15	< 0.1	0.10	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	0.13	< 0.1	0.10	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**0.15**	**< 0.1**	**0.11**	**0.10**	**< 0.1**

~~Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L~~

Table A 7: Results of analysis for nicosulfuron and 6 metabolites – Alt-Bennebek (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	0.99	< 0.1	0.22	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	0.89	< 0.1	0.29	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	1.11	< 0.1	0.37	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	1.35	< 0.1	0.41	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	1.53	< 0.1	0.43	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	1.56	< 0.1	0.42	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	1.55	< 0.1	0.48	< 0.1	0.13
Nov 2010	< 0.05	< 0.1	1.71	< 0.1	0.46	0.13	0.17
Dec 2010	< 0.05	< 0.1	1.67	< 0.1	0.51	0.12	0.16
Jan 2011	< 0.05	< 0.1	1.57	< 0.1	0.59	0.11	0.17
Feb 2011	< 0.05	< 0.1	1.40	< 0.1	0.35	< 0.1	0.16
Mar 2011	< 0.05	< 0.1	1.26	< 0.1	0.42	< 0.1	0.16
Apr 2011	< 0.05	< 0.1	1.17	< 0.1	0.81	< 0.1	0.15
May 2011	< 0.05	< 0.1	1.02	< 0.1	0.74	< 0.1	0.14
Jun 2011	< 0.05	< 0.1	0.78	< 0.1	0.52	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	0.61	< 0.1	0.45	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	0.63	< 0.1	0.58	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	0.44	< 0.1	0.66	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	0.30	< 0.1	0.39	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	0.16	< 0.1	0.39	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	0.26	< 0.1	0.41	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	0.14	< 0.1	0.23	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	0.23	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	0.19	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	0.10	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	0.20	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	0.25	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	0.26	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	0.30	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	0.30	< 0.1	0.13	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	0.30	< 0.1	0.12	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	0.34	< 0.1	0.10	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	0.38	< 0.1	0.11	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**0.70**	**< 0.1**	**0.33**	**0.10**	**0.10**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 8: Results of analysis for nicosulfuron and 6 metabolites – Breiholz (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	0.13	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	0.17	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	0.20	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	0.25	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	0.21	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	0.19	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	0.15	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	0.23	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	0.25	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	0.14	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	0.20	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	0.23	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	0.27	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	0.35	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	0.29	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	0.48	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	0.28	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	0.30	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	0.34	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	0.56	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	0.62	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	0.50	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	0.39	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**0.22**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 9: Results of analysis for nicosulfuron and 6 metabolites – Schlamerdorf (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 10: Results of analysis for nicosulfuron and 6 metabolites – Vinnen-Ahmsen (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 11: Results of analysis for nicosulfuron and 6 metabolites – Flechum (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	0.13	< 0.1	0.12	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	0.12	< 0.1	0.10	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	0.15	< 0.1	0.11	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	0.13	< 0.1	0.10	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	0.10	< 0.1	0.11	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	0.11	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	0.10	< 0.1	0.19	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	0.12	< 0.1	0.19	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	0.10	< 0.1	0.16	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	0.13	< 0.1	0.16	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	0.15	< 0.1	0.16	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	0.17	< 0.1	0.16	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	0.23	< 0.1	0.13	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	0.25	< 0.1	0.21	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	0.29	< 0.1	0.12	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	0.26	< 0.1	0.16	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	0.24	< 0.1	0.19	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	0.24	< 0.1	0.23	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	0.21	< 0.1	0.16	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	0.18	< 0.1	0.15	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	0.22	< 0.1	0.17	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	0.24	< 0.1	0.14	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	0.30	< 0.1	0.11	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	0.37	< 0.1	0.13	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	0.51	< 0.1	0.12	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	0.36	< 0.1	0.13	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	0.24	< 0.1	0.14	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	0.26	< 0.1	0.15	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	0.30	< 0.1	0.18	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	0.55	< 0.1	0.18	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	0.45	< 0.1	0.18	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	0.43	< 0.1	0.18	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	0.44	< 0.1	0.20	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	0.45	< 0.1	0.25	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	0.36	< 0.1	0.24	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	0.36	< 0.1	0.24	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**0.26**	**< 0.1**	**0.16**	**<0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 12: Results of analysis for nicosulfuron and 6 metabolites – Dalum (µg/L)

Date	**Nico**	**IN-37740**	**IN-V9367**	**IN-J0290**	**IN-HYY21**	**IN-GDC42**	**IN-64859**
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 13: Results of analysis for nicosulfuron and 6 metabolites – Veltrup (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 14: Results of analysis for nicosulfuron and 6 metabolites – Ostbevern (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 15: Results of analysis for nicosulfuron and 6 metabolites – Albersloh (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 16: Results of analysis for nicosulfuron and 6 metabolites – Rheinau-Freistett (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 17: Results of analysis for nicosulfuron and 6 metabolites – Ichenheim (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	0.11	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	0.10	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	0.11	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	0.11	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	0.10	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	0.11	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	0.10	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**0.10**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 18: Results of analysis for nicosulfuron and 6 metabolites – Rheinhausen-Oberhausen (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	0.11	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	0.10	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	0.11	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	0.11	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	0.14	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	0.12	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	0.13	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	0.11	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	0.11	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	0.13	0.14	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	0.16	0.14	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	0.11	0.12	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**0.11**	**0.10**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 19: Results of analysis for nicosulfuron and 6 metabolites – Parsberg (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 20: Results of analysis for nicosulfuron and 6 metabolites – Staadorf (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	no sample*						
Nov 2012	no sample*						
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

[a] Water was not bearing at two sampling intervals.

~~**Table A 21: Results of analysis for nicosulfuron and 6 metabolites – Asing (µg/L)**~~

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

~~Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L~~

Table A 22: Results of analysis for nicosulfuron and 6 metabolites – Tabeckendorf (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 23: Results of analysis for nicosulfuron and 6 metabolites – Postmuenster (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 24: Results of analysis for nicosulfuron and 6 metabolites – Kirchham (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

Table A 25: Results of analysis for nicosulfuron and 6 metabolites – Glaslern (µg/L)

Date	Nico	IN-37740	IN-V9367	IN-J0290	IN-HYY21	IN-GDC42	IN-64859
Apr 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2010	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Apr 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jun 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aug 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Oct 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dec 2011	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Feb 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2012	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
May 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jul 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Sep 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Nov 2013	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Jan 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mar 2014	< 0.05	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
mean	**< 0.05**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**	**< 0.1**

Limit of quantification (LOQ) for nicosulfuron: 0.05 µg/L; limit of quantification for metabolites: 0.1 µg/L; for calculation of mean value < 0.1 µg/L was calculated as 0.1 µg/L

A.2.2.3 Conclusion

Analysis of groundwater samples collected from April 2010 through March 2014 at 20 locations in maize growing regions of Germany following application of the product ACCENT® (750 g nicosulfuron/kg WG formulation) or KELVIN® (40 g nicosulfuron/L OD formulation) in the upgradient area of these monitoring points,. resulted in residues below the Limit of Quantitation of 0.05 µg/L (<LOQ) for nicosulfuron and metabolites IN-33740 and IN-J0920. Residues for IN-GDC42, IN-64859, IN-V9367 and IN-HYY21 were <LOQ at 15 locations. IN-64859 was observed at 1 location with concentrations that ranged from <LOQ to 0.17 µg/L. IN-GDC42was observed at 3 locations with concentrations that ranged from <LOQ to 0.14 µg/L. IN-V9367 was observed at 5 locations at concentrations which ranged from <LOQ to 1.71 µg/L. IN-HYY21 was observed at 4 locations at concentrations which ranged from <LOQ to 0.81 µg/L.

Since the metabolites found at >0.1 µg/L, *i.e.*, IN-V9367, IN-HYY21, IN-GDC42 and IN-64859, are toxicologically non-relevant, the use of products containing nicosulfuron is not likely to pose a threat to ground water in Germany if the product is applied according to the label recommendations.

A 2.3 Ferrari (2016)

Comments of zRMS:	In support of this submission the Applicant provided two monitoring studies performed in Germany and Italy. However, before the evaluation of the studies by the zRMS was initiated, the Applicant was requested to submit analysis of representativeness of the study locations to Polish conditions to justify consideration of results of studies performed in Germany and Italy for purposes of authorisation of the product in Poland, being the only cMS for A18032E. Since no such analysis was provided, the studies were not evaluated by the zRMS and the risk to groundwater from nicosulfuron was addressed in standard FOCUS modelling (see point 8.8.2.3 of this report). The summary below is struck through as being not validated by the zRMS.

Reference:	KCA3 7.5/01
Report	Ferrari, F. (2016): Groundwater monitoring for 6 metabolites in maize growing regions of Italy. LABCAM s.r.l. – Centro di Saggio, Albenga (SV), Italy. Unpublished report no DuPont-40798, Interim Report N.2 (Syngenta file no ASF628_11279)
Guideline(s):	Water Quality Monitoring : preparation and conduct of studies for the trace analysis of crop protection products in water”. Technical monograph no. 20, Global Crop Protection Federation (Dec 2001).
Deviations:	No
GLP:	Yes
Acceptability:	Not evaluated

~~A.2.3.1 Summary~~

~~The purpose of this study was to monitor groundwater samples for the presence of nicosulfuron and its metabolites IN-J0290 (ADMP), IN-64859 (MU466), IN-GDC42 (UCSN), IN-37740 (HMUD), IN-HYY21 (AUSN) and IN-V9367 (ASDM). Groundwater was sampled from established monitoring wells in Italy, in different regions typical of agricultural use of the active ingredient nicosulfuron. Analysis of the samples was conducted at a GLP compliant facility using a validated analytical method. A groundwater monitoring study was requested as a condition of the first registration for DPX-MTH88 (Kelvin Duo – Reg. N. 15422) and the re-registration of the following products containing nicosulfuron straight (Accent – Reg. N. 13216, Victus – Reg. N. 13814) and nicosulfuron in mixture with rimsulfuron (Titus Mais Extra – Reg. N. 13186) in Italy. A ground water monitoring study is required based on Italian Health Committee guideline if some metabolites (according to modelling studies) are predicted by modelling to be present in the range of >0.75 and <10 micrograms/L in groundwater.~~

~~Well Selection~~

~~In the present study, representative areas were considered to reflect the real situations characterised by different soil types and by different cultivations that involve the use of different products which contained nicosulfuron. The distribution of maize cultivation, analysed by a GIS, allows the spatial representation of the information about the crop and the identification of the most typical areas of that cultivation. The potential cropping areas are identified using the Italian Agricultural Census Database (ISTAT Agricultural Census 2010). In 2010, the ISTAT (Statistic National Institute) made the 6th agricultural census which reports the surface area of each crop with a municipality detail. These data can be linked to the ESRI-shapes of the borderlines of each municipality published by ISTAT in order to create a supporting GIS.~~

~~Wells were selected in the five major representative regions of the following key maize-growing areas of Northern Italy:~~

- ~~Piemonte~~
- ~~Lombardia~~
- ~~Veneto~~
- ~~Emilia-Romagna~~
- ~~Friuli-Venezia Giulia~~

~~Within these five selected region, seven key maize-growing areas of Northern Italy were identified:~~

1. ~~Pianura Padana Piemontese~~
2. ~~Pianura Padana Novarese Settentrionale~~
3. ~~Pianura Padana Lombarda~~
4. ~~Pianura Padana Piacentina~~
5. ~~Bassa Pianura Padana~~
6. ~~Pianura Veneta~~
7. ~~Pianura Friulana~~

~~After the selection of the representative maize-growing areas, the following step was the identification of the vulnerable areas, through the consultation of appropriate vulnerability maps, drawn up by the various regional bodies operating in the field of environment (Regions, Provinces, Municipalities, and the various ARPA of each region (*Agenzia Regionale per la Prevenzione e l'Ambiente*, Regional Agency for the Prevention and the Environment).~~

~~These maps were drawn up considering a number of parameters such as depth of the aquifer, depth of the gravel roof, surface lithology, different types of aquifer (free or confined), weather condition and cropping system.~~

~~Within the medium and high vulnerable areas, that are simultaneously representative for maize cultivation, 20 wells for monitoring have been identified, following three possible alternative ways:~~

~~Identification of a suitable well already inserted in the list of monitoring wells at the disposal of the Test Facility, located in an previously selected area, after the confirmation of nicosulfuron use. Nicosulfuron containing products use in upgradient field was verified and documented by farmer and retailers interviews. The first step was the interview to pesticide retailers. Pesticide retailers in the municipality where the well is located and/or in the surrounding municipalities were contacted and interviewed to check if the nicosulfuron containing products are sold and used in the area. The second step was the preparation of a table containing a list of all the trade names of the nicosulfuron containing products, with attached a satellite image of the area concerned. Farmers who cultivate maize in the fields upstream of the well were sought and were asked to indicate on the map if, where and for how many years the products on the list are used.~~

1. ~~Identification of a new suitable well, not already inserted in the list of monitoring wells at the disposal of the Test Facility, located in a previously selected area, after the confirmation of nicosulfuron use (see point 1). New wells were identified through on-field research, in some cases with assistance from relevant authorities (ARPA, other regional or provincial bodies).~~
2. ~~Identification of a farm or of a cluster of farms, located in an previously selected area, that routinely use nicosulfuron containing products. In this farm, or in a farm of the selected cluster, the possible presence of a suitable well was ascertained. If any suitable well was found in the area, a suitable piezometer was installed, after agreement with the farmer or owner of the area. The piezometers were installed following the relative SOP.~~

~~A total of 20 wells were identified. The following points were considered and any deviation was documented:~~

- ~~The zone of aquifer recharge included land where maize crops are grown, and for which the~~

use of nicosulfuron-based products was confirmed though farmer and retailer interview;

- Areas with well-documented agricultural use of the nicosulfuron containing products based on farmer interviews;
- Where possible, the monitoring sites were chosen where upgradient fields have had nicosulfuron use going back at least 3 years.
- Wells fulfil the following criteria, in order to make sure that groundwater was not contaminated from the surface and from point sources:
- Wells were not close to places where plant protection products are stored or handled, e.g. where spray tanks are filled or cleaned;
- Wells were remote to major routes of transport (railway tracks, frequently used streets);
- Wells were clearly protected from surface contamination, in terms of location, sealing, access. They were closed;
- In terms of construction, wells were in good shape and well maintained in technical terms;
- Wells collected water from the first aquifer;

The screen of the wells started ideally at 20 meters depth from the ground level. Different depths were justified according to the characteristic of the representative aquifer of the selected areas, however it was not shallower than 10 meters or deeper than 25 meters depth from the ground level.

Table A 26: Overview of wells

Region	Province	Municipality	Well Code	Coordinates (Deg°)	Well Depth (M)	Start Screen Depth (M)
Emilia Romagna	Ferrara	Ro Ferrarese	Emr/Fe/Rof	44.949643; 11.75739	51.0	23.3
Emilia Romagna	Piacenza	Piacenza	Emr/Pc/Pia	44.992634; 9.754148	18.0	11.0
Emilia Romagna	Ferrara	Jolanda Di Savoia	Emr/Fe/Jds	44.82499; 11.92724	11.5	10.0
Veneto	Treviso	Resana	Ven/Tv/Res	45.632930; 11.92922	20.0	12.0
Veneto	Padova	San Giorgio In Bosco	Ven/Pd/Sgb	45.581631; 11.81585	15.0	12.0
Veneto	Padova	Terrassa Padovana	Ven/Pd/Tep	45.235448; 11.96517	15.0	12.0
Veneto	Rovigo	Canda	Ven/Ro/Can2	45.036420; 11.50996	18.5	17.5
Veneto	Rovigo	Loreo	Ven/Ro/Lor2	45.069450; 12.151225	11.7	10.2
Veneto	Venezia	Mira	Ven/Ve/Mir	45.414048; 12.190153	17.0	15.0
Piemonte	Torino	Villafranca	Pie/To/Vil	44.799623; 7.55716	30.0	17.0
Piemonte	Cuneo	Casalgrasso	Pie/Cn/Cas	44.826535; 7.63032	18.0	14.5
Piemonte	Novara	Borgomanero	Pie/No/Bor	45.715817; 8.47217	52.0	18.0
Lombardia	Brescia	Palazzolo Sull'oglio	Lom/Bs/Pso	45.599963; 9.88759	100.0	20.0
Lombardia	Brescia	Orzinuovi	Lom/Bs/Orz	45.401770; 10.02237	25.0	15.0
Lombardia	Cremona	Trigolo	Lom/Cr/Tri	45.326035; 9.82815	17.0	14.2
Lombardia	Cremona	Gussola	Lom/Cr/Gus	45.041233; 10.35212	35.0	15.0
Lombardia	Brescia	Lograto	Lom/Bs/Log	45,46938; 10,06243	43.0	18.0
Lombardia	Lodi	Cavenago D'adda	Lom/Lo/Cda	45.268579; 9.55962	16.0	13.0
Friuli	Udine	Gonars	Fvg/Ud/Gon	45.892160; 13.262940	20.0	19.0

Region	Province	Municipality	Well Code	Coordinates (Deg°)	Well Depth (M)	Start Screen Depth (M)
Friuli	Udine	Castions Di Strada	Fvg/Ud/Cds	45.905190; 13.212670	18.5	16.5

Table A 27: Depth of groundwater level

Well I.D. (code)	05/2014	07/2014	09/2014	11/2014	01/2015	03/2015
EMR/FE/ROF	N.A.[1]	N.A.[1]	N.A.[1]	16.43	17.60	17.20
EMR/PC/PIA	8.22	9.7	12	8.17	6.95	7.05
EMR/FE/JDS	2.01	2.06	2.2	2.2	2.1	1.97
VEN/TV/RES	N.A.[2]	N.A.[2]	N.A.[2]	N.A.[2]	N.A.[2]	N.A.[2]
VEN/PD/SGB	1.25	1.34	1.28	1.1	1.33	1.59
VEN/PD/TEP	1.49	1.68	1.89	1.85	1.62	1.73
VEN/RO/CAN2	2.60	2.76	2.82	2.6	2.7	2.5
VEN/RO/LOR2	2.00	1.75	1.72	1.34	1.75	2.3
VEN/VE/MIR	2.20	2.2	2.25	2.16	1.96	2.02
PIE/TO/VIL	N.A.[3]	N.A.[3]	N.A.[3]	N.A.[3]	N.A.[3]	N.A.[3]
PIE/CN/CAS	4.50	4.76	4.8	4.68	4.7	4.4
PIE/NO/BOR	8.40	8.4	N.A.	N.A.	N.A.	N.A.
LOM/BS/PSO	17.00	12.96	13.2	14.1	15.45	N.A.
LOM/BS/ORZ	N.A.[4]	N.A.[4]	N.A.[4]	N.A.[4]	N.A.[4]	N.A.[4]
LOM/CR/TRI	1.83	1.18	1.8	2.92	2.72	2.62
LOM/CR/GUS	N.A.[5]	N.A.[5]	N.A.[5]	N.A.[5]	N.A.[5]	N.A.[5]
LOM/BS/LOG	4.30	2	2.11	N.A.[6]	N.A.[6]	N.A.[6]
LOM/LO/CDA	5.30	4.32	4.52	4.95	5.51	5.6
FVG/UD/GON	3.80	4.23	4.16	3.54	4.05	4.78
FVG/UD/CDS	3.02	3.45	3.44	3.05	3.26	4.02
EMR/FE/ROF	N.A.[1]	17.25	14.72	16.98	17.99	N.A.[1]
EMR/PC/PIA	7.13	14.25	16.50	11.05	10.60	8.58
EMR/FE/JDS	2.08	2.29	2.51	2.37	2.45	2.16
VEN/TV/RES	N.A.[2]	N.A.[2]	N.A.[2]	N.A.[2]	N.A.[2]	N.A.[2]
VEN/PD/SGB	1.72	1.72	1.32	1.78	1.83	1.33
VEN/PD/TEP	1.60	1.75	2.04	2.33	2.89	1.77
VEN/RO/CAN2	2.76	3.10	3.05	2.94	2.94	2.40
VEN/RO/LOR2	1.78	1.77	2.52	2.28	2.14	1.95
VEN/VE/MIR	2.22	2.27	2.48	2.41	2.42	2.05
PIE/TO/VIL	N.A.[3]	N.A.[3]	N.A.[3]	N.A.[3]	N.A.[3]	N.A.[3]
PIE/CN/CAS	4.41	4.85	5.05	4.80	5.02	4.82
PIE/NO/BOR	N.A.[1]	N.A.[1]	N.A.[1]	N.A.[1]	N.A.[1]	N.A.[1]
LOM/BS/PSO	16.65	N.A.[1]	N.A.[1]	N.A.[1]	N.A.[1]	20.70
LOM/BS/ORZ	N.A.[4]	N.A.[4]	N.A.[4]	N.A.[4]	N.A.[4]	N.A.[4]
LOM/CR/TRI	2.50	2.25	2.46	2.80	2.83	2.76
LOM/CR/GUS	N.A.[5]	N.A.[5]	N.A.[5]	N.A.[5]	N.A.[5]	N.A.[5]
LOM/BS/LOG	N.A.[6]	N.A.[6]	N.A.[6]	N.A.[6]	N.A.[6]	N.A.[6]
LOM/LO/CDA	5.45	4.40	4.51	5.19	6.15	6.06
FVG/UD/GON	5.29	5.59	5.64	4.93	6.02	4.17

Well I.D. (code)	05/2014	07/2014	09/2014	11/2014	01/2015	03/2015
FVG/UD/CDS	4.55	4.90	4.95	4.51	5.43	3.80

N.A.[1] = the well is hermetically sealed. The groundwater table depth can be measured only by the authorized personnel
N.A.[2] = the well is hermetically sealed. The groundwater table depth cannot be measured. The mean groundwater table depth in the area is 0.9 m
N.A.[3] = the well is hermetically sealed. The groundwater table depth cannot be measured. The mean groundwater table depth in the area is 5 m
N.A.[4] = the well is hermetically sealed. The groundwater table depth cannot be measured. The mean groundwater table depth in the area is 1.3 m
N.A.[5] = the well is hermetically sealed. The groundwater table depth cannot be measured.
N.A.[6] = the well is locked. The groundwater table depth cannot be measured if the well owner is not on the farm.

Sampling

Where possible, before a water sample was taken, the depth to groundwater within each borehole relative to the top of the wellhead was measured and recorded. In some cases, it was not possible to collect the groundwater table depth. This was due to the reason that some wells (drinking water wells) are hermetically sealed and the groundwater table depth is measured only periodically by the authorized personnel. In the first two years of the study, collection of groundwater was performed once every other month, starting from May 2014 until March 2016 (12 sampling events) using GLP compliant practices. Samples were taken from the wells at 10-25 meters and based on the water table. Duplicate, 250 mL samples were taken at each sampling interval. All sampling procedures were taken using existing guidelines to ensure a contamination-free, representative sample of the local groundwater. This sampling frequency was selected in accordance with the relatively slow groundwater recharge and the slow groundwater flow; on this basis, groundwater concentrations typically do not fluctuate largely within a year and do not immediately respond to applications at the soil surface. In addition, the objective of monitoring is not to relate concentrations in groundwater and surface water to a single application on a nearby field but to represent the overall status, integrated over a larger area.

Therefore, in the first year of the study, 240 samples were collected (20 wells × 12 sampling events). Samples were taken in two replicates, one for analysis, and a second for back up (Replicate 1 and Replicate 2). Actual sampling dates were documented in the study records. Sampling schedules were necessarily ‘staggered’ to accommodate the logistics to obtain and analyse the samples for this study. Appropriate control samples in the field (field blanks and fortifications) and laboratory (extraction blanks and fortifications) were included to ensure reliability and validity of the sample collection and analytical procedures.

Analysis

Groundwater samples were analysed at “LABCAM s.r.l. – Centro di Saggio” (Test Facility) using a verified analytical method.

All the analytical features reported below were confirmed during the test validation.

The first 11 sampling intervals were analyzed using a LC-MS/MS Thermo HPLC Accela + TSQ Quantum Access system. The remaining samples were analyzed using a LC-MS/MS Thermo HPLC Ultimate 3000 + TSQ Quantiva system. The same method has been applied for both systems, with identical instrumental settings, except some minor tuning parameters regarding the mass spectroscopy aspects which differed slightly in order to obtain an optimization of analyte detection and the injection volume, with no impact on data quality and integrity.

The analysis of nicosulfuron and its metabolites in ground water samples was performed by direct injection and determination in positive electrospray ionization mode by liquid chromatograph with mass spectrometer triple quadrupole (LC-MS/MS).

Nicosulfuron and Metabolites Analysis in Groundwater Samples

The analytical method to determine nicosulfuron and its metabolites IN-J0290 (ADMP), IN-64859 (MU466), IN-GDC42 (UCSN), IN-37740 (HMUD), IN-HYY21 (AUSN) and IN-V9367 (ASDM) in

water was successfully validated; hence residues in water samples from wells were determined.
In compliance to Document SANCO/3029/99 rev.4, section 4, the method was considered adequate and was accurate in the range 70-110% with a precision within 20%.

Water samples were analyzed for nicosulfuron and metabolites, using the validated method, with the following limit of quantification:

Method LOQ for nicosulfuron : 0.05 µg/L
Method LOQ the metabolites: 0.10 µg/L

For the first three sample series only the "Quant" transition was monitored. For samples with a concentration measured ≥ LOQ, the relative intensity of "Qual" transition to confirm the identity of compound. After the first three sample series, as the Sponsor suggested, both transitions were monitored. Results, quantified with "Quant" transition, were reported in Tables only if confirmed by "Qual" transition.

In the first two years of the study (May 2014 to March 2016), residues of nicosulfuron were determined to be <0.05 µg/L (LOQ) at all monitoring points. The concentration of the metabolites were all <0.1 µg/L except for IN-HYY21 (AUSN) which showed three detections at one location up to 0.133 µg/L and also IN-V9367 (ASDM) which showed one detection at one location up to 0.103 µg/L.

For every sample set, a point of the calibration curve was re-injected at the end of the analytical sequence, as "Quality Control" (QC); moreover, as Sponsor suggested, after the third sample series was evaluated, the recovery of an independent blank sample fortified with all the interesting analytes was conducted, intended as "Process Recovery" (PR).

In the first two years of the study (May 2014 to March 2016), residues of nicosulfuron were determined to be <0.05 µg/L (LOQ) at all monitoring points. The concentration of the metabolites were all <0.1 µg/L except for IN-HYY21 (AUSN) which showed three detections at one location up to 0.133 µg/L and also IN-V9367 (ASDM) which showed one detection at one location up to 0.103 µg/L.
A summary of the measured residues for nicosulfuron and its metabolites IN-J0290 (ADMP), IN-64859 (MU466), IN-GDC42 (UCSN), IN-37740 (HMUD), IN-HYY21 (AUSN) and IN-V9367 (ASDM) concentrations in groundwater (µg/L) detected during the study is presented below:

- Groundwater concentrations of Nicosulfuron were all < 0.05 µg/L.
- Groundwater concentrations of IN-J0290 (ADMP) were all < 0.10 µg/L.
- Groundwater concentrations of IN-64859 (MU466) were all < 0.10 µg/L.
- Groundwater concentrations of IN-GDC42 (UCSN) were all < 0.10 µg/L.
- Groundwater concentrations of IN-37740 (HMUD) were all < 0.10 µg/L.
- Groundwater concentrations of IN-HYY21 (AUSN) ranged from < 0.10 µg/L to 0.133 µg/L.
- Groundwater concentrations of IN-V9367 (ASDM) ranged from < 0.10 µg/L to 0.103 µg/L.

Analysis of nitrate in groundwater samples showed almost all samples were above the method limit of quantification (> 0.05 mg/L) with 118 samples above the concentration of 10 mg/L.

Appendix 3 Additional information provided by the applicant

A 3.1 Output of ESCAPE v2.0 for PEC_S calculations

Please Note: Default soil tillage depth 5 cm were used in all ESCAPE calculations. Where substance DT_{90} < 1 year, the $PEC_{S,plateau}$ and $PEC_{S,accumulation}$ are not presented in the final results tables in section 8.7. Where substance DT_{90} > 1 year, $PEC_{S,accumulation}$ = $PEC_{S, initial}$ + [$PEC_{S,plateau}$ (with 5cm tillage depth) ÷ 4].

A 3.1.1 Dicamba and DCSA, post-emergence application of 187.5 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 10:52:30
Calculation problem: Dicamba_Maize_187.5g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_187.5g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 187.5
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

Compound	Molecular mass(g/mol)	Formation (%)	
Dicamba	221		
NOA414746	207	877	75

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a single metabolite

Kinetics for Dicamba: Single First order (SFO)
DT50 (d): 5.5
Rate constant (1/d): 0.126
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for NOA414746: Single First order (SFO)
DT50 (d): 12
Rate constant (1/d): 0.0578
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

RESULTS FOR: Dicamba

Calculations over one year

Maximum annual total soil concentration for Dicamba over 5 cm(mg/kg): 0.1875 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Dicamba after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.1653	0.1764	0	1
2	0.1457	0.1660	0	2
4	0.1133	0.1475	0	4
7	0.0776	0.1247	0	7
14	0.0321	0.0882	0	14
21	0.0133	0.0659	0	21
28	0.0055	0.0516	0	28
42	0.0009	0.0353	0	42
50	0.0003	0.0297	0	50
100	<0.0001	0.0149	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Dicamba over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 0% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Dicamba over 5 cm considering accumulation* (mg/kg) 0.1875
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Dicamba(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.1653	0.1764	0	1
2	0.1457	0.1660	0	2
4	0.1133	0.1475	0	4
7	0.0776	0.1247	0	7
14	0.0321	0.0882	0	14
21	0.0133	0.0659	0	21
28	0.0055	0.0516	0	28
42	0.0009	0.0353	0	42
50	0.0003	0.0297	0	50
100	<0.0001	0.0149	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

In the simulation a final plateau was estimated significantly higher than the residues after 10 years.
These results may not be reliable. Please check whether the separation of residues is reasonable for the simulation.
If possible select a more suitable degradation kinetics for the simulation!

RESULTS FOR: NOA414746

Calculations over one year

Maximum annual total soil concentration for NOA414746 over 5 cm(mg/kg): 0.0700 occurring on day 11^
(^ This is 39.89 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for NOA414746 after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0700	0.0700	11	12
2	0.0695	0.0699	10	12
4	0.0675	0.0697	10	14
7	0.0626	0.0690	8	15
14	0.0484	0.0662	6	20
21	0.0350	0.0620	4	25
28	0.0245	0.0571	3	31
42	0.0114	0.0473	1	43
50	0.0073	0.0423	1	51
100	0.0004	0.0233	0	100

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for NOA414746 over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

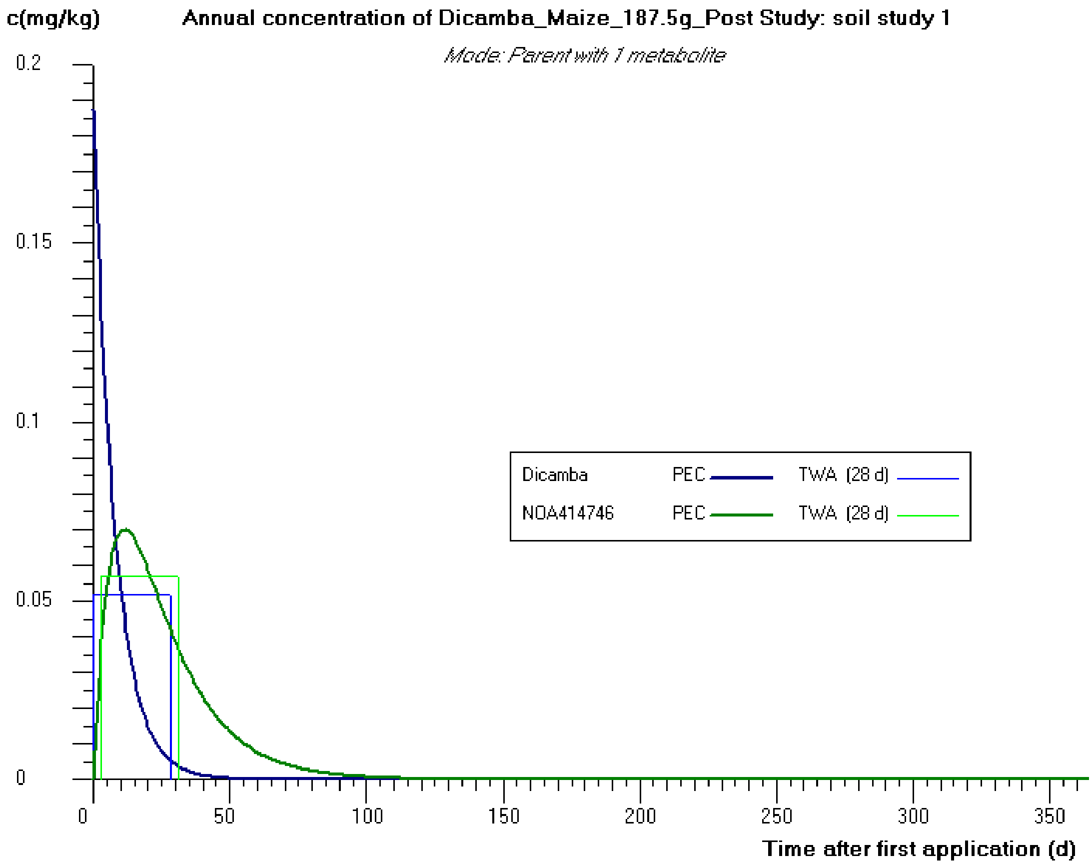
Maximum total soil concentration for NOA414746 over 5 cm considering accumulation* (mg/kg) 0.0700
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for NOA414746(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0700	0.0700	11	12
2	0.0695	0.0699	10	12
4	0.0675	0.0697	10	14
7	0.0626	0.0690	8	15
14	0.0484	0.0662	6	20
21	0.0350	0.0620	4	25
28	0.0245	0.0571	3	31
42	0.0114	0.0473	1	43
50	0.0073	0.0423	1	51
100	0.0004	0.0233	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.2 Dicamba and DCSA, post-emergence application of 125 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 07:53:17
Calculation problem: Dicamba_Maize_125g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_125g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 125
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

Compound	Molecular mass(g/mol)	Formation (%)	
Dicamba	221		
NOA414746	207	877	75

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a single metabolite

Kinetics for Dicamba: Single First order (SFO)
DT50 (d): 5.5
Rate constant (1/d): 0.126
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for NOA414746: Single First order (SFO)
DT50 (d): 12
Rate constant (1/d): 0.0578
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

RESULTS FOR: Dicamba

Calculations over one year

Maximum annual total soil concentration for Dicamba over 5 cm(mg/kg): 0.1250 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Dicamba after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.1102	0.1176	0	1
2	0.0972	0.1106	0	2
4	0.0755	0.0983	0	4
7	0.0517	0.0832	0	7
14	0.0214	0.0588	0	14
21	0.0089	0.0439	0	21
28	0.0037	0.0344	0	28
42	0.0006	0.0235	0	42
50	0.0002	0.0198	0	50
100	<0.0001	0.0099	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Dicamba over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 0% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Dicamba over 5 cm considering accumulation* (mg/kg) 0.1250
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Dicamba(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.1102	0.1176	0	1
2	0.0972	0.1106	0	2
4	0.0755	0.0983	0	4
7	0.0517	0.0832	0	7
14	0.0214	0.0588	0	14
21	0.0089	0.0439	0	21
28	0.0037	0.0344	0	28
42	0.0006	0.0235	0	42
50	0.0002	0.0198	0	50
100	<0.0001	0.0099	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

In the simulation a final plateau was estimated significantly higher than the residues after 10 years.
These results may not be reliable. Please check whether the separation of residues is reasonable for the simulation.
If possible select a more suitable degradation kinetics for the simulation!

RESULTS FOR: NOA414746

Calculations over one year

Maximum annual total soil concentration for NOA414746 over 5 cm(mg/kg): 0.0467 occurring on day 11^
(^ This is 39.89 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for NOA414746 after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0467	0.0467	11	12
2	0.0463	0.0466	10	12
4	0.0450	0.0464	10	14
7	0.0417	0.0460	8	15
14	0.0322	0.0441	6	20
21	0.0233	0.0413	4	25
28	0.0163	0.0381	3	31
42	0.0076	0.0315	1	43
50	0.0048	0.0282	1	51
100	0.0003	0.0156	0	100

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for NOA414746 over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

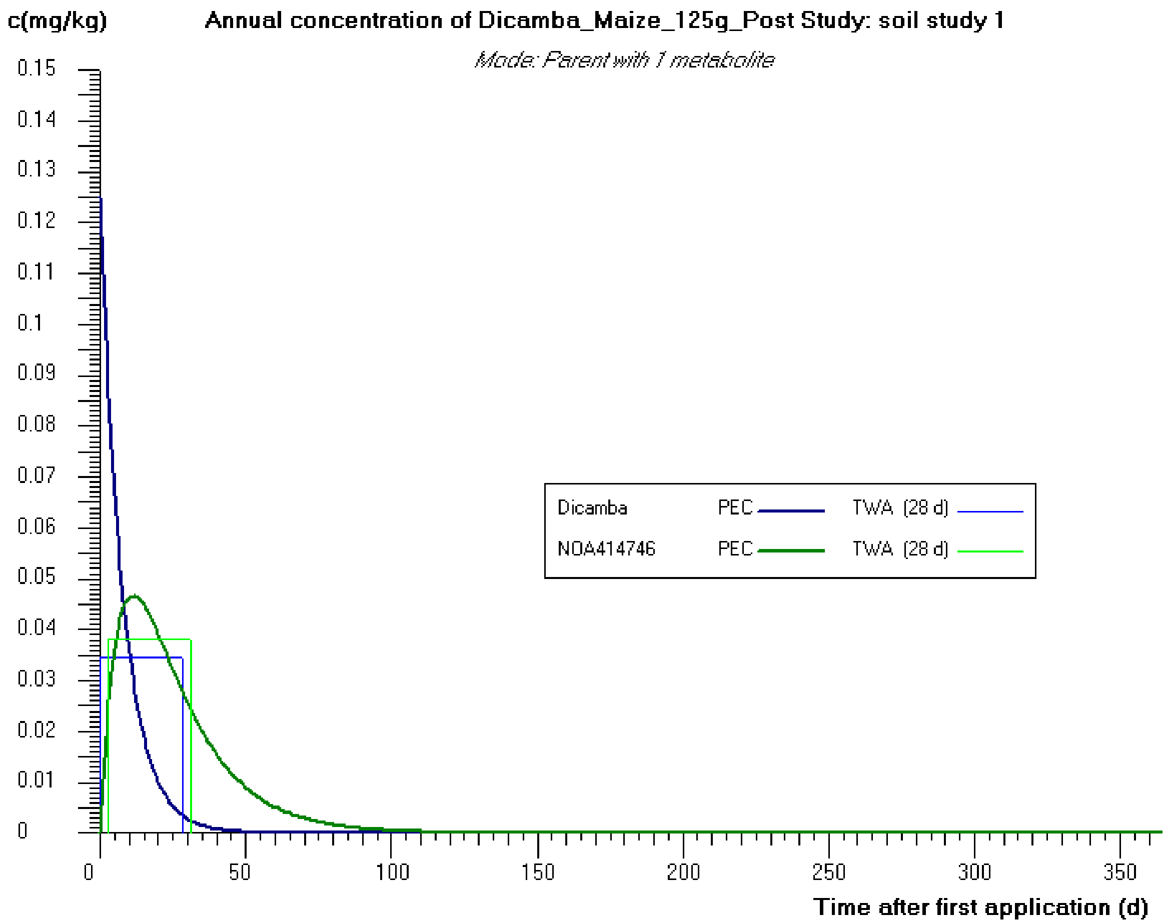
Maximum total soil concentration for NOA414746 over 5 cm considering accumulation* (mg/kg) 0.0467
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for NOA414746(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0467	0.0467	11	12
2	0.0463	0.0466	10	12
4	0.0450	0.0464	10	14
7	0.0417	0.0460	8	15
14	0.0322	0.0441	6	20
21	0.0233	0.0413	4	25
28	0.0163	0.0381	3	31
42	0.0076	0.0315	1	43
50	0.0048	0.0282	1	51
100	0.0003	0.0156	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.3 Mesotrione, MNBA and AMBA, post-emergence application of 90 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 15/04/2016, 11:18:46
Calculation problem: Mesotrione_Maize_90g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_90g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 90
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

Compound Molecular mass(g/mol) Formation (%)
Mesotrione 339.3
MNBA 245 3.2 100
AMBA 215 105.6 25

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a sequence of two metabolites

Kinetics for Mesotrione: Single First order (SFO)
DT50 (d): 28.7

Rate constant (1/d): 0.0242
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for MNBA: Single First order (SFO)
DT50 (d): 15.7
Rate constant (1/d): 0.0441
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for AMBA: Single First order (SFO)
DT50 (d): 58.7
Rate constant (1/d): 0.0118
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

RESULTS FOR: Mesotrione

Calculations over one year

Maximum annual total soil concentration for Mesotrione over 5 cm(mg/kg): 0.0900 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Mesotrione after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0879	0.0889	0	1
2	0.0858	0.0879	0	2
4	0.0817	0.0858	0	4
7	0.0760	0.0828	0	7
14	0.0642	0.0764	0	14
21	0.0542	0.0706	0	21
28	0.0458	0.0654	0	28
42	0.0326	0.0566	0	42
50	0.0269	0.0523	0	50
100	0.0080	0.0339	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Mesotrione over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Mesotrione over 5 cm considering accumulation* (mg/kg) 0.0900
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Mesotrione(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0879	0.0889	0	1
2	0.0858	0.0879	0	2
4	0.0817	0.0858	0	4
7	0.0760	0.0828	0	7
14	0.0642	0.0764	0	14
21	0.0542	0.0706	0	21
28	0.0458	0.0654	0	28
42	0.0327	0.0566	0	42
50	0.0269	0.0523	0	50
100	0.0081	0.0340	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: MNBA

Calculations over one year

Maximum annual total soil concentration for MNBA over 5 cm(mg/kg): 0.0175 occurring on day 30^
(^ This is 26.99 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for MNBA after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0175	0.0175	30	31
2	0.0175	0.0175	29	31
4	0.0174	0.0175	28	32
7	0.0172	0.0175	27	34
14	0.0162	0.0174	24	38
21	0.0150	0.0172	21	42
28	0.0136	0.0170	18	46
42	0.0108	0.0163	14	56
50	0.0093	0.0158	12	62
100	0.0032	0.0124	4	104

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for MNBA over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for MNBA over 5 cm considering accumulation* (mg/kg) 0.0175
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for MNBA(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0175	0.0175	30	31
2	0.0175	0.0175	29	31

4	0.0174	0.0175	28	32
7	0.0172	0.0175	27	34
14	0.0162	0.0174	24	38
21	0.0150	0.0172	21	42
28	0.0136	0.0170	18	46
42	0.0108	0.0163	14	56
50	0.0093	0.0158	12	62
100	0.0032	0.0124	4	104

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

RESULTS FOR: AMBA

Calculations over one year

Maximum annual total soil concentration for AMBA over 5 cm(mg/kg): 0.0066 occurring on day 87^
(^ This is 11.65 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for AMBA after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0066	0.0066	86	87
2	0.0066	0.0066	86	88
4	0.0066	0.0066	85	89
7	0.0066	0.0066	83	90
14	0.0065	0.0066	80	94
21	0.0064	0.0066	77	98
28	0.0062	0.0066	73	101
42	0.0057	0.0065	68	110
50	0.0054	0.0065	64	114
100	0.0036	0.0061	47	147

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for AMBA over 5 cm(mg/kg)*: 0.0002**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0002

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for AMBA over 5 cm considering accumulation* (mg/kg) 0.0068
(* a tillage depth of 5 cm was considered for calculating the background concentration)

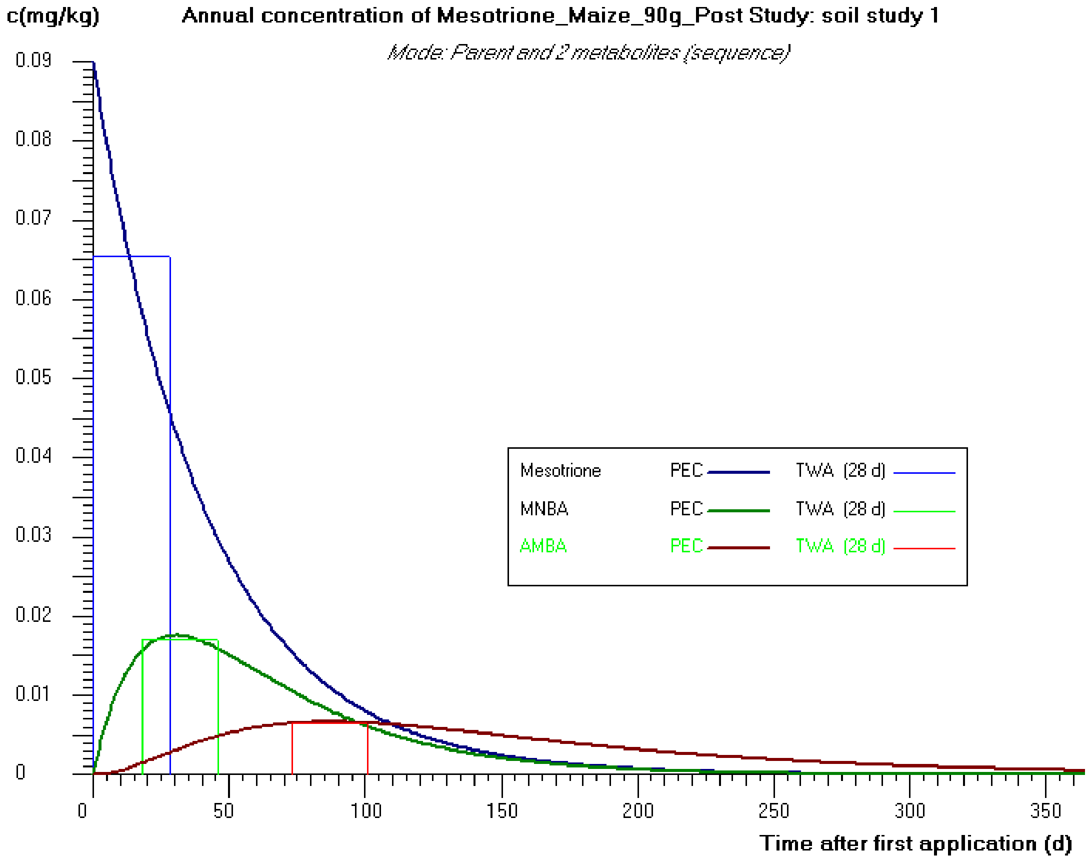
Calculated time dependent total soil concentrations over 5 cm for AMBA(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0068	0.0068	86	87
2	0.0068	0.0068	86	88
4	0.0068	0.0068	85	89
7	0.0068	0.0068	83	90
14	0.0067	0.0068	80	94
21	0.0065	0.0068	77	98
28	0.0064	0.0068	73	101
42	0.0059	0.0067	68	110

50	0.0056	0.0067	64	114
100	0.0037	0.0063	47	147

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.4 Mesotrione, MNBA and AMBA, post-emergence application of 67.5 g a.s./ha in maize

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (18 November 2016)
Date of this simulation: 21/11/2016, 09:16:30
Calculation problem: Mesotrione_Maize_67.5g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_67.5g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 67.5
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

Compound	Molecular mass(g/mol)	Formation (%)	
Mesotrione	339.3		
MNBA 245		3.2	100
AMBA 215		105.6	25

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a sequence of two metabolites

Kinetics for Mesotrione: Single First order (SFO)
DT50 (d): 28.7
Rate constant (1/d): 0.0242
Q10-factor: 2.58

Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for MNBA: Single First order (SFO)
DT50 (d): 15.7
Rate constant (1/d): 0.0441
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for AMBA: Single First order (SFO)
DT50 (d): 58.7
Rate constant (1/d): 0.0118
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

RESULTS FOR: Mesotrione

Calculations over one year

Maximum annual total soil concentration for Mesotrione over 5 cm(mg/kg): 0.0675 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Mesotrione after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0659	0.0667	0	1
2	0.0643	0.0659	0	2
4	0.0613	0.0643	0	4
7	0.0570	0.0621	0	7
14	0.0481	0.0573	0	14
21	0.0406	0.0529	0	21
28	0.0343	0.0491	0	28
42	0.0245	0.0424	0	42
50	0.0202	0.0392	0	50
100	0.0060	0.0255	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Mesotrione over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Mesotrione over 5 cm considering accumulation* (mg/kg) 0.0675
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Mesotrione(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0659	0.0667	0	1
2	0.0643	0.0659	0	2
4	0.0613	0.0644	0	4
7	0.0570	0.0621	0	7
14	0.0481	0.0573	0	14
21	0.0407	0.0530	0	21
28	0.0343	0.0491	0	28
42	0.0245	0.0424	0	42
50	0.0202	0.0392	0	50
100	0.0060	0.0255	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: MNBA

Calculations over one year

Maximum annual total soil concentration for MNBA over 5 cm(mg/kg): 0.0132 occurring on day 30^
(^ This is 26.99 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for MNBA after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0132	0.0132	30	31
2	0.0131	0.0132	29	31
4	0.0131	0.0131	28	32
7	0.0129	0.0131	27	34
14	0.0122	0.0130	24	38
21	0.0112	0.0129	21	42
28	0.0102	0.0127	18	46
42	0.0081	0.0122	14	56
50	0.0070	0.0119	12	62
100	0.0024	0.0093	4	104

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for MNBA over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for MNBA over 5 cm considering accumulation* (mg/kg) 0.0132
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for MNBA(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0132	0.0132	30	31
2	0.0131	0.0132	29	31
4	0.0131	0.0131	28	32
7	0.0129	0.0131	27	34
14	0.0122	0.0130	24	38

21	0.0112	0.0129	21	42
28	0.0102	0.0127	18	46
42	0.0081	0.0122	14	56
50	0.0070	0.0119	12	62
100	0.0024	0.0093	4	104

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

RESULTS FOR: AMBA

Calculations over one year

Maximum annual total soil concentration for AMBA over 5 cm(mg/kg): 0.0050 occurring on day 87^
(^ This is 11.65 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for AMBA after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0050	0.0050	86	87
2	0.0050	0.0050	86	88
4	0.0050	0.0050	85	89
7	0.0050	0.0050	83	90
14	0.0049	0.0050	80	94
21	0.0048	0.0050	77	98
28	0.0046	0.0049	73	101
42	0.0043	0.0049	68	110
50	0.0041	0.0049	64	114
100	0.0027	0.0045	47	147

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for AMBA over 5 cm(mg/kg)*: 0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for AMBA over 5 cm considering accumulation* (mg/kg) 0.0051
(* a tillage depth of 5 cm was considered for calculating the background concentration)

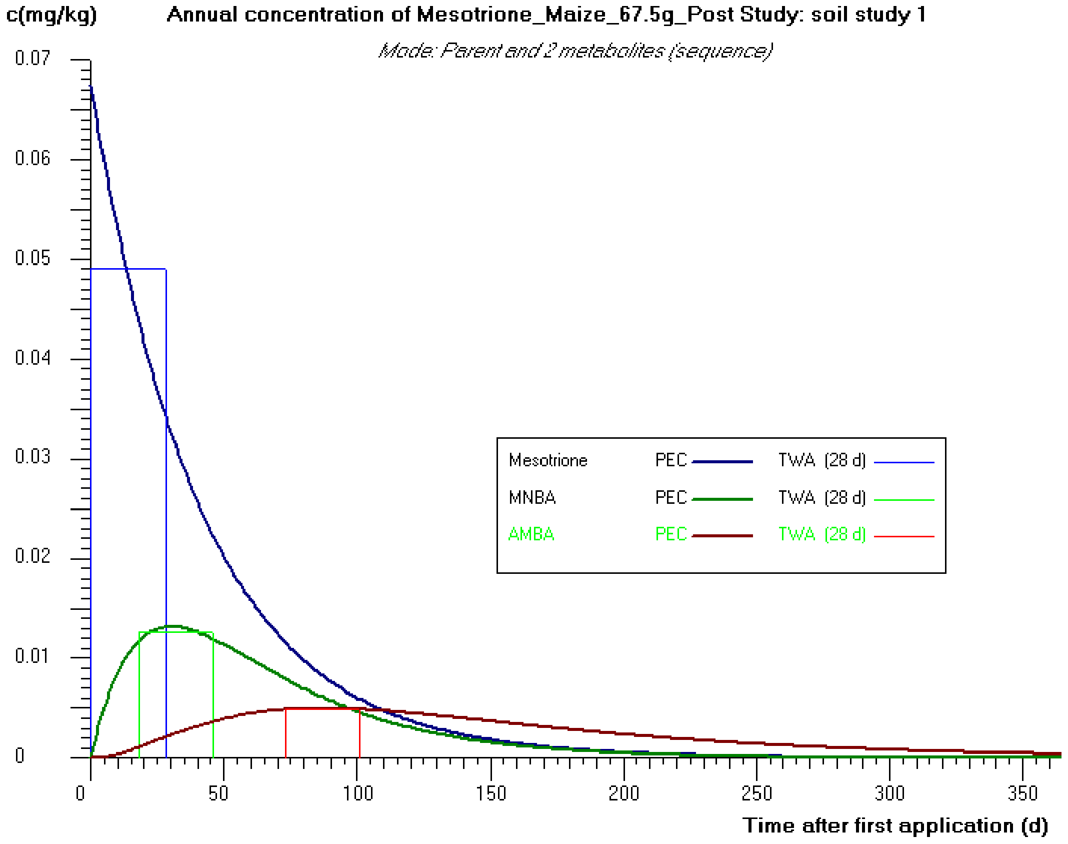
Calculated time dependent total soil concentrations over 5 cm for AMBA(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0051	0.0051	86	87
2	0.0051	0.0051	86	88
4	0.0051	0.0051	85	89
7	0.0051	0.0051	83	90
14	0.0050	0.0051	80	94
21	0.0049	0.0051	77	98
28	0.0048	0.0051	73	101
42	0.0044	0.0050	68	110
50	0.0042	0.0050	64	114
100	0.0028	0.0047	47	147

(* a tillage depth of 5 cm was considered for calculating the background concentration)

(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.5 Mesotrione, MNBA and AMBA, post-emergence application of 60 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 15/04/2016, 11:18:31
Calculation problem: Mesotrione_Maize_60g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_60g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 60
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

Compound	Molecular mass(g/mol)	Formation (%)	
Mesotrione	339.3		
MNBA 245		3.2	100
AMBA 215		105.6	25

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a sequence of two metabolites

Kinetics for Mesotrione: Single First order (SFO)
DT50 (d): 28.7
Rate constant (1/d): 0.0242
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for MNBA: Single First order (SFO)
DT50 (d): 15.7
Rate constant (1/d): 0.0441
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for AMBA: Single First order (SFO)
DT50 (d): 58.7
Rate constant (1/d): 0.0118
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

RESULTS FOR: Mesotrione

Calculations over one year

Maximum annual total soil concentration for Mesotrione over 5 cm(mg/kg): 0.0600 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Mesotrione after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0586	0.0593	0	1
2	0.0572	0.0586	0	2
4	0.0545	0.0572	0	4
7	0.0507	0.0552	0	7
14	0.0428	0.0509	0	14
21	0.0361	0.0471	0	21
28	0.0305	0.0436	0	28
42	0.0218	0.0377	0	42
50	0.0179	0.0348	0	50
100	0.0054	0.0226	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Mesotrione over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Mesotrione over 5 cm considering accumulation* (mg/kg) 0.0600
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Mesotrione(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0586	0.0593	0	1
2	0.0572	0.0586	0	2
4	0.0545	0.0572	0	4
7	0.0507	0.0552	0	7
14	0.0428	0.0509	0	14
21	0.0361	0.0471	0	21
28	0.0305	0.0436	0	28
42	0.0218	0.0377	0	42
50	0.0179	0.0348	0	50
100	0.0054	0.0226	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: MNBA

Calculations over one year

Maximum annual total soil concentration for MNBA over 5 cm(mg/kg): 0.0117 occurring on day 30^
(^ This is 26.99 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for MNBA after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0117	0.0117	30	31
2	0.0117	0.0117	29	31
4	0.0116	0.0117	28	32
7	0.0114	0.0117	27	34
14	0.0108	0.0116	24	38
21	0.0100	0.0115	21	42
28	0.0090	0.0113	18	46
42	0.0072	0.0109	14	56
50	0.0062	0.0105	12	62
100	0.0021	0.0083	4	104

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for MNBA over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for MNBA over 5 cm considering accumulation* (mg/kg) 0.0117
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for MNBA(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0117	0.0117	30	31
2	0.0117	0.0117	29	31
4	0.0116	0.0117	28	32
7	0.0114	0.0117	27	34
14	0.0108	0.0116	24	38
21	0.0100	0.0115	21	42
28	0.0091	0.0113	18	46
42	0.0072	0.0109	14	56
50	0.0062	0.0105	12	62
100	0.0021	0.0083	4	104

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

RESULTS FOR: AMBA

Calculations over one year

Maximum annual total soil concentration for AMBA over 5 cm(mg/kg): 0.0044 occurring on day 87^
(^ This is 11.65 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for AMBA after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0044	0.0044	86	87
2	0.0044	0.0044	86	88
4	0.0044	0.0044	85	89
7	0.0044	0.0044	83	90
14	0.0043	0.0044	80	94
21	0.0042	0.0044	77	98
28	0.0041	0.0044	73	101
42	0.0038	0.0044	68	110
50	0.0036	0.0043	64	114
100	0.0024	0.0040	47	147

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for AMBA over 5 cm(mg/kg)*: 0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for AMBA over 5 cm considering accumulation* (mg/kg) 0.0046
(* a tillage depth of 5 cm was considered for calculating the background concentration)

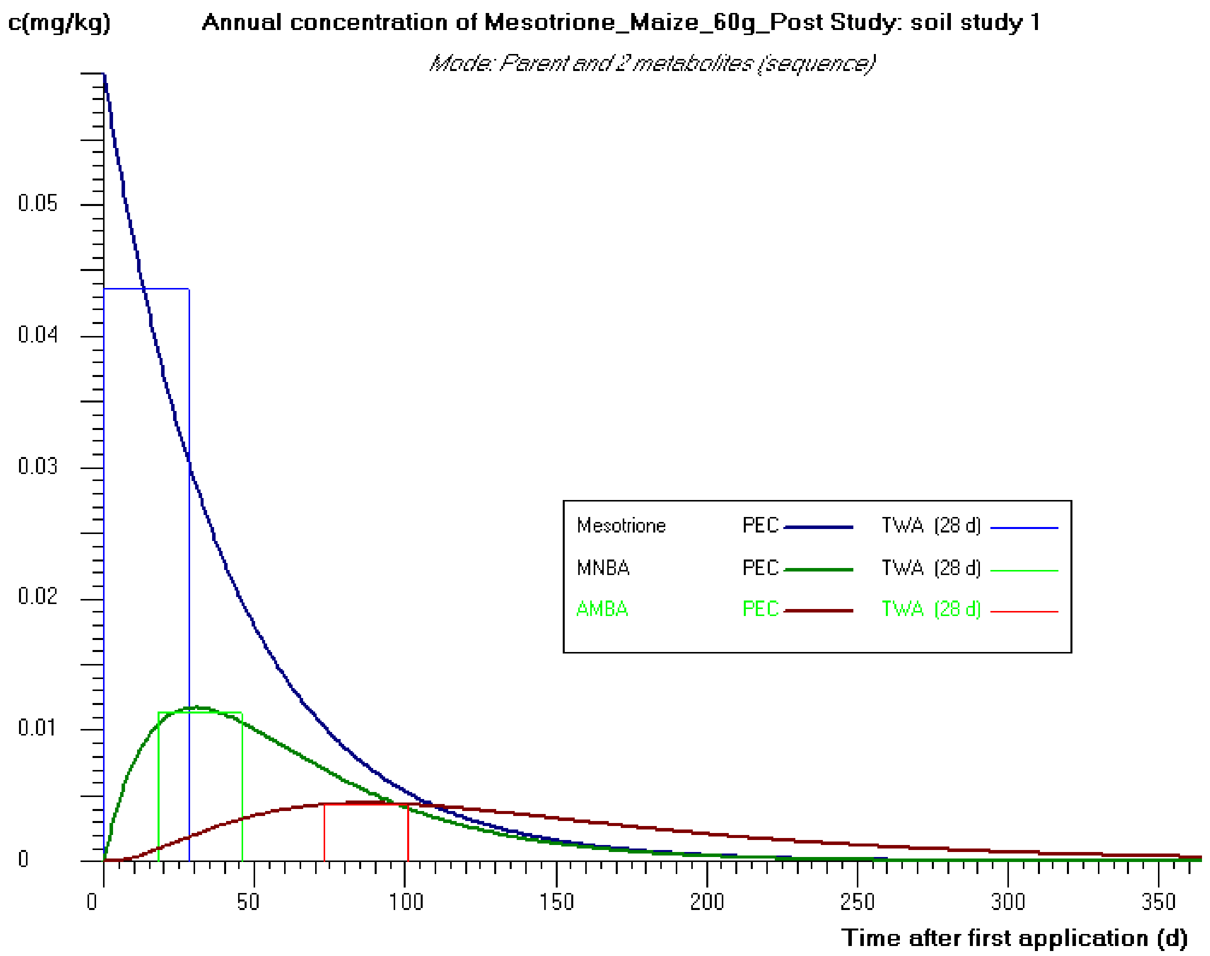
Calculated time dependent total soil concentrations over 5 cm for AMBA(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0046	0.0046	86	87
2	0.0046	0.0046	86	88

4	0.0045	0.0046	85	89
7	0.0045	0.0046	83	90
14	0.0045	0.0045	80	94
21	0.0044	0.0045	77	98
28	0.0042	0.0045	73	101
42	0.0039	0.0045	68	110
50	0.0037	0.0045	64	114
100	0.0025	0.0042	47	147

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.6 Nicosulfuron, HMUD and AUSN, post-emergence application of 60 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 08:10:49
Calculation problem: Nico+HMUD+AUSN_Maize_60g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_60g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 60
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

Compound Molecular mass(g/mol) Formation (%)
Nicosulfuron 410.4
HMUD 396.4 3.9 44.2
AUSN 314.3 13 68.7

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a sequence of two metabolites

Kinetics for Nicosulfuron: Single First order (SFO)

DT50 (d): 63
Rate constant (1/d): 0.011
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for HMUD: Single First order (SFO)
DT50 (d): 30.8
Rate constant (1/d): 0.0225
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for AUSN: Single First order (SFO)
DT50 (d): 218.2
Rate constant (1/d): 0.0032
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0600 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0593	0.0597	0	1
2	0.0587	0.0593	0	2
4	0.0574	0.0587	0	4
7	0.0556	0.0577	0	7
14	0.0514	0.0556	0	14
21	0.0476	0.0536	0	21
28	0.0441	0.0516	0	28
42	0.0378	0.0480	0	42
50	0.0346	0.0461	0	50
100	0.0200	0.0364	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0011**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0011

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0611
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0604	0.0608	0	1
2	0.0598	0.0604	0	2
4	0.0585	0.0598	0	4
7	0.0567	0.0588	0	7
14	0.0525	0.0567	0	14
21	0.0487	0.0547	0	21
28	0.0452	0.0527	0	28
42	0.0389	0.0491	0	42
50	0.0357	0.0473	0	50
100	0.0211	0.0375	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: HMUD

Calculations over one year

Maximum annual total soil concentration for HMUD over 5 cm(mg/kg): 0.0064 occurring on day 62^
(^ This is 11.02 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for HMUD after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0064	0.0064	62	63
2	0.0064	0.0064	61	63
4	0.0064	0.0064	60	64
7	0.0064	0.0064	59	66
14	0.0063	0.0064	55	69
21	0.0061	0.0064	52	73
28	0.0059	0.0063	49	77
42	0.0055	0.0063	44	86
50	0.0052	0.0062	41	91
100	0.0035	0.0058	26	126

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for HMUD over 5 cm(mg/kg)*: 0.0002**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0002

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for HMUD over 5 cm considering accumulation* (mg/kg) 0.0066
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for HMUD(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0066	0.0066	62	63
2	0.0066	0.0066	61	63

4	0.0066	0.0066	60	64
7	0.0066	0.0066	59	66
14	0.0065	0.0066	55	69
21	0.0063	0.0066	52	73
28	0.0062	0.0066	49	77
42	0.0057	0.0065	44	86
50	0.0055	0.0065	41	91
100	0.0038	0.0060	26	126

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

RESULTS FOR: AUSN

Calculations over one year

Maximum annual total soil concentration for AUSN over 5 cm(mg/kg): 0.0081 occurring on day 216^
(^ This is 17.56 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for AUSN after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0081	0.0081	216	217
2	0.0081	0.0081	215	217
4	0.0081	0.0081	214	218
7	0.0081	0.0081	213	220
14	0.0080	0.0081	209	223
21	0.0080	0.0081	206	227
28	0.0080	0.0081	203	231
42	0.0079	0.0081	196	238
50	0.0078	0.0080	193	243
100	0.0072	0.0080	171	271

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for AUSN over 5 cm(mg/kg)*: 0.0057**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0057

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for AUSN over 5 cm considering accumulation* (mg/kg) 0.0137
(* a tillage depth of 5 cm was considered for calculating the background concentration)

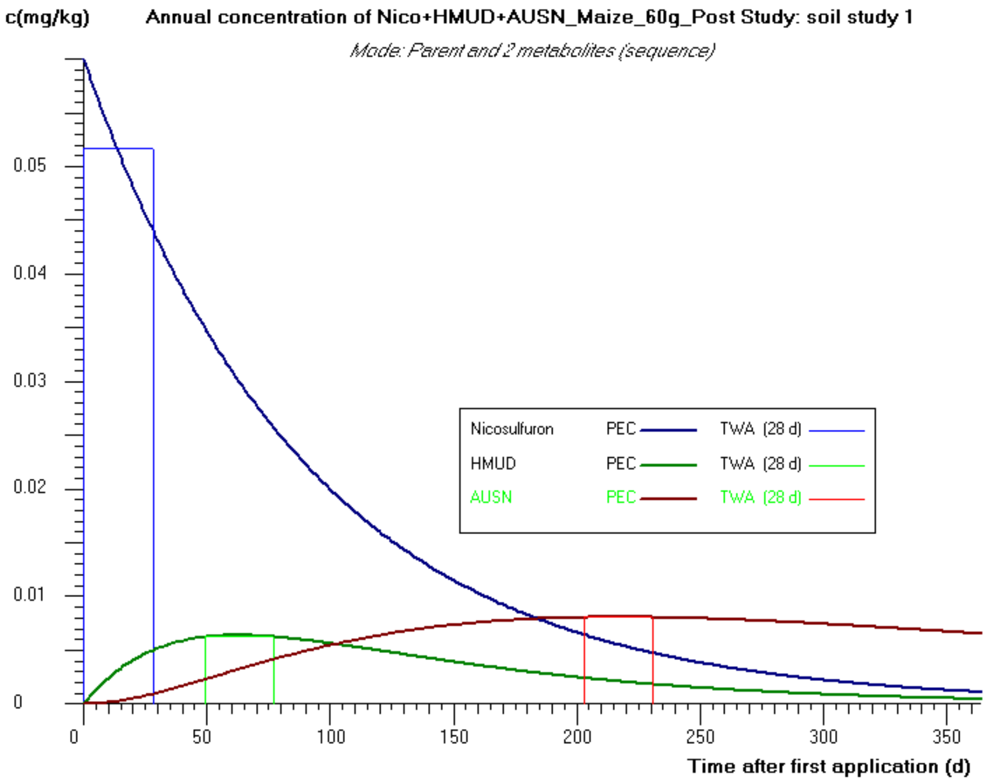
Calculated time dependent total soil concentrations over 5 cm for AUSN(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0137	0.0137	216	217
2	0.0137	0.0137	215	217
4	0.0137	0.0137	214	218
7	0.0137	0.0137	213	220
14	0.0137	0.0137	209	223
21	0.0137	0.0137	206	227
28	0.0137	0.0137	203	231
42	0.0136	0.0137	196	238

50	0.0135	0.0137	193	243
100	0.0129	0.0136	171	271

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.7 Nicosulfuron, HMUD and AUSN, post-emergence application of 45 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 09:51:04
Calculation problem: Nico+HMUD+AUSN_Maize_45g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_45g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 45
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

Compound Molecular mass(g/mol) Formation (%)
Nicosulfuron 410.4
HMUD 396.4 3.9 44.2
AUSN 314.3 13 68.7

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a sequence of two metabolites

Kinetics for Nicosulfuron: Single First order (SFO)
DT50 (d): 63

Rate constant (1/d): 0.011
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for HMUD: Single First order (SFO)
DT50 (d): 30.8
Rate constant (1/d): 0.0225
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for AUSN: Single First order (SFO)
DT50 (d): 218.2
Rate constant (1/d): 0.0032
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0450 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0445	0.0448	0	1
2	0.0440	0.0445	0	2
4	0.0431	0.0440	0	4
7	0.0417	0.0433	0	7
14	0.0386	0.0417	0	14
21	0.0357	0.0402	0	21
28	0.0331	0.0387	0	28
42	0.0283	0.0360	0	42
50	0.0260	0.0346	0	50
100	0.0150	0.0273	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0008**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0008

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0458
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0453	0.0456	0	1
2	0.0448	0.0453	0	2
4	0.0439	0.0449	0	4
7	0.0425	0.0441	0	7
14	0.0394	0.0425	0	14
21	0.0365	0.0410	0	21
28	0.0339	0.0396	0	28
42	0.0292	0.0369	0	42
50	0.0268	0.0354	0	50
100	0.0158	0.0281	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: HMUD

Calculations over one year

Maximum annual total soil concentration for HMUD over 5 cm(mg/kg): 0.0048 occurring on day 62^
(^ This is 11.02 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for HMUD after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0048	0.0048	62	63
2	0.0048	0.0048	61	63
4	0.0048	0.0048	60	64
7	0.0048	0.0048	59	66
14	0.0047	0.0048	55	69
21	0.0046	0.0048	52	73
28	0.0045	0.0048	49	77
42	0.0041	0.0047	44	86
50	0.0039	0.0047	41	91
100	0.0026	0.0044	26	126

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for HMUD over 5 cm(mg/kg)*: 0.0002**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0002

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for HMUD over 5 cm considering accumulation* (mg/kg) 0.0050
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for HMUD(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0050	0.0050	62	63
2	0.0050	0.0050	61	63

4	0.0050	0.0050	60	64
7	0.0049	0.0050	59	66
14	0.0049	0.0050	55	69
21	0.0048	0.0049	52	73
28	0.0046	0.0049	49	77
42	0.0043	0.0049	44	86
50	0.0041	0.0048	41	91
100	0.0028	0.0045	26	126

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

RESULTS FOR: AUSN

Calculations over one year

Maximum annual total soil concentration for AUSN over 5 cm(mg/kg): 0.0061 occurring on day 216^
(^ This is 17.56 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for AUSN after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0061	0.0061	216	217
2	0.0061	0.0061	215	217
4	0.0061	0.0061	214	218
7	0.0060	0.0061	213	220
14	0.0060	0.0061	210	224
21	0.0060	0.0060	206	227
28	0.0060	0.0060	203	231
42	0.0059	0.0060	196	238
50	0.0059	0.0060	193	243
100	0.0054	0.0060	171	271

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for AUSN over 5 cm(mg/kg)*: 0.0043**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0043

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for AUSN over 5 cm considering accumulation* (mg/kg) 0.0103
(* a tillage depth of 5 cm was considered for calculating the background concentration)

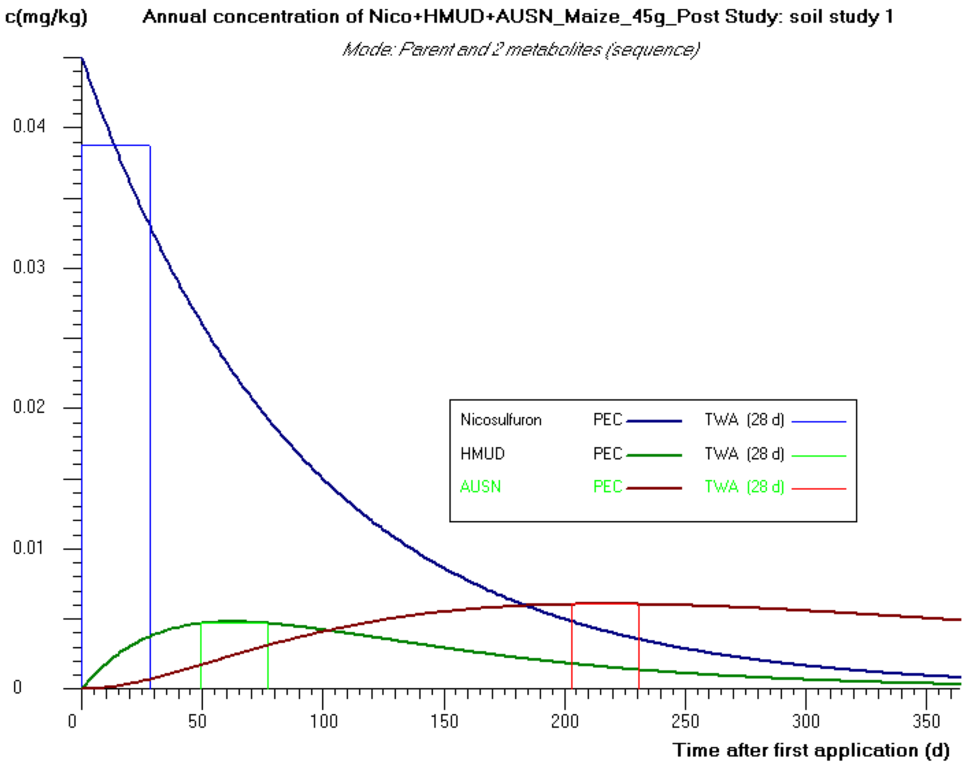
Calculated time dependent total soil concentrations over 5 cm for AUSN(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0103	0.0103	216	217
2	0.0103	0.0103	215	217
4	0.0103	0.0103	214	218
7	0.0103	0.0103	213	220
14	0.0103	0.0103	210	224
21	0.0103	0.0103	206	227
28	0.0102	0.0103	203	231
42	0.0102	0.0103	196	238

50	0.0101	0.0103	193	243
100	0.0097	0.0102	171	271

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.8 Nicosulfuron, HMUD and AUSN, post-emergence application of 40 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 08:11:18
Calculation problem: Nico+HMUD+AUSN_Maize_40g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_40g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 40
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

Compound Molecular mass(g/mol) Formation (%)
Nicosulfuron 410.4
HMUD 396.4 3.9 44.2
AUSN 314.3 13 68.7

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a sequence of two metabolites

Kinetics for Nicosulfuron: Single First order (SFO)
DT50 (d): 63

Rate constant (1/d): 0.011
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for HMUD: Single First order (SFO)
DT50 (d): 30.8
Rate constant (1/d): 0.0225
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for AUSN: Single First order (SFO)
DT50 (d): 218.2
Rate constant (1/d): 0.0032
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0400 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0396	0.0398	0	1
2	0.0391	0.0396	0	2
4	0.0383	0.0391	0	4
7	0.0370	0.0385	0	7
14	0.0343	0.0371	0	14
21	0.0317	0.0357	0	21
28	0.0294	0.0344	0	28
42	0.0252	0.0320	0	42
50	0.0231	0.0308	0	50
100	0.0133	0.0243	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0007**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0007

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0407
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0403	0.0405	0	1
2	0.0399	0.0403	0	2
4	0.0390	0.0399	0	4
7	0.0378	0.0392	0	7
14	0.0350	0.0378	0	14
21	0.0325	0.0364	0	21
28	0.0301	0.0352	0	28
42	0.0259	0.0328	0	42
50	0.0238	0.0315	0	50
100	0.0140	0.0250	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: HMUD

Calculations over one year

Maximum annual total soil concentration for HMUD over 5 cm(mg/kg): 0.0043 occurring on day 62^
(^ This is 11.02 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for HMUD after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0043	0.0043	62	63
2	0.0043	0.0043	61	63
4	0.0043	0.0043	60	64
7	0.0042	0.0043	59	66
14	0.0042	0.0042	55	69
21	0.0041	0.0042	52	73
28	0.0040	0.0042	49	77
42	0.0037	0.0042	44	86
50	0.0035	0.0042	41	91
100	0.0023	0.0039	26	126

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for HMUD over 5 cm(mg/kg)*: 0.0002**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0002

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for HMUD over 5 cm considering accumulation* (mg/kg) 0.0044
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for HMUD(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0044	0.0044	62	63
2	0.0044	0.0044	61	63

4	0.0044	0.0044	60	64
7	0.0044	0.0044	59	66
14	0.0043	0.0044	55	69
21	0.0042	0.0044	52	73
28	0.0041	0.0044	49	77
42	0.0038	0.0043	44	86
50	0.0036	0.0043	41	91
100	0.0025	0.0040	26	126

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

RESULTS FOR: AUSN

Calculations over one year

Maximum annual total soil concentration for AUSN over 5 cm(mg/kg): 0.0054 occurring on day 216^
(^ This is 17.56 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for AUSN after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0054	0.0054	216	217
2	0.0054	0.0054	215	217
4	0.0054	0.0054	214	218
7	0.0054	0.0054	213	220
14	0.0054	0.0054	210	224
21	0.0053	0.0054	206	227
28	0.0053	0.0054	203	231
42	0.0053	0.0054	196	238
50	0.0052	0.0054	193	243
100	0.0048	0.0053	171	271

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for AUSN over 5 cm(mg/kg)*: 0.0038**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0038

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for AUSN over 5 cm considering accumulation* (mg/kg) 0.0092
(* a tillage depth of 5 cm was considered for calculating the background concentration)

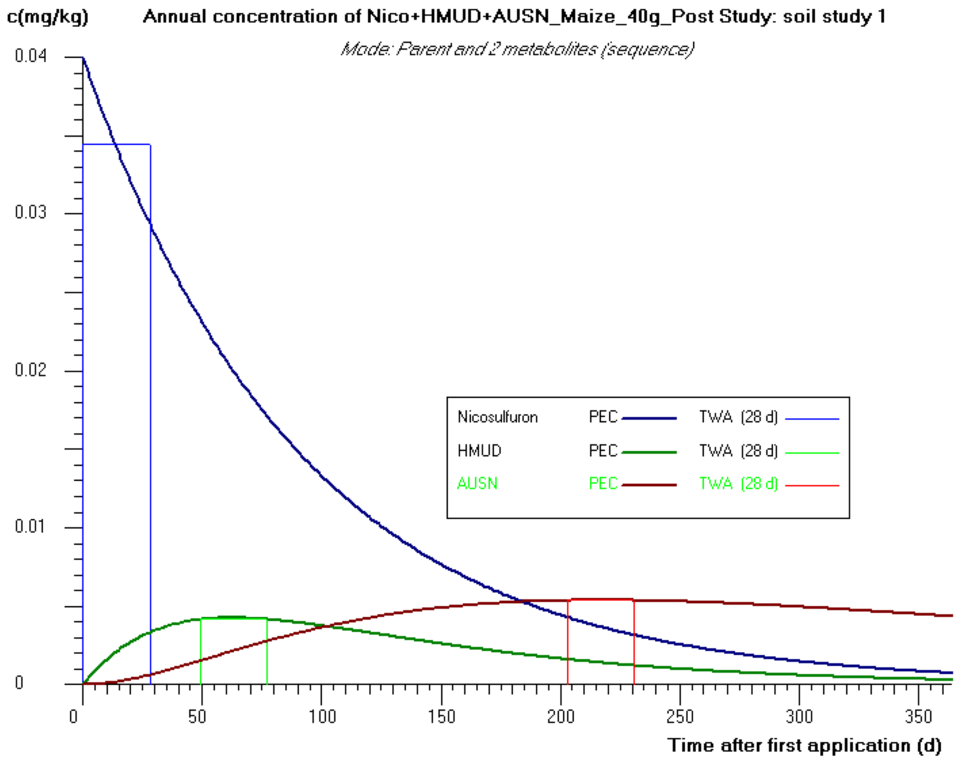
Calculated time dependent total soil concentrations over 5 cm for AUSN(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0092	0.0092	216	217
2	0.0092	0.0092	215	217
4	0.0092	0.0092	214	218
7	0.0092	0.0092	213	220
14	0.0091	0.0092	210	224
21	0.0091	0.0092	206	227
28	0.0091	0.0092	203	231
42	0.0090	0.0091	196	238

50	0.0090	0.0091	193	243
100	0.0086	0.0091	171	271

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.9 Nicosulfuron and ADMP, post-emergence application of 60 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 08:15:44
Calculation problem: Nico+ADMP_Maize_60g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_60g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 60
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

Compound Molecular mass(g/mol) Formation (%)
Nicosulfuron 410.4
ADMP 155.2 51 21.4

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a single metabolite

Kinetics for Nicosulfuron: Single First order (SFO)
DT50 (d): 63

Rate constant (1/d): 0.011
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for ADMP: Single First order (SFO)
DT50 (d): 11.3
Rate constant (1/d): 0.0613
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0600 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0593	0.0597	0	1
2	0.0587	0.0593	0	2
4	0.0574	0.0587	0	4
7	0.0556	0.0577	0	7
14	0.0514	0.0556	0	14
21	0.0476	0.0536	0	21
28	0.0441	0.0516	0	28
42	0.0378	0.0480	0	42
50	0.0346	0.0461	0	50
100	0.0200	0.0364	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0011**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0011

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0611
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0604	0.0608	0	1
2	0.0598	0.0604	0	2
4	0.0585	0.0598	0	4

7	0.0567	0.0588	0	7
14	0.0525	0.0567	0	14
21	0.0487	0.0547	0	21
28	0.0452	0.0527	0	28
42	0.0389	0.0491	0	42
50	0.0357	0.0473	0	50
100	0.0211	0.0375	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: ADMP

Calculations over one year

Maximum annual total soil concentration for ADMP over 5 cm(mg/kg): 0.0006 occurring on day 34^
(^ This is 2.72 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for ADMP after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0006	0.0006	34	35
2	0.0006	0.0006	33	35
4	0.0006	0.0006	32	36
7	0.0006	0.0006	31	38
14	0.0006	0.0006	28	42
21	0.0006	0.0006	25	46
28	0.0005	0.0006	22	50
42	0.0005	0.0006	18	60
50	0.0004	0.0006	16	66
100	0.0003	0.0005	8	108

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for ADMP over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

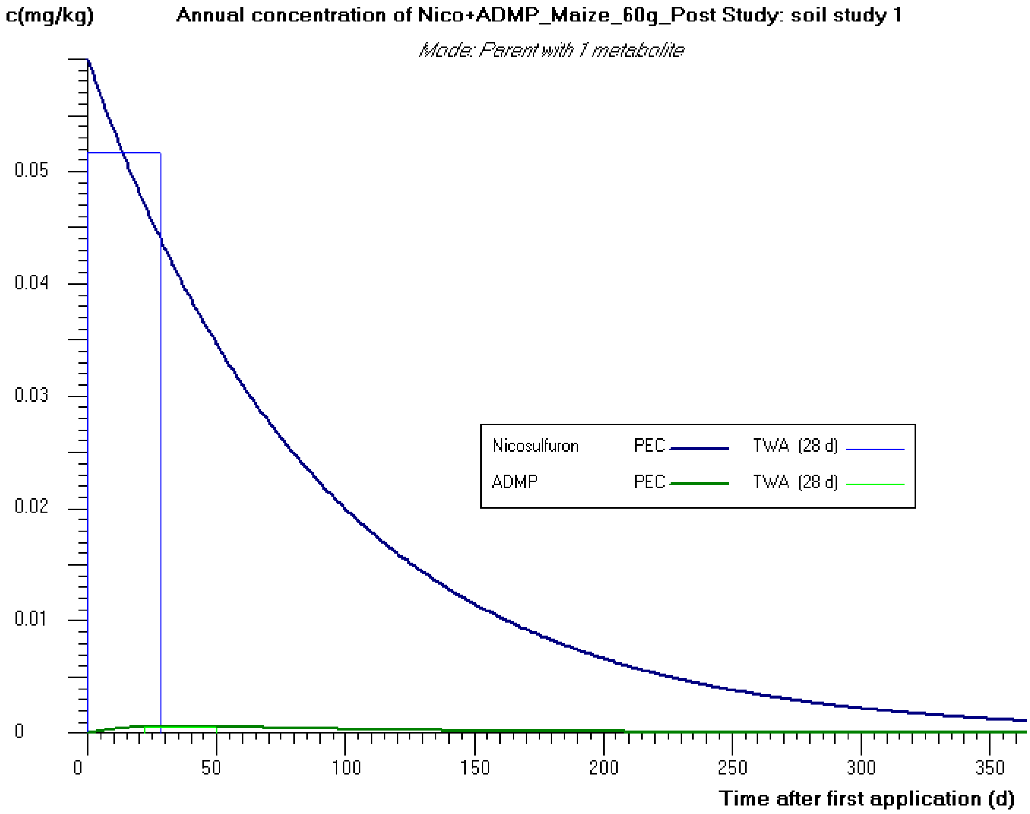
Maximum total soil concentration for ADMP over 5 cm considering accumulation* (mg/kg) 0.0006
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for ADMP(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0006	0.0006	34	35
2	0.0006	0.0006	33	35
4	0.0006	0.0006	32	36
7	0.0006	0.0006	31	38
14	0.0006	0.0006	28	42
21	0.0006	0.0006	25	46
28	0.0005	0.0006	22	50
42	0.0005	0.0006	18	60
50	0.0004	0.0006	16	66

100 0.0003 0.0005 8 108
(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.10 Nicosulfuron and ADMP, post-emergence application of 45 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 09:44:37
Calculation problem: Nico+ADMP_Maize_45g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_45g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 45
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

Compound Molecular mass(g/mol) Formation (%)
Nicosulfuron 410.4
ADMP 155.2 51 21.4

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a single metabolite

Kinetics for Nicosulfuron: Single First order (SFO)
DT50 (d): 63

Rate constant (1/d): 0.011
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for ADMP: Single First order (SFO)
DT50 (d): 11.3
Rate constant (1/d): 0.0613
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0450 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0445	0.0448	0	1
2	0.0440	0.0445	0	2
4	0.0431	0.0440	0	4
7	0.0417	0.0433	0	7
14	0.0386	0.0417	0	14
21	0.0357	0.0402	0	21
28	0.0331	0.0387	0	28
42	0.0283	0.0360	0	42
50	0.0260	0.0346	0	50
100	0.0150	0.0273	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0008**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0008

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0458
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0453	0.0456	0	1
2	0.0448	0.0453	0	2
4	0.0439	0.0449	0	4

7	0.0425	0.0441	0	7
14	0.0394	0.0425	0	14
21	0.0365	0.0410	0	21
28	0.0339	0.0396	0	28
42	0.0292	0.0369	0	42
50	0.0268	0.0354	0	50
100	0.0158	0.0281	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: ADMP

Calculations over one year

Maximum annual total soil concentration for ADMP over 5 cm(mg/kg): 0.0005 occurring on day 34^
(^ This is 2.72 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for ADMP after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0005	0.0005	34	35
2	0.0005	0.0005	33	35
4	0.0005	0.0005	32	36
7	0.0005	0.0005	31	38
14	0.0004	0.0005	28	42
21	0.0004	0.0005	25	46
28	0.0004	0.0005	22	50
42	0.0003	0.0004	18	60
50	0.0003	0.0004	16	66
100	0.0002	0.0004	8	108

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for ADMP over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

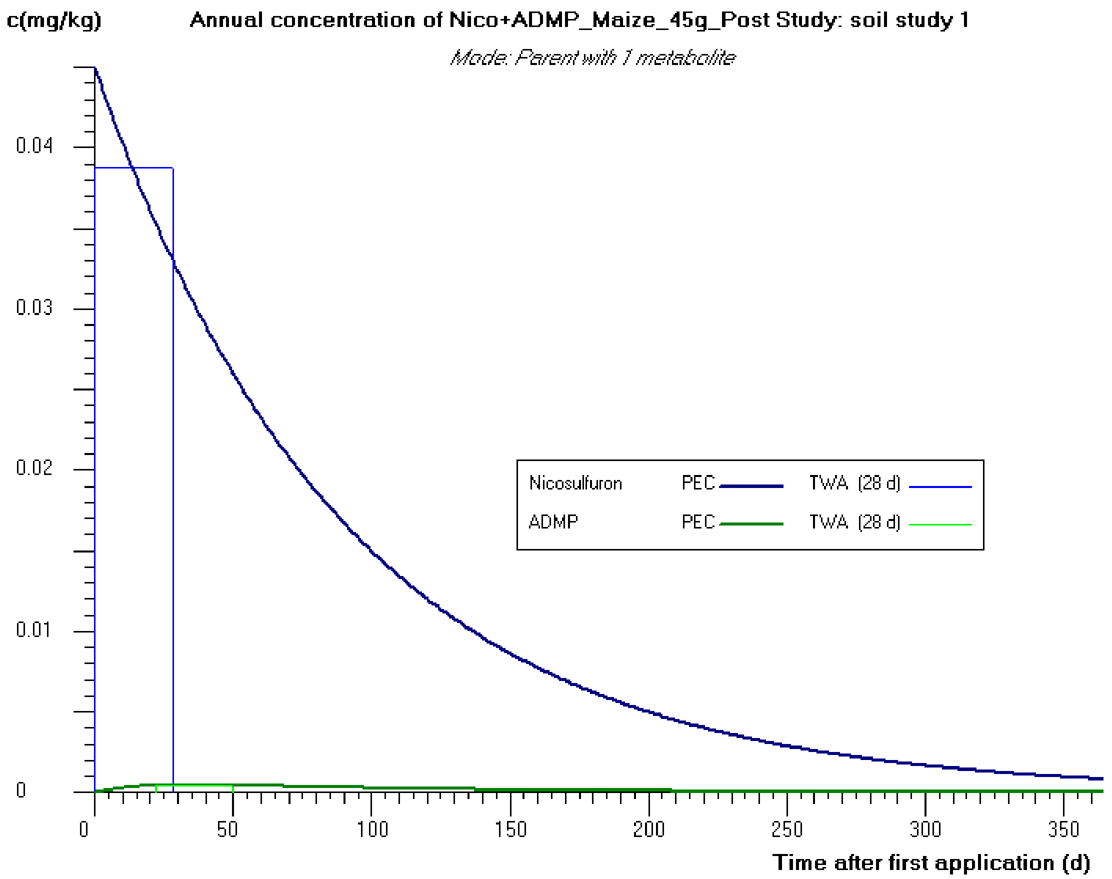
Maximum total soil concentration for ADMP over 5 cm considering accumulation* (mg/kg) 0.0005
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for ADMP(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0005	0.0005	34	35
2	0.0005	0.0005	33	35
4	0.0005	0.0005	32	36
7	0.0005	0.0005	31	38
14	0.0005	0.0005	28	42
21	0.0004	0.0005	25	46
28	0.0004	0.0005	22	50
42	0.0004	0.0005	18	60
50	0.0003	0.0004	16	66

100 0.0002 0.0004 8 108
(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.11 Nicosulfuron and ADMP, post-emergence application of 40 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 08:14:53
Calculation problem: Nico+ADMP_Maize_40g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_40g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 40
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

Compound Molecular mass(g/mol) Formation (%)
Nicosulfuron 410.4
ADMP 155.2 51 21.4

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a single metabolite

Kinetics for Nicosulfuron: Single First order (SFO)
DT50 (d): 63

Rate constant (1/d): 0.011
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for ADMP: Single First order (SFO)
DT50 (d): 11.3
Rate constant (1/d): 0.0613
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0400 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0396	0.0398	0	1
2	0.0391	0.0396	0	2
4	0.0383	0.0391	0	4
7	0.0370	0.0385	0	7
14	0.0343	0.0371	0	14
21	0.0317	0.0357	0	21
28	0.0294	0.0344	0	28
42	0.0252	0.0320	0	42
50	0.0231	0.0308	0	50
100	0.0133	0.0243	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0007**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0007

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0407
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0403	0.0405	0	1
2	0.0399	0.0403	0	2
4	0.0390	0.0399	0	4

7	0.0378	0.0392	0	7
14	0.0350	0.0378	0	14
21	0.0325	0.0364	0	21
28	0.0301	0.0352	0	28
42	0.0259	0.0328	0	42
50	0.0238	0.0315	0	50
100	0.0140	0.0250	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: ADMP

Calculations over one year

Maximum annual total soil concentration for ADMP over 5 cm(mg/kg): 0.0004 occurring on day 34^
(^ This is 2.72 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for ADMP after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0004	0.0004	34	35
2	0.0004	0.0004	33	35
4	0.0004	0.0004	32	36
7	0.0004	0.0004	31	38
14	0.0004	0.0004	28	42
21	0.0004	0.0004	25	46
28	0.0004	0.0004	22	50
42	0.0003	0.0004	18	60
50	0.0003	0.0004	16	66
100	0.0002	0.0003	8	108

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for ADMP over 5 cm(mg/kg)*: <0.0001**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): <0.0001

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for ADMP over 5 cm considering accumulation* (mg/kg) 0.0004
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for ADMP(mg/kg) considering accumulation*

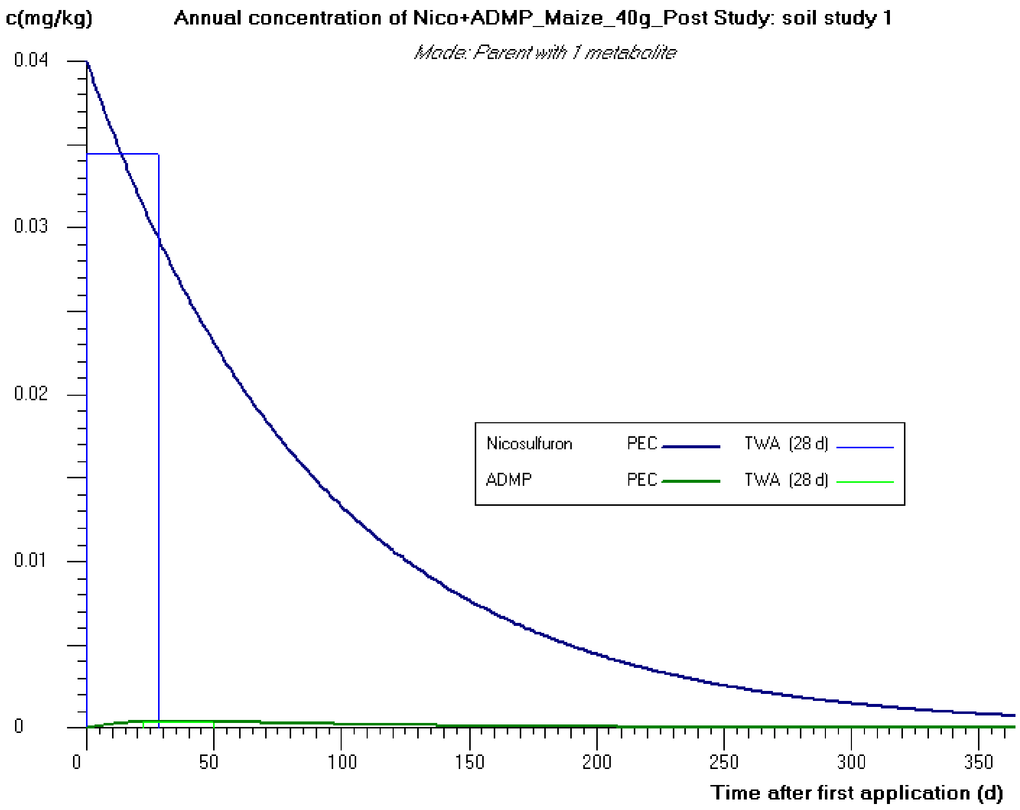
Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0004	0.0004	34	35
2	0.0004	0.0004	33	35
4	0.0004	0.0004	32	36
7	0.0004	0.0004	31	38
14	0.0004	0.0004	28	42
21	0.0004	0.0004	25	46
28	0.0004	0.0004	22	50
42	0.0003	0.0004	18	60
50	0.0003	0.0004	16	66

100 0.0002 0.0003 8 108

(* a tillage depth of 5 cm was considered for calculating the background concentration)

(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.12 Nicosulfuron, HMUD and UCSN, post-emergence application of 60 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 08:09:01
Calculation problem: Nico+HMUD+UCSN_Maize_60g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_60g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 60
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

Compound	Molecular mass(g/mol)	Formation (%)	
Nicosulfuron	410.4		
HMUD	396.4	3.9	44.2
UCSN	315.3	2.6	31.3

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a sequence of two metabolites

Kinetics for Nicosulfuron: Single First order (SFO)
DT50 (d): 63
Rate constant (1/d): 0.011
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for HMUD: Single First order (SFO)
DT50 (d): 30.8
Rate constant (1/d): 0.0225
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for UCSN: Single First order (SFO)
DT50 (d): 307.5
Rate constant (1/d): 0.0023
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0600 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0593	0.0597	0	1
2	0.0587	0.0593	0	2
4	0.0574	0.0587	0	4
7	0.0556	0.0577	0	7
14	0.0514	0.0556	0	14
21	0.0476	0.0536	0	21
28	0.0441	0.0516	0	28
42	0.0378	0.0480	0	42
50	0.0346	0.0461	0	50
100	0.0200	0.0364	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0011**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0011

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0611

(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0604	0.0608	0	1
2	0.0598	0.0604	0	2
4	0.0585	0.0598	0	4
7	0.0567	0.0588	0	7
14	0.0525	0.0567	0	14
21	0.0487	0.0547	0	21
28	0.0452	0.0527	0	28
42	0.0389	0.0491	0	42
50	0.0357	0.0473	0	50
100	0.0211	0.0375	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: HMUD

Calculations over one year

Maximum annual total soil concentration for HMUD over 5 cm(mg/kg): 0.0064 occurring on day 62^
(^ This is 11.02 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for HMUD after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0064	0.0064	62	63
2	0.0064	0.0064	61	63
4	0.0064	0.0064	60	64
7	0.0064	0.0064	59	66
14	0.0063	0.0064	55	69
21	0.0061	0.0064	52	73
28	0.0059	0.0063	49	77
42	0.0055	0.0063	44	86
50	0.0052	0.0062	41	91
100	0.0035	0.0058	26	126

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for HMUD over 5 cm(mg/kg)*: 0.0002**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0002

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for HMUD over 5 cm considering accumulation* (mg/kg) 0.0066
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for HMUD(mg/kg) considering accumulation*

Time(d) PECact** PECtwa Begin TWAframe(d) End TWAframe(d)

1	0.0066	0.0066	62	63
2	0.0066	0.0066	61	63
4	0.0066	0.0066	60	64
7	0.0066	0.0066	59	66
14	0.0065	0.0066	55	69
21	0.0063	0.0066	52	73
28	0.0062	0.0066	49	77
42	0.0057	0.0065	44	86
50	0.0055	0.0065	41	91
100	0.0038	0.0060	26	126

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

RESULTS FOR: UCSN

Calculations over one year

Maximum annual total soil concentration for UCSN over 5 cm(mg/kg): 0.0041 occurring on day 240^
(^ This is 8.91 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for UCSN after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0041	0.0041	239	240
2	0.0041	0.0041	238	240
4	0.0041	0.0041	238	242
7	0.0041	0.0041	236	243
14	0.0041	0.0041	233	247
21	0.0041	0.0041	229	250
28	0.0041	0.0041	226	254
42	0.0040	0.0041	220	262
50	0.0040	0.0041	216	266
100	0.0038	0.0041	195	295

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for UCSN over 5 cm(mg/kg)*: 0.0044**

(* estimated to occur after 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0044

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for UCSN over 5 cm considering accumulation* (mg/kg) 0.0085
(* a tillage depth of 5 cm was considered for calculating the background concentration)

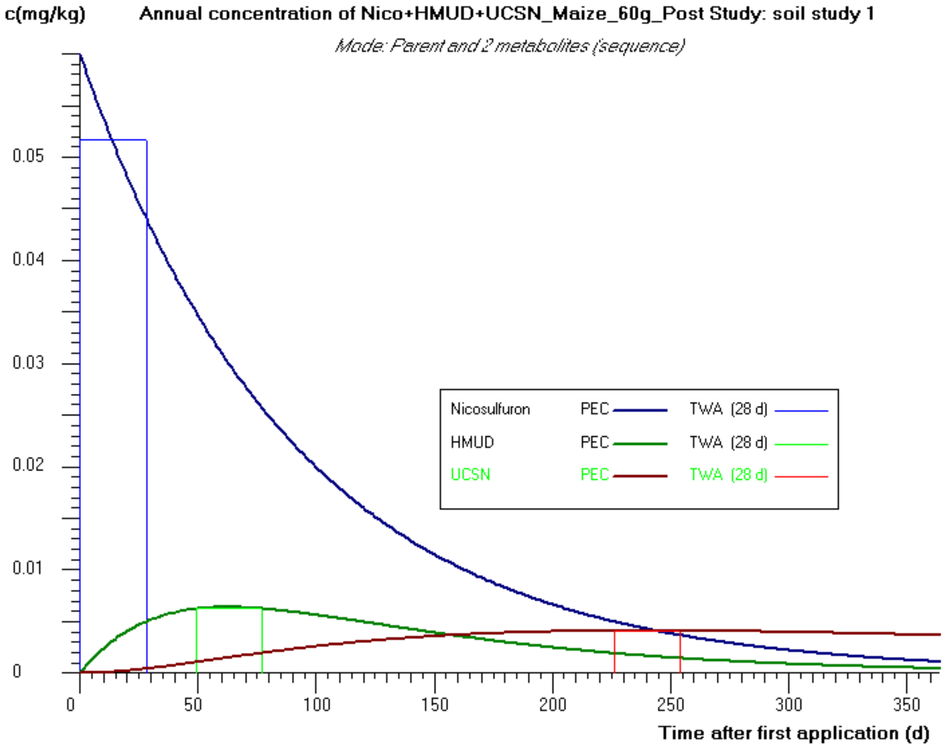
Calculated time dependent total soil concentrations over 5 cm for UCSN(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0085	0.0085	239	240
2	0.0085	0.0085	238	240
4	0.0085	0.0085	238	242
7	0.0085	0.0085	236	243
14	0.0085	0.0085	233	247
21	0.0085	0.0085	229	250

28	0.0085	0.0085	226	254
42	0.0085	0.0085	220	262
50	0.0084	0.0085	216	266
100	0.0082	0.0085	195	295

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.13 Nicosulfuron, HMUD and UCSN, post-emergence application of 45 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 09:53:15
Calculation problem: Nico+HMUD+UCSN_Maize_45g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_45g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 45
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

Compound	Molecular mass(g/mol)	Formation (%)	
Nicosulfuron	410.4		
HMUD 396.4		3.9	44.2
UCSN 315.3		2.6	31.3

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a sequence of two metabolites

Kinetics for Nicosulfuron: Single First order (SFO)

DT50 (d): 63
Rate constant (1/d): 0.011
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for HMUD: Single First order (SFO)
DT50 (d): 30.8
Rate constant (1/d): 0.0225
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for UCSN: Single First order (SFO)
DT50 (d): 307.5
Rate constant (1/d): 0.0023
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0450 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0445	0.0448	0	1
2	0.0440	0.0445	0	2
4	0.0431	0.0440	0	4
7	0.0417	0.0433	0	7
14	0.0386	0.0417	0	14
21	0.0357	0.0402	0	21
28	0.0331	0.0387	0	28
42	0.0283	0.0360	0	42
50	0.0260	0.0346	0	50
100	0.0150	0.0273	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0008**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0008

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0458
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0453	0.0456	0	1
2	0.0448	0.0453	0	2
4	0.0439	0.0449	0	4
7	0.0425	0.0441	0	7
14	0.0394	0.0425	0	14
21	0.0365	0.0410	0	21
28	0.0339	0.0396	0	28
42	0.0292	0.0369	0	42
50	0.0268	0.0354	0	50
100	0.0158	0.0281	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: HMUD

Calculations over one year

Maximum annual total soil concentration for HMUD over 5 cm(mg/kg): 0.0048 occurring on day 62^
(^ This is 11.02 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for HMUD after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0048	0.0048	62	63
2	0.0048	0.0048	61	63
4	0.0048	0.0048	60	64
7	0.0048	0.0048	59	66
14	0.0047	0.0048	55	69
21	0.0046	0.0048	52	73
28	0.0045	0.0048	49	77
42	0.0041	0.0047	44	86
50	0.0039	0.0047	41	91
100	0.0026	0.0044	26	126

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for HMUD over 5 cm(mg/kg)*: 0.0002**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0002

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for HMUD over 5 cm considering accumulation* (mg/kg) 0.0050
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for HMUD(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0050	0.0050	62	63
2	0.0050	0.0050	61	63

4	0.0050	0.0050	60	64
7	0.0049	0.0050	59	66
14	0.0049	0.0050	55	69
21	0.0048	0.0049	52	73
28	0.0046	0.0049	49	77
42	0.0043	0.0049	44	86
50	0.0041	0.0048	41	91
100	0.0028	0.0045	26	126

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

RESULTS FOR: UCSN

Calculations over one year

Maximum annual total soil concentration for UCSN over 5 cm(mg/kg): 0.0031 occurring on day 240^
(^ This is 8.91 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for UCSN after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0031	0.0031	239	240
2	0.0031	0.0031	239	241
4	0.0031	0.0031	238	242
7	0.0031	0.0031	236	243
14	0.0031	0.0031	233	247
21	0.0031	0.0031	229	250
28	0.0031	0.0031	226	254
42	0.0030	0.0031	220	262
50	0.0030	0.0031	216	266
100	0.0028	0.0030	195	295

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for UCSN over 5 cm(mg/kg)*: 0.0033**

(* estimated to occur after 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0033

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for UCSN over 5 cm considering accumulation* (mg/kg) 0.0064
(* a tillage depth of 5 cm was considered for calculating the background concentration)

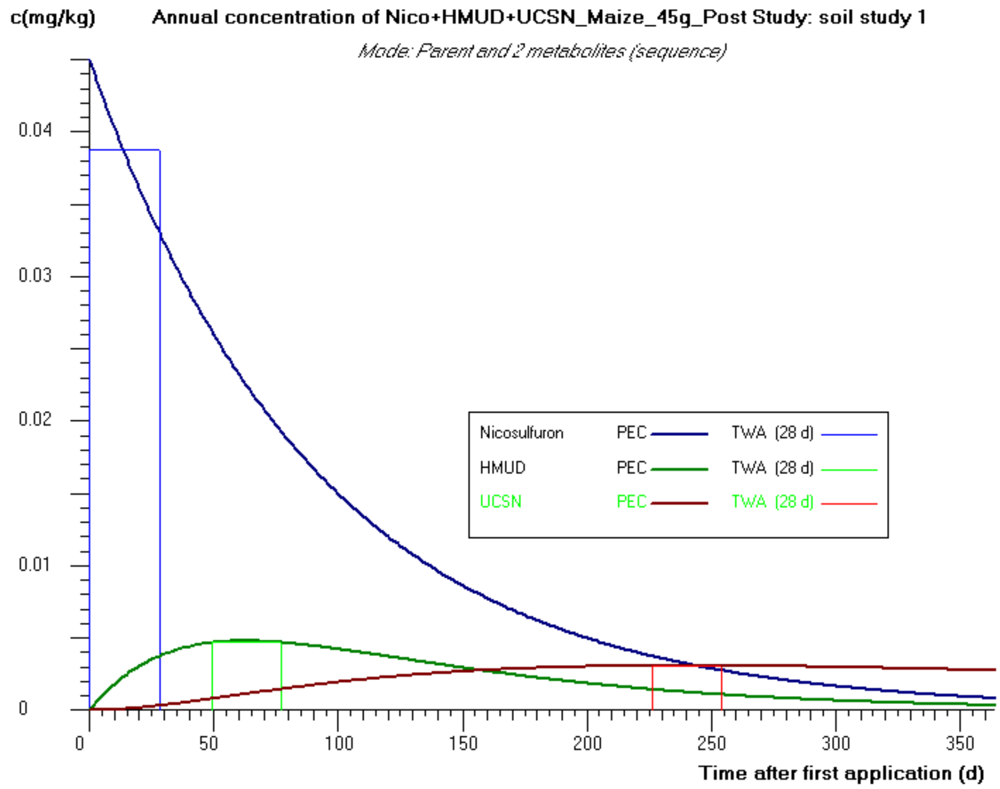
Calculated time dependent total soil concentrations over 5 cm for UCSN(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0064	0.0064	239	240
2	0.0064	0.0064	239	241
4	0.0064	0.0064	238	242
7	0.0064	0.0064	236	243
14	0.0064	0.0064	233	247
21	0.0064	0.0064	229	250
28	0.0064	0.0064	226	254
42	0.0063	0.0064	220	262

50	0.0063	0.0064	216	266
100	0.0062	0.0064	195	295

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.14 Nicosulfuron, HMUD and UCSN, post-emergence application of 40 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 08:07:48
Calculation problem: Nico+HMUD+UCSN_Maize_40g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_40g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 40
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

Compound Molecular mass(g/mol) Formation (%)
Nicosulfuron 410.4
HMUD 396.4 3.9 44.2
UCSN 315.3 2.6 31.3

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a sequence of two metabolites

Kinetics for Nicosulfuron: Single First order (SFO)

DT50 (d): 63
Rate constant (1/d): 0.011
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for HMUD: Single First order (SFO)
DT50 (d): 30.8
Rate constant (1/d): 0.0225
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for UCSN: Single First order (SFO)
DT50 (d): 307.5
Rate constant (1/d): 0.0023
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a sequence of two metabolites

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0400 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0396	0.0398	0	1
2	0.0391	0.0396	0	2
4	0.0383	0.0391	0	4
7	0.0370	0.0385	0	7
14	0.0343	0.0371	0	14
21	0.0317	0.0357	0	21
28	0.0294	0.0344	0	28
42	0.0252	0.0320	0	42
50	0.0231	0.0308	0	50
100	0.0133	0.0243	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0007**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0007

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0407
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0403	0.0405	0	1
2	0.0399	0.0403	0	2
4	0.0390	0.0399	0	4
7	0.0378	0.0392	0	7
14	0.0350	0.0378	0	14
21	0.0325	0.0364	0	21
28	0.0301	0.0352	0	28
42	0.0259	0.0328	0	42
50	0.0238	0.0315	0	50
100	0.0140	0.0250	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: HMUD

Calculations over one year

Maximum annual total soil concentration for HMUD over 5 cm(mg/kg): 0.0043 occurring on day 62^
(^ This is 11.02 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for HMUD after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0043	0.0043	62	63
2	0.0043	0.0043	61	63
4	0.0043	0.0043	60	64
7	0.0042	0.0043	59	66
14	0.0042	0.0042	55	69
21	0.0041	0.0042	52	73
28	0.0040	0.0042	49	77
42	0.0037	0.0042	44	86
50	0.0035	0.0042	41	91
100	0.0023	0.0039	26	126

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for HMUD over 5 cm(mg/kg)*: 0.0002**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0002

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for HMUD over 5 cm considering accumulation* (mg/kg) 0.0044
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for HMUD(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0044	0.0044	62	63
2	0.0044	0.0044	61	63

4	0.0044	0.0044	60	64
7	0.0044	0.0044	59	66
14	0.0043	0.0044	55	69
21	0.0042	0.0044	52	73
28	0.0041	0.0044	49	77
42	0.0038	0.0043	44	86
50	0.0036	0.0043	41	91
100	0.0025	0.0040	26	126

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

RESULTS FOR: UCSN

Calculations over one year

Maximum annual total soil concentration for UCSN over 5 cm(mg/kg): 0.0027 occurring on day 240^
(^ This is 8.91 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for UCSN after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0027	0.0027	239	240
2	0.0027	0.0027	239	241
4	0.0027	0.0027	238	242
7	0.0027	0.0027	236	243
14	0.0027	0.0027	233	247
21	0.0027	0.0027	229	250
28	0.0027	0.0027	226	254
42	0.0027	0.0027	220	262
50	0.0027	0.0027	216	266
100	0.0025	0.0027	195	295

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for UCSN over 5 cm(mg/kg)*: 0.0029**

(* estimated to occur after 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0029

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for UCSN over 5 cm considering accumulation* (mg/kg) 0.0057
(* a tillage depth of 5 cm was considered for calculating the background concentration)

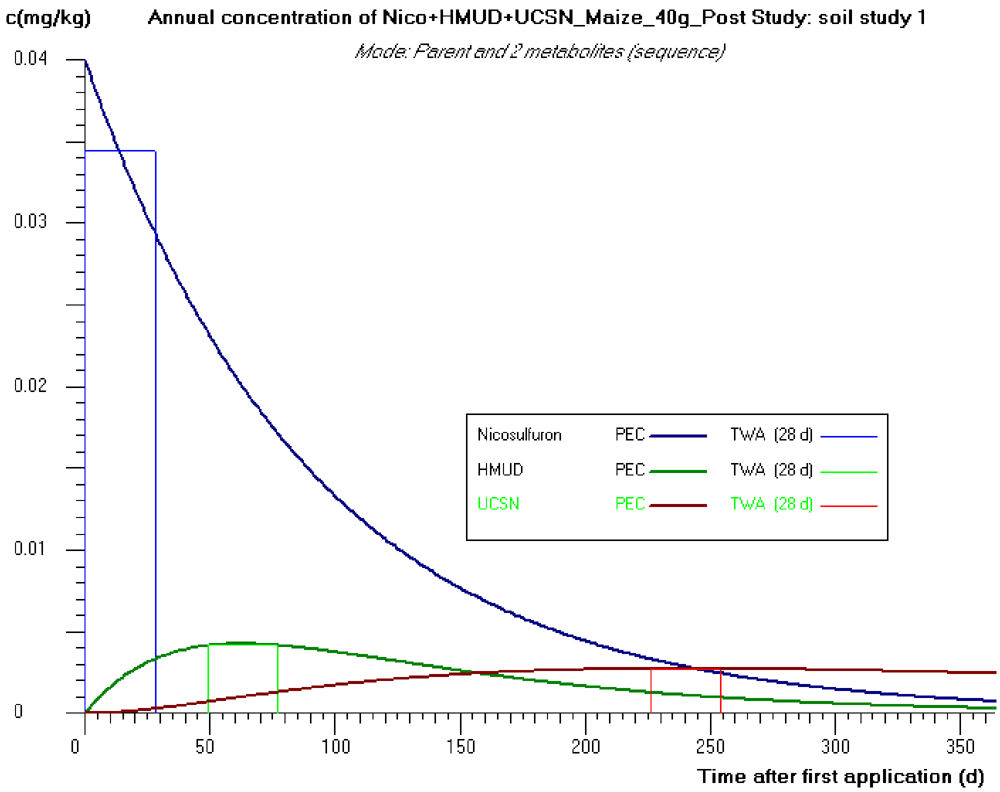
Calculated time dependent total soil concentrations over 5 cm for UCSN(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0057	0.0057	239	240
2	0.0057	0.0057	239	241
4	0.0057	0.0057	238	242
7	0.0057	0.0057	236	243
14	0.0057	0.0057	233	247
21	0.0057	0.0057	229	250
28	0.0057	0.0057	226	254
42	0.0056	0.0057	220	262

50	0.0056	0.0057	216	266
100	0.0055	0.0057	195	295

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.15 Nicosulfuron and ASDM, post-emergence application of 60 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 08:20:00
Calculation problem: Nico+ASDM_Maize_60g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_60g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 60
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

Compound Molecular mass(g/mol) Formation (%)
Nicosulfuron 410.4
ASDM 229.2 2.3 21.4

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a single metabolite

Kinetics for Nicosulfuron: Single First order (SFO)
DT50 (d): 63
Rate constant (1/d): 0.011
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for ASDM: Single First order (SFO)
DT50 (d): 268.5
Rate constant (1/d): 0.0026
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0600 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0593	0.0597	0	1
2	0.0587	0.0593	0	2
4	0.0574	0.0587	0	4
7	0.0556	0.0577	0	7
14	0.0514	0.0556	0	14
21	0.0476	0.0536	0	21
28	0.0441	0.0516	0	28
42	0.0378	0.0480	0	42
50	0.0346	0.0461	0	50
100	0.0200	0.0364	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0011**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0011

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0611
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d) PECact** PECtwa Begin TWAframe(d) End TWAframe(d)

1	0.0604	0.0608	0	1
2	0.0598	0.0604	0	2
4	0.0585	0.0598	0	4
7	0.0567	0.0588	0	7
14	0.0525	0.0567	0	14
21	0.0487	0.0547	0	21
28	0.0452	0.0527	0	28
42	0.0389	0.0491	0	42
50	0.0357	0.0473	0	50
100	0.0211	0.0375	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: ASDM

Calculations over one year

Maximum annual total soil concentration for ASDM over 5 cm(mg/kg): 0.0046 occurring on day 172^
(^ This is 13.74 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for ASDM after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0046	0.0046	172	173
2	0.0046	0.0046	171	173
4	0.0046	0.0046	170	174
7	0.0046	0.0046	169	176
14	0.0046	0.0046	165	179
21	0.0046	0.0046	162	183
28	0.0046	0.0046	159	187
42	0.0045	0.0046	152	194
50	0.0045	0.0046	149	199
100	0.0042	0.0046	128	228

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for ASDM over 5 cm(mg/kg)*: 0.0041**

(* estimated to occur after 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0041

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for ASDM over 5 cm considering accumulation* (mg/kg) 0.0087
(* a tillage depth of 5 cm was considered for calculating the background concentration)

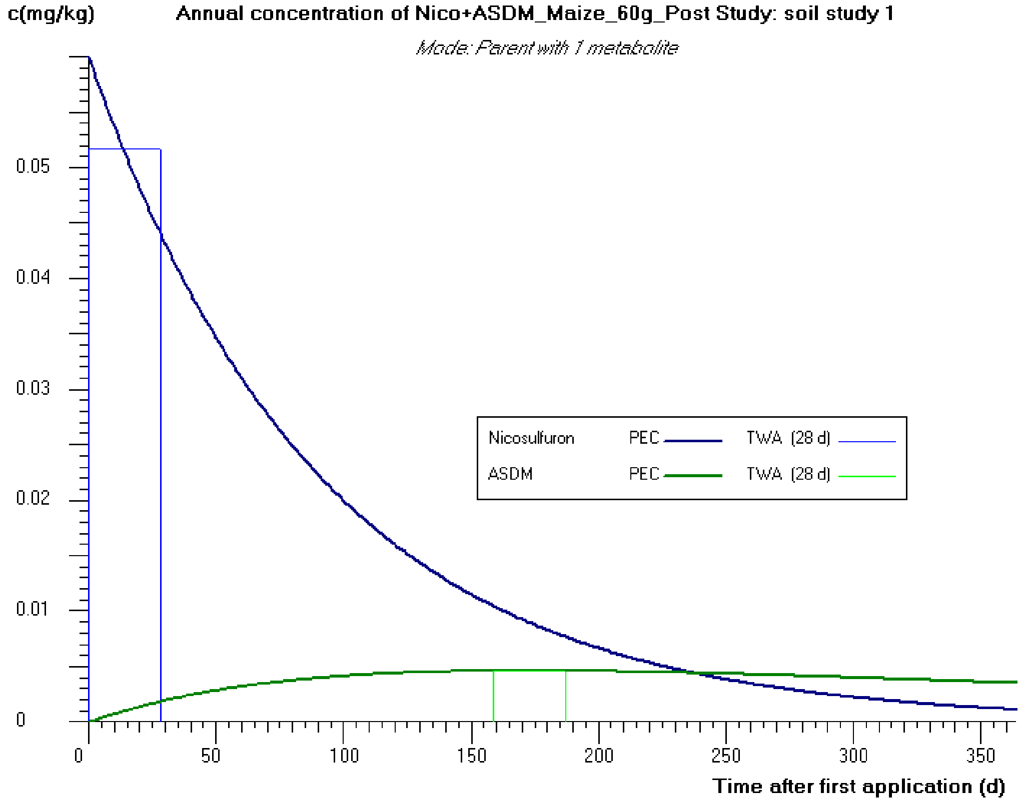
Calculated time dependent total soil concentrations over 5 cm for ASDM(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0087	0.0087	172	173
2	0.0087	0.0087	171	173
4	0.0087	0.0087	170	174
7	0.0087	0.0087	169	176
14	0.0087	0.0087	165	179
21	0.0087	0.0087	162	183

28	0.0087	0.0087	159	187
42	0.0086	0.0087	152	194
50	0.0086	0.0087	149	199
100	0.0083	0.0087	128	228

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.16 Nicosulfuron and ASDM, post-emergence application of 45 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 09:47:56
Calculation problem: Nico+ASDM_Maize_45g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_45g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 45
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

Compound Molecular mass(g/mol) Formation (%)
Nicosulfuron 410.4
ASDM 229.2 2.3 21.4

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a single metabolite

Kinetics for Nicosulfuron: Single First order (SFO)
DT50 (d): 63
Rate constant (1/d): 0.011

Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for ASDM: Single First order (SFO)
DT50 (d): 268.5
Rate constant (1/d): 0.0026
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0450 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0445	0.0448	0	1
2	0.0440	0.0445	0	2
4	0.0431	0.0440	0	4
7	0.0417	0.0433	0	7
14	0.0386	0.0417	0	14
21	0.0357	0.0402	0	21
28	0.0331	0.0387	0	28
42	0.0283	0.0360	0	42
50	0.0260	0.0346	0	50
100	0.0150	0.0273	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0008**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0008

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0458
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0453	0.0456	0	1
2	0.0448	0.0453	0	2
4	0.0439	0.0449	0	4
7	0.0425	0.0441	0	7

14	0.0394	0.0425	0	14
21	0.0365	0.0410	0	21
28	0.0339	0.0396	0	28
42	0.0292	0.0369	0	42
50	0.0268	0.0354	0	50
100	0.0158	0.0281	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: ASDM

Calculations over one year

Maximum annual total soil concentration for ASDM over 5 cm(mg/kg): 0.0035 occurring on day 172^
(^ This is 13.74 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for ASDM after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0035	0.0035	172	173
2	0.0035	0.0035	171	173
4	0.0035	0.0035	170	174
7	0.0035	0.0035	169	176
14	0.0034	0.0035	165	179
21	0.0034	0.0035	162	183
28	0.0034	0.0034	159	187
42	0.0034	0.0034	152	194
50	0.0034	0.0034	149	199
100	0.0031	0.0034	128	228

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for ASDM over 5 cm(mg/kg)*: 0.0031**

(* estimated to occur after 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0031

Calculations of concentrations considering accumulation after many years of application

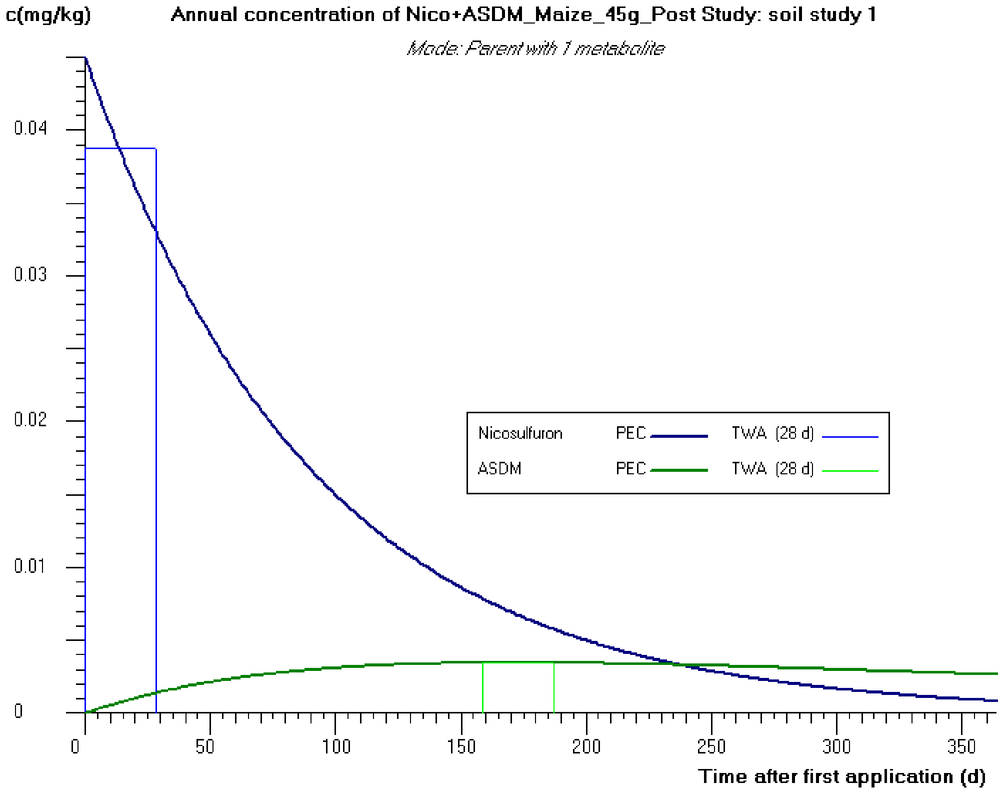
Maximum total soil concentration for ASDM over 5 cm considering accumulation* (mg/kg) 0.0065
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for ASDM(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0065	0.0065	172	173
2	0.0065	0.0065	171	173
4	0.0065	0.0065	170	174
7	0.0065	0.0065	169	176
14	0.0065	0.0065	165	179
21	0.0065	0.0065	162	183
28	0.0065	0.0065	159	187
42	0.0065	0.0065	152	194
50	0.0064	0.0065	149	199
100	0.0062	0.0065	128	228

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.1.17 Nicosulfuron and ASDM, post-emergence application of 40 g a.s./ha in maize

Comments of zRMS:	For comments on soil exposure assessment, please refer to point 8.7 of this report.

E S C A P E
Estimation of Soil Concentrations After PEsticide Applications

developed by Michael Klein

Program version: 2.0 (5 November 2015)
Date of this simulation: 13/04/2016, 08:20:35
Calculation problem: Nico+ASDM_Maize_40g_Post

PROGRAM SETTINGS

Calculation mode: Residues from different applications are considered separately over one year
Application mode: Single annual application pattern (calculation period 1 year)

SCENARIO DATA USED IN THE CALCULATION

Name of the scenario: Maize_40g_post
Name of the soil: Borstel
Soil density (kg/L): 1.5
Soil depth (cm): 5
Tillage depth (cm)*: 5
Organic carbon content (%): 1.5
Field capacity (Vol%): 29.2
Wilting point (Vol%): 6.4

Climatic conditions: 20 °C constant
(* for calculation of background concentrations)

APPLICATION PATTERN USED IN THE CALCULATION

Crop rotation: every year

Application date: 1 May
Application rate (g/ha): 40
Crop interception (%): 25

COMPOUNDS CONSIDERED IN THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

Compound Molecular mass(g/mol) Formation (%)
Nicosulfuron 410.4
ASDM 229.2 2.3 21.4

DEGRADATION KINETICS PARAMETERS CONSIDERED FOR THE CALCULATION

Soil study: soil study 1

Metabolism scheme: Active compound and a single metabolite

Kinetics for Nicosulfuron: Single First order (SFO)
DT50 (d): 63
Rate constant (1/d): 0.011

Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

Kinetics for ASDM: Single First order (SFO)
DT50 (d): 268.5
Rate constant (1/d): 0.0026
Q10-factor: 2.58
Walker-exponent: 0.7
Ref. temperature (°C): 20

RESULTS OF THE CALCULATION

Metabolism scheme: Active compound and a single metabolite

RESULTS FOR: Nicosulfuron

Calculations over one year

Maximum annual total soil concentration for Nicosulfuron over 5 cm(mg/kg): 0.0400 occurring on day 0

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0396	0.0398	0	1
2	0.0391	0.0396	0	2
4	0.0383	0.0391	0	4
7	0.0370	0.0385	0	7
14	0.0343	0.0371	0	14
21	0.0317	0.0357	0	21
28	0.0294	0.0344	0	28
42	0.0252	0.0320	0	42
50	0.0231	0.0308	0	50
100	0.0133	0.0243	0	100

(* PECact values are related to the time after the first application)

Calculation of background concentrations after many years

Final Background concentration in total soil for Nicosulfuron over 5 cm(mg/kg)*: 0.0007**

(* estimated to occur within 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0007

Calculations of concentrations considering accumulation after many years of application

Maximum total soil concentration for Nicosulfuron over 5 cm considering accumulation* (mg/kg) 0.0407
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for Nicosulfuron(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0403	0.0405	0	1
2	0.0399	0.0403	0	2
4	0.0390	0.0399	0	4
7	0.0378	0.0392	0	7

14	0.0350	0.0378	0	14
21	0.0325	0.0364	0	21
28	0.0301	0.0352	0	28
42	0.0259	0.0328	0	42
50	0.0238	0.0315	0	50
100	0.0140	0.0250	0	100

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the first application)

RESULTS FOR: ASDM

Calculations over one year

Maximum annual total soil concentration for ASDM over 5 cm(mg/kg): 0.0031 occurring on day 172^
(^ This is 13.74 % of the theoretical maximum concentration of the metabolite)

Calculated time dependent total soil concentrations over 5 cm for ASDM after one year (mg/kg)

Time(d)	PECact*	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0031	0.0031	172	173
2	0.0031	0.0031	171	173
4	0.0031	0.0031	170	174
7	0.0031	0.0031	169	176
14	0.0031	0.0031	165	179
21	0.0031	0.0031	162	183
28	0.0030	0.0031	159	187
42	0.0030	0.0031	152	194
50	0.0030	0.0031	149	199
100	0.0028	0.0030	128	228

(* PECact values are related to the time after the maximum concentration)

Calculation of background concentrations after many years

Final Background concentration in total soil for ASDM over 5 cm(mg/kg)*: 0.0027**

(* estimated to occur after 10 years without crop rotation)
(** according to the estimation 100% of the final plateau was reached after 10 years without crop rotation)

Reduction factor to account for crop rotation: 1

Final Background concentration in total soil including crop rotation(mg/kg): 0.0027

Calculations of concentrations considering accumulation after many years of application

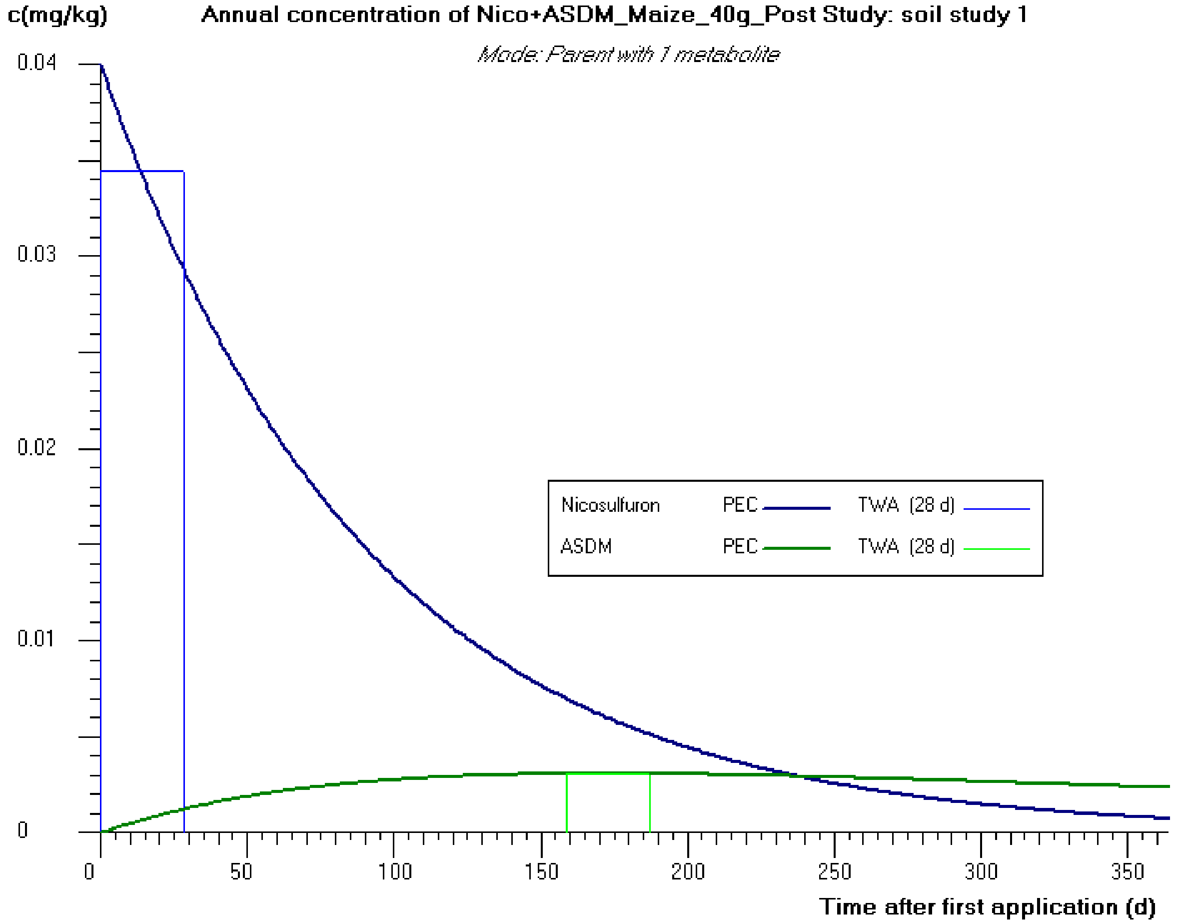
Maximum total soil concentration for ASDM over 5 cm considering accumulation* (mg/kg) 0.0058
(* a tillage depth of 5 cm was considered for calculating the background concentration)

Calculated time dependent total soil concentrations over 5 cm for ASDM(mg/kg) considering accumulation*

Time(d)	PECact**	PECtwa	Begin TWAframe(d)	End TWAframe(d)
1	0.0058	0.0058	172	173
2	0.0058	0.0058	171	173
4	0.0058	0.0058	170	174
7	0.0058	0.0058	169	176
14	0.0058	0.0058	165	179
21	0.0058	0.0058	162	183
28	0.0058	0.0058	159	187
42	0.0058	0.0058	152	194
50	0.0057	0.0058	149	199
100	0.0055	0.0058	128	228

(* a tillage depth of 5 cm was considered for calculating the background concentration)
(** PECact values are related to the time after the maximum concentration)'

GRAPHIC REPRESENTATION OF THE CALCULATION



A 3.2 Real Llanderal (2015)

The report summarised below contains various use patterns but only those use patterns are presented here which are relevant for this core dossier. Use numbers in this summary refer to the modelling report and not to the numbers in Table 8.1-1.

Comments of zRMS:	For comments on groundwater exposure assessment, please refer to point 8.8 of this report.

Reference:	KCP 9.2.4.1/01
Report	Real Llanderal, J. (2015): Dicamba - A Leaching Assessment for Parent and One Soil Metabolite (DCSA) Using the FOCUS Groundwater Scenarios Following Spray Application to Maize in the EU. RIFCON GmbH Unpublished report 1520411-1 (Syngenta File No. SAN837_11572)
Guideline(s):	FOCUS (2000). FOCUS groundwater scenarios in the EU review of active substances. Report of the FOCUS groundwater scenarios workgroup, EC document reference Sanco/321/2000 rev. 2, 202 pp. FOCUS (2014a). Assessing potential for movement of active substances and their metabolites to groundwater in the EU. Report of the FOCUS Groundwater Work Group, EC Document Reference Sanco/13144/2010 version 3, 613 pp. FOCUS (2014b). Generic guidance for Tier 1 FOCUS groundwater assessments, version 2.2. FOCUS groundwater scenarios working group.
Deviations:	No
GLP:	No (not applicable, calculations)
Acceptability:	Acceptable

A.3.2.1 Materials and methods

This report describes a FOCUS groundwater modelling study that examined the potential for dicamba and its metabolite DCSA to reach groundwater following application to maize. The FOCUS simulation models FOCUS-PEARL (v 4.4.4), FOCUS-PELMO (v 5.5.3) and FOCUS-MACRO (v 5.5.4) were used in the modelling study.

Detailed information on the use pattern of dicamba included in the modelling is presented in Table A 28, below.

Table A 28: Application pattern of dicamba used in modelling

Crop	Application method	Growth stage [approx. BBCH]	Application rate [g a.s./ha]	No. of applications	Application interval [d]	FOCUS crop interception [%]	Resulting soil deposit [g a.s./ha]
Maize	Foliar spray	12	264	1	-	25	198
Maize	Foliar spray	12	176	1	-	25	132

Applications were considered for all available FOCUS scenarios for maize implemented in the models. Application dates are presented in Table A 29, below. Simulations were carried out using the FOCUS standard crop ‘maize’. Simulations were carried out over 26 years, as proposed by FOCUS for pesticides that are applied annually. The first 6 years are intended to be a ‘warm up’ period, thus the following 20 years were taken into account for the assessment of the leaching behaviour.

Table A 29: Application dates of dicamba to maize used in modelling

Crop	Growth stage [approx. BBCH]	Scenario	Application date
Maize	12	Châteaudun	4-May
		Hamburg	8-May
		Kremsmünster	8-May
		Okehampton	28-May
		Piacenza	18-May
		Porto	4-May
		Sevilla	10-Mar
		Thiva	23-Apr

The input parameters of dicamba and its metabolite DCSA used in modelling are shown in Table A 30, below. The modelled metabolic pathway for dicamba degradation in soil is shown in Figure A 3.

Table A 30: Summary of input parameters for dicamba and DCSA for the leaching simulation models FOCUS-PEARL (v 4.4.4), FOCUS-PELMO (v 5.5.3) and FOCUS-MACRO (v 5.5.4)

Physical chemistry properties			
	Molecular weight [g/mol]	**Water solubility at 25°C [mg/L]**	**Vapour pressure at 25°C [Pa]**
Dicamba	221	6600	0
Remarks	EFSA, 2011	EFSA, 2011	Worst case
DCSA	207	88000	0
Remarks	EFSA, 2011	EFSA, 2011	Worst case

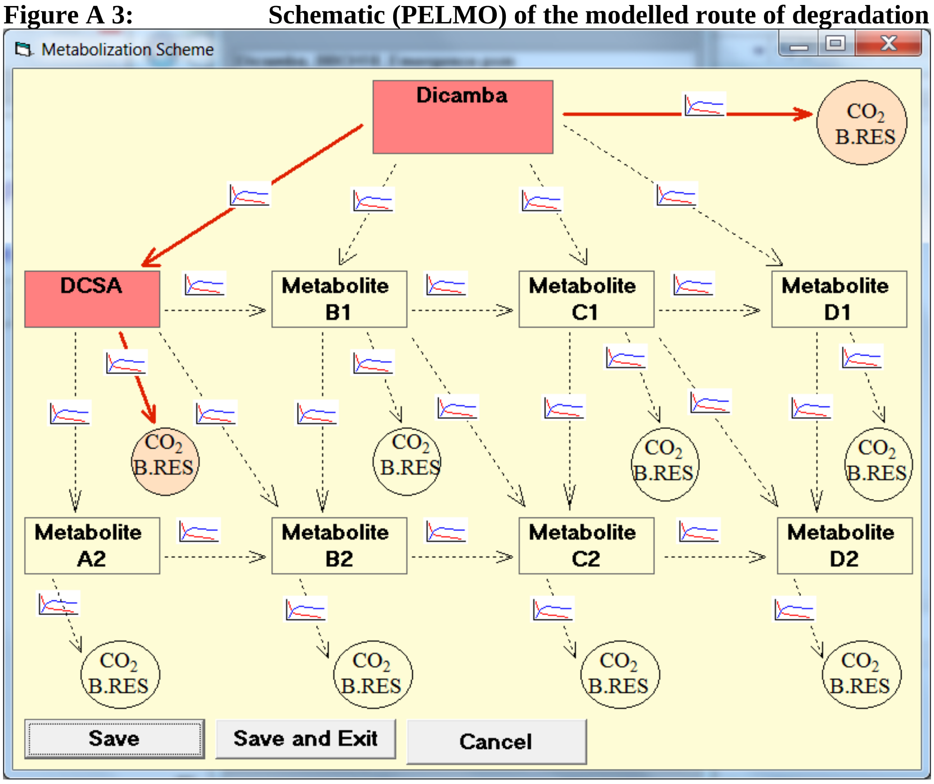
Degradation in soil				
	DT_{50} laboratory soil [d]	**Formation fraction source to sink relation [-]**	**Conversion factor for MACRO [a] [-]**	**Transformation rate [b] [-]**
Dicamba	4.0	0.75 (to DCSA)	0.702	0.1299651 to DCSA 0.0433217 to CO_2
Remarks	Geometric mean at reference conditions (n = 5) EFSA, 2011	EFSA, 2011	-	-
DCSA	9.40	-	-	0.0737391 to CO_2
Remarks	Geometric mean at reference conditions (n = 5) EFSA, 2011	-	-	-

NA – not applicable
[a] for MACRO, FFm * (MolWeight_metabolite/ MolWeight_ parent)
[b] for PELMO; (ln(2) / DT_{50}) * FFm

Sorption to soil			
	K_{FOC} [L/kg]	**K_{FOM} [L/kg]**	**Freundlich exponent 1/n [-]**
Dicamba	9.82	5.7	0.74
Remarks	Geometric mean (n = 4) EFSA, 2011	Calculated from K_{FOC} K_{FOM} = K_{FOC} / 1.724	Arithmetic mean (n = 4) EFSA, 2011
DCSA	877	509	0.8
Remarks	Geometric mean (n = 5) EFSA, 2011	Calculated from K_{FOC} K_{FOM} = K_{FOC} / 1.724	Arithmetic mean (n = 5) EFSA, 2011

Crop parameters	
	Crop uptake factor [-]
Dicamba	0
Remarks	Default value
DCSA	0
Remarks	Default value

Figure A 3: Schematic (PELMO) of the modelled route of degradation of dicamba



A.3.2.2 Results and discussions

Predicted environmental concentrations for dicamba and its metabolite DCSA in groundwater (PEC_{GW}) were calculated for the use of dicamba on maize in Europe in accordance with FOCUS guidelines (FOCUS, 2000, 2014a, b).

The 80th percentile (at 1 m soil depth) PEC_{GW} values generated by the FOCUS-PEARL, FOCUS-PELMO and FOCUS-MACRO simulations are given in Table A 31 to Table A 33.

Table A 31: PEC_{GW} of dicamba and DCSA following applications of dicamba to maize (FOCUS-PEARL)

Crop	Application rate [g a.s./ha]	No. of appl.	Scenario	PEC_{GW} at 1 m soil depth [µg/L]	
				Dicamba	DCSA
Maize	264	1	Châteaudun	<0.001	<0.001
			Hamburg	<0.001	<0.001
			Kremsmünster	<0.001	<0.001
			Okehampton	<0.001	<0.001
			Piacenza	<0.001	<0.001
			Porto	<0.001	<0.001
			Sevilla	<0.001	<0.001
			Thiva	<0.001	<0.001
Maize	176	1	Châteaudun	<0.001	<0.001
			Hamburg	<0.001	<0.001
			Kremsmünster	<0.001	<0.001
			Okehampton	<0.001	<0.001
			Piacenza	<0.001	<0.001
			Porto	<0.001	<0.001
			Sevilla	<0.001	<0.001
			Thiva	<0.001	<0.001

Table A 32: PEC_{GW} of dicamba and DCSA following applications of dicamba to maize (FOCUS-PELMO)

Crop	Application rate [g a.s./ha]	No. of appl.	Scenario	PEC_{GW} at 1 m soil depth [µg/L]	
				Dicamba	DCSA
Maize	264	1	Châteaudun	<0.001	<0.001
			Hamburg	<0.001	<0.001
			Kremsmünster	<0.001	<0.001
			Okehampton	<0.001	<0.001
			Piacenza	<0.001	<0.001
			Porto	<0.001	<0.001
			Sevilla	<0.001	<0.001
			Thiva	<0.001	<0.001
Maize	176	1	Châteaudun	<0.001	<0.001
			Hamburg	<0.001	<0.001
			Kremsmünster	<0.001	<0.001
			Okehampton	<0.001	<0.001
			Piacenza	<0.001	<0.001
			Porto	<0.001	<0.001
			Sevilla	<0.001	<0.001
			Thiva	<0.001	<0.001

Table A 33: PEC_{GW} of dicamba and DCSA following application of dicamba to maize (FOCUS-MACRO)

Crop	Application rate [g a.s./ha]	No. of appl.	Scenario	PEC_{GW} at 1 m soil depth [µg/L]	
				Dicamba	DCSA
Maize	264	1	Châteaudun	<0.001	<0.001
Maize	176	1	Châteaudun	<0.001	<0.001

A 3.3 Ibrahim (2017)

The report summarised below contains various use patterns but only those use patterns are presented here which are relevant for this core dossier. Use numbers in this summary refer to the modelling report and not to the numbers in Table 8.1-1.

Comments of zRMS:	The groundwater modelling for mesotrione was not agreed by the zRMS due to higher groundwater exposure calculated by the zRMS for the correct application dates. For detailed discussion on groundwater exposure assessment, please refer to point 8.8 of this report.

Reference:	KCP 9.2.4.1/02
Report	Ibrahim, L. (2017): Mesotrione - A Leaching Assessment for Parent and Metabolites MNBA and AMBA Using the PEARL 4.4.4, PELMO 5.5.3 and MACRO 5.5.4 Groundwater Models Following Spray Application to Maize. RIFCON GmbH Unpublished report 1520528-1 (Syngenta File No. ZA1296_10472)
Guideline(s):	EFSA (2014). Guidance Document for evaluating laboratory and field dissipation studies to obtain $DegT_{50}$ values of active substances of plant protection products and transformation products of these active substances in soil. EFSA Journal, 12(5): 3662. FOCUS (2000). FOCUS groundwater scenarios in the EU review of active substances. Report of the FOCUS groundwater scenarios workgroup, EC document reference Sanco/321/2000 rev. 2, 202 pp. FOCUS (2014a). Assessing potential for movement of active substances and their metabolites to groundwater in the EU. Report of the FOCUS Groundwater Work Group, EC Document Reference Sanco/13144/2010 version 3, 613 pp. FOCUS (2014b). Generic guidance for Tier 1 FOCUS groundwater assessments, version 2.2 FOCUS groundwater scenarios working group.
Deviations:	No
GLP:	No (not applicable, calculations)
Acceptability:	Not accepted

~~A.3.3.1 Materials and methods~~

~~This report describes a FOCUS groundwater modelling study that examined the potential for mesotrione and its metabolites MNBA and AMBA to reach groundwater following application to maize. The FOCUS simulation models FOCUS PEARL (v4.4.4), FOCUS PELMO (v5.5.3) and MACRO (v5.5.4) were used in the modelling study. The input parameters relating to application are shown in Table A 34, below.~~

~~Table A 34: Application patterns of mesotrione to maize used in modelling~~

~~Use No.~~	~~5~~	~~6~~
~~Crop~~	~~Maize~~	~~Maize~~
~~Application rate (g as/ha)~~	~~100~~	~~75~~
~~Number of applications / interval (d)~~	~~1 / -~~	~~1 / -~~
~~Relative application date/BBCH growth stage~~	~~early post-emergence~~	~~early post-emergence~~
~~Crop interception (%)~~	~~25~~	~~25~~
~~Frequency of application~~	~~annual~~	~~annual~~
~~Models used for calculation~~	~~FOCUS PEARL v4.4.4, FOCUS PELMO v5.5.3, FOCUS MACRO v5.5.4~~	

~~Applications were considered for the FOCUS scenarios in PEARL and PELMO Châteaudun,~~

~~Hamburg, Kremsmünster, Okehampton, Piacenza, Porto, Sevilla and Thiva. For MACRO, only the scenario Châteaudun is defined. 25% interception was assumed for the post-emergence applications.~~

~~Application dates are presented in Table A 35, below. The dates were set at BBCH 12 for post-emergence application according to the tool AppDate (v2.0SE; Klein, 2015). Simulations were carried out using the FOCUS standard crop maize in FOCUS PEARL and PELMO as well as in FOCUS-MACRO. Simulations were carried out over 26 years, as proposed by FOCUS for pesticides that are applied annually. The first 6 years are intended to be a 'warm up' period, thus the following 20 years were taken into account for the assessment of the leaching behaviour.~~

~~**Table A 35: Application dates of mesotrione to maize used in modelling**~~

~~**Use pattern**~~	~~**Scenario**~~	~~**Application dates (absolute)**~~
		~~**1st Application**~~
~~Maize~~ ~~Use No. 5 & 6~~ ~~early post-emergence~~ ~~BBCH 12~~	~~Châteaudun~~	~~04-May (124)~~
	~~Hamburg~~	~~08-May (128)~~
	~~Kremsmünster~~	~~08-May (128)~~
	~~Okehampton~~	~~28-May (148)~~
	~~Piacenza~~	~~18-May (138)~~
	~~Porto~~	~~04-May (124)~~
	~~Sevilla~~	~~10-Mar (130)~~
	~~Thiva~~	~~23-Apr (113)~~

~~The input parameters of mesotrione and its metabolites MNBA and AMBA used in modelling are shown in Table A 36, below. All other input values were set at the default values unless otherwise stated.~~

~~A pH dependence of the rate of degradation and sorption could be assumed from the available data for mesotrione and additionally for the sorption data for AMBA. Peer review agreed to use a fitting of data to a linear relationship for degradation and to an exponential curve for sorption to represent this dependence in environmental modelling. The pH dependence observed on the degradation and soil adsorption of mesotrione and AMBA was taken into account in the PEC_{GW} calculations. The input values were selected to cover the most relevant soil pHs for maize in EU as suggested by the EFSA conclusion on mesotrione (2016).~~

~~Within the FOCUS-MACRO modelling shell, it is only possible to simulate the degradation of a parent compound to a single metabolite. In order to simulate the degradation pathway of mesotrione to MNBA and AMBA in series, it was necessary to run MACRO outside the shell. The steps taken to conduct the modelling are laid out in report.~~

~~**Table A 36: Summary of input parameters for mesotrione, MNBA and AMBA for PEC_{GW} calculations**~~

~~**Compound**~~	~~**Mesotrione**~~	~~**MNBA**~~	~~**AMBA**~~	~~**Value in accordance with EU endpoint / Reference**~~
~~Molar mass (g/mol)~~	~~339.3~~	~~245~~	~~215~~	~~Yes, EFSA (2016)~~
~~Water solubility (mg/L)~~	~~160*~~ ~~(20)~~	~~32400**~~ ~~(20)~~	~~23000**~~ ~~(20)~~	~~* Yes, EFSA (2016)~~ ~~** Yes, RAR (2015)~~
~~Saturated vapour pressure (Pa)~~	~~0~~ ~~(20)~~	~~0~~ ~~(20)~~	~~0~~ ~~(20)~~	~~Worst case assumption~~
~~DT_{50} in soil (d)~~	~~acidic soil [a]:~~ ~~27.88~~ ~~alkaline soil [b]:~~ ~~0.54~~ ~~(pH dependent: linear fit, lab. data, normalisation to 10 kPa or pF2, 20°C, n = 18)~~	~~3.4~~ ~~(geomean, normalisation to 10 kPa or pF2, 20°C, n = 10)~~	~~14.5~~ ~~(geomean, normalisation to 10 kPa or pF2, 20°C, n = 5)~~	~~Yes, EFSA (2016)~~
~~Transformation rate (1/d)~~ ~~for PELMO~~	~~acidic soil [a]:~~ ~~0.025 to MNBA~~ ~~0.000 to CO_2~~ ~~alkaline soil [b]:~~	~~0.051 to AMBA~~ ~~0.153 to CO_2~~	~~0.048 to CO_2~~	~~Calculated~~

Compound	Mesotrione	MNBA	AMBA	Value in accordance with EU endpoint / Reference
	1.284 to MNBA 0.000 to CO_2			
Conversion factor for MACRO	–	0.722 referring to mesotrione	0.219 referring to MNBA	Calculated
K_{FOC} / K_{FOM} (mL/g)	acidic soil [a]: 156.7/90.89 alkaline soil [b]: 17.39/10.09 (pH dependent: log fit, n = 10)	3.2/1.9 (pH independent, worst case, n=2)	acidic soil [a]: 105.6/61.3 alkaline soil [b]: 21.8/12.6 (pH dependent: log fit, n = 5)	Yes, EFSA (2016) K_{FOM} calculated as K_{FOC}/1.724
1/n	0.94 (arithmetic mean, n = 10 to be used for both pH scenarios)	0.9 FOCUS default	0.85 (arithmetic mean, n = 5 to be used for both pH scenarios)	Yes, EFSA (2016)
Plant uptake factor	0	0	0	Worst case assumption
Formation fraction	–	1 from parent	0.25 from MNBA	Yes, EFSA (2016)
Washoff factor (1/m)	not relevant	not relevant	not relevant	–
Foliar DT_{50} (d)	not relevant	not relevant	not relevant	–

[a] acid value for pH 5.1
[b] alkaline value for pH 7.9

A.3.3.2 Results

Predicted environmental concentrations for mesotrione, MNBA and AMBA in groundwater (PEC_{GW}) were calculated for the use of mesotrione on maize in Europe in accordance with FOCUS guidelines (FOCUS, 2000, 2014a, 2014b).

The 80[th] percentile (at 1 m soil depth) PEC_{GW} values generated by the FOCUS PEARL, FOCUS PELMO and MACRO simulations are given in the tables below.

Table A 37: PEC_{GW} for mesotrione, MNBA and AMBA in maize (with FOCUS PEARL v4.4.4)

Use pattern	Scenario	80[th] Percentile PEC_{GW} at 1 m Soil Depth (µg/L)					
		Mesotrione		MNBA		AMBA	
		pH 5.1	pH 7.9	pH 5.1	pH 7.9	pH 5.1	pH 7.9
Use 5: Maize 100 g a.s/ha early post-emergence	Châteaudun	< 0.001	< 0.001	0.005	< 0.001	< 0.001	0.002
	Hamburg	0.004	< 0.001	0.059	< 0.001	0.014	0.007
	Kremsmünster	0.002	< 0.001	0.012	< 0.001	0.002	0.010
	Okehampton	0.005	< 0.001	0.030	0.002	0.004	0.019
	Piacenza	0.003	< 0.001	0.009	< 0.001	0.002	0.002
	Porto	0.001	< 0.001	0.008	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001
	Thiva	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001
Use 6: Maize 75 g a.s/ha early post-emergence	Châteaudun	< 0.001	< 0.001	0.003	< 0.001	< 0.001	0.002
	Hamburg	0.002	< 0.001	0.043	< 0.001	0.010	0.005
	Kremsmünster	0.001	< 0.001	0.009	< 0.001	0.001	0.007
	Okehampton	0.003	< 0.001	0.021	0.001	0.003	0.013
	Piacenza	0.002	< 0.001	0.006	< 0.001	0.001	0.002
	Porto	< 0.001	< 0.001	0.006	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001
	Thiva	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001

Table A 38: PEC$_{GW}$ for mesotrione, MNBA and AMBA in maize (with FOCUS PELMO v5.5.3)

Use pattern	Scenario	80th Percentile PEC$_{GW}$ at 1 m Soil Depth (µg/L)					
		Mesotrione		MNBA		AMBA	
		pH 5.1	pH 7.9	pH 5.1	pH 7.9	pH 5.1	pH 7.9
Use 5: Maize 100 g a.s/ha early post-emergence	Châteaudun	< 0.001	< 0.001	0.003	< 0.001	<0.001	0.001
	Hamburg	0.004	< 0.001	0.075	< 0.001	0.009	0.003
	Kremsmünster	0.002	< 0.001	0.018	< 0.001	0.002	0.011
	Okehampton	0.004	< 0.001	0.046	0.005	0.005	0.020
	Piacenza	0.005	< 0.001	0.017	< 0.001	0.003	0.004
	Porto	0.001	< 0.001	0.018	< 0.001	<0.001	0.001
	Sevilla	< 0.001	< 0.001	0.001	< 0.001	<0.001	<0.001
	Thiva	< 0.001	< 0.001	0.002	< 0.001	<0.001	<0.001
Use 6: Maize 75 g a.s/ha early post-emergence	Châteaudun	< 0.001	< 0.001	0.002	< 0.001	<0.001	0.001
	Hamburg	0.002	< 0.001	0.054	< 0.001	0.007	0.002
	Kremsmünster	0.001	< 0.001	0.013	< 0.001	0.002	0.007
	Okehampton	0.003	< 0.001	0.033	0.003	0.003	0.013
	Piacenza	0.003	< 0.001	0.012	< 0.001	0.002	0.003
	Porto	0.001	< 0.001	0.013	< 0.001	<0.001	<0.001
	Sevilla	< 0.001	< 0.001	0.001	< 0.001	<0.001	<0.001
	Thiva	< 0.001	< 0.001	0.002	< 0.001	<0.001	<0.001

Table A 39: PEC$_{GW}$ for mesotrione, MNBA and AMBA in maize (with MACRO v5.5.4)

Use pattern	Scenario	80th Percentile PEC$_{GW}$ at 1 m Soil Depth (µg/L)					
		Mesotrione		MNBA		AMBA	
		pH 5.1	pH 7.9	pH 5.1	pH 7.9	pH 5.1	pH 7.9
Use 5: Maize, 100 g a.s/ha early post-emergence	Châteaudun	0.001	< 0.001	0.004	< 0.001	< 0.001	0.003
Use 6: Maize, 75 g a.s/ha early post-emergence	Châteaudun	0.001	< 0.001	0.003	< 0.001	< 0.001	0.002

Table A 40: Summary of maximum PEC$_{GW}$ across all models for mesotrione, MNBA and AMBA in maize

Crop	Substance	80th Percentile PEC$_{GW}$ (µg/L)	Model and Version Number	Scenario
Use 5: Maize, 100 g a.s/ha early post-emergence	Mesotrione	0.005	PEARL v.4.4.4 PELMO v.5.5.3	Okehampton, acidic soil Piacenza, acidic soil
	MNBA	0.075	PELMO v.5.5.3	Hamburg, acidic soil
	AMBA	0.020	PELMO v.5.5.3	Okehampton, alkaline soil
Use 6: Maize, 75 g a.s/ha early post-emergence	Mesotrione	0.003	PEARL v.4.4.4 PELMO v.5.5.3	Okehampton, acidic soil Okehampton and Piacenza, acidic soil
	MNBA	0.054	PELMO v.5.5.3	Hamburg, acidic soil
	AMBA	0.013	PEARL v.4.4.4 PELMO v.5.5.3	Okehampton, alkaline soil

A 3.4 Nicolaisen (2017)

The report summarised below contains various use patterns; only those of relevance for the present product are included in the summary. Use numbers in this summary refer to the modelling report and not to the numbers in Table 8.1-1.

Comments of zRMS:	The groundwater modelling for mesotrione was not agreed by the zRMS due to higher groundwater exposure calculated by the zRMS for the correct application dates. For detailed discussion on groundwater exposure assessment, please refer to point 8.8 of this report.

Reference:	KCP 9.2.4.1/03
Report	Nicolaisen, B. (2017): Mesotrione - A Leaching Assessment for Parent and Metabolites MNBA and AMBA Using the PEARL 4.4.4, PELMO 5.5.3 and MACRO 5.5.4 Groundwater Models Following Spray Application to Maize (Simulations for Neutral Soil). RIFCON GmbH Unpublished report 1760183-1 (Syngenta file no ZA1296_10590)
Guideline(s):	EFSA (2014). Guidance Document for evaluating laboratory and field dissipation studies to obtain $DegT_{50}$ values of active substances of plant protection products and transformation products of these active substances in soil. EFSA Journal, 12(5): 3662. FOCUS (2000). FOCUS groundwater scenarios in the EU review of active substances. Report of the FOCUS groundwater scenarios workgroup, EC document reference Sanco/321/2000 rev. 2, 202 pp. FOCUS (2014a). Assessing potential for movement of active substances and their metabolites to groundwater in the EU. Report of the FOCUS Groundwater Work Group, EC Document Reference Sanco/13144/2010 version 3, 613 pp. FOCUS (2014b). Generic guidance for Tier 1 FOCUS groundwater assessments, version 2.2 FOCUS groundwater scenarios working group.
Deviations:	No
GLP:	No (not applicable, calculations)
Acceptability:	Not accepted

~~A.3.4.1 Materials and methods~~

~~This report describes a FOCUS groundwater modelling study that examined the potential for mesotrione and its metabolites MNBA and AMBA to reach groundwater following application to maize. Calculations were only performed to simulate maize growing in soil pH 6.5 in this report. The FOCUS simulation models FOCUS PEARL (v4.4.4), FOCUS PELMO (v5.5.3) and MACRO (v5.5.4) were used in the modelling study. The input parameters relating to application are shown in the table below.~~

Table A 41: Application patterns of mesotrione to maize used in modelling

Use No.	5	6
Crop	Maize	Maize
Application rate (g as/ha)	100	75
Number of applications / interval (d)	1 / –	1 / –
Relative application date/BBCH growth stage	early post-emergence	early post-emergence
Crop interception (%)	25	25
Frequency of application	annual	annual
Models used for calculation	FOCUS PEARL v4.4.4, FOCUS PELMO v5.5.3, FOCUS MACRO v5.5.4	FOCUS PEARL v4.4.4, FOCUS PELMO v5.5.3, FOCUS MACRO v5.5.4

Applications were considered for the FOCUS scenarios in PEARL and PELMO Châteaudun, Hamburg, Kremsmünster, Okehampton, Piacenza, Porto, Sevilla and Thiva. For MACRO, only the scenario Châteaudun is defined. 25% interception was assumed for the post-emergence applications.

Application dates are presented in Table A 42, below. The dates were set at BBCH 12 post-emergence application according to the tool AppDate (v2.0SE; Klein, 2015). Simulations were carried out using the FOCUS standard crop maize in FOCUS PEARL and PELMO as well as in FOCUS MACRO. Simulations were carried out over 26 years, as proposed by FOCUS for pesticides that are applied annually. The first 6 years are intended to be a 'warm up' period, thus the following 20 years were taken into account for the assessment of the leaching behaviour.

Table A 42: Application dates of mesotrione to maize used in modelling

Crop	Scenario	Application dates (absolute)	
		1st Application	2nd Application
Maize Use No. 5 to 6 early post-emergence	Châteaudun	04-May (124)	-
	Hamburg	08-May (128)	-
	Kremsmünster	08-May (128)	-
	Okehampton	28-May (148)	-
	Piacenza	18-May (138)	-
	Porto	04-May (124)	-
	Sevilla	10-Mar (130)	-
	Thiva	23-Apr (113)	-

The input parameters of mesotrione and its metabolites MNBA and AMBA used in modelling are shown in Table A 43, below. All other input values were set at the default values unless otherwise stated.

A pH dependence of the rate of degradation and sorption could be assumed from the available data for mesotrione and additionally for the sorption data for AMBA. Peer review agreed to use a fitting of data to a linear relationship for degradation and to an exponential curve for sorption to represent this dependence in environmental modelling. In the EFSA conclusion on mesotrione (2016), the input values were selected to cover the most relevant soil pHs for maize in EU (pH 5.1, 6.5 and 7.9). In this report, calculations were only performed to simulate maize growing in soil pH 6.5.

Within the FOCUS MACRO modelling shell, it is only possible to simulate the degradation of a parent compound to a single metabolite. In order to simulate the degradation pathway of mesotrione to MNBA and AMBA in series, it was necessary to run MACRO outside the shell.

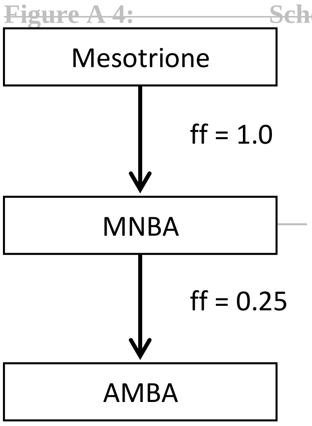
Table A 43: Summary of input parameters for mesotrione, MNBA and AMBA for PEC_{GW} calculations

Compound	Mesotrione	MNBA	AMBA	Value in accordance with EU endpoint / Reference
Molar mass (g/mol)	339.3	245	215	Yes, EFSA (2016)
Water solubility (mg/L)	160* (20)	32400** (20)	23000** (20)	* Yes, EFSA (2016) ** Yes, RAR
Saturated vapour pressure (Pa)	0 (20)	0 (20)	0 (20)	Worst case assumption
DT_{50} in soil (d)	neutral soil [a]: 14.2 (pH dependent: linear fit, lab. data, normalisation to 10 kPa or pF2, 20 °C, n = 18)	3.4 (geomean, normalisation to 10 kPa or pF2, 20°C, n = 10)	14.5 (geomean, normalisation to 10 kPa or pF2, 20°C, n = 5)	Yes, EFSA (2016)
Transformation rate (1/d) for PELMO	neutral soil [a]: 0.0488 to MNBA 0.000 to CO_2	0.051 to AMBA 0.153 to CO_2	0.048 to CO_2	Calculated
Conversion factor for MACRO	-	0.722 mesotrione as precursor	0.219 MNBA as precursor	Calculated
K_{FOC} / K_{FOM} (mL/g)	neutral soil [a]: 52.2/30.28 (pH dependent: log fit, n = 10)	3.2/1.9 (pH independent, worst case, n=2)	neutral soil [a]: 48.02/27.9 (pH dependent: log fit, n = 5)	Yes, EFSA (2016) K_{FOM} calculated as K_{FOC}/1.724
1/n	0.94 (arithmetic mean, n = 10 to be used for both pH scenarios)	0.9 FOCUS default	0.85 (arithmetic mean, n = 5 to be used for both pH scenarios)	Yes, EFSA (2016)
Plant uptake factor	0	0	0	Worst case assumption
Formation fraction	-	1 from parent	0.25 from MNBA	Yes, EFSA (2016)
Washoff factor (1/m)	not relevant	not relevant	not relevant	-
Foliar DT_{50} (d)	not relevant	not relevant	not relevant	-

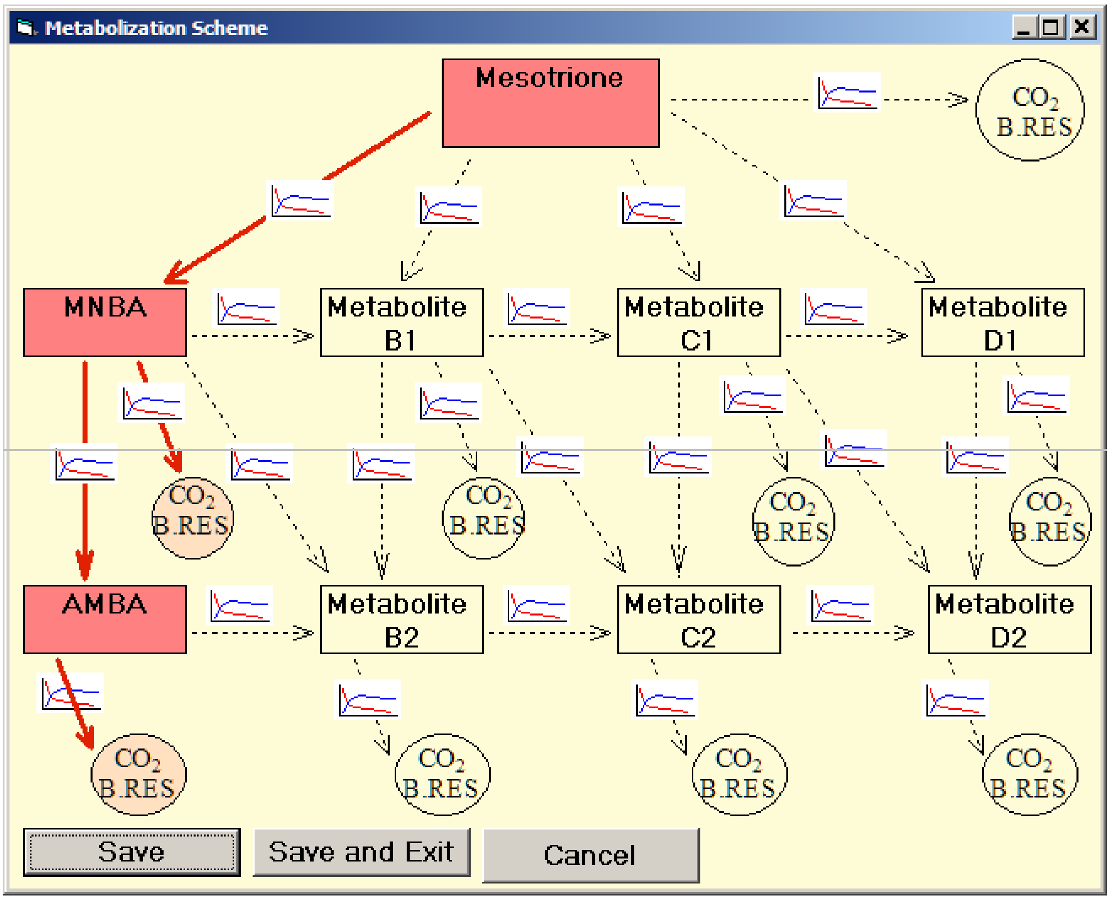
[a] pH 6.5

The degradation pathway of mesotrione and the implementation of the pathway in PELMO are shown below.

Figure A 4: Schematic diagram of the modelled route of degradation of mesotrione



~~Figure A 5: Degradation scheme for mesotrione and its metabolites as used in FOCUS-PELMO~~



~~A.3.4.2 Results~~

~~Predicted environmental concentrations for mesotrione, MNBA and AMBA in groundwater (PEC_{GW}) were calculated for the use of mesotrione on maize in Europe in accordance with FOCUS guidelines (FOCUS, 2000, 2014, 2014a).~~

~~The 80th percentile (at 1 m soil depth) PEC_{GW} values generated by the FOCUS PEARL, FOCUS PELMO and MACRO simulations are given in Table A 44 to Table A 46.~~

~~Table A 44: PEC_{GW} for mesotrione, MNBA and AMBA in maize (with FOCUS PEARL v4.4.4) – parameter set for pH 6.5~~

~~Use pattern~~	~~Scenario~~	~~80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)~~		
		~~Mesotrione~~	~~MNBA~~	~~AMBA~~
~~Use 5: Maize 100 g a.s/ha early post-emergence~~	~~Châteaudun~~	~~0.004~~	~~0.005~~	~~0.001~~
	~~Hamburg~~	~~0.014~~	~~0.037~~	~~0.016~~
	~~Kremsmünster~~	~~0.010~~	~~0.011~~	~~0.007~~
	~~Okehampton~~	~~0.022~~	~~0.029~~	~~0.012~~
	~~Piacenza~~	~~0.005~~	~~0.003~~	~~0.002~~
	~~Porto~~	~~0.001~~	~~0.002~~	~~< 0.001~~
	~~Sevilla~~	~~< 0.001~~	~~< 0.001~~	~~< 0.001~~
	~~Thiva~~	~~0.001~~	~~0.001~~	~~< 0.001~~

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)		
		Mesotrione	MNBA	AMBA
Use 6: Maize 75 g a.s/ha early post-emergence	Châteaudun	0.003	0.004	0.001
	Hamburg	0.010	0.027	0.011
	Kremsmünster	0.007	0.008	0.004
	Okehampton	0.016	0.021	0.008
	Piacenza	0.003	0.002	0.002
	Porto	0.001	0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001
	Thiva	< 0.001	0.001	< 0.001

Table A 45: PEC_{GW} for mesotrione, MNBA and AMBA in maize (with FOCUS PELMO v5.5.3) – parameter set for pH 6.5

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)		
		Mesotrione	MNBA	AMBA
Use 5: Maize 100 g a.s/ha early post-emergence	Châteaudun	0.002	0.004	0.001
	Hamburg	0.010	0.031	0.009
	Kremsmünster	0.008	0.014	0.006
	Okehampton	0.025	0.033	0.011
	Piacenza	0.008	0.007	0.005
	Porto	0.001	0.003	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001
	Thiva	0.001	0.001	< 0.001
Use 6: Maize 75 g a.s/ha early post-emergence	Châteaudun	0.001	0.003	0.001
	Hamburg	0.007	0.022	0.007
	Kremsmünster	0.006	0.010	0.004
	Okehampton	0.018	0.024	0.008
	Piacenza	0.006	0.005	0.003
	Porto	0.001	0.002	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001
	Thiva	< 0.001	0.001	< 0.001

Table A 46: PEC_{GW} for mesotrione, MNBA and AMBA in maize (with MACRO v5.5.4) – parameter set for pH 6.5

Use pattern	Scenario	80th Percentile PEC_{GW} at 1 m Soil Depth (µg/L)		
		Mesotrione	MNBA	AMBA
Use 5: Maize 100 g a.s/ha early post-emergence	Châteaudun	0.003	0.004	0.001
Use 6: Maize 75 g a.s/ha early post-emergence	Châteaudun	0.002	0.003	0.001

Table A 47: Summary of maximum PEC_{GW} across all models for mesotrione, MNBA and AMBA in maize – parameter set for pH 6.5

Use pattern	Substance	80th Percentile PEC_{GW} (µg/L)	Appli-cation	Model and Version Number	Scenario
Use 5: Maize, 100 g a.s/ha early post-emergence	Mesotrione	0.025	100	PELMO v.5.5.3	Okehampton
	MNBA	0.037	100	PEARL v.4.4.4	Hamburg
	AMBA	0.016	100	PEARL v.4.4.4	Hamburg
Use 6: Maize, 75 g a.s/ha early post-emergence	Mesotrione	0.018	75	PELMO v.5.5.3	Okehampton
	MNBA	0.027	75	PEARL v.4.4.4	Hamburg
	AMBA	0.011	75	PEARL v.4.4.4	Hamburg

A 3.5 Carnall (2017)

The report summarised below contains various use patterns but only those use patterns are presented here which are relevant for this core dossier.

Comments of zRMS:	The groundwater modelling for nicosulfuron was not agreed by the zRMS due to higher groundwater exposure calculated by the zRMS for the correct sorption data and application dates. For detailed discussion on groundwater exposure assessment, please refer to point 8.8 of this report.

Reference:	KCP 9.2.4.1/04
Report	Carnall, J. (2017): Nicosulfuron - A Leaching Assessment for Parent and Soil Metabolites HMUD, AUSN, UCSN, ASDM, MU-466 and ADMP Using the FOCUS Groundwater Scenarios Following Spray Application to Maize in the EU. Cambridge Environmental Assessments Unpublished report no. CEA.1865 (Syngenta File No. ASF628_11313)
Guideline(s):	FOCUS (2000). FOCUS groundwater scenarios in the EU review of active substances. Report of the FOCUS groundwater scenarios workgroup, EC document reference Sanco/321/2000 rev. 2, 202 pp. FOCUS (2009). Assessing potential for movement of active substances and their metabolites to groundwater in the EU. Report of the FOCUS Groundwater Work Group, EC Document Reference Sanco/13144/2010 version 1, 604 pp. FOCUS (2014). Generic guidance for Tier 1 FOCUS groundwater assessments, version 2.2. FOCUS groundwater scenarios working group.
Deviations:	No
GLP:	No (not applicable, calculations)
Acceptability:	Not accepted

A.3.5.1 Materials and methods

This report describes a FOCUS groundwater modelling study that examined the potential for nicosulfuron and its metabolites – HMUD, AUSN, UCSN, ASDM, MU-466 and ADMP – to reach groundwater following application to maize. The FOCUS simulation models FOCUS-PEARL (v 4.4.4), FOCUS-PELMO (v 5.5.3) and FOCUS-MACRO (v 5.5.4) were used in the modelling study.

A single foliar application of nicosulfuron was simulated at approximately BBCH 12-19, at application rates of 40 g a.s./ha, 45 g a.s./ha and 60 g a.s./ha. Detailed information on the use patterns of nicosulfuron included in the modelling is presented in the table below.

Table A 48: Application patterns of nicosulfuron to maize used in the modelling

Application method	Growth stage [approx. BBCH]	Application rate [g a.s./ha]	No. of applications	Application frequency	FOCUS crop interception at application [%]	Resulting soil deposit per application [g a.s./ha]
Foliar spray	12-19	40	1	Annual	25	30.0
		45	1	Annual	25	33.75
		60	1	Annual	25	45.0

For maize, applications were considered for the FOCUS scenarios Châteaudun, Hamburg, Kremsmünster, Okehampton, Piacenza, Porto, Sevilla and Thiva.

For all scenarios, the first application date was set to 3 days after emergence. The application dates used in the modelling are presented in Table A 49. Simulations were carried out using the FOCUS

~~standard crop 'maize'. Simulations were carried out over 26 years for annual applications. The first 6 years are intended to be a 'warm up' period, thus the following 20 or 40 years were taken into account for the assessment of the leaching behaviour.~~

~~**Table A 49: Application dates of nicosulfuron to maize used in the modelling**~~

~~Growth stage [approx. BBCH]~~	~~Scenario~~	~~Application date~~
~~12-19~~	~~Châteaudun~~	~~04-May~~
	~~Hamburg~~	~~08-May~~
	~~Kremsmünster~~	~~08-May~~
	~~Okehampton~~	~~28-May~~
	~~Piacenza~~	~~18-May~~
	~~Porto~~	~~04-May~~
	~~Sevilla~~	~~10-Mar~~
	~~Thiva~~	~~23-Apr~~

~~The input parameters for nicosulfuron and its metabolites HMUD, AUSN, UCSN, ASDM, MU-466 and ADMP used in the modelling are given in Table A 50. The modelled metabolic pathway for nicosulfuron degradation in soil is given in Figure A 6.~~

~~**Table A 50: Summary of input parameters for nicosulfuron, HMUD, AUSN, UCSN, ASDM, MU-466 and ADMP for the leaching simulation models FOCUS-PEARL (v 4.4.4), FOCUS-PELMO (v 5.5.3) and FOCUS-MACRO (v 5.5.4)**~~

~~**Physical chemistry properties**~~			
	~~**Molecular weight [g/mol]**~~	~~**Water solubility at 25°C [mg/L]**~~	~~**Vapour pressure at 20°C [Pa]**~~
~~Nicosulfuron~~	~~410.4~~	~~9500~~	~~0~~
~~Remarks~~	~~Calculated~~	~~EFSA (2007)~~	~~Loss due to volatilisation was not considered (i.e. set to 0) → worst case[a]~~
~~HMUD~~	~~396.4~~	~~9500~~	~~0~~
~~Remarks~~	~~Calculated~~	~~Assumed same as parent value~~	~~Loss due to volatilisation was not considered (i.e. set to 0) → worst case[a]~~
~~AUSN~~	~~314.3~~	~~9500~~	~~0~~
~~Remarks~~	~~Calculated~~	~~Assumed same as parent value~~	~~Loss due to volatilisation was not considered (i.e. set to 0) → worst case[a]~~
~~UCSN~~	~~315.3~~	~~9500~~	~~0~~
~~Remarks~~	~~Calculated~~	~~Assumed same as parent value~~	~~Loss due to volatilisation was not considered (i.e. set to 0) → worst case[a]~~
~~ASDM~~	~~229.2~~	~~9500~~	~~0~~
~~Remarks~~	~~Calculated~~	~~Assumed same as parent value~~	~~Loss due to volatilisation was not considered (i.e. set to 0) → worst case[a]~~
~~MU-466~~	~~215.1~~	~~9500~~	~~0~~
~~Remarks~~	~~Calculated~~	~~Assumed same as parent value~~	~~Loss due to volatilisation was not considered (i.e. set to 0) → worst case[a]~~
~~ADMP~~	~~155.2~~	~~9500~~	~~0~~
~~Remarks~~	~~Calculated~~	~~Assumed same as parent value~~	~~Loss due to volatilisation was not considered (i.e. set to 0) → worst case[a]~~

~~[a] Implemented in PELMO 5.5.3 by entering the Henry's law constant directly as 0 J/mol at 20°C and 30°C~~

Degradation in soil					
	DT_{50} field soil [d]	DT_{50} laboratory soil [d]	Molar formation fraction[-] source to sink relation [-]	Mass conversion fraction[a] [-] source to sink relation [-]	Transformation rate[b] [-]
Nicosulfuron	NA	16.4	0.442 to HMUD 0.214 to ASDM 0.214 to ADMP	0.427 to HMUD 0.120 to ASDM 0.081 to ADMP	0.018681 to HMUD 0.009045 to ASDM 0.009045 to ADMP (0.005494 to CO_2)
Remarks	–	Geometric mean value (n=7); EFSA (2007)	EFSA (2007)	Calculated	Calculated
HMUD	NA	23.8	0.687 to AUSN 0.313 to UCSN	0.545 to AUSN 0.249 to UCSN	0.020008 to AUSN 0.009116 to UCSN
Remarks	–	Geometric mean value (n=2); EFSA (2007)	EFSA (2007)	Calculated	Calculated
AUSN	NA	192.3	NA	NA	NA
Remarks	–	Worst-case value (EFSA, 2007)	–	–	–
UCSN	NA	271.0	NA	NA	NA
Remarks	–	Worst-case value (EFSA, 2007)	–	–	–
ASDM	NA	236.6	0.282 to MU-466	0.265 to MU-466	0.000826 to MU-466 (0.002103 to CO_2)
Remarks	–	Worst-case value (EFSA, 2007)	EFSA (2007)	Calculated	Calculated
MU-466	NA	75.5	NA	NA	NA
Remarks	–	Worst-case value (EFSA, 2007)	–	–	–
ADMP	NA	4.5	NA	NA	NA
Remarks	–	Geometric mean value (n=3); EFSA (2007)	–	–	–

NA not applicable
[a] Required for input into MACRO 5.5.4; calculated by adjusting molar formation fraction to account for molecular weights of compounds.
[b] for PELMO; $(\ln(2) / DT_{50}) * FFm$

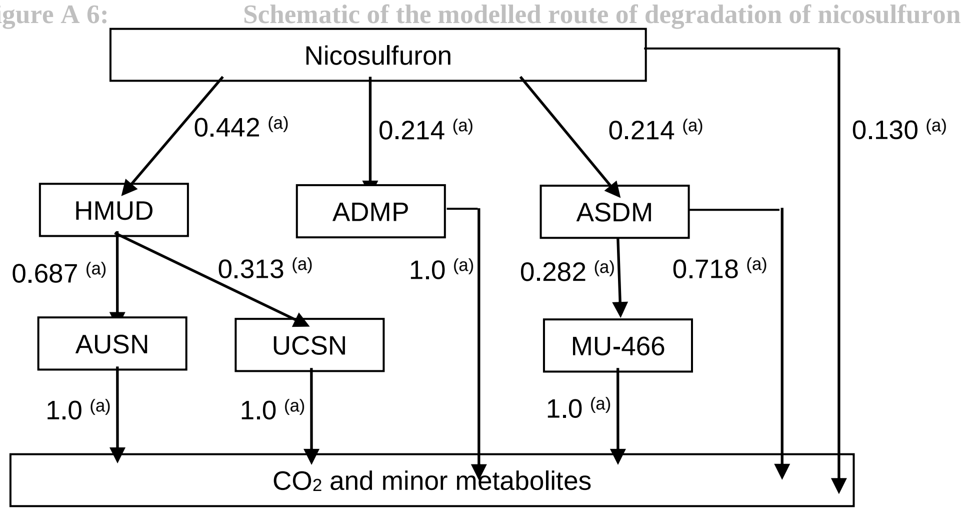
Sorption to soil			
	K_{FOC} [L/kg]	K_{FOM} [L/kg]	Freundlich exponent 1/n [-]
Nicosulfuron	24.6	14.3	0.95
Remarks	Geometric mean value (n=14; EFSA, 2007 & Graham and Strachan, 2008).	Calculated from K_{FOC} $K_{FOM} = K_{FOC} / 1.724$	Arithmetic mean value (n=14; EFSA, 2007 & Graham and Strachan, 2008).
HMUD	3.9	2.3	0.90
Remarks	Geometric mean value (n=5; EFSA, 2007)	Calculated from K_{FOC} $K_{FOM} = K_{FOC} / 1.724$	Default value
AUSN	13[a,b] / 22.3[c] / 37.3[d]	7.5[a,b] / 12.9[c] / 21.6[d]	0.98[a,b] / 0.96[c] / 0.95[d]
Remarks	pH dependent sorption	Calculated from K_{FOC} $K_{FOM} = K_{FOC} / 1.724$	pH dependent sorption

Sorption to soil			
	K_{FOC} [L/kg]	K_{FOM} [L/kg]	Freundlich exponent 1/n [-]
UCSN	2.6	1.5	0.90
Remarks	Geometric mean value (n=4; EFSA, 2007)	Calculated from K_{FOC} $K_{FOM}=K_{FOC}$ / 1.724	Default value
ASDM	2.3[a,b] / 6.0[c] / 7.2[d]	1.3[a,b] / 3.5[c] / 4.2[d]	0.82[a,b] / 0.94[c,d]
Remarks	pH dependent sorption	Calculated from K_{FOC} $K_{FOM}=K_{FOC}$ / 1.724	pH dependent sorption
MU-466	3.6[a] / 7.5[b,c] / 13.4[d]	2.1[a] / 4.4[b,c] / 7.8[d]	0.90
Remarks	pH dependent sorption	Calculated from K_{FOC} $K_{FOM}=K_{FOC}$ / 1.724	Default value
ADMP	51.1	29.6	0.87
Remarks	Geometric mean value (n=4; EFSA, 2007)	Calculated from K_{FOC} $K_{FOM}=K_{FOC}$ / 1.724	Arithmetic mean value (n=4; EFSA, 2007)

[a] pH dependent sorption; value specific for Hamburg, Okehampton and Porto scenarios
[b] pH dependent sorption; value specific for Piacenza scenario
[c] pH dependent sorption; value specific for Sevilla scenario
[d] pH dependent sorption; value specific for Châteaudun, Kremsmünster and Thiva scenarios

Crop parameters	
	Crop uptake factor [-]
Nicosulfuron	0
Remarks	Default value
HMUD	0
Remarks	Default value
AUSN	0
Remarks	Default value
UCSN	0
Remarks	Default value
ASDM	0
Remarks	Default value
MU-466	0
Remarks	Default value
ADMP	0
Remarks	Default value

Figure A 6: Schematic of the modelled route of degradation of nicosulfuron



a - indicates the molar fraction of compound degraded via pathway

A.3.5.2 Results

Predicted environmental concentrations of nicosulfuron and its metabolites in groundwater (PEC_{GW}) were calculated for the use of nicosulfuron on maize in Europe in accordance with FOCUS guidelines (FOCUS, 2000, 2009, 2014).

The 80[th] percentile (at 1 m soil depth) PEC_{GW} values generated by the FOCUS-PEARL, FOCUS-PELMO and FOCUS-MACRO simulations are given in the tables below.

Table A 51: PEC_{GW} for nicosulfuron, HMUD, AUSN, UCSN, ASDM, MU-466 and ADMP following annual application of nicosulfuron to maize (FOCUS-PEARL)

Application rate [g a.s./ha]	Scenario	PEC_{GW} at 1 m soil depth [µg/L]						
		Nicosulfuron	HMUD	AUSN	UCSN	ASDM	MU-466	ADMP
1 × 40	Châteaudun	0.047	0.512	1.57	1.16	1.26	0.060	<0.001
	Hamburg	0.116	1.23	2.66	1.41	1.70	0.074	0.001
	Kremsmünster	0.075	0.547	1.32	0.801	0.894	0.036	0.001
	Okehampton	0.136	0.637	1.24	0.651	0.789	0.033	0.001
	Piacenza	0.023	0.280	2.08	1.16	1.15	0.078	<0.001
	Porto	0.010	0.178	1.01	0.488	0.529	0.031	<0.001
	Sevilla	0.001	0.043	1.53	1.36	1.20	0.101	<0.001
	Thiva	0.013	0.262	2.99	2.27	2.13	0.149	<0.001
1 × 45	Châteaudun	0.054	0.579	1.77	1.31	1.42	0.068	<0.001
	Hamburg	0.132	1.39	2.99	1.58	1.91	0.083	0.002
	Kremsmünster	0.085	0.618	1.48	0.901	1.01	0.041	0.001
	Okehampton	0.154	0.719	1.39	0.732	0.890	0.037	0.001
	Piacenza	0.026	0.316	2.34	1.30	1.29	0.087	<0.001
	Porto	0.012	0.201	1.13	0.548	0.595	0.035	<0.001
	Sevilla	0.001	0.049	1.73	1.53	1.35	0.114	<0.001
	Thiva	0.015	0.297	3.37	2.55	2.40	0.168	<0.001
1 × 60	Châteaudun	0.074	0.782	2.37	1.74	1.90	0.091	<0.001
	Hamburg	0.182	1.87	3.98	2.11	2.56	0.110	0.002
	Kremsmünster	0.116	0.834	1.98	1.20	1.35	0.055	0.001
	Okehampton	0.209	0.969	1.86	0.976	1.19	0.049	0.002
	Piacenza	0.035	0.425	3.12	1.74	1.73	0.116	<0.001
	Porto	0.016	0.271	1.51	0.731	0.794	0.046	<0.001
	Sevilla	0.001	0.066	2.31	2.04	1.80	0.154	<0.001
	Thiva	0.021	0.401	4.53	3.41	3.21	0.226	<0.001

~~**Table A 52: PEC$_{GW}$ for nicosulfuron, HMUD, AUSN, UCSN, ASDM, MU-466 and ADMP following annual application of nicosulfuron to maize (FOCUS-PELMO)**~~

Application rate [g a.s./ha]	Scenario	PEC$_{GW}$ at 1 m soil depth [µg/L]						
		Nicosulfuron	HMUD	AUSN	UCSN	ASDM	MU-466	ADMP
1 × 40	Châteaudun	0.028	0.393	1.70	1.32	1.31	0.070	<0.001
	Hamburg	0.094	0.871	2.16	1.13	1.31	0.061	0.001
	Kremsmünster	0.083	0.611	1.44	0.885	0.992	0.043	0.001
	Okehampton	0.133	0.613	1.21	0.666	0.777	0.034	0.001
	Piacenza	0.041	0.342	1.32	0.740	0.791	0.039	0.001
	Porto	0.011	0.159	1.06	0.515	0.551	0.035	<0.001
	Sevilla	0.001	0.051	1.34	1.08	0.987	0.082	<0.001
	Thiva	0.009	0.146	2.20	1.69	1.58	0.113	<0.001
1 × 45	Châteaudun	0.032	0.445	1.92	1.48	1.48	0.079	<0.001
	Hamburg	0.106	0.985	2.43	1.27	1.47	0.069	0.001
	Kremsmünster	0.094	0.690	1.62	0.996	1.12	0.048	0.001
	Okehampton	0.151	0.692	1.37	0.750	0.876	0.039	0.001
	Piacenza	0.047	0.386	1.49	0.834	0.892	0.043	0.001
	Porto	0.012	0.180	1.20	0.579	0.620	0.039	<0.001
	Sevilla	0.001	0.058	1.51	1.21	1.11	0.093	<0.001
	Thiva	0.010	0.165	2.48	1.90	1.78	0.128	<0.001
1 × 60	Châteaudun	0.044	0.600	2.57	1.98	1.97	0.106	<0.001
	Hamburg	0.144	1.33	3.24	1.69	1.97	0.091	0.002
	Kremsmünster	0.129	0.927	2.18	1.33	1.49	0.064	0.001
	Okehampton	0.207	0.931	1.82	1.00	1.17	0.051	0.001
	Piacenza	0.064	0.518	1.98	1.11	1.20	0.058	0.001
	Porto	0.017	0.245	1.60	0.771	0.827	0.051	<0.001
	Sevilla	0.002	0.079	2.04	1.62	1.48	0.124	<0.001
	Thiva	0.013	0.222	3.33	2.54	2.38	0.172	<0.001

~~**Table A 53: PEC$_{GW}$ for nicosulfuron, HMUD, AUSN, UCSN, ASDM, MU-466 and ADMP following annual application of nicosulfuron to maize (FOCUS-MACRO)**~~

Application rate [g a.s./ha]	Scenario	PEC$_{GW}$ at 1 m soil depth [µg/L]						
		Nicosulfuron	HMUD	AUSN	UCSN	ASDM	MU-466	ADMP
1 × 40	Châteaudun	0.023	0.261	1.33	1.08	1.06	0.056	<0.001
1 × 45	Châteaudun	0.026	0.295	1.50	1.21	1.19	0.064	<0.001
1 × 60	Châteaudun	0.036	0.398	2.02	1.62	1.59	0.085	<0.001

~~The overall maximum PEC$_{GW}$ values predicted by the FOCUS-PEARL and FOCUS-PELMO simulations across all available FOCUS scenarios are summarised in the tables below. For FOCUS-MACRO, only a single scenario (Châteaudun) is available.~~

~~**Table A 54: Overall maximum PEC$_{GW}$ for nicosulfuron, HMUD, AUSN, UCSN, ASDM, MU-466 and ADMP across all FOCUS scenarios, as calculated by FOCUS-PEARL (annual applications)**~~

Application rate [g a.s./ha]	Maximum PEC$_{GW}$ at 1 m soil depth across all FOCUS scenarios [µg/L]						
	Nicosulfuron	HMUD	AUSN	UCSN	ASDM	MU-466	ADMP
1 × 40	0.136	1.23	2.99	2.27	2.13	0.149	0.001
1 × 45	0.154	1.39	3.37	2.55	2.40	0.168	0.002
1 × 60	0.209	1.87	4.53	3.41	3.21	0.226	0.002

Table A 55: Overall maximum PEC_{GW} for nicosulfuron, HMUD, AUSN, UCSN, ASDM, MU-466 and ADMP across all FOCUS scenarios, as calculated by FOCUS-PELMO (annual applications)

Application rate [g a.s./ha]	Maximum PEC_{GW} at 1 m soil depth across all FOCUS scenarios [µg/L]						
	Nicosulfuron	HMUD	AUSN	UCSN	ASDM	MU-466	ADMP
1 × 40	0.133	0.871	2.20	1.69	1.58	0.113	0.001
1 × 45	0.151	0.985	2.48	1.90	1.78	0.128	0.001
1 × 60	0.207	1.33	3.33	2.54	2.38	0.172	0.002

At an application rate of 1 × 40 g a.s./ha, the overall maximum PEC_{GW} for nicosulfuron in leachate at 1 m soil depth does not exceed 0.136 µg/L when applications are made annually.

At an application rate of 1 × 45 g a.s./ha, the overall maximum PEC_{GW} for nicosulfuron in leachate at 1 m soil depth does not exceed 0.154 µg/L when applications are made annually.

At an application rate of 1 × 60 g a.s./ha, the overall maximum PEC_{GW} for nicosulfuron in leachate at 1 m soil depth does not exceed 0.209 µg/L when applications are made annually.

The full set of results, containing all data output by the model, is available on request.

A 3.6 Example output files of Step 2 calculations

A 3.6.1 Mesotrione, post-emergence application of 100 g a.s./ha in maize, Northern Europe, March-May, parameter set for neutral soils

Comments of zRMS:	For comments on surface water exposure assessment, please refer to point 8.9 of this report.

STEPS 1-2 in FOCUS

FOCUS Surface water Tool for Exposure Preditions Step 2

developed by Michael Klein

Program version:	Version 3.2
Date of this simulation:	22/06/2016, 08:43:36

OVERVIEW ON THE SUBSTANCE SPECIFIC INPUT DATA USED IN THE CALCULATION

Comments: maize, 1 x 100 g/ha, North Mar-May

Active substance:	Mesotrione_nt_log26
Application rate (g/ha) of a.i.:	100.00
Crop Interception:	minimal crop cover (25 %)
Application/crop type:	maize
Number of applications per season:	1
Region and season of application:	North Europe, Mar. - May
Water solubility (mg/L):	160.00
KOC assessed compound(L/kg):	52.20
KOC parent compound(L/kg):	52.20
DT50 water(d):	5.50
DT50 sediment (d):	5.60
DT50 soil (d):	14.20

SCENARIO DATA USED IN THE CALCULATION

Distance to the water body (m):	1.00
Spraydrift (% of application):	2.7590
Runoff + drainage(% of application):	2.00
Ratio of field to water body:	10.00
Water depth (cm):	30.00
Sediment depth (cm):	5.00
Effective sediment depth for sorption (cm):	1.00
Sediment OC (%):	5.00
Sed. bulk density (kg/L):	0.80

RESULTS OF THE CALCULATION

Number of application per season considered for this run:	1
Equilvalent application rate for drift (g/ha):	100.00
Equilvalent application rate for runoff/drainage(g/ha):	75.00
Loading to water body per drift event(mg/m²):	0.2759
Loading to water body via runoff/drainage (mg/m²):	1.2339
fraction of substance entering water body in water phase:	0.9349
fraction of substance entering water body in sediment:	0.0651

Total Loading to water body via drift (mg/m²): 0.2759 (18.2735%)
Total Loading to water body via water phase(mg/m²): 1.1536 (76.4085%)
Total Loading to water body via sediment phase (mg/m²): 0.0803 (5.3180%)
Maximum PECSW (µg/L): 4.3765
Maximum PECSW occuring on day: 4
Maximum PECsed (µg/kg dry sediment): 2.1926
Maximum PECsed occuring on day: 4

Table: Calculated Concentrations in the water body

	PECsw (µg/L)		PECsed(µg/kg dry sediment)	
Time after max. peak(d)	Actual	TWA	Actual	TWA
0	4.3765	---	2.1926	---
1	3.8482	4.1124	2.0133	2.1029
2	3.3930	3.8665	1.7752	1.9986
4	2.6379	3.4350	1.3801	1.7850
7	1.8082	2.9057	0.9460	1.5132
14	0.7491	2.0546	0.3919	1.0714
21	0.3104	1.5359	0.1624	0.8012
28	0.1286	1.2036	0.0673	0.6280
42	0.0221	0.8226	0.0115	0.4292
50	0.0081	0.6932	0.0042	0.3617
100	0.0000	0.3472	0.0000	0.1812

A 3.6.2 MNBA (metabolite of mesotrione), post-emergence application of 100 g a.s./ha in maize, Northern Europe, March-May, parameter set for neutral soils

Comments of zRMS:	For comments on surface water exposure assessment, please refer to point 8.9 of this report.

STEPS 1-2 in FOCUS

FOCUS Surface water Tool for Exposure Preditions Step 2

developed by Michael Klein

Program version:	Version 3.2
Date of this simulation:	22/06/2016, 08:43:43

OVERVIEW ON THE SUBSTANCE SPECIFIC INPUT DATA USED IN THE CALCULATION

Comments: maize, 1 x 100 g/ha, North Mar-May

Active substance:	Mesotrione_nt_log32
Compound for PEC calculation:	MNBA_nt_log32
Application rate (g/ha) of a.i.:	100.00
Crop Interception:	minimal crop cover (25 %)
Application/crop type:	maize
Number of applications per season:	1
Region and season of application:	North Europe, Mar. - May
Molecular mass of active ingredient (g/mole):	339.30
Molecular mass of calc. compound (g/mole):	245.00
Maximum observed in water/sediment studies (%)	7.40
Maximum observed in soil studies (%)	57.20
DT50 soil (d) parent compound:	14.20
Water solubility (mg/L):	32400.00
KOC assessed compound(L/kg):	3.20
KOC parent compound(L/kg):	52.20
DT50 water(d):	1000.00
DT50 sediment (d):	1000.00
DT50 soil (d):	3.40

SCENARIO DATA USED IN THE CALCULATION

Distance to the water body (m):	1.00
Spraydrift (% of application):	2.7590
Runoff + drainage(% of application):	2.00
Ratio of field to water body:	10.00
Water depth (cm):	30.00
Sediment depth (cm):	5.00
Effective sediment depth for sorption (cm):	1.00
Sediment OC (%):	5.00
Sed. bulk density (kg/L):	0.80

RESULTS OF THE CALCULATION

Number of application per season considered for this run:	1
Equilvalent application rate for drift (g/ha):	5.34
Equilvalent application rate for runoff/drainage(g/ha):	30.98

Equilvalent app. rate for runoff/drainage of parent compound(g/ha):	4.01

Loading to water body per drift event(mg/m²):	0.0147
Loading to water body via runoff/drainage (mg/m²):	0.2741
fraction of substance entering water body in water phase:	0.9958
fraction of substance entering water body in sediment:	0.0042
Loading to water body via runoff/drainage of parent substance(mg/m²):	0.0659
fraction of parent substance entering water body in water phase:	0.9349
fraction of parent substance entering water body in sediment:	0.0651

Total Loading to water body via drift (mg/m²):	0.0147 (4.1553%)
Total Loading to water body via water phase(mg/m²):	0.2729 (76.9321%)
Total Loading to water body via sediment phase (mg/m²):	0.0012 (0.3282%)
Total Loading into water phase via Parent's runoff (mg/m²):	0.0616 (17.3751%)
Total Loading into sediment phase via Parent's runoff (mg/m²):	0.0043 (1.2093%)

Maximum PECSW (µg/L):	1.1775
Maximum PECSW occuring on day:	4
Maximum PECsed (µg/kg dry sediment):	0.0377
Maximum PECsed occuring on day:	5

Table: Calculated Concentrations in the water body

	PECsw (µg/L)		PECsed(µg/kg dry sediment)	
Time after max. peak(d)	Actual	TWA	Actual	TWA
0	1.1775	---	0.0377	---
1	1.1766	1.1771	0.0376	0.0376
2	1.1758	1.1766	0.0376	0.0376
4	1.1742	1.1758	0.0375	0.0376
7	1.1717	1.1746	0.0375	0.0376
14	1.1661	1.1718	0.0373	0.0375
21	1.1604	1.1689	0.0371	0.0374
28	1.1548	1.1661	0.0369	0.0373
42	1.1437	1.1605	0.0366	0.0371
50	1.1373	1.1573	0.0364	0.0370
100	1.0986	1.1376	0.0351	0.0364

A 3.6.3 AMBA (metabolite of mesotrione), post-emergence application of 100 g a.s./ha in maize, Northern Europe, March-May, parameter set for neutral soils

Comments of zRMS:	For comments on surface water exposure assessment, please refer to point 8.9 of this report.

STEPS 1-2 in FOCUS

FOCUS Surface water Tool for Exposure Preditions Step 2

developed by Michael Klein

Program version:	Version 3.2
Date of this simulation:	22/06/2016, 08:43:51

OVERVIEW ON THE SUBSTANCE SPECIFIC INPUT DATA USED IN THE CALCULATION

Comments: maize, 1 x 100 g/ha, North Mar-May

Active substance:	Mesotrione_nt_log38
Compound for PEC calculation:	AMBA_nt_log38
Application rate (g/ha) of a.i.:	100.00
Crop Interception:	minimal crop cover (25 %)
Application/crop type:	maize
Number of applications per season:	1
Region and season of application:	North Europe, Mar. - May
Molecular mass of active ingredient (g/mole):	339.30
Molecular mass of calc. compound (g/mole):	215.00
Maximum observed in water/sediment studies (%)	24.60
Maximum observed in soil studies (%)	9.70
DT50 soil (d) parent compound:	14.20
Water solubility (mg/L):	23000.00
KOC assessed compound(L/kg):	48.00
KOC parent compound(L/kg):	52.20
DT50 water(d):	1000.00
DT50 sediment (d):	1000.00
DT50 soil (d):	14.50

SCENARIO DATA USED IN THE CALCULATION

Distance to the water body (m):	1.00
Spraydrift (% of application):	2.7590
Runoff + drainage(% of application):	2.00
Ratio of field to water body:	10.00

Water depth (cm):	30.00
Sediment depth (cm):	5.00
Effective sediment depth for sorption (cm):	1.00
Sediment OC (%):	5.00
Sed. bulk density (kg/L):	0.80

RESULTS OF THE CALCULATION

Number of application per season considered for this run:	1

Equilvalent application rate for drift (g/ha):	15.59

Equilvalent application rate for runoff/drainage(g/ha):	4.61
Equilvalent app. rate for runoff/drainage of parent compound(g/ha):	11.69
Loading to water body per drift event(mg/m²):	0.0430
Loading to water body via runoff/drainage (mg/m²):	0.0762
fraction of substance entering water body in water phase:	0.9398
fraction of substance entering water body in sediment:	0.0602
Loading to water body via runoff/drainage of parent substance(mg/m²):	0.1923
fraction of parent substance entering water body in water phase:	0.9349
fraction of parent substance entering water body in sediment:	0.0651
Total Loading to water body via drift (mg/m²):	0.0430 (13.8063%)
Total Loading to water body via water phase(mg/m²):	0.0716 (22.9757%)
Total Loading to water body via sediment phase (mg/m²):	0.0046 (1.4704%)
Total Loading into water phase via Parent's runoff (mg/m²):	0.1798 (57.7296%)
Total Loading into sediment phase via Parent's runoff (mg/m²):	0.0125 (4.0180%)
Maximum PECSW (µg/L):	0.9783
Maximum PECSW occuring on day:	4
Maximum PECsed (µg/kg dry sediment):	0.4679
Maximum PECsed occuring on day:	5

Table: Calculated Concentrations in the water body

	PECsw (µg/L)		PECsed(µg/kg dry sediment)	
Time after max. peak(d)	Actual	TWA	Actual	TWA
0	0.9783	---	0.4679	---
1	0.9748	0.9766	0.4676	0.4678
2	0.9742	0.9755	0.4673	0.4676
4	0.9728	0.9745	0.4666	0.4673
7	0.9708	0.9734	0.4657	0.4668
14	0.9661	0.9709	0.4634	0.4657
21	0.9614	0.9685	0.4612	0.4645
28	0.9568	0.9662	0.4589	0.4634
42	0.9475	0.9615	0.4545	0.4612
50	0.9423	0.9588	0.4520	0.4599
100	0.9102	0.9425	0.4366	0.4521

A 3.6.4 SYN546974 (metabolite of mesotrione), post-emergence application of 100 g a.s./ha in maize, Northern Europe, March-May, parameter set for neutral soils

Comments of zRMS:	For comments on surface water exposure assessment, please refer to point 8.9 of this report.

STEPS 1-2 in FOCUS

FOCUS Surface water Tool for Exposure Preditions Step 2

developed by Michael Klein

Program version:	Version 3.2
Date of this simulation:	22/06/2016, 08:43:58

OVERVIEW ON THE SUBSTANCE SPECIFIC INPUT DATA USED IN THE CALCULATION

Comments: maize, 1 x 100 g/ha, North Mar-May

Active substance:	Mesotrione_nt_log44
Compound for PEC calculation:	SYN546974_nt_log44
Application rate (g/ha) of a.i.:	100.00
Crop Interception:	minimal crop cover (25 %)
Application/crop type:	maize
Number of applications per season:	1
Region and season of application:	North Europe, Mar. - May
Molecular mass of active ingredient (g/mole):	339.30
Molecular mass of calc. compound (g/mole):	291.00
Maximum observed in water/sediment studies (%)	33.00
Maximum observed in soil studies (%)	0.00E+00
DT50 soil (d) parent compound:	14.20
Water solubility (mg/L):	160.00
KOC assessed compound(L/kg):	8021.00
KOC parent compound(L/kg):	52.20
DT50 water(d):	1000.00
DT50 sediment (d):	1000.00
DT50 soil (d):	0.10

SCENARIO DATA USED IN THE CALCULATION

Distance to the water body (m):	1.00
Spraydrift (% of application):	2.7590
Runoff + drainage(% of application):	2.00
Ratio of field to water body:	10.00
Water depth (cm):	30.00
Sediment depth (cm):	5.00
Effective sediment depth for sorption (cm):	1.00
Sediment OC (%):	5.00
Sed. bulk density (kg/L):	0.80

RESULTS OF THE CALCULATION

Number of application per season considered for this run:	1
Equilvalent application rate for drift (g/ha):	28.30

Equilvalent application rate for runoff/drainage(g/ha): 0.00E+00
Equilvalent app. rate for runoff/drainage of parent compound(g/ha): 21.23

Loading to water body per drift event(mg/m²): 0.0781
Loading to water body via runoff/drainage (mg/m²): 0.0000
fraction of substance entering water body in water phase: 0.0855
fraction of substance entering water body in sediment: 0.9145
Loading to water body via runoff/drainage of parent substance(mg/m²): 0.3492
fraction of parent substance entering water body in water phase: 0.9349
fraction of parent substance entering water body in sediment: 0.0651

Total Loading to water body via drift (mg/m²): 0.0781 (18.2735%)
Total Loading to water body via water phase(mg/m²): 0.0000 (0.0000%)
Total Loading to water body via sediment phase (mg/m²): 0.0000 (0.0000%)
Total Loading into water phase via Parent's runoff (mg/m²): 0.3265 (76.4085%)
Total Loading into sediment phase via Parent's runoff (mg/m²): 0.0227 (5.3180%)

Maximum PECSW (µg/L): 0.2603
Maximum PECSW occuring on day: 0
Maximum PECsed (µg/kg dry sediment): 9.7578
Maximum PECsed occuring on day: 5

Table: Calculated Concentrations in the water body

	PECsw (µg/L)		PECsed(µg/kg dry sediment)	
Time after max. peak(d)	Actual	TWA	Actual	TWA
0	0.2603	---	9.7578	---
1	0.1015	0.1809	9.7511	9.7544
2	0.0532	0.1291	9.7443	9.7511
4	0.1334	0.0975	9.7308	9.7443
7	0.1215	0.1087	9.7106	9.7342
14	0.1209	0.1149	9.6636	9.7106
21	0.1203	0.1168	9.6168	9.6871
28	0.1197	0.1176	9.5703	9.6637
42	0.1186	0.1181	9.4778	9.6171
50	0.1179	0.1181	9.4254	9.5907
100	0.1139	0.1170	9.1044	9.4273

A 3.7 Real Llanderal (2015a)

The report summarised below contains various use patterns but only those use patterns are presented here which are relevant for this core dossier. Use numbers in this summary refer to the modelling report and not to the numbers in Table 8.1-1.

Comments of zRMS:	For comments on surface water exposure assessment, please refer to point 8.9 of this report.

Reference:	KCP 9.2.5/01
Report	Real Llanderal, J. (2015a): Dicamba - A Surface Water Assessment for Parent and Metabolite DCSA Using the FOCUS Surface Water Scenarios at Step 1 and 2 Following Spray Applications to Maize in Europe. RIFCON GmbH Unpublished report 1520411-2 (Syngenta File No. SAN837_11574)
Guideline(s):	FOCUS (2001). FOCUS Surface Water Scenarios in the EU Evaluation Process under 91/414/EEC. Report of the FOCUS Working Group on Surface Water Scenarios, EC Document Reference SANCO/4802/2001 rev. 2. FOCUS (2015). Generic Guidance for FOCUS Surface Water Scenarios, version 1.4.
Deviations:	No
GLP:	No (not applicable, calculations)
Acceptability:	Acceptable

A.3.7.1 Materials and methods

This report describes a FOCUS modelling study that examined the potential for dicamba and its metabolite DCSA to reach surface water following foliar application to maize. The FOCUS tool STEPS 1-2 (version 3.2) was used for Step 1 and Step 2 simulations. Detailed information on the use pattern of dicamba included in the modelling is presented in Table A 56 below.

Table A 56: Application pattern of dicamba used in modelling

Crop	Application method	Growth stage [approx. BBCH]	Application rate [g a.s./ha]	No. of applications	Application interval [d]
Maize	Foliar spray	12	264	1	-
Maize	Foliar spray	12	176	1	-
Maize	Foliar spray	12	132	1	-

Crop interception was set to ‘minimal’ for BBCH 12. All regions and seasons available in STEPS 1-2 were calculated. All model input parameters are presented in the following table.

Table A 57: Summary of input parameters for dicamba and DCSA used in FOCUS simulations

Physical chemistry properties			
	Molecular weight [g/mol]	**Water solubility [mg/L]**	**Vapour pressure at 20°C [Pa]**
Dicamba	221	6600 (25°C)	-
Remarks	EFSA, 2011	EFSA, 2011	Not necessary for Step 1 and 2
DCSA	207	88000 (25°C)	-
Remarks	EFSA, 2011	EFSA, 2011	Not necessary for Step 1 and 2

Degradation in soil			
	DT_{50} field soil [d]	**DT_{50} laboratory soil [d]**	**Maximum occurrence in soil [%]**
Dicamba	NA	4.0	NA
Remarks	-	Geometric mean at reference conditions (n=5) EFSA, 2011	-
DCSA	NA	9.40	58.8
Remarks	-	Geometric mean at reference conditions (n=5) EFSA, 2011	EFSA, 2011

NA – not applicable

Degradation in water/sediment systems				
	Whole system DT_{50} [d]	**Water phase DT_{50} [d]**	**Sediment phase DT_{50} [d]**	**Maximum occurrence in water / sediment [%]**
Dicamba	41.0	41.0	1000	NA
Remarks	Geometric mean (n = 2) EFSA, 2011	Whole system value EFSA, 2011	FOCUS default value	-
DCSA	49.4	49.4	1000	31.4
	Arithmetic mean (n = 2) EFSA, 2011	Whole system value EFSA, 2011	FOCUS default value	-

NA – not applicable

Sorption to soil			
	K_{FOC} [L/kg]	**K_{FOM} [L/kg]**	**Freundlich exponent 1/n [-]**
Dicamba	9.82	5.7	NA
Remarks	Geometric mean (n = 4) EFSA, 2011	Geometric mean (n = 4) EFSA, 2011	-
DCSA	877	509	NA
Remarks	Geometric mean (n = 5) EFSA, 2011	Geometric mean (n = 5) EFSA, 2011	-

A.3.7.2 Results and discussions

Predicted environmental concentrations in surface water (PEC_{SW}) and sediment (PEC_{SED}) were calculated for the use of dicamba on maize in Europe in accordance with FOCUS guidelines. The global maximum PEC_{SW} and PEC_{SED} values at Step 1 and 2 over all seasons and regions are presented in the following tables.

Table A 58: Maximum PEC_{SW} and PEC_{SED} of dicamba at Step 1 and 2

Use pattern	Step	Region	Season	Dicamba	
				Max PEC_{SW} [µg/L]	Max PEC_{SED} [mg/kg]
Maize 1 x 264	1	-	-	89.3	8.53
	2	N EU	Oct – Feb	18.5	1.82
	2	N EU	Mar – May	8.77	0.859
	2	N EU	Jun – Sep	8.77	0.859
	2	S EU	Oct – Feb	15.3	1.50
	2	S EU	Mar – May	15.3	1.50
	2	S EU	Jun – Sep	12.0	1.18
Maize 1 x 176	1	-	-	59.5	5.75
	2	N EU	Oct – Feb	12.4	1.21
	2	N EU	Mar – May	5.84	0.57
	2	N EU	Jun – Sep	5.84	0.57
	2	S EU	Oct – Feb	10.2	1.00
	2	S EU	Mar – May	10.2	1.00
	2	S EU	Jun – Sep	8.02	0.786
Maize 1 x 132	1	-	-	44.7	4.26
	2	N EU	Oct – Feb	9.27	0.91
	2	N EU	Mar – May	4.38	0.430
	2	N EU	Jun – Sep	4.38	0.430
	2	S EU	Oct – Feb	7.64	0.750
	2	S EU	Mar – May	7.64	0.750
	2	S EU	Jun – Sep	6.01	0.590

Table A 59: Maximum PEC_{SW} and PEC_{SED} of DCSA at Step 1 and 2

Use pattern	Step	Region	Season	DCSA	
				Max PEC_{SW} [µg/L]	Max PEC_{SED} [mg/kg]
Maize 1 x 264	1	-	-	35.0	301
	2	N EU	Oct – Feb	8.86	77.1
	2	N EU	Mar – May	3.78	32.5
	2	N EU	Jun – Sep	3.78	32.5
	2	S EU	Oct – Feb	7.17	62.2
	2	S EU	Mar – May	7.17	62.2
	2	S EU	Jun – Sep	5.47	47.4
Maize 1 x 176	1	-	-	23.3	200
	2	N EU	Oct – Feb	5.91	51.4
	2	N EU	Mar – May	2.52	21.7
	2	N EU	Jun – Sep	2.52	21.7
	2	S EU	Oct – Feb	4.78	41.5
	2	S EU	Mar – May	4.78	41.5
	2	S EU	Jun – Sep	3.65	31.6
Maize 1 x 132	1	-	-	17.5	150
	2	N EU	Oct – Feb	4.43	38.5
	2	N EU	Mar – May	1.89	16.2
	2	N EU	Jun – Sep	1.89	16.2
	2	S EU	Oct – Feb	3.58	31.1
	2	S EU	Mar – May	3.58	31.1
	2	S EU	Jun – Sep	2.74	23.7

A 3.8 Ibrahim (2017a)

The report summarised below contains various use patterns but only those use patterns are presented here which are relevant for this core dossier. Use numbers in this summary refer to the modelling report and not to the numbers in Table 8.1-1.

Comments of zRMS:	For comments on surface water exposure assessment, please refer to point 8.9 of this report. Please note that EPAT analysis was not validated by the zRMS as being not necessary for the aquatic risk assessment.

Reference:	KCP 9.2.5/02
Report	Ibrahim, L. (2017a): Mesotrione - A European Environmental Fate Assessment for Parent Using the FOCUS Surface Water Models at Steps 3 to 4 Following Spray Application to Maize and an Analysis of its FOCUS Step 3 and 4 Exposure Patterns Using the EPAT Tool. RIFCON GmbH Unpublished report 1520528-2 (Syngenta File No. ZA1296_10482)
Guideline(s):	FOCUS (2001). FOCUS Surface Water Scenarios in the EU Evaluation Process under 91/414/EEC. Report of the FOCUS Working Group on Surface Water Scenarios, EC Document Reference SANCO/4802/2001 rev. 2. FOCUS (2007). Landscape and Mitigation Factors In Aquatic Ecological Risk Assessment. Volume 1. Extended Summary and Recommendations, The Final Report of the FOCUS Working Group on Landscape and Mitigation Factors in Ecological Risk Assessment, EC Document Reference Sanco/10422/2005, version 2.0, September 2007. FOCUS (2015). Generic Guidance for FOCUS Surface Water Scenarios, version 1.4.
Deviations:	No
GLP:	No (not applicable, calculations)
Acceptability:	Acceptable

A.3.8.1 Materials and methods

This report describes a FOCUS modelling study that examined the potential for mesotrione to reach surface water following foliar application to maize with post-emergence application rates of 100 g a.s./ha and 75 g a.s./ha. The FOCUS tool SWASH (v 5.3), including the operational models FOCUS-MACRO (v 5.5.4), FOCUS-PRZM (v 4.3.1) and FOCUS-TOXSWA (v 4.4.3), were used in the modelling study for Step 3 simulations. The ECPA tool SWAN (v 4.0.1) was used to implement mitigation options at Step 4, including VFSmod.

Single foliar applications were considered. The input parameters relating to application are shown below.

Table A 60: Input parameters related to application for $PEC_{SW/SED}$ calculations

Use No.	**2**
Crop	Maize
Application rate (g as/ha)	100; 75
Number of applications/interval (d)	1 / -
Relative application date / BBCH growth stage	Early post-emergence
Application method	Ground spray
CAM (Chemical application method)	CAM 2 (‘Appl. foliar linear’)
Soil depth (cm)	4
Models used for calculation	FOCUS SWASH v5.3, FOCUS PRZM v4.3.1, FOCUS MACRO v5.5.4, FOCUS TOXWA v4.4.3, ECPA SWAN v4.0.1

Ground spray application (CAM-2 foliar application for post-emergence) was considered as the application method in all simulations. Crop interception at Step 3 is calculated internally by the model on the basis of the maximum interception capacity and the actual leaf area index.

An application window has to be specified from which the Pesticide Application Timer (PAT), internal to the model, determines actual application dates which were set generically for all scenarios. The dates were selected with the tool AppDate (v2.0bSE; Klein, 2015) based on BBCH growth stages given in the recommended GAP. Simulations were carried out using the FOCUS standard crop maize. The application windows used for each scenario are shown below.

Table A 61: FOCUS Step 3 Scenario related input parameters for PEC$_{SW/SED}$ calculations for the application of mesotrione

Use pattern	Scenario	Mesotrione	
		Application window used in modelling	
		Start of Window	End of Window
Maize Use No. 2 Early post-emergence	D3	06-May (126)	05-Jun (156)
	D4	11-May (131)	10-Jun (161)
	D5	11-May (131)	10-Jun (161)
	D6	21-Apr (111)	21-May (141)
	R1	04-May (124)	03-Jun (154)
	R2	02-May (122)	01-Jun (152)
	R3	02-May (122)	01-Jun (152)
	R4	11-Apr (101)	11-May (131)

Numbers in brackets are the corresponding ‘Julian Day’ numbers

Step 4 calculations were carried out for all uses and scenarios with the following mitigation methods:

- spray drift reduction by 50% drift reducing nozzles.
- spray drift reduction by a non-sprayed buffer strip of 5m.
- spray drift and run off reduction by non-sprayed and vegetated buffer stripes of 10 m and 20 m using runoff and erosion reduction values as given by the FOCUS Working Group on Landscape and Mitigation Factors (2007) – runoff/erosion reduction of 60/85% for 10 m and 80/95% for 20 m.
- spray drift and runoff reduction by a non-sprayed and vegetated buffer stripe of 5 m as calculated by VFSmod.

The input parameters for mesotrione as used in the modelling are shown below. Mesotrione was modelled using three parameter sets for acidic, alkaline and neutral soils.

Table A 62: Input parameters related to active substance mesotrione for PEC$_{SW/SED}$ calculations

Compound	Mesotrione	Value in accordance to EU endpoint / Reference
Molar mass (g/mol)	339.3	Yes, EFSA (2016)
Water solubility (mg/L)	160 (20)	Yes, EFSA (2016)
Saturated vapour pressure (Pa)	0 (20)	Worst case assumption
Diffusion coefficient in water (m²/d)	4.3×10^{-5}	FOCUS default
Diffusion coefficient in air (m²/d)	0.43	FOCUS default
K_{FOC} (mL/g)	acidic soil [a]: 156.7 neutral soil [b]: 52.2 alkaline soil [c]: 17.39 (pH dependent: log fit, n = 10)	Yes, EFSA (2016)

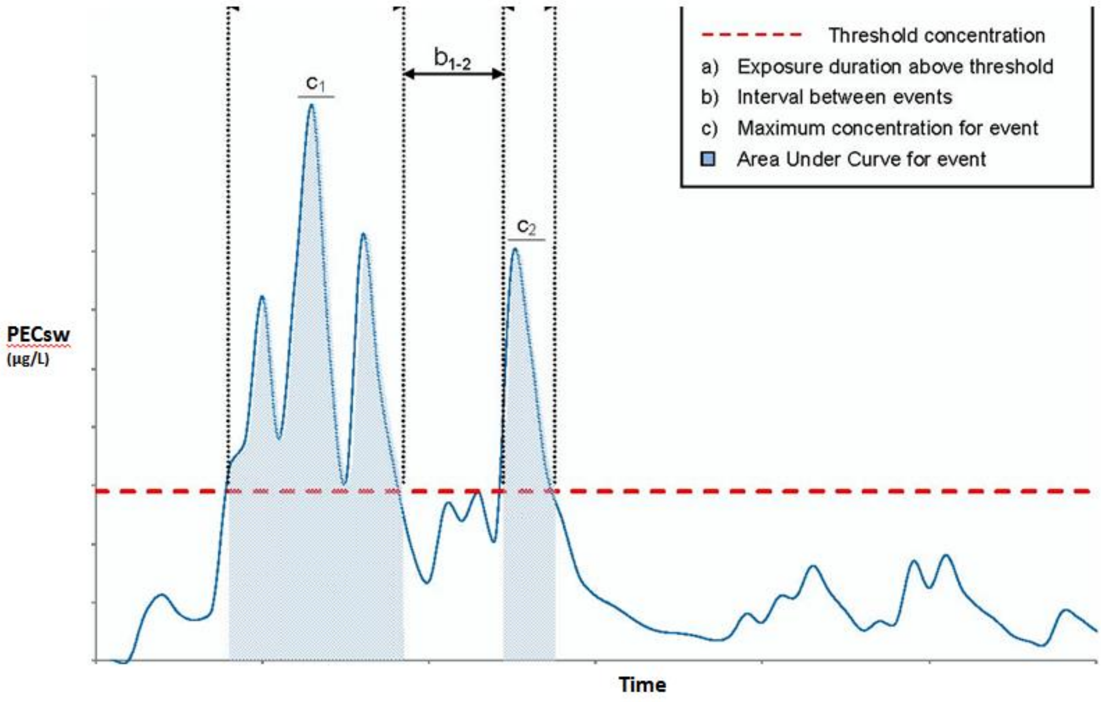
Compound	**Mesotrione**	**Value in accordance to EU endpoint / Reference**
Freundlich exponent 1/n	0.94 (arithmetic mean, n = 10 to be used for all pH scenarios)	Yes, EFSA (2016)
Plant uptake	0	Yes, EFSA (2016)
Wash-off factor from crop (1/mm)	0.05 (MACRO) 0.50 (PRZM)	FOCUS default
$DT_{50,soil}$ (d)	acidic soil [a]: 27.88 neutral soil [b]: 14.2 alkaline soil [c]: 0.54 (pH dependent: linear fit, lab. data, normalisation to 10 kPa or pF2, 20 °C, n = 18)	Yes, EFSA (2016)
$DT_{50,water}$ (d)	5.5 (geometric mean, n=6)	Yes, EFSA (2016)
$DT_{50,sed}$ (d)	1000 (conservative default value)	Yes, EFSA (2016)
$DT_{50,whole\ system}$ (d)	5.6 (geometric mean, n=6)	Yes, EFSA (2016)
Maximum occurrence observed (% molar basis with respect to the parent)	Soil: 100 Water: 100 Sed.: 4.3 Total sys.: 100	Yes, EFSA (2016)
Formation fraction in soil	-	-

[a] acid value for pH 5.1
[b] neutral value for pH 6.5
[c] alkaline value for pH 7.9

The TOXSWA time series output (*.cwa) files from the Step 3 and Step 4 simulations were analysed using the Exposure Pattern Analysis Tool (EPAT) version 1.1, developed by RIFCON. The objective of the analysis was to determine the number and duration of predicted exposure events exceeding a threshold concentration of 0.52 µg/L (worst-case RAC) and 2.8 µg/L (first level refinement RAC). Single peaks may exceed these RACs if it can be shown that the exceedance time is no longer than 24 hours. EPAT analysis was done for all Step 3 runs where the worst-case RAC was exceeded and for Step 4 runs if peaks at Step 3 were either longer than 24 hours or higher than 6 µg/L (second-level refinement RAC). Figure A 7 provides an illustration of the analysis.

TOXSWA outputs concentrations in water at various distances (segments) along the simulated water body. In this exposure pattern analysis, the time series output for the last segment (FOCUS default segment) have been analysed.

~~**Figure A 7: Definition and quantification of exposure events in the EPAT analysis**~~



A.3.8.2 Results

Predicted environmental concentrations in surface water (PEC_{SW}) and sediment (PEC_{SED}) were calculated for the use of mesotrione on maize in Europe in accordance with FOCUS guidelines.

The results are presented in the tables below in the following order:

- FOCUS Step 3 Global Maximum PEC_{SW} and PEC_{SED} for mesotrione following single application to maize (including results for acidic, neutral and alkaline soils)
- FOCUS Application dates and global maximum timing
- FOCUS Step 3 Time Weighted Average for mesotrione following single application to maize (including results for acidic, neutral and alkaline soils)
- FOCUS Step 3 Global Maximum PEC_{SW} and PEC_{SED} for mesotrione following single application to maize (maxima over all soil types)
- FOCUS Step 4 Global Maximum PEC_{SW} for mesotrione following single application to maize for each soil type
- FOCUS Step 4 Global Maximum PEC_{SW} for mesotrione following single application to maize – maximum results over all soil types
- FOCUS Step 4 Time Weighted Average PEC_{SW} for mesotrione following single application to maize for each soil type
- FOCUS Step 4 Time Weighted Average PEC_{SW} for mesotrione following single application to maize – maximum results over all soil types

~~Additionally, for each application rate:~~

- ~~Exposure Events at Step 3 – parameter set for acidic soil~~
- ~~Exposure Events at Step 4 – parameter set for acidic soil~~
- ~~Exposure Events at Step 3 – parameter set for neutral soil~~
- ~~Exposure Events at Step 4 – parameter set for neutral soil~~
- ~~Exposure Events at Step 3 – parameter set for alkaline soil~~
- ~~Exposure Events at Step 4 – parameter set for alkaline soil~~

Table A 63: FOCUS Step 3 Global Maximum PEC_{SW} and PEC_{SED} for mesotrione following single application to maize

Use pattern	Scenario	Water body	Case 1 Acidic soil			Case 2 Neutral soil			Case 3 Alkaline soil		
			PEC_{SW} (µg/L)	PEC_{SED} (µg/kg)	Dominant Route of Entry	PEC_{SW} (µg/L)	PEC_{SED} (µg/kg)	Dominant Route of Entry	PEC_{SW} (µg/L)	PEC_{SED} (µg/kg)	Dominant Route of Entry
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3	ditch	0.525	0.137	Spray drift	0.525	0.085	Spray drift	0.525	0.056	Spray drift
	D4	pond	0.056	0.106	Drainage	0.022	0.013	Spray drift	0.021	0.007	Spray drift
	D4	stream	0.451	0.085	Spray drift	0.451	0.024	Spray drift	0.449	0.015	Spray drift
	D5	pond	0.031	0.062	Drainage	0.023	0.020	Spray drift	0.021	0.007	Spray drift
	D5	stream	0.459	0.067	Spray drift	0.452	0.027	Spray drift	0.448	0.009	Spray drift
	D6	ditch	0.527	0.152	Spray drift	0.526	0.090	Spray drift	0.525	0.056	Spray drift
	R1	pond	0.076	0.084	Runoff	0.049	0.031	Runoff	0.021	0.008	Spray drift
	R1	stream	1.60	0.372	Runoff	1.10	0.145	Runoff	0.360	0.026	Runoff
	R2	stream	1.19	0.323	Runoff	2.16	0.349	Runoff	0.486	0.017	Spray drift
	R3	stream	3.13	0.684	Runoff	3.94	0.535	Runoff	0.515	0.053	Runoff
	R4	stream	3.58	0.994	Runoff	4.16	0.708	Runoff	0.363	0.038	Spray drift
Use No.2 Maize 1 x 75 g a.s/ha Early post-emergence	D3	ditch	0.394	0.104	Spray drift	0.394	0.064	Spray drift	0.394	0.042	Spray drift
	D4	pond	0.042	0.080	Drainage	0.016	0.010	Spray drift	0.016	0.005	Spray drift
	D4	stream	0.339	0.064	Spray drift	0.338	0.018	Spray drift	0.337	0.011	Spray drift
	D5	pond	0.023	0.047	Drainage	0.017	0.015	Spray drift	0.016	0.005	Spray drift
	D5	stream	0.344	0.049	Spray drift	0.339	0.020	Spray drift	0.336	0.007	Spray drift
	D6	ditch	0.396	0.114	Spray drift	0.395	0.068	Spray drift	0.394	0.042	Spray drift
	R1	pond	0.057	0.064	Runoff	0.037	0.023	Runoff	0.016	0.006	Spray drift
	R1	stream	1.20	0.281	Runoff	0.820	0.111	Runoff	0.270	0.020	Runoff
	R2	stream	0.877	0.241	Runoff	1.61	0.261	Runoff	0.365	0.013	Spray drift
	R3	stream	2.33	0.513	Runoff	2.95	0.403	Runoff	0.384	0.040	Runoff
	R4	stream	2.67	0.748	Runoff	3.12	0.533	Runoff	0.272	0.028	Spray drift

Table A 64: FOCUS Application dates and surface water global maximum timing at STEP 3

Use pattern	Scenario	Water body	Case 1 Acidic soil		Case 2 Neutral soil		Case 3 Alkaline soil	
			Application date	Date of global maximum	Application date	Date of global maximum	Application date	Date of global maximum
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3	ditch	05-May	05-May	05-May	05-May	05-May	05-May
	D4	pond	30-May	17-Dec	30-May	30-May	30-May	30-May
	D4	stream	30-May	30-May	30-May	30-May	30-May	30-May
	D5	pond	11-May	13-Feb	11-May	11-May	11-May	11-May
	D5	stream	11-May	11-May	11-May	11-May	11-May	11-May
	D6	ditch	23-Apr	23-Apr	23-Apr	23-Apr	23-Apr	23-Apr
	R1	pond	09-May	20-May	09-May	20-May	09-May	09-May
	R1	stream	09-May	20-May	09-May	14-May	09-May	14-May
	R2	stream	07-May	13-May	07-May	13-May	07-May	07-May
	R3	stream	18-May	23-May	18-May	23-May	18-May	23-May
	R4	stream	11-Apr	18-Apr	11-Apr	18-Apr	11-Apr	11-Apr
Use No.2 Maize 1 x 75 g a.s/ha Early post-emergence	D3	ditch	05-May	05-May	05-May	05-May	05-May	05-May
	D4	pond	30-May	17-Dec	30-May	30-May	30-May	30-May
	D4	stream	30-May	30-May	30-May	30-May	30-May	30-May
	D5	pond	11-May	13-Feb	11-May	11-May	11-May	11-May
	D5	stream	11-May	11-May	11-May	11-May	11-May	11-May
	D6	ditch	23-Apr	23-Apr	23-Apr	23-Apr	23-Apr	23-Apr
	R1	pond	09-May	20-May	09-May	20-May	09-May	09-May
	R1	stream	09-May	20-May	09-May	14-May	09-May	14-May
	R2	stream	07-May	13-May	07-May	13-May	07-May	07-May
	R3	stream	18-May	23-May	18-May	23-May	18-May	23-May
	R4	stream	11-Apr	18-Apr	11-Apr	18-Apr	11-Apr	11-Apr

Table A 65: FOCUS Step 3 Time Weighted Average PEC_{SW} for mesotrione following single application to maize

Use pattern	Sce-nario	Water body	Max $TWAEC_{SW}$								
			Case 1 Acidic soil			Case 2 Neutral soil			Case 3 Alkaline soil		
			7 day	21 day	28 day	7 day	21 day	28 day	7 day	21 day	28 day
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3	ditch	0.083	0.028	0.021	0.083	0.028	0.021	0.083	0.028	0.021
	D4	pond	0.055	0.052	0.049	0.017	0.011	0.009	0.017	0.011	0.009
	D4	stream	0.070	0.045	0.038	0.011	0.008	0.007	0.006	0.002	0.001
	D5	pond	0.030	0.025	0.023	0.017	0.012	0.010	0.016	0.011	0.009
	D5	stream	0.023	0.018	0.017	0.012	0.011	0.010	0.003	0.001	0.001
	D6	ditch	0.082	0.030	0.023	0.081	0.028	0.022	0.079	0.026	0.020
	R1	pond	0.062	0.048	0.040	0.039	0.027	0.025	0.017	0.013	0.011
	R1	stream	0.150	0.066	0.051	0.111	0.040	0.030	0.021	0.008	0.006
	R2	stream	0.111	0.038	0.040	0.196	0.066	0.051	0.016	0.005	0.004
	R3	stream	0.353	0.125	0.094	0.398	0.140	0.105	0.065	0.023	0.017
	R4	stream	0.397	0.175	0.136	0.461	0.177	0.134	0.033	0.015	0.011
Use No.2 Maize 1 x 75 g a.s/ha Early post-emergence	D3	ditch	0.062	0.021	0.016	0.062	0.021	0.016	0.062	0.021	0.016
	D4	pond	0.041	0.039	0.037	0.013	0.008	0.007	0.012	0.008	0.007
	D4	stream	0.052	0.034	0.028	0.008	0.006	0.005	0.004	0.001	0.001
	D5	pond	0.022	0.019	0.017	0.013	0.009	0.007	0.012	0.008	0.007
	D5	stream	0.018	0.013	0.013	0.009	0.008	0.007	0.002	0.001	0.001
	D6	ditch	0.061	0.022	0.017	0.061	0.021	0.016	0.059	0.020	0.015
	R1	pond	0.046	0.036	0.030	0.030	0.020	0.019	0.013	0.010	0.008
	R1	stream	0.112	0.050	0.038	0.084	0.031	0.023	0.016	0.006	0.005
	R2	stream	0.082	0.028	0.030	0.146	0.049	0.038	0.012	0.004	0.003
	R3	stream	0.263	0.093	0.070	0.298	0.105	0.079	0.049	0.017	0.013
	R4	stream	0.296	0.131	0.102	0.345	0.133	0.100	0.025	0.011	0.008

All PEC's tabulated below are the highest figures taken from the three parameter sets for acidic, neutral and alkaline soils.

Table A 66: FOCUS Step 3 Summary Table, Global Maximum PEC_{SW} and PEC_{SED} for mesotrione following single application to maize

Use pattern	Scenario	Waterbody	Max PEC_{SW} (µg/L)	Dominant entry route	7 d-$PEC_{SW,twa}$ (µg/L)	21 d-$PEC_{SW,twa}$ (µg/L)	Max PEC_{SED} (µg/kg)
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3	ditch	0.525	Spray drift	0.083	0.028	0.137
	D4	pond	0.056	Drainage	0.055	0.052	0.106
	D4	stream	0.451	Spray drift	0.070	0.045	0.085
	D5	pond	0.031	Drainage	0.030	0.025	0.062
	D5	stream	0.459	Spray drift	0.023	0.018	0.067
	D6	ditch	0.527	Spray drift	0.082	0.030	0.152
	R1	pond	0.076	Runoff	0.062	0.048	0.084
	R1	stream	1.60	Runoff	0.150	0.066	0.372
	R2	stream	2.16	Runoff	0.196	0.066	0.349
	R3	stream	3.94	Runoff	0.398	0.140	0.684
	R4	stream	4.16	Runoff	0.461	0.177	0.994
Use No.2 Maize 1 x 75 g a.s/ha Early post-emergence	D3	ditch	0.394	Spray drift	0.062	0.021	0.104
	D4	pond	0.042	Drainage	0.041	0.039	0.080
	D4	stream	0.339	Spray drift	0.052	0.034	0.064
	D5	pond	0.023	Drainage	0.022	0.019	0.047
	D5	stream	0.344	Spray drift	0.018	0.013	0.049
	D6	ditch	0.396	Spray drift	0.061	0.022	0.114
	R1	pond	0.057	Runoff	0.046	0.036	0.064
	R1	stream	1.20	Runoff	0.112	0.050	0.281
	R2	stream	1.61	Runoff	0.146	0.049	0.261
	R3	stream	2.95	Runoff	0.298	0.105	0.513
	R4	stream	3.12	Runoff	0.345	0.133	0.748

Table A 67: FOCUS Step 4 Global Maximum PEC$_{SW}$ for mesotrione following single application to maize - case 1: acidic soil

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3 ditch	0.262	Spray drift	0.172	Spray drift	0.091	Spray drift	0.047	Spray drift	not calculated	
	D4 pond	0.056	Drainage	0.056	Drainage	0.056	Drainage	0.056	Drainage		
	D4 stream	0.227	Spray drift	0.191	Spray drift	0.102	Spray drift	0.090	Drainage		
	D5 pond	0.031	Drainage	0.031	Drainage	0.031	Drainage	0.031	Drainage		
	D5 stream	0.235	Spray drift	0.199	Spray drift	0.111	Spray drift	0.063	Spray drift		
	D6 ditch	0.265	Spray drift	0.175	Spray drift	0.094	Spray drift	0.050	Spray drift		
	R1 pond	0.071	Runoff	0.075	Runoff	0.033	Runoff	0.018	Runoff	0.019	Spray drift
	R1 stream	1.60	Runoff	1.60	Runoff	0.724	Runoff	0.379	Runoff	0.150	Spray drift
	R2 stream	1.19	Runoff	1.19	Runoff	0.523	Runoff	0.271	Runoff	0.205	Spray drift
	R3 stream	3.13	Runoff	3.13	Runoff	1.41	Runoff	0.738	Runoff	0.215	Spray drift
	R4 stream	3.58	Runoff	3.58	Runoff	1.63	Runoff	0.853	Runoff	0.153	Spray drift
Use No.2 Maize 1 x 75 g a.s/ha Early post-emergence	D3 ditch	0.197	Spray drift	0.129	Spray drift	0.068	Spray drift	0.036	Spray drift	not calculated	
	D4 pond	0.042	Drainage	0.042	Drainage	0.042	Drainage	0.042	Drainage		
	D4 stream	0.170	Spray drift	0.143	Spray drift	0.077	Spray drift	0.068	Drainage		
	D5 pond	0.023	Drainage	0.023	Drainage	0.023	Drainage	0.023	Drainage		
	D5 stream	0.176	Spray drift	0.149	Spray drift	0.083	Spray drift	0.047	Spray drift		
	D6 ditch	0.199	Spray drift	0.131	Spray drift	0.070	Spray drift	0.038	Spray drift		
	R1 pond	0.053	Runoff	0.056	Runoff	0.025	Runoff	0.013	Runoff	0.014	Spray drift
	R1 stream	1.20	Runoff	1.20	Runoff	0.544	Runoff	0.284	Runoff	0.113	Spray drift
	R2 stream	0.877	Runoff	0.877	Runoff	0.387	Runoff	0.201	Runoff	0.154	Spray drift
	R3 stream	2.33	Runoff	2.33	Runoff	1.05	Runoff	0.549	Runoff	0.161	Spray drift
	R4 stream	2.67	Runoff	2.67	Runoff	1.21	Runoff	0.636	Runoff	0.114	Spray drift

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

Table A 68: FOCUS Step 4 Global Maximum PEC$_{SW}$ for mesotrione following single application to maize - case 2: neutral soil

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3 ditch	0.263	Spray drift	0.172	Spray drift	0.091	Spray drift	0.048	Spray drift	not calculated	
	D4 pond	0.011	Spray drift	0.019	Spray drift	0.014	Spray drift	0.009	Spray drift		
	D4 stream	0.226	Spray drift	0.190	Spray drift	0.101	Spray drift	0.053	Spray drift		
	D5 pond	0.012	Spray drift	0.020	Spray drift	0.015	Spray drift	0.010	Spray drift		
	D5 stream	0.229	Spray drift	0.193	Spray drift	0.105	Spray drift	0.057	Spray drift		
	D6 ditch	0.264	Spray drift	0.173	Spray drift	0.093	Spray drift	0.049	Spray drift		
	R1 pond	0.043	Runoff	0.047	Runoff	0.022	Runoff	0.012	Runoff	0.019	Spray drift
	R1 stream	1.10	Runoff	1.10	Runoff	0.450	Runoff	0.227	Runoff	0.150	Spray drift
	R2 stream	2.16	Runoff	2.16	Runoff	0.952	Runoff	0.493	Runoff	0.205	Spray drift
	R3 stream	3.94	Runoff	3.94	Runoff	1.78	Runoff	0.931	Runoff	0.215	Spray drift
	R4 stream	4.16	Runoff	4.16	Runoff	1.89	Runoff	0.992	Runoff	0.153	Spray drift

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**PEC_{SW} (µg/L)**	**Dominant route of entry**	**PEC_{SW} (µg/L)**	**Dominant route of entry**	**PEC_{SW} (µg/L)**	**Dominant route of entry**	**PEC_{SW} (µg/L)**	**Dominant route of entry**	**PEC_{SW} (µg/L)**	**Dominant route of entry**
Use No.2 Maize 1 x 75 g a.s/ha Early post-emergence	D3 ditch	0.197	Spray drift	0.129	Spray drift	0.069	Spray drift	0.036	Spray drift	not calculated	
	D4 pond	0.008	Spray drift	0.014	Spray drift	0.010	Spray drift	0.007	Spray drift		
	D4 stream	0.170	Spray drift	0.143	Spray drift	0.076	Spray drift	0.040	Spray drift		
	D5 pond	0.009	Spray drift	0.015	Spray drift	0.011	Spray drift	0.008	Spray drift		
	D5 stream	0.172	Spray drift	0.145	Spray drift	0.078	Spray drift	0.043	Spray drift		
	D6 ditch	0.198	Spray drift	0.130	Spray drift	0.070	Spray drift	0.037	Spray drift		
	R1 pond	0.033	Runoff	0.036	Runoff	0.017	Runoff	0.009	Runoff	0.014	Spray drift
	R1 stream	0.820	Runoff	0.820	Runoff	0.337	Runoff	0.170	Runoff	0.113	Spray drift
	R2 stream	1.61	Runoff	1.605	Runoff	0.708	Runoff	0.367	Runoff	0.154	Spray drift
	R3 stream	2.95	Runoff	2.952	Runoff	1.33	Runoff	0.697	Runoff	0.161	Spray drift
	R4 stream	3.12	Runoff	3.116	Runoff	1.42	Runoff	0.742	Runoff	0.114	Spray drift

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

Table A 69: FOCUS Step 4 Global Maximum PEC_{SW} for mesotrione following single application to maize - case 3: alkaline soil

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**PEC_{SW} (µg/L)**	**Dominant route of entry**	**PEC_{SW} (µg/L)**	**Dominant route of entry**	**PEC_{SW} (µg/L)**	**Dominant route of entry**	**PEC_{SW} (µg/L)**	**Dominant route of entry**	**PEC_{SW} (µg/L)**	**Dominant route of entry**
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3 ditch	0.262	Spray drift	0.172	Spray drift	0.091	Spray drift	0.047	Spray drift	not calculated	
	D4 pond	0.011	Spray drift	0.019	Spray drift	0.014	Spray drift	0.009	Spray drift		
	D4 stream	0.225	Spray drift	0.189	Spray drift	0.100	Spray drift	0.052	Spray drift		
	D5 pond	0.011	Spray drift	0.019	Spray drift	0.014	Spray drift	0.009	Spray drift		
	D5 stream	0.224	Spray drift	0.189	Spray drift	0.100	Spray drift	0.052	Spray drift		
	D6 ditch	0.262	Spray drift	0.172	Spray drift	0.091	Spray drift	0.047	Spray drift		
	R1 pond	0.011	Spray drift	0.019	Spray drift	0.014	Spray drift	0.009	Spray drift	0.019	Spray drift
	R1 stream	0.360	Runoff	0.360	Runoff	0.148	Runoff	0.075	Runoff	0.150	Spray drift
	R2 stream	0.243	Spray drift	0.205	Spray drift	0.108	Spray drift	0.057	Spray drift	0.205	Spray drift
	R3 stream	0.515	Runoff	0.515	Runoff	0.232	Runoff	0.122	Runoff	0.215	Spray drift
	R4 stream	0.302	Runoff	0.302	Runoff	0.137	Runoff	0.072	Runoff	0.153	Spray drift
Use No.2 Maize 1 x 75 g a.s/ha Early post-emergence	D3 ditch	0.197	Spray drift	0.129	Spray drift	0.068	Spray drift	0.036	Spray drift	not calculated	
	D4 pond	0.008	Spray drift	0.014	Spray drift	0.010	Spray drift	0.007	Spray drift		
	D4 stream	0.169	Spray drift	0.142	Spray drift	0.075	Spray drift	0.039	Spray drift		
	D5 pond	0.008	Spray drift	0.014	Spray drift	0.010	Spray drift	0.007	Spray drift		
	D5 stream	0.168	Spray drift	0.141	Spray drift	0.075	Spray drift	0.039	Spray drift		
	D6 ditch	0.197	Spray drift	0.129	Spray drift	0.068	Spray drift	0.036	Spray drift		
	R1 pond	0.008	Spray drift	0.014	Spray drift	0.010	Spray drift	0.007	Spray drift	0.014	Spray drift
	R1 stream	0.270	Runoff	0.270	Runoff	0.111	Runoff	0.056	Runoff	0.113	Spray drift
	R2 stream	0.183	Spray drift	0.154	Spray drift	0.081	Spray drift	0.042	Spray drift	0.154	Spray drift
	R3 stream	0.384	Runoff	0.384	Runoff	0.174	Runoff	0.091	Runoff	0.161	Spray drift
	R4 stream	0.226	Runoff	0.226	Runoff	0.103	Runoff	0.054	Runoff	0.114	Spray drift

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

Table A 70: FOCUS Step 4 Global Maximum PEC$_{SW}$ for mesotrione following single application to maize – overall maxima of calculations for acidic, neutral and alkaline soil

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**	**PEC$_{SW}$ (µg/L)**	**Dominant route of entry**
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3 ditch	0.263	Spray drift	0.172	Spray drift	0.091	Spray drift	0.048	Spray drift	not calculated	
	D4 pond	0.056	Drainage	0.056	Drainage	0.056	Drainage	0.056	Drainage		
	D4 stream	0.227	Spray drift	0.191	Spray drift	0.102	Spray drift	0.090	Drainage		
	D5 pond	0.031	Drainage	0.031	Drainage	0.031	Drainage	0.031	Drainage		
	D5 stream	0.235	Spray drift	0.199	Spray drift	0.111	Spray drift	0.063	Spray drift		
	D6 ditch	0.265	Spray drift	0.175	Spray drift	0.094	Spray drift	0.050	Spray drift		
	R1 pond	0.071	Runoff	0.075	Runoff	0.033	Runoff	0.018	Runoff	0.019	Spray drift
	R1 stream	1.60	Runoff	1.60	Runoff	0.724	Runoff	0.379	Runoff	0.150	Spray drift
	R2 stream	2.16	Runoff	2.16	Runoff	0.952	Runoff	0.493	Runoff	0.205	Spray drift
	R3 stream	3.94	Runoff	3.94	Runoff	1.78	Runoff	0.931	Runoff	0.215	Spray drift
	R4 stream	4.16	Runoff	4.16	Runoff	1.89	Runoff	0.992	Runoff	0.153	Spray drift
Use No.2 Maize 1 x 75 g a.s/ha Early post-emergence	D3 ditch	0.197	Spray drift	0.129	Spray drift	0.069	Spray drift	0.036	Spray drift	not calculated	
	D4 pond	0.042	Drainage	0.042	Drainage	0.042	Drainage	0.042	Drainage		
	D4 stream	0.170	Spray drift	0.143	Spray drift	0.077	Spray drift	0.068	Drainage		
	D5 pond	0.023	Drainage	0.023	Drainage	0.023	Drainage	0.023	Drainage		
	D5 stream	0.176	Spray drift	0.149	Spray drift	0.083	Spray drift	0.047	Spray drift		
	D6 ditch	0.199	Spray drift	0.131	Spray drift	0.070	Spray drift	0.038	Spray drift		
	R1 pond	0.053	Runoff	0.056	Runoff	0.025	Runoff	0.013	Runoff	0.014	Spray drift
	R1 stream	1.20	Runoff	1.20	Runoff	0.544	Runoff	0.284	Runoff	0.113	Spray drift
	R2 stream	1.61	Runoff	1.61	Runoff	0.708	Runoff	0.367	Runoff	0.154	Spray drift
	R3 stream	2.95	Runoff	2.95	Runoff	1.33	Runoff	0.697	Runoff	0.161	Spray drift
	R4 stream	3.12	Runoff	3.12	Runoff	1.42	Runoff	0.742	Runoff	0.114	Spray drift

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

Table A 71: FOCUS Step 4: TWA PEC$_{SW}$ for mesotrione following single application to maize - case 1: acidic soil

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**Time weighted average PEC$_{SW}$ (µg/L)**									
		7-d	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3 ditch	0.041	0.014	0.027	0.009	0.014	0.005	0.007	0.003	not calculated	
	D4 pond	0.055	0.052	0.055	0.052	0.055	0.052	0.055	0.052		
	D4 stream	0.070	0.045	0.070	0.045	0.070	0.045	0.070	0.045		
	D5 pond	0.030	0.025	0.030	0.025	0.030	0.025	0.030	0.025		
	D5 stream	0.023	0.018	0.023	0.018	0.023	0.018	0.023	0.018		
	D6 ditch	0.043	0.016	0.029	0.012	0.017	0.008	0.011	0.006		
	R1 pond	0.058	0.045	0.061	0.047	0.027	0.021	0.014	0.011	0.015	0.011
	R1 stream	0.150	0.066	0.150	0.066	0.067	0.029	0.035	0.015	0.003	0.003
	R2 stream	0.108	0.036	0.107	0.036	0.047	0.016	0.024	0.008	0.003	0.001
	R3 stream	0.353	0.122	0.353	0.121	0.158	0.054	0.082	0.028	0.009	0.003
	R4 stream	0.397	0.173	0.397	0.173	0.181	0.079	0.095	0.041	0.004	0.001

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**Time weighted average PEC_{SW} (µg/L)**									
		7-d	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**
Use No.2 Maize 1 x 75 g a.s/ha Early post-emer-gence	D3 ditch	0.031	0.010	0.020	0.007	0.011	0.004	0.006	0.002	not calculated	
	D4 pond	0.041	0.039	0.041	0.039	0.041	0.039	0.041	0.039		
	D4 stream	0.052	0.034	0.052	0.034	0.052	0.034	0.052	0.034		
	D5 pond	0.022	0.019	0.022	0.019	0.022	0.019	0.022	0.019		
	D5 stream	0.018	0.013	0.018	0.013	0.018	0.013	0.018	0.013		
	D6 ditch	0.032	0.012	0.022	0.009	0.013	0.006	0.008	0.005		
	R1 pond	0.043	0.034	0.046	0.036	0.020	0.015	0.011	0.008	0.011	0.008
	R1 stream	0.112	0.050	0.112	0.050	0.050	0.022	0.026	0.011	0.003	0.002
	R2 stream	0.080	0.027	0.079	0.027	0.035	0.012	0.018	0.006	0.002	0.001
	R3 stream	0.263	0.091	0.263	0.090	0.117	0.040	0.061	0.021	0.007	0.002
	R4 stream	0.296	0.129	0.296	0.129	0.135	0.059	0.071	0.031	0.003	0.001

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

Table A 72: FOCUS Step 4: TWA PEC_{SW} for mesotrione following single application to maize - case 2: neutral soil

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**Time weighted average PEC_{SW} (µg/L)**									
		7-d	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3 ditch	0.042	0.014	0.027	0.009	0.015	0.005	0.008	0.003	not calculated	
	D4 pond	0.009	0.009	0.015	0.010	0.011	0.009	0.009	0.009		
	D4 stream	0.011	0.008	0.011	0.008	0.011	0.008	0.011	0.008		
	D5 pond	0.009	0.008	0.016	0.010	0.012	0.008	0.009	0.008		
	D5 stream	0.012	0.011	0.012	0.011	0.012	0.011	0.012	0.011		
	D6 ditch	0.041	0.015	0.028	0.011	0.016	0.006	0.009	0.004		
	R1 pond	0.035	0.024	0.038	0.026	0.018	0.013	0.010	0.008	0.015	0.011
	R1 stream	0.111	0.039	0.111	0.039	0.048	0.017	0.025	0.009	0.004	0.002
	R2 stream	0.193	0.065	0.192	0.065	0.085	0.028	0.044	0.015	0.003	0.001
	R3 stream	0.398	0.137	0.398	0.136	0.178	0.061	0.093	0.032	0.009	0.003
	R4 stream	0.461	0.176	0.461	0.175	0.210	0.080	0.110	0.042	0.004	0.001
Use No.2 Maize 1 x 75 g a.s/ha Early post-emer-gence	D3 ditch	0.031	0.011	0.021	0.007	0.011	0.004	0.006	0.002	not calculated	
	D4 pond	0.007	0.007	0.011	0.007	0.008	0.007	0.007	0.007		
	D4 stream	0.008	0.006	0.008	0.006	0.008	0.006	0.008	0.006		
	D5 pond	0.007	0.006	0.012	0.008	0.009	0.006	0.007	0.006		
	D5 stream	0.009	0.008	0.009	0.008	0.009	0.008	0.009	0.008		
	D6 ditch	0.031	0.011	0.021	0.008	0.012	0.005	0.007	0.003		
	R1 pond	0.027	0.018	0.029	0.020	0.013	0.010	0.007	0.006	0.011	0.008
	R1 stream	0.084	0.030	0.084	0.030	0.036	0.013	0.019	0.007	0.003	0.002
	R2 stream	0.143	0.048	0.143	0.048	0.063	0.021	0.033	0.011	0.002	0.001
	R3 stream	0.298	0.102	0.298	0.102	0.134	0.046	0.070	0.024	0.007	0.002
	R4 stream	0.345	0.132	0.345	0.132	0.157	0.060	0.082	0.031	0.003	0.001

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

Table A 73: FOCUS Step 4: TWA PEC$_{SW}$ for mesotrione following single application to maize - case 3: alkaline soil

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**Time weighted average PEC$_{SW}$ (µg/L)**									
		7-d	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3 ditch	0.042	0.014	0.027	0.009	0.014	0.005	0.008	0.003	not calculated	
	D4 pond	0.008	0.005	0.015	0.009	0.011	0.007	0.007	0.005		
	D4 stream	0.003	0.001	0.002	0.001	0.001	0.000	0.001	0.000		
	D5 pond	0.008	0.005	0.015	0.009	0.010	0.007	0.007	0.005		
	D5 stream	0.001	0.000	0.001	0.000	0.001	0.000	0.000	0.000		
	D6 ditch	0.040	0.013	0.026	0.009	0.014	0.005	0.007	0.002		
	R1 pond	0.009	0.007	0.015	0.012	0.011	0.008	0.007	0.005	0.015	0.010
	R1 stream	0.018	0.007	0.018	0.007	0.008	0.003	0.004	0.002	0.003	0.001
	R2 stream	0.012	0.004	0.012	0.004	0.005	0.002	0.003	0.001	0.003	0.001
	R3 stream	0.054	0.019	0.052	0.019	0.024	0.009	0.013	0.005	0.009	0.003
	R4 stream	0.033	0.013	0.033	0.013	0.015	0.006	0.008	0.003	0.004	0.001
Use No.2 Maize 1 x 75 g a.s/ha Early post-emer-gence	D3 ditch	0.031	0.010	0.020	0.007	0.011	0.004	0.006	0.002	not calculated	
	D4 pond	0.006	0.004	0.011	0.007	0.008	0.005	0.005	0.003		
	D4 stream	0.002	0.001	0.002	0.001	0.001	0.000	0.000	0.000		
	D5 pond	0.006	0.004	0.011	0.007	0.008	0.005	0.005	0.003		
	D5 stream	0.001	0.000	0.001	0.000	0.000	0.000	0.000	0.000		
	D6 ditch	0.030	0.010	0.019	0.006	0.010	0.003	0.005	0.002		
	R1 pond	0.007	0.005	0.012	0.009	0.008	0.006	0.005	0.004	0.011	0.008
	R1 stream	0.014	0.005	0.014	0.005	0.006	0.002	0.003	0.001	0.002	0.001
	R2 stream	0.009	0.003	0.009	0.003	0.004	0.001	0.002	0.001	0.002	0.001
	R3 stream	0.040	0.015	0.039	0.014	0.018	0.007	0.010	0.003	0.007	0.002
	R4 stream	0.025	0.010	0.025	0.010	0.011	0.004	0.006	0.002	0.003	0.001

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

Table A 74: FOCUS Step 4: TWA PEC$_{SW}$ for mesotrione following single application to maize – overall maxima of calculations for acidic, neutral and alkaline soil

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**Time weighted average PEC$_{SW}$ (µg/L)**									
		7-d	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**
Use No.2 Maize 1 x 100 g a.s/ha Early post-emergence	D3 ditch	0.042	0.014	0.027	0.009	0.015	0.005	0.008	0.003	not calculated	
	D4 pond	0.055	0.052	0.055	0.052	0.055	0.052	0.055	0.052		
	D4 stream	0.070	0.045	0.070	0.045	0.070	0.045	0.070	0.045		
	D5 pond	0.030	0.025	0.030	0.025	0.030	0.025	0.030	0.025		
	D5 stream	0.023	0.018	0.023	0.018	0.023	0.018	0.023	0.018		
	D6 ditch	0.043	0.016	0.029	0.012	0.017	0.008	0.011	0.006		
	R1 pond	0.058	0.045	0.061	0.047	0.027	0.021	0.014	0.011	0.015	0.011
	R1 stream	0.150	0.066	0.150	0.066	0.067	0.029	0.035	0.015	0.004	0.003
	R2 stream	0.193	0.065	0.192	0.065	0.085	0.028	0.044	0.015	0.003	0.001
	R3 stream	0.398	0.137	0.398	0.136	0.178	0.061	0.093	0.032	0.009	0.003
	R4 stream	0.461	0.176	0.461	0.175	0.210	0.080	0.110	0.042	0.004	0.001

		Mitigation options									
Vegetative strip (m) [a]		-		-		10 (L & M)		20 (L & M)		5 (VFSmod)	
No spray buffer (m)		-		5		10		20		5	
Nozzle reduction (%)		50		-		-		-		-	
Use pattern	**Scenario**	**Time weighted average PEC_{SW} (µg/L)**									
		7-d	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**	**7-d**	**21-d**
Use No.2 Maize 1 x 75 g a.s/ha Early post-emer-gence	D3 ditch	0.031	0.011	0.021	0.007	0.011	0.004	0.006	0.002	not calculated	
	D4 pond	0.041	0.039	0.041	0.039	0.041	0.039	0.041	0.039		
	D4 stream	0.052	0.034	0.052	0.034	0.052	0.034	0.052	0.034		
	D5 pond	0.022	0.019	0.022	0.019	0.022	0.019	0.022	0.019		
	D5 stream	0.018	0.013	0.018	0.013	0.018	0.013	0.018	0.013		
	D6 ditch	0.032	0.012	0.022	0.009	0.013	0.006	0.008	0.005		
	R1 pond	0.043	0.034	0.046	0.036	0.020	0.015	0.011	0.008	0.011	0.008
	R1 stream	0.112	0.050	0.112	0.050	0.050	0.022	0.026	0.011	0.003	0.002
	R2 stream	0.143	0.048	0.143	0.048	0.063	0.021	0.033	0.011	0.002	0.001
	R3 stream	0.298	0.102	0.298	0.102	0.134	0.046	0.070	0.024	0.007	0.002
	R4 stream	0.345	0.132	0.345	0.132	0.157	0.060	0.082	0.031	0.003	0.001

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass
VFSmod = simulated using VFSmod tool included in SWAN v 4.0.1

~~A.3.8.3 Results of the exposure event analysis (EPAT) for mesotrione~~

~~**Exposure Events Following Early Post-Emergence Application at 100 g a.s./ha**~~

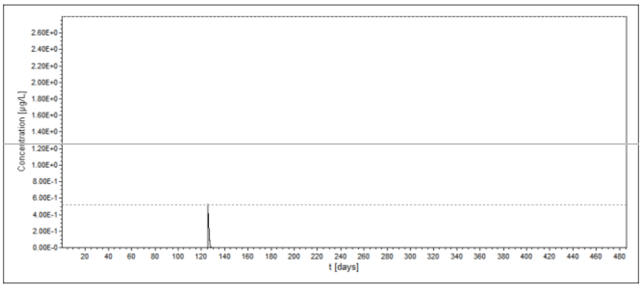
~~**A) Parameter set for acidic soil**~~

~~**Table A 75: Duration and Frequency of Exposure Events Above the Threshold Concentration of 0.52 µg/L or 2.8 µg/L Following Post-Emergence Application to Maize at a Rate of 100 g a.s./ha (FOCUS Step 3) as Determined With EPAT v1.1 -**~~ **acidic soil**

Scenario	Threshold value (µg/L)	Event No.	Start date & time	Max conc. (µg/L)	Duration (days)	Interval (days)	Number of extrema	Area under curve (µg/L)	TWAC-event (µg/L)
D3 Ditch	0.52	1	05/05/1992 09:00:00	0.525	0.042	-	1	0.525	0.525
D4 Pond	0.52	-	-	-	-	-	-	-	-
D4 Stream	0.52	-	-	-	-	-	-	-	-
D5 Pond	0.52	-	-	-	-	-	-	-	-
D5 Stream	0.52	-	-	-	-	-	-	-	-
D6 Ditch	0.52	1	23/04/1986 09:00:00	0.527	0.042	-	1	0.53	0.53
R1 Pond	0.52	-	-	-	-	-	-	-	-
R1 Stream	0.52	1	14/05/1984 04:00:00	0.783	0.208	-	1	3.76	0.752
		2	20/05/1984 01:00:00	1.60	0.541	5.67	2	19.4	1.49
R2 Stream	0.52	1	13/05/1977 02:00:00	1.19	0.584	-	1	16.3	1.16
R3 Stream	0.52	1	23/05/1980 01:00:00	3.13	0.750	-	2	42.0	2.34
		2	27/05/1980 03:00:00	1.42	0.500	3.33	1	13.8	1.15
	2.8	1	23/05/1980 02:00:00	3.13	0.334	-	2	24.8	3.10
R4 Stream	0.52	1	18/04/1984 01:00:00	3.58	0.875	-	2	66.2	3.15
		2	27/04/1984 01:00:00	1.06	0.791	8.13	2	18.9	0.996
	2.8	1	18/04/1984 01:00:00	3.58	0.666	-	2	56.9	3.56

~~**Figure A 8: Comparison of FOCUS Step 3 Surface Water Concentrations (µg/L) with Thresholds of 0.52 µg/L and 2.8 µg/L Following Post-Emergence Applications to Maize at a Rate of 100 g a.s./ha - acidic soil**~~

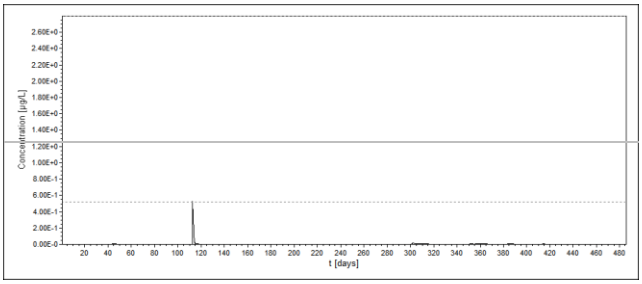
~~D3 Ditch~~



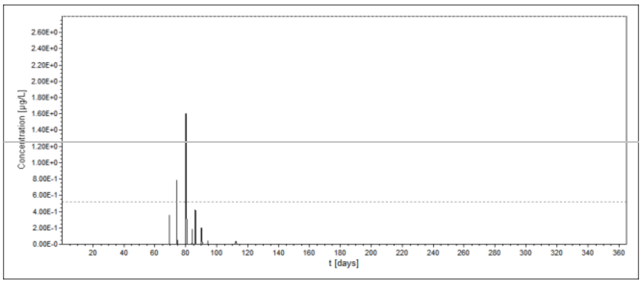
~~D4 Stream~~

~~D5 Stream~~

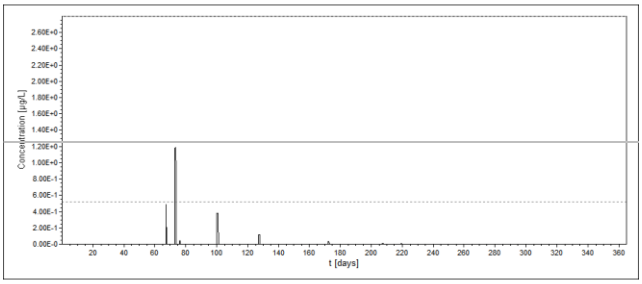
~~D6 Ditch~~



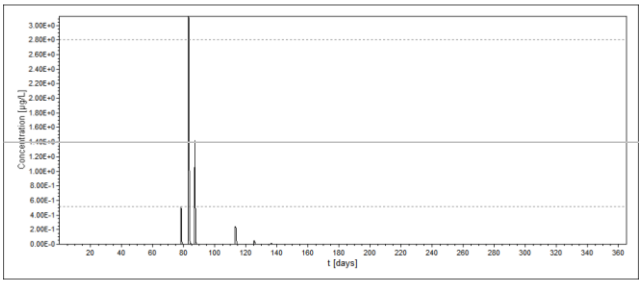
~~R1 Stream~~



~~R2 Stream~~



~~R3 Stream~~



~~R4 Stream~~

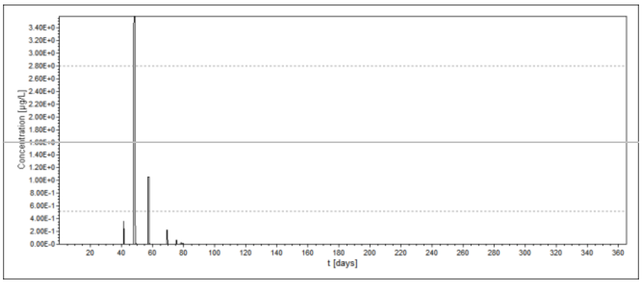


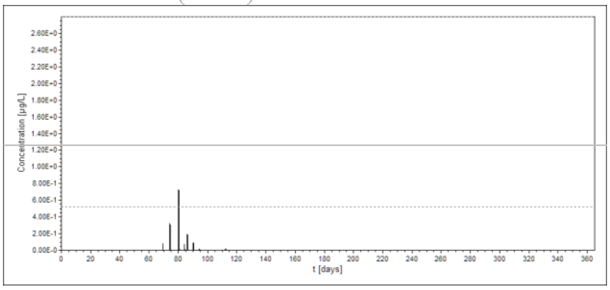
Table A 76: Duration and Frequency of Exposure Events Above the Threshold Concentration of 0.52 µg/L or 2.8 µg/L Following Post-Emergence Application to Maize at a Rate of 100 g a.s./ha (FOCUS Step 4) as Determined With EPAT v1.1 - acidic soil

Scenario	Scenario and mitigation	Threshold value (µg/L)	Event No.	Start data & time	Max conc. (µg/L)	Duration (days)	Interval (days)	Number of extrema	Area under curve (µg/L)	TWAC-event (µg/L)
D3 Ditch	–	–	–	–	–	–	–	–	–	–
D4 Pond	–	–	–	–	–	–	–	–	–	–
D4 Stream	–	–	–	–	–	–	–	–	–	–
D5 Pond	–	–	–	–	–	–	–	–	–	–
D5 Stream	–	–	–	–	–	–	–	–	–	–
D6 Ditch	–	–	–	–	–	–	–	–	–	–
R1 stream	10 m (L&M)[a]	0.52	1	20/05/1984	0.724	0.500	–	2	8.36	0.697
	20 m (L&M)[a]	–	–	–	–	–	–	–	–	–
R2 stream	10 m (L&M)[a]	0.52	1	13/05/1977	0.523	0.458	–	1	5.75	0.523
	20 m (L&M)[a]	–	–	–	–	–	–	–	–	–
R3 stream	10 m (L&M)[a]	0.52	1	23/05/1980	1.41	0.625	–	1	18.0	1.20
			2	27/05/1980	0.619	0.250	3.50	1	3.57	0.595
	20 m (L&M)[a]	0.52	1	23/05/1980	0.738	0.500	–	1	8.31	0.692
R4 Stream	10 m (L&M)[a]	0.52	1	18/04/1984	1.63	0.833	–	2	29.8	1.49
	20 m (L&M)[a]	0.52	1	18/04/1984	0.853	0.750	–	2	14.8	0.821

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): runoff / erosion reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass.

Figure A 9: **Comparison of FOCUS Step 4 Surface Water Concentrations (µg/L) with Thresholds of 0.52 µg/L and 2.8 µg/L Following Post-Emergence Applications to Maize at a Rate of 100 g a.s./ha – acidic soil**

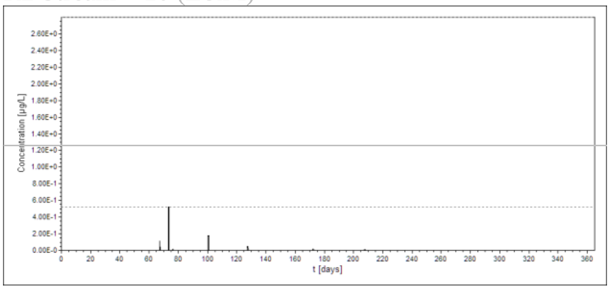
R1 Stream – 10 (L&M)



R1 Stream – 20 (L&M)

–

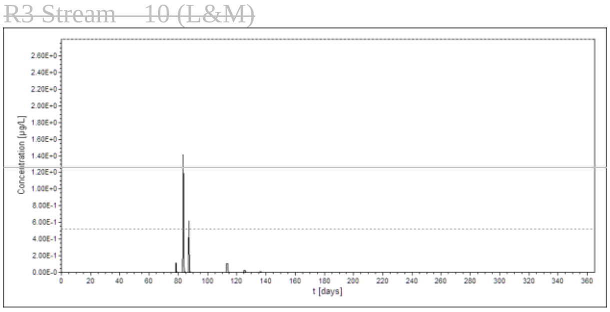
R2 Stream – 10 (L&M)



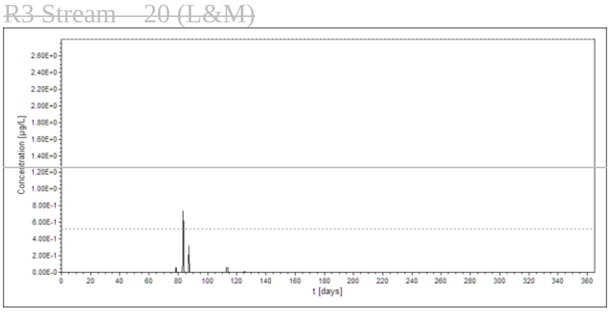
R2 Stream – 20 (L&M)

–

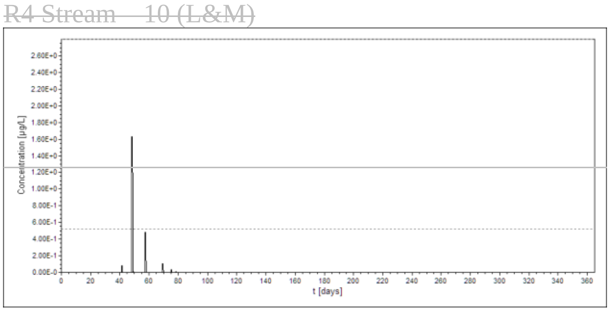
R3 Stream – 10 (L&M)



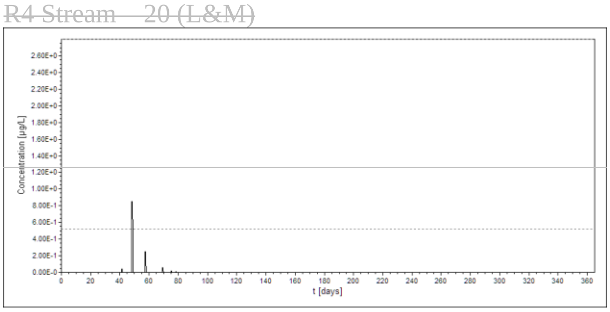
R3 Stream – 20 (L&M)



R4 Stream – 10 (L&M)



R4 Stream – 20 (L&M)



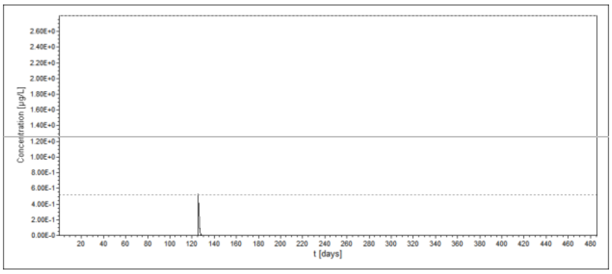
Parameter set for neutral soil

Table A 77: Duration and Frequency of Exposure Events Above the Threshold Concentration of 0.52 µg/L or 2.8 µg/L Following Post-Emergence Application to Maize at a Rate of 100 g a.s./ha (FOCUS Step 3) as Determined With EPAT v1.1 - neutral soil

Scenario	Threshold value (µg/L)	Event No.	Start date & time	Max conc. (µg/L)	Duration (days)	Interval (days)	Number of extrema	Area under curve (µg/L)	TWAC-event (µg/L)
D3 Ditch	0.52	1	05/05/1992 09:00:00	0.525	0.042	–	1	0.525	0.525
D4 Pond	0.52	–	–	–	–	–	–	–	–
D4 Stream	0.52	–	–	–	–	–	–	–	–
D5 Pond	0.52	–	–	–	–	–	–	–	–
D5 Stream	0.52	–	–	–	–	–	–	–	–
D6 Ditch	0.52	1	23/04/1986 09:00:00	0.526	0.042	–	1	0.526	0.526
R1 Pond	0.52	–	–	–	–	–	–	–	–
R1 Stream	0.52	1	14/05/1984 03:00:00	1.10	0.292	–	1	6.62	0.946
		2	20/05/1984 01:00:00	0.908	0.500	5.63	2	10.5	0.875
R2 Stream	0.52	1	13/05/1977 01:00:00	2.16	0.666	–	1	31.2	1.95
R3 Stream	0.52	1	23/05/1980 01:00:00	3.94	0.791	–	2	53.7	2.82
		2	27/05/1980 03:00:00	1.07	0.458	3.29	1	9.94	0.904
	2.8	1	23/05/1980 02:00:00	3.94	0.500	–	2	44.2	3.68
R4 Stream	0.52	1	18/04/1984 01:00:00	4.16	0.875	–	2	77.0	3.67
		2	27/04/1984 01:00:00	0.555	0.666	8.13	2	8.82	0.551
	2.8	1	18/04/1984 01:00:00	4.16	0.750	–	2	72.2	4.01

~~Figure A 10: Comparison of FOCUS Step 3 Surface Water Concentrations (µg/L) with Thresholds of 0.52 µg/L and 2.8 µg/L Following Post-Emergence Applications to Maize at a Rate of 100 g a.s./ha - neutral soil~~

~~D3 Ditch~~



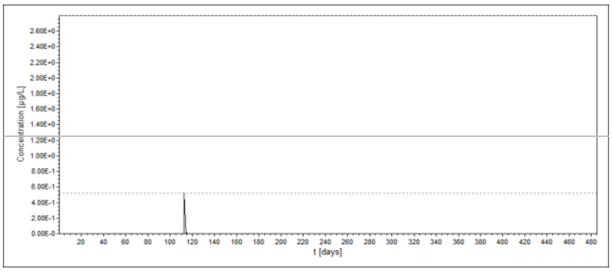
~~D4 Stream~~

–

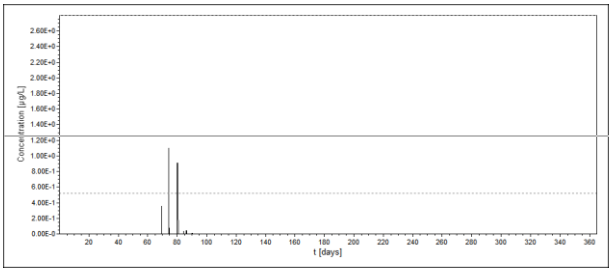
~~D5 Stream~~

–

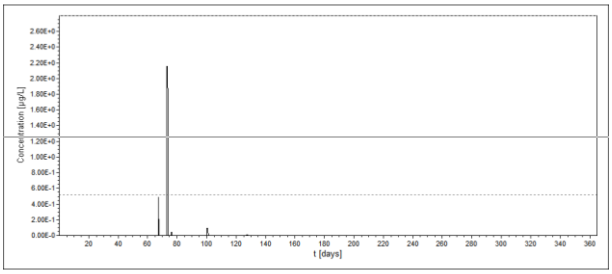
~~D6 Ditch~~



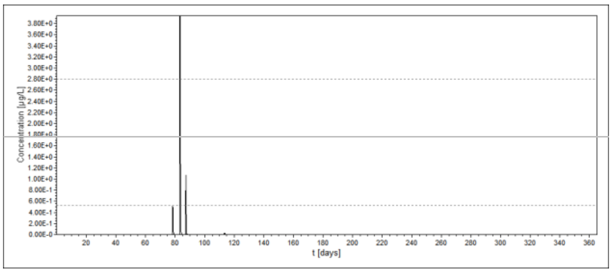
~~R1 Stream~~



~~R2 Stream~~



~~R3 Stream~~



~~R4 Stream~~

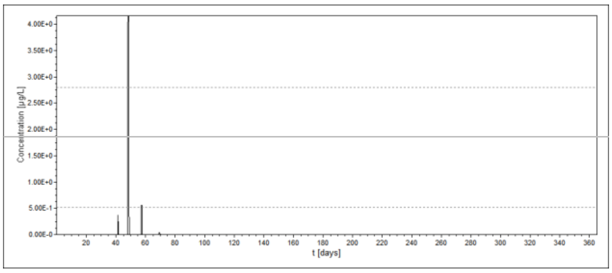


Table A 78: Duration and Frequency of Exposure Events Above the Threshold Concentration of 0.52 µg/L or 2.8 µg/L Following Post-Emergence Application to Maize at a Rate of 100 g a.s./ha (FOCUS Step 4) as Determined With EPAT v1.1 - neutral soil

Scenario	Scenario and mitigation	Threshold value (µg/L)	Event No.	Start data & time	Max conc. (µg/L)	Duration (days)	Interval (days)	Number of extrema	Area under curve (µg/L)	TWAC-event (µg/L)
D3 Ditch	–	–	–	–	–	–	–	–	–	–
D4 Pond	–	–	–	–	–	–	–	–	–	–
D4 Stream	–	–	–	–	–	–	–	–	–	–
D5 Pond	–	–	–	–	–	–	–	–	–	–
D5 Stream	–	–	–	–	–	–	–	–	–	–
D6 Ditch	–	–	–	–	–	–	–	–	–	–
R1 stream	10 m (L&M)[a]	–	–	–	–	–	–	–	–	–
	20 m (L&M)[a]	–	–	–	–	–	–	–	–	–
R2 stream	10 m (L&M)[a]	0.52	1	13/05/1977	0.952	0.584	–	1	13.1	0.934
	20 m (L&M)[a]	–	–	–	–	–	–	–	–	–
R3 stream	10 m (L&M)[a]	0.52	1	23/05/1980	1.78	0.625	–	1	22.7	1.52
	20 m (L&M)[a]	0.52	1	23/05/1980	0.931	0.542	–	1	11.1	0.852
R4 Stream	10 m (L&M)[a]	0.52	1	18/04/1984	1.89	0.833	–	2	34.6	1.73
	20 m (L&M)[a]	0.52	1	18/04/1984	0.992	0.791	–	2	17.8	0.935

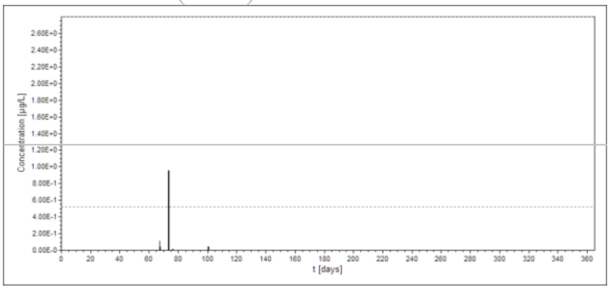
[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): runoff / erosion reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass.

~~**Figure A 11: Comparison of FOCUS Step 4 Surface Water Concentrations (µg/L) with Thresholds of 0.52 µg/L and 2.8 µg/L Following Post-Emergence Applications to Maize at a Rate of 100 g a.s./ha – neutral soil**~~

~~R1 Stream – 10 (L&M)~~

–

~~R2 Stream – 10 (L&M)~~



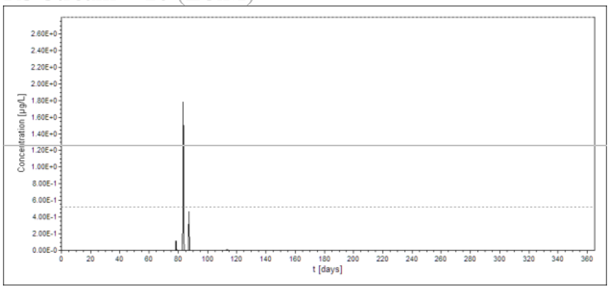
~~R1 Stream – 20 (L&M)~~

–

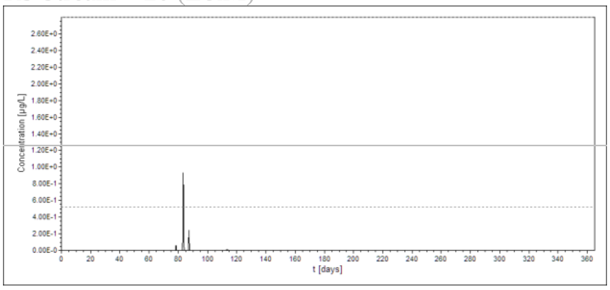
~~R2 Stream – 20 (L&M)~~

–

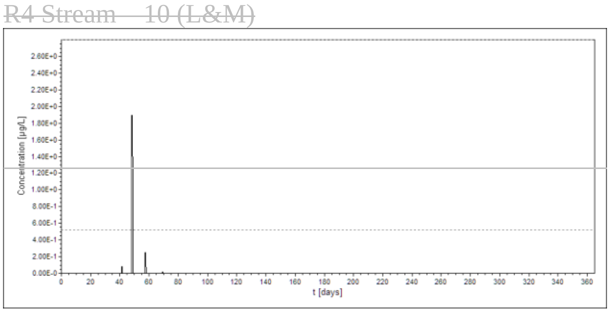
~~R3 Stream – 10 (L&M)~~



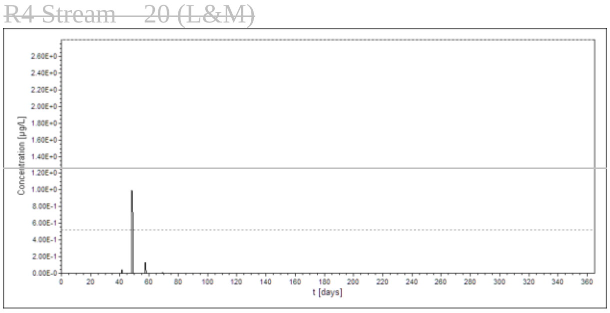
~~R3 Stream – 20 (L&M)~~



~~R4 Stream – 10 (L&M)~~



~~R4 Stream – 20 (L&M)~~



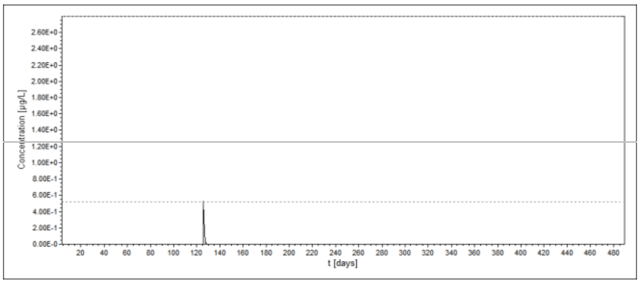
B) Parameter set for alkaline soil

Table A 79: Duration and Frequency of Exposure Events Above the Threshold Concentration of 0.52 µg/L or 2.8 µg/L Following Post-Emergence Application to Maize at a Rate of 100 g a.s./ha (FOCUS Step 3) as Determined With EPAT v1.1 - alkaline soil

Scenario	Threshold value (µg/L)	Event No.	Start date & time	Max conc. (µg/L)	Duration (days)	Interval (days)	Number of extrema	Area under curve (µg/L)	TWAC-event (µg/L)
D3 Ditch	0.52	1	05/05/1992 09:00:00	0.525	0.042	–	1	0.525	0.525
D4 Pond	0.52	–	–	–	–	–	–	–	–
D4 Stream	0.52	–	–	–	–	–	–	–	–
D5 Pond	0.52	–	–	–	–	–	–	–	–
D5 Stream	0.52	–	–	–	–	–	–	–	–
D6 Ditch	0.52	1	23/04/1986 09:00:00	0.525	0.042	–	1	0.525	0.525
R1 Pond	0.52	–	–	–	–	–	–	–	–
R1 Stream	0.52	–	–	–	–	–	–	–	–
R2 Stream	0.52	–	–	–	–	–	–	–	–
R3 Stream	0.52	–	–	–	–	–	–	–	–
R4 Stream	0.52	–	–	–	–	–	–	–	–

Figure A 12: Comparison of FOCUS Step 3 Surface Water Concentrations (µg/L) with Thresholds of 0.52 µg/L and 2.8 µg/L Following Post-Emergence Applications to Maize at a Rate of 100 g a.s./ha - alkaline soil

D3 Ditch



D6 Ditch

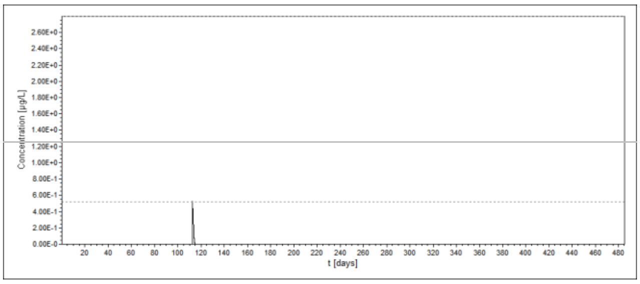


Table A 80: Duration and Frequency of Exposure Events Above the Threshold Concentration of 0.52 µg/L or 2.8 µg/L Following Post-Emergence Application to Maize at a Rate of 100 g a.s./ha (FOCUS Step 4) as Determined With EPAT v1.1 - alkaline soil

Scenario	Scenario and mitigation	Thres-hold value (µg/L)	Event No.	Start data & time	Max conc. (µg/L)	Dura-tion (days)	Inter-val (days)	Number of extrema	Area under curve (µg/L)	TWAC-event (µg/L)
D3 Ditch	-	-	-	-	-	-	-	-	-	-
D4 Pond	-	-	-	-	-	-	-	-	-	-
D4 Stream	-	-	-	-	-	-	-	-	-	-
D5 Pond	-	-	-	-	-	-	-	-	-	-
D5 Stream	-	-	-	-	-	-	-	-	-	-
D6 Ditch	-	-	-	-	-	-	-	-	-	-
R1 stream	10 m (L&M)[a]	-	-	-	-	-	-	-	-	-
R2 stream	10 m (L&M)[a]	-	-	-	-	-	-	-	-	-
R3 stream	10 m (L&M)[a]	-	-	-	-	-	-	-	-	-
R4 Stream	10 m (L&M)[a]	-	-	-	-	-	-	-	-	-

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): runoff / erosion reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass.

Exposure Events Following Early Post-Emergence Application at 75 g a.s./ha

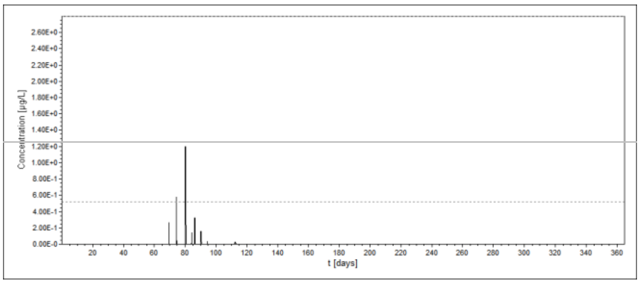
A) Parameter set for acidic soil

Table A 81: Duration and Frequency of Exposure Events Above the Threshold Concentration of 0.52 µg/L or 2.8 µg/L Following Post-Emergence Application to Maize at a Rate of 75 g a.s./ha (FOCUS Step 3) as Determined With EPAT v1.1 - acidic soil

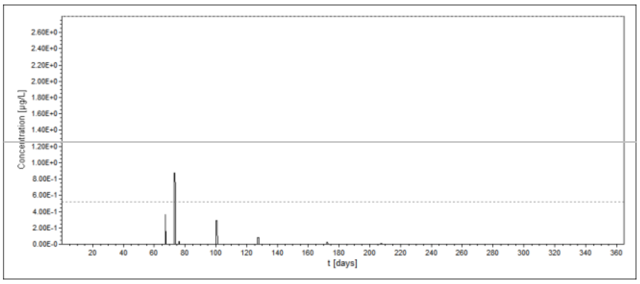
Scenario	Threshold value (µg/L)	Event No.	Start date & time	Max conc. (µg/L)	Duration (days)	Interval (days)	Number of extrema	Area under curve (µg/L)	TWAC-event (µg/L)
D3 Ditch	0.52	–	–	–	–	–	–	–	–
D4 Pond	0.52	–	–	–	–	–	–	–	–
D4 Stream	0.52	–	–	–	–	–	–	–	–
D5 Pond	0.52	–	–	–	–	–	–	–	–
D5 Stream	0.52	–	–	–	–	–	–	–	–
D6 Ditch	0.52	–	–	–	–	–	–	–	–
R1 Pond	0.52	–	–	–	–	–	–	–	–
R1 Stream	0.52	1	14/05/1984 05:00:00	0.582	0.167	–	1	2.28	0.570
		2	20/05/1984 01:00:00	1.20	0.541	5.67	2	14.6	1.12
R2 Stream	0.52	1	13/05/1977 02:00:00	0.877	0.584	–	1	12.1	0.861
R3 Stream	0.52	1	23/05/1980 01:00:00	2.33	0.708	–	2	30.8	1.81
		2	27/05/1980 03:00:00	1.06	0.458	3.36	1	9.87	0.897
R4 Stream	0.52	1	18/04/1984 01:00:00	2.67	0.875	–	2	49.4	2.35
		2	27/04/1984 01:00:00	0.797	0.750	8.13	2	13.8	0.768

Figure A 13: Comparison of FOCUS Step 3 Surface Water Concentrations (µg/L) with Thresholds of 0.52 µg/L and 2.8 µg/L Following Post-Emergence Applications to Maize at a Rate of 75 g a.s./ha - acidic soil

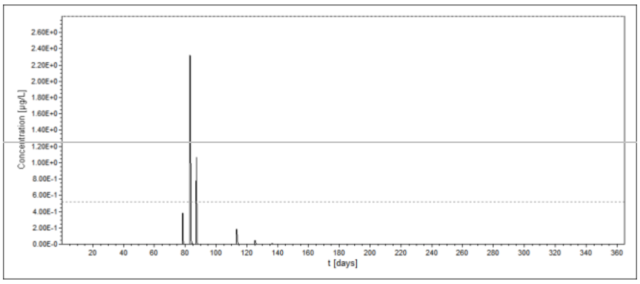
R1 Stream



R2 Stream



R3 Stream



R4 Stream

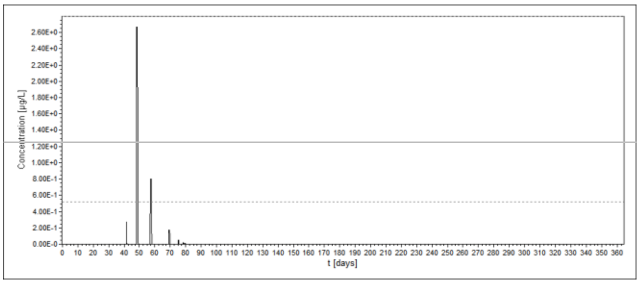


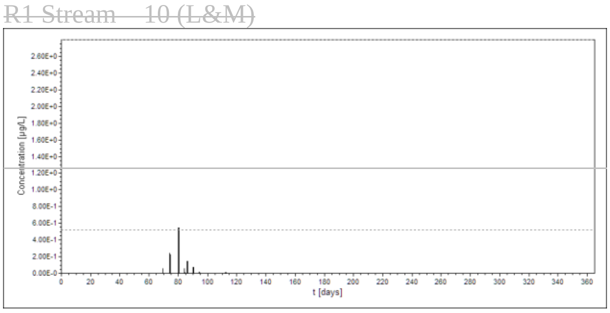
Table A 82: Duration and Frequency of Exposure Events Above the Threshold Concentration of 0.52 µg/L or 2.8 µg/L Following Post-Emergence Application to Maize at a Rate of 75 g a.s./ha (FOCUS Step 4) as Determined With EPAT v1.1 - acidic soil

Scenario	Scenario and mitigation	Threshold value (µg/L)	Event No.	Start data & time	Max conc. (µg/L)	Duration (days)	Interval (days)	Number of extrema	Area under curve (µg/L)	TWAC-event (µg/L)
D3 Ditch	–	–	–	–	–	–	–	–	–	–
D4 Pond	–	–	–	–	–	–	–	–	–	–
D4 Stream	–	–	–	–	–	–	–	–	–	–
D5 Pond	–	–	–	–	–	–	–	–	–	–
D5 Stream	–	–	–	–	–	–	–	–	–	–
D6 Ditch	–	–	–	–	–	–	–	–	–	–
R1 stream	10 m (L&M)[a]	0.52	1	20/05/1984	0.544	0.375	–	2	4.88	0.542
	20 m (L&M)[a]	–	–	–	–	–	–	–	–	–
R2 stream	10 m (L&M)[a]	–	–	–	–	–	–	–	–	–
	20 m (L&M)[a]	–	–	–	–	–	–	–	–	–
R3 stream	10 m (L&M)[a]	0.52	1	23/05/1980	1.05	0.542	–	1	12.5	0.959
	20 m (L&M)[a]	0.52	1	23/05/1980	0.549	0.334	–	1	4.35	0.544
R4 Stream	10 m (L&M)[a]	0.52	1	18/04/1984	1.21	0.791	–	2	21.7	1.14
	20 m (L&M)[a]	0.52	1	18/04/1984	0.636	0.666	–	2	10.1	0.630

[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): runoff / erosion reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass.

~~**Figure A 14: Comparison of FOCUS Step 4 Surface Water Concentrations (µg/L) with Thresholds of 0.52 µg/L and 2.8 µg/L Following Post-Emergence Applications to Maize at a Rate of 75 g a.s./ha – acidic soil**~~

~~R1 Stream – 10 (L&M)~~



~~R1 Stream – 20 (L&M)~~

–

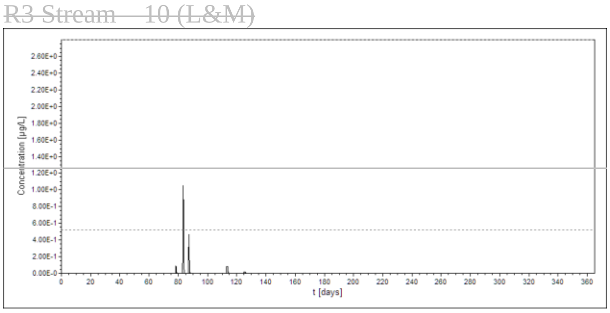
~~R2 Stream – 10 (L&M)~~

–

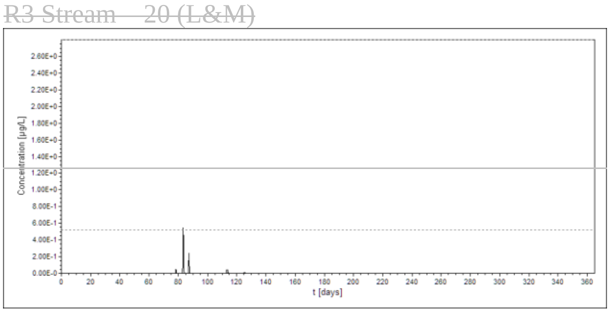
~~R2 Stream – 20 (L&M)~~

–

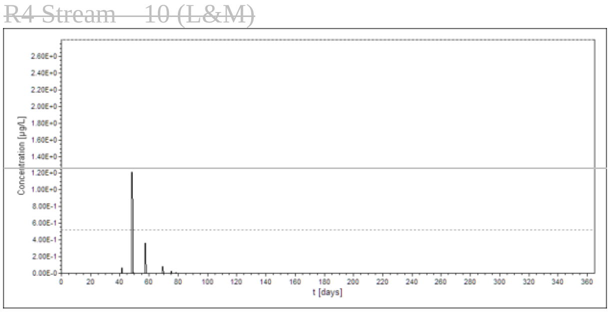
~~R3 Stream – 10 (L&M)~~



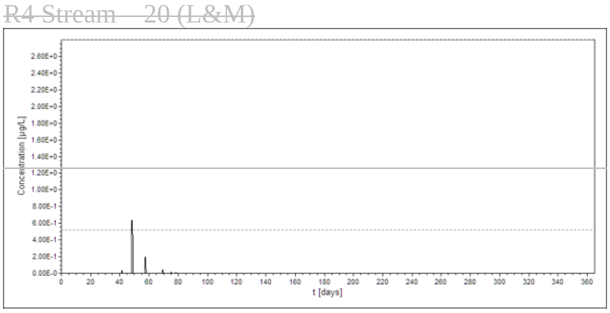
~~R3 Stream – 20 (L&M)~~



~~R4 Stream – 10 (L&M)~~



~~R4 Stream – 20 (L&M)~~



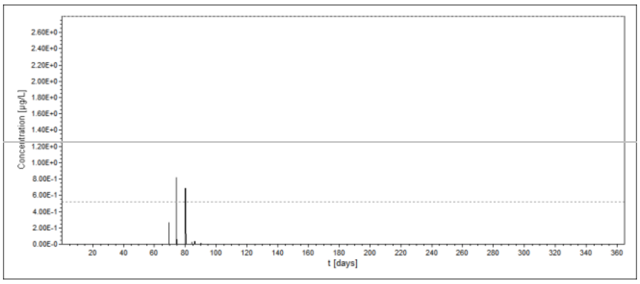
B) Parameter set for neutral soil

Table A 83: Duration and Frequency of Exposure Events Above the Threshold Concentration of 0.52 µg/L or 2.8 µg/L Following Post-Emergence Application to Maize at a Rate of 75 g a.s./ha (FOCUS Step 3) as Determined With EPAT v1.1 - neutral soil

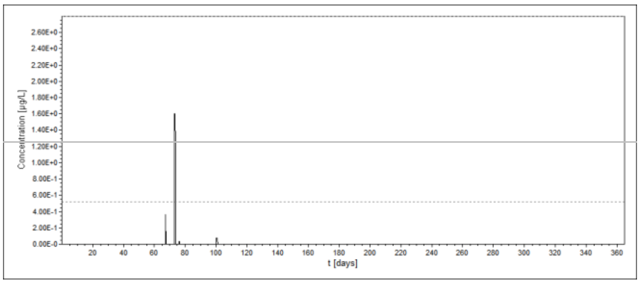
Scenario	Threshold value (µg/L)	Event No.	Start date & time	Max conc. (µg/L)	Duration (days)	Interval (days)	Number of extrema	Area under curve (µg/L)	TWAC-event (µg/L)
D3 Ditch	0.52	–	–	–	–	–	–	–	–
D4 Pond	0.52	–	–	–	–	–	–	–	–
D4 Stream	0.52	–	–	–	–	–	–	–	–
D5 Pond	0.52	–	–	–	–	–	–	–	–
D5 Stream	0.52	–	–	–	–	–	–	–	–
D6 Ditch	0.52	–	–	–	–	–	–	–	–
R1 Pond	0.52	–	–	–	–	–	–	–	–
R1 Stream	0.52	1	14/05/1984 04:00:00	0.820	0.250	–	1	4.47	0.745
		2	20/05/1984 01:00:00	0.689	0.458	5.63	2	7.47	0.680
R2 Stream	0.52	1	13/05/1977 02:00:00	1.61	0.625	–	1	22.7	1.51
R3 Stream	0.52	1	23/05/1980 01:00:00	2.95	0.750	–	2	39.8	2.21
		2	27/05/1980 04:00:00	0.808	0.375	3.38	1	6.57	0.731
	2.8	1	23/05/1980 02:00:00	2.95	0.334	–	2	23.4	2.93
R4 Stream	0.52	1	18/04/1984 01:00:00	3.12	0.875	–	2	57.6	2.74
	2.8	1	18/04/1984 01:00:00	3.12	0.666	–	2	49.5	3.10

Figure A 15: Comparison of FOCUS Step 3 Surface Water Concentrations (µg/L) with Thresholds of 0.52 µg/L and 2.8 µg/L Following Post-Emergence Applications to Maize at a Rate of 75 g a.s./ha - neutral soil

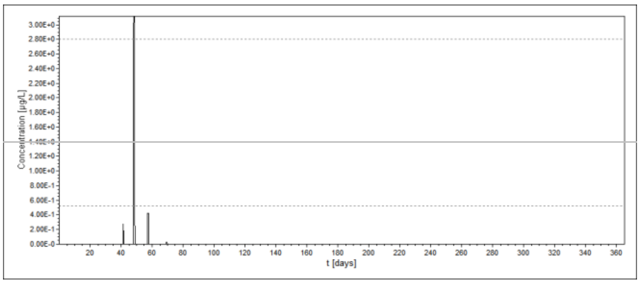
R1 Stream



R2 Stream



R3 Stream



R4 Stream

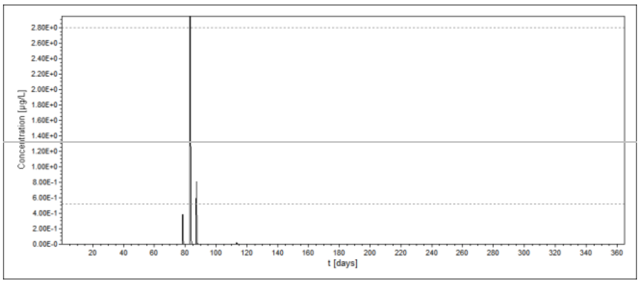


Table A 84: Duration and Frequency of Exposure Events Above the Threshold Concentration of 0.52 µg/L or 2.8 µg/L Following Post-Emergence Application to Maize at a Rate of 75 g a.s./ha (FOCUS Step 4) as Determined With EPAT v1.1 - neutral soil

Scenario	Scenario and mitigation	Threshold value (µg/L)	Event No.	Start data & time	Max conc. (µg/L)	Duration (days)	Interval (days)	Number of extrema	Area under curve (µg/L)	TWAC-event (µg/L)
D3 Ditch	–	–	–	–	–	–	–	–	–	–
D4 Pond	–	–	–	–	–	–	–	–	–	–
D4 Stream	–	–	–	–	–	–	–	–	–	–
D5 Pond	–	–	–	–	–	–	–	–	–	–
D5 Stream	–	–	–	–	–	–	–	–	–	–
D6 Ditch	–	–	–	–	–	–	–	–	–	–
R1 stream	10 m (L&M)[a]	–	–	–	–	–	–	–	–	–
	20 m (L&M)[a]	–	–	–	–	–	–	–	–	–
R2 stream	10 m (L&M)[a]	0.52	1	13/05/1977	0.708	0.584	–	1	9.73	0.695
	20 m (L&M)[a]	–	–	–	–	–	–	–	–	–
R3 stream	10 m (L&M)[a]	0.52	1	23/05/1980	1.33	0.584	–	1	16.5	1.18
	20 m (L&M)[a]	0.52	1	23/05/1980	0.697	0.500	–	1	7.86	0.655
R4 Stream	10 m (L&M)[a]	0.52	1	18/04/1984	1.42	0.833	–	2	25.9	1.30
	20 m (L&M)[a]	0.52	1	18/04/1984	0.742	0.750	–	2	12.9	0.715

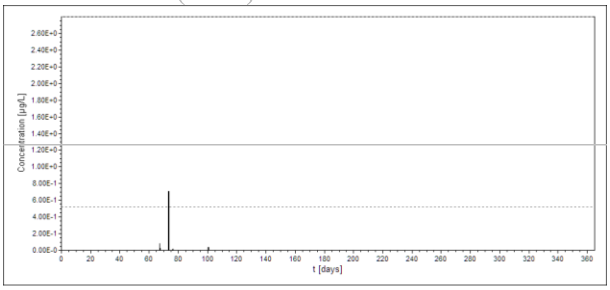
[a] L & M = mitigation according to FOCUS Landscape and Mitigation V1 (2007): runoff / erosion reduction for 10 / 20 m buffer is 60 / 80 % in runoff flux and volume and 85 / 95 % in sediment flux and mass.

Figure A 16: **Comparison of FOCUS Step 4 Surface Water Concentrations (µg/L) with Thresholds of 0.52 µg/L and 2.8 µg/L Following Post-Emergence Applications to Maize at a Rate of 75 g a.s./ha – neutral soil**

R1 Stream – 10 (L&M)

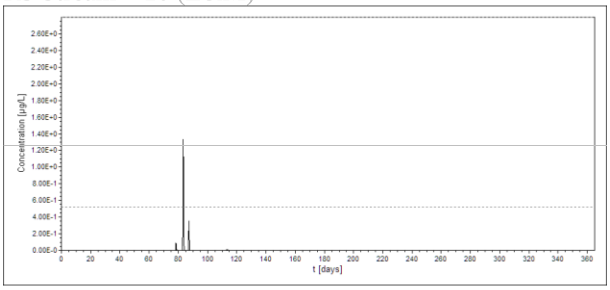
R1 Stream – 20 (L&M)

R2 Stream – 10 (L&M)

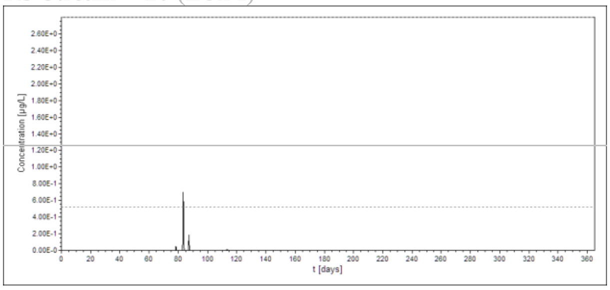


R2 Stream – 20 (L&M)

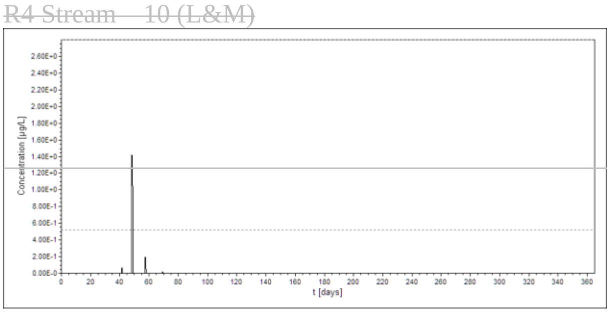
R3 Stream – 10 (L&M)



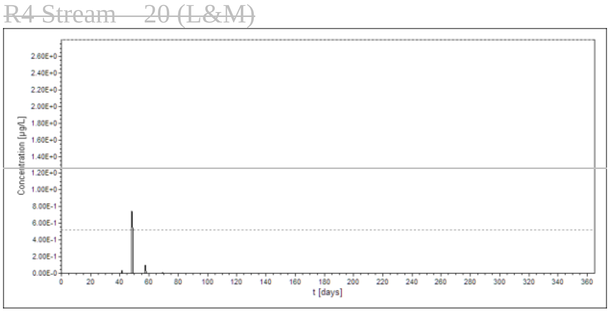
R3 Stream – 20 (L&M)



R4 Stream – 10 (L&M)



R4 Stream – 20 (L&M)



C) Parameter set for alkaline soil

For the mesotrione parameter set for alkaline soil, none of the simulated exposure events at FOCUS Step 3 was above the threshold concentrations of 0.52 µg/L or 2.8 µg/L, following post-emergence application to maize at a rate of 75 g a.s./ha. Therefore, no further analysis was conducted.

A 3.9 Carnall (2017a)

The report summarised below contains various use patterns but only those use patterns are presented here which are relevant for this core dossier.

Comments of zRMS:	For comments on surface water exposure assessment, please refer to point 8.9 of this report.

Reference:	KCP 9.2.5/03
Report	Carnall, J. (2017a): Nicosulfuron – A European Fate Assessment Using the FOCUS Surface Water Step 1-2 Tool Following Spray Application to Maize. Cambridge Environmental Assessments Unpublished report no. CEA.1863 (Syngenta File No. ASF628_11334)
Guideline(s):	FOCUS (2001). FOCUS Surface Water Scenarios in the EU Evaluation Process under 91/414/EEC. Report of the FOCUS Working Group on Surface Water Scenarios, EC Document Reference SANCO/4802/2001 rev. 2. FOCUS (2015). Generic Guidance for FOCUS Surface Water Scenarios, version 1.4.
Deviations:	No
GLP:	No (not applicable, calculations)
Acceptability:	Acceptable

A.3.9.1 Materials and methods

This report describes a FOCUS modelling study that examined the potential for nicosulfuron and its metabolites - HMUD, AUSN, UCSN, ASDM and ADMP - to reach surface water following foliar application to maize. The FOCUS Steps 1-2 calculator (v. 3.2) was used in the simulations.

A single application of nicosulfuron was simulated at approximately BBCH 12-19, at application rates of 40 g a.s./ha, 45 g a.s./ha and 60 g a.s./ha. Detailed information on the use patterns of nicosulfuron included in the modelling is presented in the table below.

Table A 85: Application patterns of nicosulfuron to maize used in the modelling

FOCUS crop	Growth stage [approx. BBCH]	Application rate [g a.s./ha]	No. of applications	Crop canopy	Application window
Maize	12-19	40	1	Minimal	Mar-May
		45	1	Minimal	Mar-May
		60	1	Minimal	Mar-May

At Step 2, simulations were performed for both Northern Europe and Southern Europe. The crop canopy was set to ‘minimal’, and a March-May application window was considered.

The input parameters for nicosulfuron and its metabolites used in the modelling are given in the table below.

Table A 86: Summary of input parameters for nicosulfuron, HMUD, AUSN, UCSN, ASDM and ADMP used in FOCUS Step 1-2 simulations

Physical chemistry properties		
	Molecular weight [g/mol]	**Water solubility at 20°C [mg/L]**
Nicosulfuron	410.4	9500
Remarks	Calculated	EFSA (2007)
HMUD	396.4	9500
Remarks	Calculated	Assumed same as parent value
AUSN	314.3	9500
Remarks	Calculated	Assumed same as parent value
UCSN	315.3	9500
Remarks	Calculated	Assumed same as parent value
ASDM	229.2	9500
Remarks	Calculated	Assumed same as parent value
ADMP	155.2	9500
Remarks	Calculated	Assumed same as parent value

Degradation in soil			
	DT_{50} field soil [d]	**DT_{50} laboratory soil [d]**	**Maximum occurrence in soil [%]**
Nicosulfuron	NA	16.4	NA
Remarks	-	Geometric mean value (n=7); EFSA (2007)	-
HMUD	NA	23.8	14.4
Remarks	-	Geometric mean value (n=2); EFSA (2007)	EFSA (2007)
AUSN	NA	192.3	26.8
Remarks	-	Worst-case value (EFSA, 2007)	EFSA (2007)
UCSN	NA	271.0	11
Remarks	-	Worst-case value (EFSA, 2007)	EFSA (2007)
ASDM	NA	236.6	63.4
Remarks	-	Worst-case value (EFSA, 2007)	EFSA (2007)
ADMP	NA	4.5	7.2
Remarks	-	Geometric mean value (n=3); EFSA (2007)	EFSA (2007)

NA – not applicable

Degradation in water/sediment systems				
	Whole System DT_{50} [d]	**Water phase DT_{50} [d]**	**Sediment phase DT_{50} [d]**	**Maximum occurrence in water/sediment systems [%]**
Nicosulfuron	42.3	65	13.9	NA
Remarks	Representative worst-case whole system value; EFSA (2007)	Geometric mean value (n=2); EFSA (2007)	Geometric mean value (n=2); EFSA (2007)	-
HMUD	1000	1000	1000	19.3
Remarks	Default value	Default value	Default value	EFSA (2007)
AUSN	1000	1000	1000	11.1
Remarks	Default value	Default value	Default value	EFSA (2007)
UCSN	1000	1000	1000	6.5
Remarks	Default value	Default value	Default value	EFSA (2007)
ASDM	1000	1000	1000	9.4
Remarks	Default value	Default value	Default value	EFSA (2007)
ADMP	1000	1000	1000	1×10^{-6}
Remarks	Default value	Default value	Default value	EFSA (2007)

Sorption to soil	
	K_{FOC} [L/kg]
Nicosulfuron	24.6
Remarks	Geometric mean value (n=14; EFSA, 2007 and Graham & Strachan, 2008)
HMUD	3.9
Remarks	Geometric mean value (n=5; EFSA, 2007)
AUSN	13
Remarks	Worst-case value (n=4; EFSA, 2007)
UCSN	2.6
Remarks	Geometric mean value (n=4; EFSA, 2007)
ASDM	2.3
Remarks	Worst-case value (n=4; EFSA, 2007)
ADMP	51.1
Remarks	Geometric mean value (n=4; EFSA, 2007)

A.3.9.2 Results

Predicted environmental concentrations of nicosulfuron, HMUD, AUSN, UCSN, ASDM and ADMP in surface water (PEC_{SW}) and sediment (PEC_{SED}) were calculated for the use of nicosulfuron on maize in Europe, in accordance with FOCUS guidelines.

The maximum PEC_{SW} and PEC_{SED} values generated by the simulations at Steps 1 and 2 are given in Table A 87. The overall maximum PEC_{SW} and PEC_{SED} values for each compound are given in Table A 88.

The full set of results, containing all data output by the model, is available on request.

Table A 87: Maximum Predicted Environmental Concentrations of nicosulfuron, HMUD, AUSN, UCSN, ASDM and ADMP at Steps 1 and 2 following application to maize

Application rate and timing [g a.s./ha]	Compound	Step	Region	PEC_{SW} [µg/L]	Day	PEC_{SED} [µg/kg]	Day
1 × 40 Mar-May	Nicosulfuron	1	-	13.3	0	3.21	1
		2	Northern Europe	1.98	4	0.462	5
			Southern Europe	3.61	4	0.859	4
	HMUD	1	-	4.39	0	0.171	1
		2	Northern Europe	0.628	4	0.025	5
			Southern Europe	1.19	4	0.046	5
	AUSN	1	-	3.84	0	0.498	1
		2	Northern Europe	0.570	4	0.074	5
			Southern Europe	1.11	4	0.144	5
	UCSN	1	-	1.80	0	0.047	1
		2	Northern Europe	0.269	4	0.007	5
			Southern Europe	0.520	4	0.014	5
	ASDM	1	-	5.42	0	0.125	1
		2	Northern Europe	0.805	4	0.019	5
			Southern Europe	1.59	4	0.037	5
	ADMP	1	-	0.340	0	0.174	0
		2	Northern Europe	0.028	4	0.014	4
			Southern Europe	0.055	4	0.028	4
1 × 45 Mar-May	Nicosulfuron	1	-	14.9	0	3.61	1
		2	Northern Europe	2.23	4	0.520	5
			Southern Europe	4.07	4	0.966	4
	HMUD	1	-	4.93	0	0.192	1
		2	Northern Europe	0.706	4	0.028	5
			Southern Europe	1.34	4	0.052	5
	AUSN	1	-	4.31	0	0.561	1
		2	Northern Europe	0.641	4	0.083	5
			Southern Europe	1.25	4	0.162	5
	UCSN	1	-	2.03	0	0.053	1
		2	Northern Europe	0.303	4	0.008	5
			Southern Europe	0.585	4	0.015	5
	ASDM	1	-	6.10	0	0.140	1
		2	Northern Europe	0.906	4	0.021	5
			Southern Europe	1.79	4	0.041	5
	ADMP	1	-	0.382	0	0.195	0
		2	Northern Europe	0.031	4	0.016	4
			Southern Europe	0.062	4	0.032	4
1 × 60 Mar-May	Nicosulfuron	1	-	19.9	0	4.82	1
		2	Northern Europe	2.97	4	0.694	5
			Southern Europe	5.42	4	1.29	4
	HMUD	1	-	6.58	0	0.256	1
		2	Northern Europe	0.942	4	0.037	5
			Southern Europe	1.78	4	0.069	5
	AUSN	1	-	5.75	0	0.747	1
		2	Northern Europe	0.855	4	0.111	5
			Southern Europe	1.66	4	0.216	5
	UCSN	1	-	2.71	0	0.070	1
		2	Northern Europe	0.404	4	0.011	5
			Southern Europe	0.780	4	0.020	5
	ASDM	1	-	8.14	0	0.187	1
		2	Northern Europe	1.21	4	0.028	5
			Southern Europe	2.39	4	0.055	5
	ADMP	1	-	0.510	0	0.261	0
		2	Northern Europe	0.041	4	0.021	4
			Southern Europe	0.083	4	0.042	4

Table A 88: Overall maximum Predicted Environmental Concentrations of nicosulfuron, HMUD, AUSN, UCSN, ASDM and ADMP at Steps 1 and 2

Application timing (BBCH)	Compound	Step	Application rate [g a.s./ha]	PEC_{SW} [µg/L]	PEC_{SED} [µg/kg]
12-19	Nicosulfuron	1	1 × 40	13.3	3.21
			1 × 45	14.9	3.61
			1 × 60	19.9	4.82
		2	1 × 40	3.61	0.859
			1 × 45	4.07	0.966
			1 × 60	5.42	1.29
	HMUD	1	1 × 40	4.39	0.171
			1 × 45	4.93	0.192
			1 × 60	6.58	0.256
		2	1 × 40	1.19	0.046
			1 × 45	1.34	0.052
			1 × 60	1.78	0.069
	AUSN	1	1 × 40	3.84	0.498
			1 × 45	4.31	0.561
			1 × 60	5.75	0.747
		2	1 × 40	1.11	0.144
			1 × 45	1.25	0.162
			1 × 60	1.66	0.216
	UCSN	1	1 × 40	1.80	0.047
			1 × 45	2.03	0.053
			1 × 60	2.71	0.070
		2	1 × 40	0.520	0.014
			1 × 45	0.585	0.015
			1 × 60	0.780	0.020
	ASDM	1	1 × 40	5.42	0.125
			1 × 45	6.10	0.140
			1 × 60	8.14	0.187
		2	1 × 40	1.59	0.037
			1 × 45	1.79	0.041
			1 × 60	2.39	0.055
	ADMP	1	1 × 40	0.340	0.174
			1 × 45	0.382	0.195
			1 × 60	0.510	0.261
			1 × 60	0.510	0.261
		2	1 × 40	0.055	0.028
			1 × 45	0.062	0.032
			1 × 60	0.083	0.042

A 3.10 Carnall (2017b)

The report summarised below contains various use patterns but only those use patterns are presented here which are relevant for this core dossier. Use numbers in this summary refer to the modelling report and not to the numbers in Table 8.1-1.

Comments of zRMS:	For comments on surface water exposure assessment, please refer to point 8.9 of this report. Please note that EPAT analysis was not validated by the zRMS as being not necessary for the aquatic risk assessment.

Reference:	KCP 9.2.5/04
Report	Carnall, J. (2017b): Nicosulfuron - A European Fate Assessment Using the FOCUS Surface Water Scenarios at Step 3 and Step 4 Following Spray Application to Maize. Cambridge Environmental Assessments Unpublished report no. CEA.1864 (Syngenta File No. ASF628_11312)
Guideline(s):	FOCUS (2001). FOCUS Surface Water Scenarios in the EU Evaluation Process under 91/414/EEC. Report of the FOCUS Working Group on Surface Water Scenarios, EC Document Reference SANCO/4802/2001 rev. 2. FOCUS (2007). Landscape and Mitigation Factors In Aquatic Ecological Risk Assessment. Volume 1. Extended Summary and Recommendations, The Final Report of the FOCUS Working Group on Landscape and Mitigation Factors in Ecological Risk Assessment, EC Document Reference Sanco/10422/2005, version 2.0, September 2007. FOCUS (2015). Generic Guidance for FOCUS Surface Water Scenarios, version 1.4.
Deviations:	No
GLP:	No (not applicable, calculations)
Acceptability:	Acceptable

A.3.10.1 Materials and methods

This report describes a FOCUS modelling study that examined the potential for nicosulfuron to reach surface water following foliar application to maize. The FOCUS tool SWASH (v 5.3), including FOCUS SPIN (v 2.2) and the operational models FOCUS-MACRO (v 5.5.4), FOCUS-PRZM (v 4.3.1) and FOCUS-TOXSWA (v 4.4.3), was used in the modelling study for the Step 3 simulations. The ECPA tool SWAN (v 4.0.1) was used to implement mitigation options at Step 4.

A single application of nicosulfuron was simulated at approximately BBCH 12-19, at application rates of 40 g a.s./ha, 45 g a.s./ha and 60 g a.s./ha, using the maize FOCUS crop. Detailed information on the use patterns of nicosulfuron included in the modelling is presented in Table A 89.

Table A 89: Application patterns of nicosulfuron to maize used in modelling

Application method	Growth stage [approx. BBCH]	FOCUS crop	Application rate [g a.s./ha]	No. of applications
Foliar spray	12-19	Maize	40	1
			45	1
			60	1

Foliar spray application (ground spray) was considered as the application method in all simulations. Crop interception at Step 3 is calculated internally by the model on the basis of the maximum interception capacity and the actual leaf area index.

An application window has to be specified from which the Pesticide Application Timer (PAT), internal to the model, determines actual application dates. For the purposes of this simulation, application timings were selected based on plant development dates specified by FOCUS (2001, 2015) and the BBCH growth stages given in the recommended GAP. The resultant application windows are shown below.

Table A 90: Application windows used in modelling

Growth stage [approx. BBCH]	Scenario	First date of application window	Last date of application window
12-19	D3	06-May (126)	05-Jun (156)
	D4	11-May (131)	10-Jun (161)
	D5	11-May (131)	10-Jun (161)
	D6	21-Apr (111)	21-May (141)
	R1	04-May (124)	03-Jun (154)
	R2	02-May (122)	01-Jun (152)
	R3	02-May (122)	01-Jun (152)
	R4	11-Apr (101)	11-May (131)

Numbers in brackets are the corresponding 'Julian Day' numbers

The input parameters for nicosulfuron, as used in the modelling, are shown in below.

Table A 91: Summary of input parameters for nicosulfuron used in FOCUS Step 3 simulations

Physical chemistry properties			
	Molecular weight [g/mol]	**Water solubility at 20°C [mg/L]**	**Vapour pressure at 25°C [Pa]**
Nicosulfuron	410.4	9500	8×10^{-10}
Remarks	EFSA (2007)	EFSA (2007)	EFSA (2007)

Degradation in soil				
	DT_{50} field soil [d]	**DT_{50} laboratory soil [d]**	**Molar formation fraction[-] source to sink relation [-]**	**Maximum occurrence in soil [%]**
Nicosulfuron	N/A	16.4	NA	NA
Remarks	-	Geometric mean value (n=7); EFSA (2007)	-	-

NA – not applicable

Degradation in water/sediment systems		
	Water phase DT_{50} [d]	**Sediment phase DT_{50} [d]**
Nicosulfuron	65	13.9
Remarks	Geometric mean value (n=2); EFSA (2007)	Geometric mean value (n=2); EFSA (2007)

NA – not applicable

Sorption to soil			
	K_{FOC} [L/kg]	**K_{FOM} [L/kg]**	**Freundlich exponent 1/n [-]**
Nicosulfuron	24.6	14.3	0.95
Remarks	Geometric mean of values (n=14) EFSA (2007), Graham & Strachan (2008)	Calculated from K_{FOC} $K_{FOM} = K_{FOC} / 1.724$	Arithmetic mean value (n=14) EFSA (2007), Graham & Strachan (2008)

Crop parameters			
	Crop uptake factor [-]	**Foliar extraction coefficient [1/m]**	**Foliar DT_{50} [d]**
Nicosulfuron	0	50	10
Remarks	Default value	Default value	Default value

A.3.10.2 Results

Predicted environmental concentrations of nicosulfuron in surface water (PEC_{SW}) and sediment (PEC_{SED}) were calculated for the use of nicosulfuron on maize in Europe, in accordance with FOCUS guidelines.

The global maximum PEC_{SW} and PEC_{SED} values generated by the simulations at Step 3, along with the corresponding overall maximum values, are given in Table A 92 and Table A 93.

At Step 4, mitigation of spray drift and runoff was implemented using SWAN v. 4.0.1. Simulations were performed for spray buffer widths of 5 m, 10 m, 15 m and 20 m. Additional simulations were also performed for a 5 m vegetated buffer zone, using the VFSmod software included in the SWAN tool.

The global maximum PEC_{SW} and PEC_{SED} values following mitigation at Step 4 are given in Table A 94 to Table A 95. Selected Time Weighted Average PEC_{SW} are given in Table A 97 to Table A 99. The full set of results, containing all data output by the models, is available on request.

~~For each FOCUS scenario in which the maximum calculated PEC_{SW} at Step 3 or Step 4 exceeded a threshold concentration of 0.27 µg/L, the corresponding TOXSWA exposure profile was analysed using the ECPA EPAT software (Exposure Pattern Analysis Tool; version 1.1.1). A single threshold concentration of 0.27 µg/L was entered into the EPAT interface; each reported exceedance event therefore represents an exceedance of this concentration. The results of this analysis are given in Table A 101 to Table A 103, and the graphical outputs from the EPAT interface are given at the end of this summary.~~

Table A 92: Global maximum Predicted Environmental Concentrations of nicosulfuron at Step 3

Application rate and timing [g a.s./ha]	Scenario	Water body	PEC_{SW} [µg/L]	PEC_{SED} [µg/kg]	Main route of entry to water body for max. PEC_{SW}
1 × 40 BBCH 12-19	D3	Ditch	0.217	0.032	Drift
	D4	Pond	0.026	0.027	Drainage
	D4	Stream	0.184	0.012	Drift
	D5	Pond	0.019	0.014	Drift
	D5	Stream	0.183	0.008	Drift
	D6	Ditch	0.211	0.026	Drift
	R1	Pond	0.017	0.010	Runoff
	R1	Stream	0.453	0.034	Runoff
	R2	Stream	1.16	0.136	Runoff
	R3	Stream	1.65	0.165	Runoff
	R4	Stream	1.79	0.226	Runoff
1 × 45 BBCH 12-19	D3	Ditch	0.244	0.036	Drift
	D4	Pond	0.029	0.031	Drainage
	D4	Stream	0.207	0.014	Drift
	D5	Pond	0.021	0.016	Drift
	D5	Stream	0.206	0.009	Drift
	D6	Ditch	0.237	0.030	Drift
	R1	Pond	0.019	0.011	Runoff
	R1	Stream	0.510	0.038	Runoff
	R2	Stream	1.31	0.153	Runoff
	R3	Stream	1.85	0.185	Runoff
	R4	Stream	2.02	0.253	Runoff

Application rate and timing [g a.s./ha]	Scenario	Water body	PEC_{SW} [µg/L]	PEC_{SED} [µg/kg]	Main route of entry to water body for max. PEC_{SW}
1 × 60 BBCH 12-19	D3	Ditch	0.325	0.048	Drift
	D4	Pond	0.040	0.041	Drainage
	D4	Stream	0.275	0.018	Drift
	D5	Pond	0.029	0.021	Drift
	D5	Stream	0.275	0.012	Drift
	D6	Ditch	0.316	0.039	Drift
	R1	Pond	0.025	0.014	Runoff
	R1	Stream	0.679	0.051	Runoff
	R2	Stream	1.75	0.203	Runoff
	R3	Stream	2.47	0.246	Runoff
	R4	Stream	2.69	0.336	Runoff

Table A 93: Overall maximum Predicted Environmental Concentrations of nicosulfuron at Step 3

Application rate [g a.s./ha]	Application timing [BBCH]	PEC_{SW}[a] [µg/L]	PEC_{SED}[a] [µg/kg]	Scenarios requiring mitigation against RAC[b] of 0.27 µg/L
1 × 40	12-19	1.79	0.226	R1, R2, R3, R4
1 × 45	12-19	2.02	0.253	R1, R2, R3, R4
1 × 60	12-19	2.69	0.336	D3, D4, D5, D6, R1, R2, R3, R4

[a] Maximum PEC across all scenarios; i.e. the reported PEC_{SW} and PEC_{SED} do not necessarily result from the same scenario
[b] RAC: Regulatory Acceptable Concentration

Table A 94: Global maximum Predicted Environmental Concentrations of nicosulfuron at Step 4 (10 m vegetated buffer zone; fractional runoff reduction values)

Application rate and timing [g a.s./ha]	Scenario	Water body	PEC_{SW} [µg/L]	PEC_{SED} [µg/kg]
Run-off mitigation			**10 m VFS[a]**	
Spray-drift buffer			**10 m**	
Drift reducing nozzles			**-**	
1 × 40 BBCH 12-19	D3	Ditch	0.043	0.011
	D4	Pond	0.026	0.027
	D4	Stream	0.044	0.012
	D5	Pond	0.016	0.013
	D5	Stream	0.044	0.007
	D6	Ditch	0.037	0.005
	R1	Pond	0.009	0.005
	R1	Stream	0.186	0.014
	R2	Stream	0.511	0.060
	R3	Stream	0.745	0.075
	R4	Stream	0.815	0.103
1 × 45 BBCH 12-19	D3	Ditch	0.049	0.013
	D4	Pond	0.029	0.030
	D4	Stream	0.050	0.014
	D5	Pond	0.018	0.015
	D5	Stream	0.050	0.008
	D6	Ditch	0.042	0.006
	R1	Pond	0.010	0.006
	R1	Stream	0.209	0.016
	R2	Stream	0.576	0.068
	R3	Stream	0.838	0.085
	R4	Stream	0.917	0.116

Application rate and timing [g a.s./ha]	Scenario	Water body	PEC_{SW} [µg/L]	PEC_{SED} [µg/kg]
Run-off mitigation			**10 m VFS[a]**	
Spray-drift buffer			**10 m**	
Drift reducing nozzles			**-**	
1 × 60 BBCH 12-19	D3	Ditch	0.065	0.017
	D4	Pond	0.040	0.041
	D4	Stream	0.066	0.018
	D5	Pond	0.024	0.020
	D5	Stream	0.066	0.010
	D6	Ditch	0.056	0.008
	R1	Pond	0.013	0.008
	R1	Stream	0.279	0.021
	R2	Stream	0.771	0.090
	R3	Stream	1.12	0.112
	R4	Stream	1.22	0.154

[a] 10 m vegetated filter strip: 60% reduction in runoff flux and volume; 85% reduction in sediment flux and mass (FOCUS, 2007).

Table A 95: Global maximum Predicted Environmental Concentrations of nicosulfuron at Step 4 (20 m vegetated buffer zone; fractional runoff reduction values)

Application rate and timing [g a.s./ha]	Scenario	Water body	PEC_{SW} [µg/L]	PEC_{SED} [µg/kg]
Run-off mitigation			**20 m VFS[a]**	
Spray-drift buffer			**20 m**	
Drift reducing nozzles			**-**	
1 × 40 BBCH 12-19	D3	Ditch	0.026	0.009
	D4	Pond	0.026	0.027
	D4	Stream	0.025	0.012
	D5	Pond	0.014	0.013
	D5	Stream	0.025	0.007
	D6	Ditch	0.020	0.003
	R1	Pond	0.005	0.003
	R1	Stream	0.094	0.007
	R2	Stream	0.265	0.031
	R3	Stream	0.390	0.040
	R4	Stream	0.427	0.054
1 × 45 BBCH 12-19	D3	Ditch	0.029	0.010
	D4	Pond	0.029	0.030
	D4	Stream	0.028	0.014
	D5	Pond	0.016	0.015
	D5	Stream	0.028	0.008
	D6	Ditch	0.022	0.004
	R1	Pond	0.006	0.003
	R1	Stream	0.106	0.008
	R2	Stream	0.298	0.035
	R3	Stream	0.438	0.045
	R4	Stream	0.480	0.061
1 × 60 BBCH 12-19	D3	Ditch	0.039	0.014
	D4	Pond	0.039	0.041
	D4	Stream	0.037	0.018
	D5	Pond	0.021	0.020
	D5	Stream	0.037	0.010
	D6	Ditch	0.030	0.005
	R1	Pond	0.008	0.005
	R1	Stream	0.141	0.011
	R2	Stream	0.399	0.047

Application rate and timing [g a.s./ha]	Scenario	Water body	PEC_{SW} [µg/L]	PEC_{SED} [µg/kg]
Run-off mitigation			20 m VFS[a]	
Spray-drift buffer			20 m	
Drift reducing nozzles			-	
	R3	Stream	0.584	0.059
	R4	Stream	0.641	0.081

[a] 20 m vegetated filter strip: 80% reduction in runoff flux and volume; 95% reduction in sediment flux and mass (FOCUS, 2007).

Table A 96: Global maximum Predicted Environmental Concentrations of nicosulfuron at Step 4 (5 m vegetated buffer zone; runoff reduction via VFSmod)

Application rate and timing [g a.s./ha]	Scenario	Water body	PEC_{SW} [µg/L]	PEC_{SED} [µg/kg]
Run-off mitigation			5 m VFSmod[a]	
Spray-drift buffer			5 m	
Drift reducing nozzles			-	
1 × 40 BBCH 12-19	D3	Ditch	0.075	0.015
	D4	Pond	0.026	0.027
	D4	Stream	0.080	0.012
	D5	Pond	0.018	0.014
	D5	Stream	0.079	0.007
	D6	Ditch	0.070	0.009
	R1	Pond	0.008	0.005
	R1	Stream	0.060	0.003
	R2	Stream	0.082	0.003
	R3	Stream	0.086	0.006
	R4	Stream	0.061	0.003
1 × 45 BBCH 12-19	D3	Ditch	0.085	0.017
	D4	Pond	0.029	0.031
	D4	Stream	0.089	0.014
	D5	Pond	0.020	0.015
	D5	Stream	0.089	0.008
	D6	Ditch	0.078	0.011
	R1	Pond	0.008	0.005
	R1	Stream	0.068	0.003
	R2	Stream	0.092	0.004
	R3	Stream	0.097	0.007
	R4	Stream	0.069	0.004
1 × 60 BBCH 12-19	D3	Ditch	0.113	0.023
	D4	Pond	0.040	0.041
	D4	Stream	0.119	0.018
	D5	Pond	0.027	0.021
	D5	Stream	0.119	0.010
	D6	Ditch	0.104	0.014
	R1	Pond	0.011	0.007
	R1	Stream	0.090	0.004
	R2	Stream	0.123	0.005
	R3	Stream	0.129	0.009
	R4	Stream	0.092	0.005

[a] 5 m vegetated filter strip, simulated using VFSmod tool included in SWAN v. 4.0.1.

Table A 97: Time Weighted Average PEC_{SW} for nicosulfuron at Step 3

Application rate and timing [g a.s./ha]	Scenario	Water body	TWA PEC_{SW} [µg/L]		
			7 day	21 day	28 day
1 × 40 BBCH 12-19	D3	Ditch	0.042	0.018	0.015
	D4	Pond	0.026	0.025	0.025
	D4	Stream	0.016	0.015	0.014
	D5	Pond	0.018	0.017	0.017
	D5	Stream	0.009	0.009	0.008
	D6	Ditch	0.034	0.012	0.009
	R1	Pond	0.016	0.015	0.014
	R1	Stream	0.034	0.012	0.009
	R2	Stream	0.104	0.035	0.026
	R3	Stream	0.160	0.056	0.042
	R4	Stream	0.198	0.074	0.055
1 × 45 BBCH 12-19	D3	Ditch	0.047	0.021	0.017
	D4	Pond	0.029	0.029	0.028
	D4	Stream	0.018	0.017	0.015
	D5	Pond	0.021	0.019	0.019
	D5	Stream	0.011	0.010	0.009
	D6	Ditch	0.038	0.014	0.010
	R1	Pond	0.018	0.016	0.016
	R1	Stream	0.038	0.014	0.010
	R2	Stream	0.118	0.039	0.030
	R3	Stream	0.180	0.063	0.048
	R4	Stream	0.223	0.083	0.062
1 × 60 BBCH 12-19	D3	Ditch	0.063	0.028	0.024
	D4	Pond	0.040	0.039	0.038
	D4	Stream	0.024	0.023	0.021
	D5	Pond	0.028	0.026	0.025
	D5	Stream	0.014	0.013	0.012
	D6	Ditch	0.051	0.018	0.014
	R1	Pond	0.024	0.022	0.021
	R1	Stream	0.050	0.018	0.014
	R2	Stream	0.157	0.053	0.040
	R3	Stream	0.240	0.084	0.063
	R4	Stream	0.298	0.111	0.083

Table A 98: Time Weighted Average PEC_{SW} for nicosulfuron at Step 4 (10 m vegetated buffer zone; fractional runoff reduction values)

Application rate and timing [g a.s./ha]	Scenario	Water body	TWA PEC_{SW} [µg/L]		
			7 day	21 day	28 day
1 × 40 BBCH 12-19	D3	Ditch	0.013	0.009	0.008
	D4	Pond	0.026	0.025	0.025
	D4	Stream	0.016	0.015	0.014
	D5	Pond	0.015	0.015	0.014
	D5	Stream	0.009	0.009	0.008
	D6	Ditch	0.007	0.003	0.002
	R1	Pond	0.008	0.007	0.007
	R1	Stream	0.014	0.005	0.004
	R2	Stream	0.045	0.015	0.011
	R3	Stream	0.072	0.025	0.018
	R4	Stream	0.090	0.033	0.025

Application rate and timing [g a.s./ha]	Scenario	Water body	TWA PEC_{SW} [µg/L]		
			7 day	21 day	28 day
1 × 45 BBCH 12-19	D3	Ditch	0.014	0.010	0.009
	D4	Pond	0.029	0.029	0.028
	D4	Stream	0.018	0.017	0.015
	D5	Pond	0.017	0.016	0.016
	D5	Stream	0.011	0.010	0.009
	D6	Ditch	0.008	0.003	0.003
	R1	Pond	0.009	0.008	0.008
	R1	Stream	0.016	0.006	0.004
	R2	Stream	0.051	0.017	0.013
	R3	Stream	0.081	0.028	0.021
	R4	Stream	0.102	0.037	0.028
1 × 60 BBCH 12-19	D3	Ditch	0.020	0.014	0.013
	D4	Pond	0.040	0.039	0.038
	D4	Stream	0.024	0.023	0.021
	D5	Pond	0.023	0.022	0.021
	D5	Stream	0.014	0.013	0.012
	D6	Ditch	0.010	0.004	0.004
	R1	Pond	0.012	0.011	0.011
	R1	Stream	0.021	0.008	0.006
	R2	Stream	0.068	0.023	0.017
	R3	Stream	0.108	0.037	0.028
	R4	Stream	0.136	0.050	0.037

Table A 99: Time Weighted Average PEC_{SW} for nicosulfuron at Step 4 (20 m vegetated buffer zone; fractional runoff reduction values)

Application rate and timing [g a.s./ha]	Scenario	Water body	TWA PEC_{SW} [µg/L]		
			7 day	21 day	28 day
1 × 40 BBCH 12-19	D3	Ditch	0.010	0.008	0.008
	D4	Pond	0.026	0.025	0.025
	D4	Stream	0.016	0.015	0.014
	D5	Pond	0.014	0.014	0.013
	D5	Stream	0.009	0.009	0.008
	D6	Ditch	0.004	0.002	0.002
	R1	Pond	0.005	0.004	0.004
	R1	Stream	0.007	0.003	0.002
	R2	Stream	0.023	0.008	0.006
	R3	Stream	0.037	0.013	0.010
	R4	Stream	0.047	0.017	0.013
1 × 45 BBCH 12-19	D3	Ditch	0.011	0.009	0.009
	D4	Pond	0.029	0.028	0.028
	D4	Stream	0.018	0.017	0.015
	D5	Pond	0.015	0.015	0.015
	D5	Stream	0.011	0.010	0.009
	D6	Ditch	0.005	0.002	0.002
	R1	Pond	0.005	0.005	0.005
	R1	Stream	0.008	0.003	0.002
	R2	Stream	0.026	0.009	0.007
	R3	Stream	0.042	0.014	0.011
	R4	Stream	0.053	0.020	0.015

Application rate and timing [g a.s./ha]	Scenario	Water body	TWA PEC_{SW} [µg/L]		
			7 day	21 day	28 day
1 × 60 BBCH 12-19	D3	Ditch	0.015	0.012	0.012
	D4	Pond	0.039	0.039	0.038
	D4	Stream	0.024	0.023	0.021
	D5	Pond	0.021	0.021	0.020
	D5	Stream	0.014	0.013	0.012
	D6	Ditch	0.006	0.003	0.003
	R1	Pond	0.007	0.007	0.006
	R1	Stream	0.011	0.004	0.003
	R2	Stream	0.035	0.012	0.009
	R3	Stream	0.056	0.019	0.014
	R4	Stream	0.071	0.026	0.020

Table A 100: Time Weighted Average PEC_{SW} for nicosulfuron at Step 4 (5 m vegetated buffer zone; runoff reduction via VFSmod)

Application rate and timing [g a.s./ha]	Scenario	Water body	TWA PEC_{SW} [µg/L]		
			7 day	21 day	28 day
1 × 40 BBCH 12-19	D3	Ditch	0.018	0.010	0.009
	D4	Pond	0.026	0.025	0.025
	D4	Stream	0.016	0.015	0.014
	D5	Pond	0.017	0.016	0.016
	D5	Stream	0.009	0.009	0.008
	D6	Ditch	0.012	0.005	0.004
	R1	Pond	0.007	0.007	0.007
	R1	Stream	0.001	0.001	0.001
	R2	Stream	0.001	<0.001	<0.001
	R3	Stream	0.004	0.001	0.001
	R4	Stream	0.002	0.001	<0.001
1 × 45 BBCH 12-19	D3	Ditch	0.021	0.012	0.011
	D4	Pond	0.029	0.029	0.028
	D4	Stream	0.018	0.017	0.015
	D5	Pond	0.020	0.018	0.018
	D5	Stream	0.011	0.010	0.009
	D6	Ditch	0.013	0.005	0.004
	R1	Pond	0.008	0.008	0.007
	R1	Stream	0.001	0.001	0.001
	R2	Stream	0.001	<0.001	<0.001
	R3	Stream	0.004	0.001	0.001
	R4	Stream	0.002	0.001	<0.001
1 × 60 BBCH 12-19	D3	Ditch	0.028	0.016	0.015
	D4	Pond	0.040	0.039	0.038
	D4	Stream	0.024	0.023	0.021
	D5	Pond	0.026	0.025	0.024
	D5	Stream	0.014	0.013	0.012
	D6	Ditch	0.018	0.007	0.006
	R1	Pond	0.011	0.010	0.010
	R1	Stream	0.002	0.001	0.001
	R2	Stream	0.002	0.001	<0.001
	R3	Stream	0.006	0.002	0.001
	R4	Stream	0.002	0.001	0.001

Table A 101: Exceedance events at Step 3 and Step 4 calculated using EPAT against a threshold concentration of 0.27 µg/L (1 × 40 g a.s./ha)

Step/ mitigation	Scenario	Event no	Start date	Interval (days)	Max PEC_{SW} (µg/L)	Duration (days)	Area under curve (h.g/m³)
Step 3	R1 Stream	1	14/05/1982	–	0.453	0.250	2.470×10^{0}
	R2 Stream	1	13/05/1977	–	1.16	0.666	1.674×10^{1}
	R3 Stream	1	23/05/1980	–	1.65	0.750	2.229×10^{1}
		2	27/05/1980	3.375	0.341	0.333	2.551×10^{0}
	R4 Stream	1	18/04/1984	–	1.79	0.875	3.318×10^{1}
Step 4: 10 m VFS	R2 Stream	1	13/05/1977	–	0.511	0.584	7.022×10^{0}
	R3 Stream	1	23/05/1980	–	0.745	0.625	9.536×10^{0}
	R4 Stream	1	18/04/1984	–	0.815	0.833	1.492×10^{1}
Step 4: 20 m VFS	R3 Stream	1	23/05/1980	–	0.390	0.500	4.397×10^{0}
	R4 Stream	1	18/04/1984	–	0.427	0.750	7.402×10^{0}

VFS – vegetated filter strip; fractional runoff reduction simulated using runoff/erosion reduction of 60/85% for 10 m and 80/95% for 20 m.

Table A 102: Exceedance events at Step 3 and Step 4 calculated using EPAT against a threshold concentration of 0.27 µg/L (1 × 45 g a.s./ha)

Step/ mitigation	Scenario	Event no	Start date	Interval (days)	Max PEC_{SW} (µg/L)	Duration (days)	Area under curve (h.g/m³)
Step 3	R1 Stream	1	14/05/1984	–	0.510	0.292	3.078×10^{0}
	R2 Stream	1	13/05/1977	–	1.31	0.666	1.886×10^{1}
	R3 Stream	1	23/05/1980	–	1.85	0.750	2.508×10^{1}
		2	27/05/1980	3.375	0.383	0.333	2.865×10^{0}
	R4 Stream	1	18/04/1984	–	2.02	0.875	3.732×10^{1}
Step 4: 10 m VFS	R2 Stream	1	13/05/1977	–	0.576	0.584	7.913×10^{0}
	R3 Stream	1	23/05/1980	–	0.838	0.625	1.073×10^{1}
	R4 Stream	1	18/04/1984	–	0.917	0.833	1.678×10^{1}
Step 4: 20 m VFS	R2 Stream	1	13/05/1977	–	0.298	0.542	3.868×10^{0}
	R3 Stream	1	23/05/1980	–	0.438	0.542	5.225×10^{0}
	R4 Stream	1	18/04/1984	–	0.480	0.791	8.607×10^{0}

VFS – vegetated filter strip; fractional runoff reduction simulated using runoff/erosion reduction of 60/85% for 10 m and 80/95% for 20 m.

Table A 103: Exceedance events at Step 3 and Step 4 calculated using EPAT against a threshold concentration of 0.27 µg/L (1 × 60 g a.s./ha)

Step/ mitigation	Scenario	Event no	Start date	Interval (days)	Max PEC_{SW} (µg/L)	Duration (days)	Area under curve (h.g/m³)
Step 3	D3 Ditch	1	05/05/1992	–	0.325	0.583	4.181×10^{0}
	D4 Stream	1	30/05/1985	–	0.275	0.042	2.754×10^{-1}
	D5 Stream	1	11/05/1978	–	0.275	0.042	2.745×10^{-1}
	D6 Ditch	1	23/04/1986	–	0.316	0.542	3.828×10^{0}
	R1 Stream	1	14/05/1984	–	0.679	0.292	4.099×10^{0}
		2	20/05/1984	5.625	0.310	0.458	3.365×10^{0}
	R2 Stream	1	07/08/1977	–	0.292	0.083	5.785×10^{-1}
		2	13/05/1977	5.584	1.75	0.708	2.552×10^{1}
	R3 Stream	1	18/05/1980	–	0.306	0.208	1.493×10^{0}
		2	23/05/1980	4.459	2.47	0.791	3.378×10^{1}
		3	27/05/1980	3.292	0.508	0.458	4.732×10^{0}
	R4 Stream	1	18/04/1984	–	2.69	0.916	5.011×10^{1}
Step 4: 10 m VFS	R1 Stream	1	14/05/1984	–	0.279	0.125	8.270×10^{-1}
	R2 Stream	1	13/05/1977	–	0.771	0.625	1.091×10^{1}
	R3 Stream	1	23/05/1980	–	1.12	0.667	1.462×10^{1}
	R4 Stream	1	18/14/1984	–	1.22	0.833	2.241×10^{1}
Step 4: 20 m VFS	R2 Stream	1	13/05/1977	–	0.399	0.584	5.485×10^{0}
	R3 Stream	1	23/05/1980	–	0.584	0.584	7.261×10^{0}
	R4 Stream	1	18/14/1984	–	0.641	0.791	1.149×10^{1}

VFS – vegetated filter strip; fractional runoff reduction simulated using runoff/erosion reduction of 60/85% for 10 m and 80/95% for 20 m.

Time Weighted Average Data

1 × 40 g a.s./ha

Table A 104: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 40 g a.s./ha; Step 3

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.180	0.124	0.068	0.042	0.024	0.018	0.015	0.013
D4	Pond	0.026	0.026	0.026	0.026	0.026	0.025	0.025	0.025
D4	Stream	0.020	0.017	0.016	0.016	0.015	0.015	0.014	0.011
D5	Pond	0.019	0.019	0.019	0.018	0.018	0.017	0.017	0.016
D5	Stream	0.012	0.010	0.009	0.009	0.009	0.009	0.008	0.008
D6	Ditch	0.175	0.114	0.059	0.034	0.018	0.012	0.009	0.007
R1	Pond	0.017	0.017	0.016	0.016	0.015	0.015	0.014	0.013
R1	Stream	0.125	0.063	0.031	0.034	0.018	0.012	0.009	0.006
R2	Stream	0.710	0.355	0.179	0.104	0.052	0.035	0.026	0.018
R3	Stream	0.958	0.482	0.241	0.160	0.085	0.056	0.042	0.028
R4	Stream	1.38	0.694	0.347	0.198	0.109	0.074	0.055	0.037

Table A 105: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 40 g a.s./ha; Step 4 (10 m vegetated buffer zone; fractional runoff reduction)

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.037	0.027	0.017	0.013	0.010	0.009	0.008	0.008
D4	Pond	0.026	0.026	0.026	0.026	0.026	0.025	0.025	0.025
D4	Stream	0.017	0.017	0.016	0.016	0.015	0.015	0.014	0.011
D5	Pond	0.016	0.016	0.016	0.015	0.015	0.015	0.014	0.013
D5	Stream	0.010	0.010	0.009	0.009	0.009	0.009	0.008	0.008
D6	Ditch	0.031	0.021	0.011	0.007	0.004	0.003	0.002	0.002
R1	Pond	0.008	0.008	0.008	0.008	0.008	0.007	0.007	0.007
R1	Stream	0.051	0.026	0.013	0.014	0.007	0.005	0.004	0.003
R2	Stream	0.312	0.156	0.078	0.045	0.023	0.015	0.011	0.008
R3	Stream	0.433	0.218	0.109	0.072	0.037	0.025	0.018	0.012
R4	Stream	0.630	0.316	0.158	0.090	0.049	0.033	0.025	0.017

Table A 106: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 40 g a.s./ha; Step 4 (20 m vegetated buffer zone; fractional runoff reduction)

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.022	0.017	0.012	0.010	0.008	0.008	0.008	0.008
D4	Pond	0.026	0.026	0.026	0.026	0.025	0.025	0.025	0.025
D4	Stream	0.017	0.017	0.016	0.016	0.015	0.015	0.014	0.011
D5	Pond	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.013
D5	Stream	0.010	0.010	0.009	0.009	0.009	0.009	0.008	0.008
D6	Ditch	0.017	0.011	0.006	0.004	0.003	0.002	0.002	0.002
R1	Pond	0.005	0.005	0.005	0.005	0.005	0.004	0.004	0.004
R1	Stream	0.026	0.013	0.006	0.007	0.004	0.003	0.002	0.001
R2	Stream	0.162	0.081	0.041	0.023	0.012	0.008	0.006	0.004
R3	Stream	0.227	0.114	0.057	0.037	0.019	0.013	0.010	0.006
R4	Stream	0.330	0.165	0.083	0.047	0.026	0.017	0.013	0.009

Table A 107: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 40 g a.s./ha; Step 4 (5 m vegetated buffer zone; runoff reduction *via* VFSmod)

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.063	0.045	0.027	0.018	0.012	0.010	0.009	0.009
D4	Pond	0.026	0.026	0.026	0.026	0.026	0.025	0.025	0.025
D4	Stream	0.017	0.017	0.016	0.016	0.015	0.015	0.014	0.011
D5	Pond	0.018	0.018	0.018	0.017	0.017	0.016	0.016	0.015
D5	Stream	0.010	0.010	0.009	0.009	0.009	0.009	0.008	0.008
D6	Ditch	0.058	0.038	0.020	0.012	0.006	0.005	0.004	0.003
R1	Pond	0.008	0.007	0.007	0.007	0.007	0.007	0.007	0.006
R1	Stream	0.009	0.004	0.002	0.001	0.001	0.001	0.001	<0.001
R2	Stream	0.008	0.004	0.002	0.001	0.001	<0.001	<0.001	<0.001
R3	Stream	0.027	0.013	0.007	0.004	0.002	0.001	0.001	0.001
R4	Stream	0.011	0.006	0.003	0.002	0.001	0.001	<0.001	<0.001

1 × 45 g a.s./ha

Table A 108: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 45 g a.s./ha; Step 3

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.202	0.140	0.077	0.047	0.027	0.021	0.017	0.014
D4	Pond	0.029	0.029	0.029	0.029	0.029	0.029	0.028	0.028
D4	Stream	0.022	0.019	0.019	0.018	0.017	0.017	0.015	0.012
D5	Pond	0.021	0.021	0.021	0.021	0.020	0.019	0.019	0.018
D5	Stream	0.013	0.011	0.011	0.011	0.010	0.010	0.009	0.009
D6	Ditch	0.197	0.128	0.066	0.038	0.020	0.014	0.010	0.008
R1	Pond	0.019	0.019	0.018	0.018	0.017	0.016	0.016	0.014
R1	Stream	0.141	0.071	0.035	0.038	0.020	0.014	0.010	0.007
R2	Stream	0.800	0.400	0.201	0.118	0.059	0.039	0.030	0.020
R3	Stream	1.08	0.542	0.271	0.180	0.095	0.063	0.048	0.032
R4	Stream	1.56	0.781	0.390	0.223	0.122	0.083	0.062	0.042

Table A 109: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 45 g a.s./ha; Step 4 (10 m vegetated buffer zone; fractional runoff reduction)

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.041	0.031	0.020	0.014	0.011	0.010	0.009	0.009
D4	Pond	0.029	0.029	0.029	0.029	0.029	0.029	0.028	0.028
D4	Stream	0.019	0.019	0.019	0.018	0.017	0.017	0.015	0.012
D5	Pond	0.018	0.018	0.018	0.017	0.017	0.016	0.016	0.015
D5	Stream	0.011	0.011	0.011	0.011	0.010	0.010	0.009	0.009
D6	Ditch	0.035	0.023	0.013	0.008	0.004	0.003	0.003	0.002
R1	Pond	0.009	0.009	0.009	0.009	0.009	0.008	0.008	0.007
R1	Stream	0.058	0.029	0.014	0.016	0.008	0.006	0.004	0.003
R2	Stream	0.352	0.176	0.088	0.051	0.026	0.017	0.013	0.009
R3	Stream	0.488	0.245	0.123	0.081	0.042	0.028	0.021	0.014
R4	Stream	0.708	0.355	0.178	0.102	0.056	0.037	0.028	0.019

Table A 110: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 45 g a.s./ha; Step 4 (20 m vegetated buffer zone; fractional runoff reduction)

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.025	0.020	0.014	0.011	0.009	0.009	0.009	0.009
D4	Pond	0.029	0.029	0.029	0.029	0.029	0.028	0.028	0.028
D4	Stream	0.019	0.019	0.019	0.018	0.017	0.017	0.015	0.012
D5	Pond	0.016	0.016	0.016	0.015	0.015	0.015	0.015	0.015
D5	Stream	0.011	0.011	0.011	0.011	0.010	0.010	0.009	0.009
D6	Ditch	0.019	0.013	0.007	0.005	0.003	0.002	0.002	0.002
R1	Pond	0.006	0.006	0.006	0.005	0.005	0.005	0.005	0.004
R1	Stream	0.029	0.014	0.007	0.008	0.004	0.003	0.002	0.001
R2	Stream	0.182	0.091	0.046	0.026	0.013	0.009	0.007	0.004
R3	Stream	0.255	0.128	0.064	0.042	0.022	0.014	0.011	0.007
R4	Stream	0.371	0.186	0.093	0.053	0.029	0.020	0.015	0.010

Table A 111: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 45 g a.s./ha; Step 4 (5 m vegetated buffer zone; runoff reduction *via* VFSmod)

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.071	0.051	0.030	0.021	0.014	0.012	0.011	0.010
D4	Pond	0.029	0.029	0.029	0.029	0.029	0.029	0.028	0.028
D4	Stream	0.019	0.019	0.019	0.018	0.017	0.017	0.015	0.012
D5	Pond	0.020	0.020	0.020	0.020	0.019	0.018	0.018	0.017
D5	Stream	0.011	0.011	0.011	0.011	0.010	0.010	0.009	0.009
D6	Ditch	0.065	0.043	0.023	0.013	0.007	0.005	0.004	0.003
R1	Pond	0.008	0.008	0.008	0.008	0.008	0.008	0.007	0.007
R1	Stream	0.010	0.005	0.003	0.001	0.001	0.001	0.001	<0.001
R2	Stream	0.009	0.005	0.002	0.001	0.001	<0.001	<0.001	<0.001
R3	Stream	0.030	0.015	0.008	0.004	0.002	0.001	0.001	0.001
R4	Stream	0.013	0.006	0.003	0.002	0.001	0.001	<0.001	<0.001

1 × 60 g a.s./ha

Table A 112: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 60 g a.s./ha; Step 3

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.270	0.187	0.103	0.063	0.037	0.028	0.024	0.019
D4	Pond	0.040	0.040	0.040	0.040	0.039	0.039	0.038	0.038
D4	Stream	0.030	0.026	0.025	0.024	0.023	0.023	0.021	0.017
D5	Pond	0.028	0.028	0.028	0.028	0.027	0.026	0.025	0.023
D5	Stream	0.017	0.014	0.014	0.014	0.014	0.013	0.012	0.012
D6	Ditch	0.262	0.171	0.089	0.051	0.026	0.018	0.014	0.010
R1	Pond	0.025	0.025	0.024	0.024	0.023	0.022	0.021	0.019
R1	Stream	0.188	0.094	0.047	0.050	0.027	0.018	0.014	0.009
R2	Stream	1.07	0.536	0.269	0.157	0.079	0.053	0.040	0.027
R3	Stream	1.44	0.722	0.361	0.240	0.127	0.084	0.063	0.042
R4	Stream	2.08	1.04	0.521	0.298	0.163	0.111	0.083	0.056

Table A 113: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 60 g a.s./ha; Step 4 (10 m vegetated buffer zone; fractional runoff reduction)

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.055	0.041	0.026	0.020	0.015	0.014	0.013	0.012
D4	Pond	0.040	0.040	0.040	0.040	0.039	0.039	0.038	0.038
D4	Stream	0.026	0.026	0.025	0.024	0.023	0.023	0.021	0.017
D5	Pond	0.024	0.024	0.024	0.023	0.023	0.022	0.021	0.020
D5	Stream	0.014	0.014	0.014	0.014	0.014	0.013	0.012	0.012
D6	Ditch	0.047	0.031	0.017	0.010	0.006	0.004	0.004	0.003
R1	Pond	0.013	0.013	0.012	0.012	0.012	0.011	0.011	0.010
R1	Stream	0.077	0.038	0.019	0.021	0.011	0.008	0.006	0.004
R2	Stream	0.471	0.236	0.118	0.068	0.034	0.023	0.017	0.012
R3	Stream	0.650	0.327	0.164	0.108	0.055	0.037	0.028	0.019
R4	Stream	0.946	0.474	0.237	0.136	0.074	0.050	0.037	0.025

Table A 114: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 60 g a.s./ha; Step 4 (20 m vegetated buffer zone; fractional runoff reduction)

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.034	0.026	0.019	0.015	0.013	0.012	0.012	0.012
D4	Pond	0.039	0.039	0.039	0.039	0.039	0.039	0.038	0.038
D4	Stream	0.026	0.026	0.025	0.024	0.023	0.023	0.021	0.017
D5	Pond	0.021	0.021	0.021	0.021	0.021	0.021	0.020	0.020
D5	Stream	0.014	0.014	0.014	0.014	0.014	0.013	0.012	0.012
D6	Ditch	0.025	0.017	0.009	0.006	0.004	0.003	0.003	0.003
R1	Pond	0.007	0.007	0.007	0.007	0.007	0.007	0.006	0.006
R1	Stream	0.039	0.019	0.010	0.011	0.006	0.004	0.003	0.002
R2	Stream	0.244	0.122	0.061	0.035	0.018	0.012	0.009	0.006
R3	Stream	0.340	0.171	0.085	0.056	0.029	0.019	0.014	0.010
R4	Stream	0.495	0.248	0.124	0.071	0.039	0.026	0.020	0.013

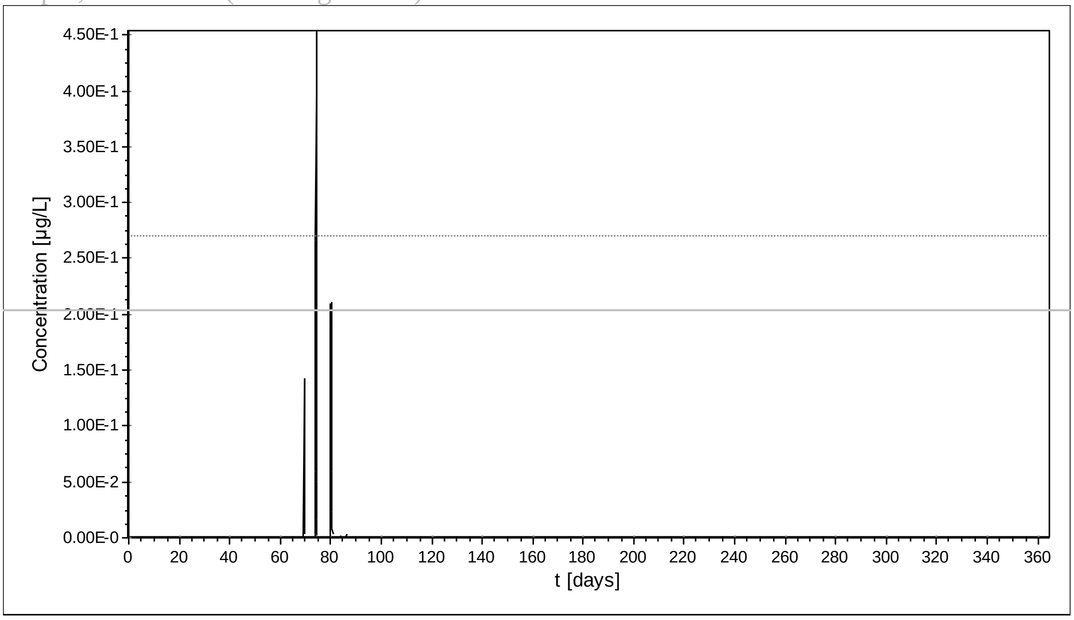
Table A 115: Time Weighted Average (TWA) PEC_{SW} for nicosulfuron; 1 × 60 g a.s./ha; Step 4 (5 m vegetated buffer zone; runoff reduction *via* VFSmod)

Scenario	Water Body	TWA PEC_{SW} [µg/L] days							
		1	2	4	7	14	21	28	42
D3	Ditch	0.095	0.068	0.041	0.028	0.019	0.016	0.015	0.013
D4	Pond	0.040	0.040	0.040	0.040	0.039	0.039	0.038	0.038
D4	Stream	0.026	0.026	0.025	0.024	0.023	0.023	0.021	0.017
D5	Pond	0.027	0.027	0.027	0.026	0.026	0.025	0.024	0.022
D5	Stream	0.014	0.014	0.014	0.014	0.014	0.013	0.012	0.012
D6	Ditch	0.087	0.057	0.030	0.018	0.010	0.007	0.006	0.004
R1	Pond	0.011	0.011	0.011	0.011	0.011	0.010	0.010	0.009
R1	Stream	0.013	0.007	0.003	0.002	0.002	0.001	0.001	0.001
R2	Stream	0.013	0.006	0.003	0.002	0.001	0.001	<0.001	<0.001
R3	Stream	0.040	0.020	0.010	0.006	0.003	0.002	0.001	0.001
R4	Stream	0.017	0.009	0.004	0.002	0.001	0.001	0.001	<0.001

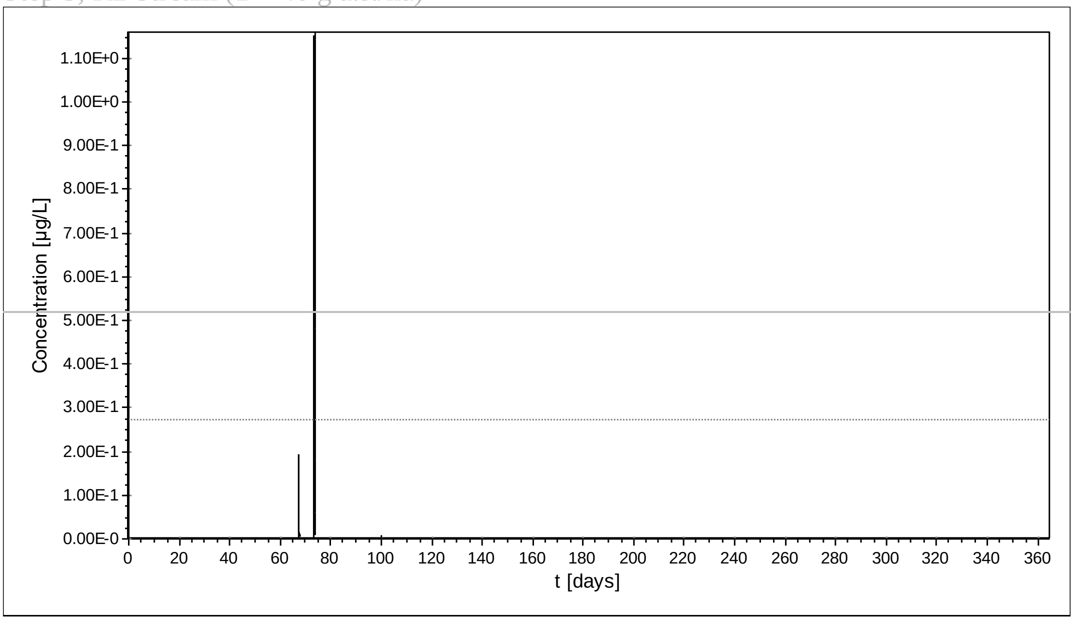
EPAT Graphical Outputs

1 × 40 g a.s./ha

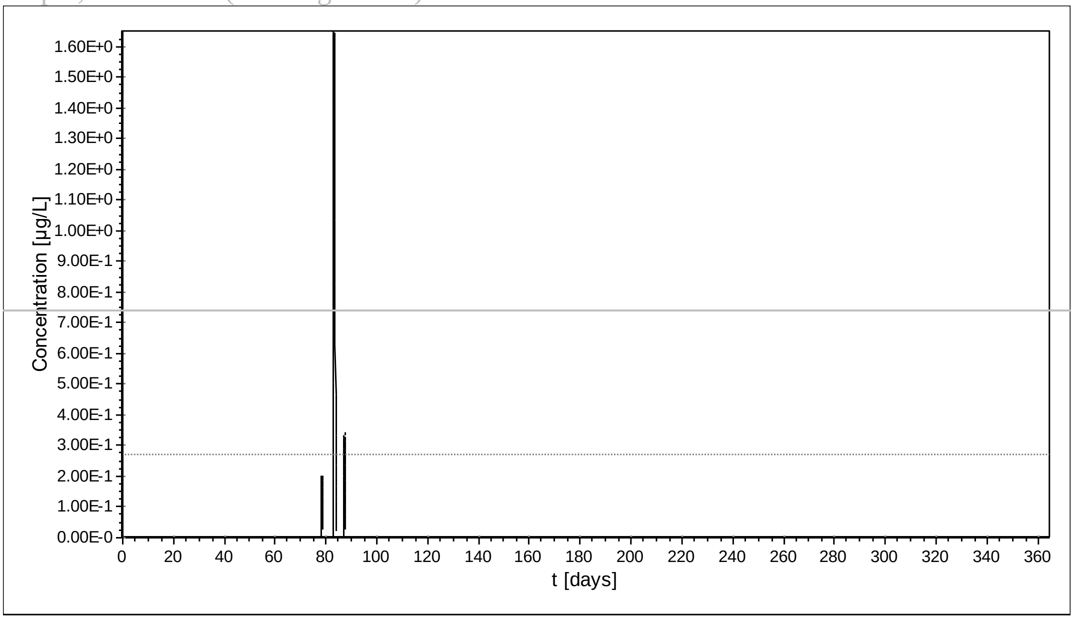
Step 3; R1 Stream (1 × 40 g a.s./ha)



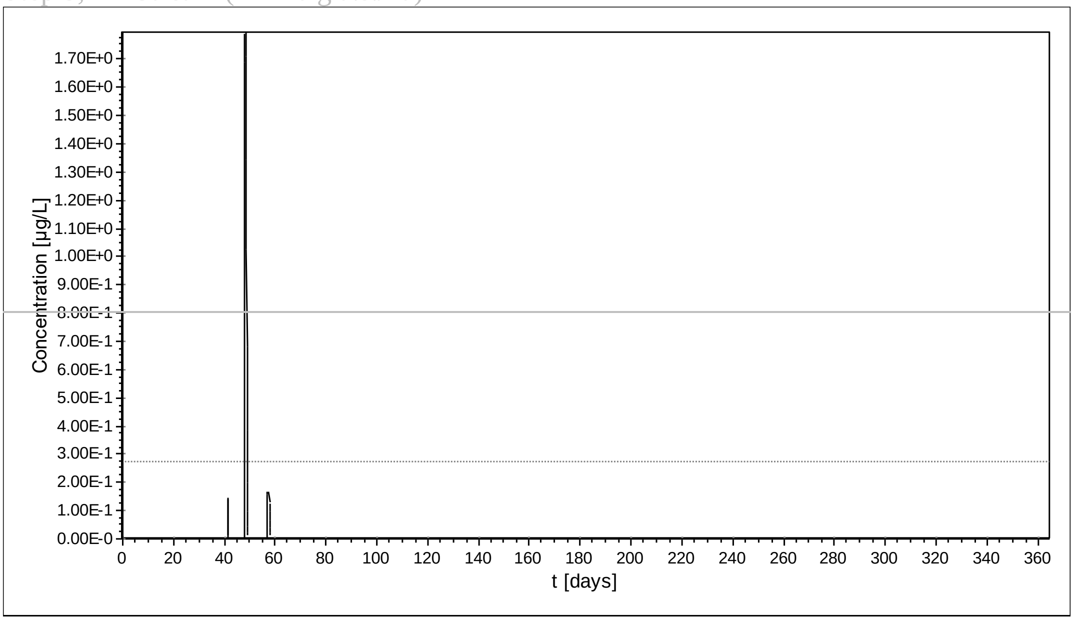
Step 3; R2 Stream (1 × 40 g a.s./ha)



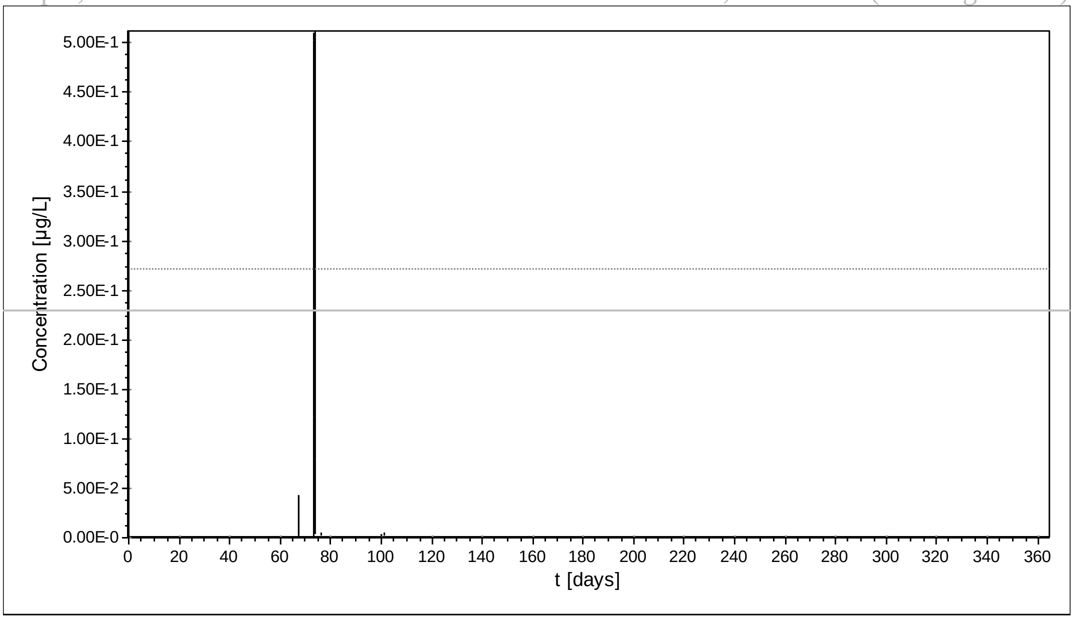
~~Step 3; R3 Stream (1 × 40 g a.s./ha)~~



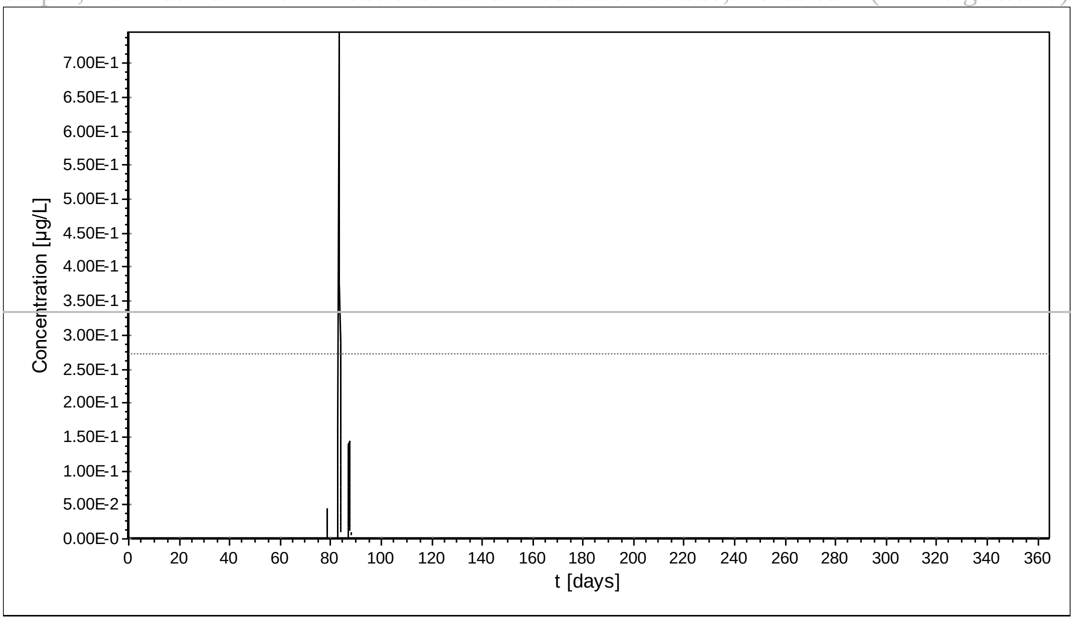
~~Step 3; R4 Stream (1 × 40 g a.s./ha)~~



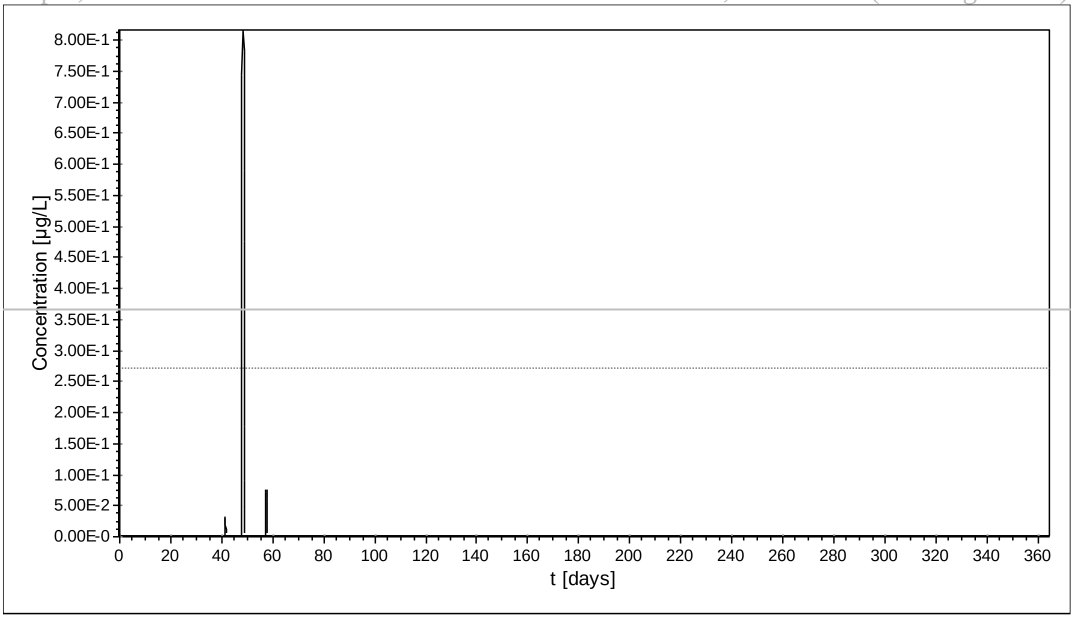
~~Step 4; 10 m buffer + 10 m fractional runoff reduction values; R2 Stream (1 × 40 g a.s./ha)~~



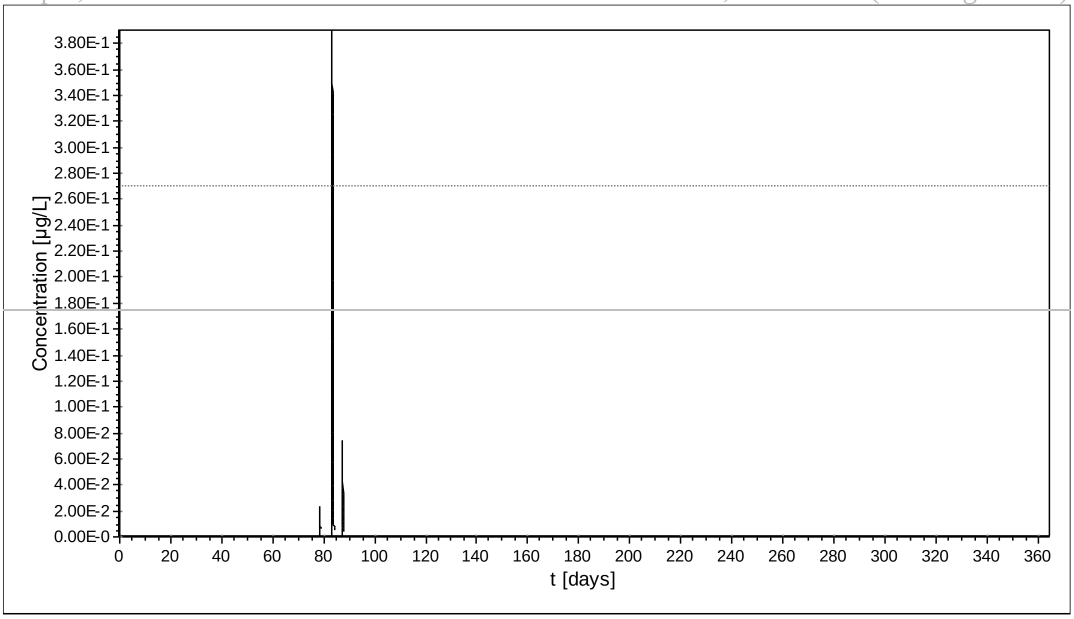
~~Step 4; 10 m buffer + 10 m fractional runoff reduction values; R3 Stream (1 × 40 g a.s./ha)~~



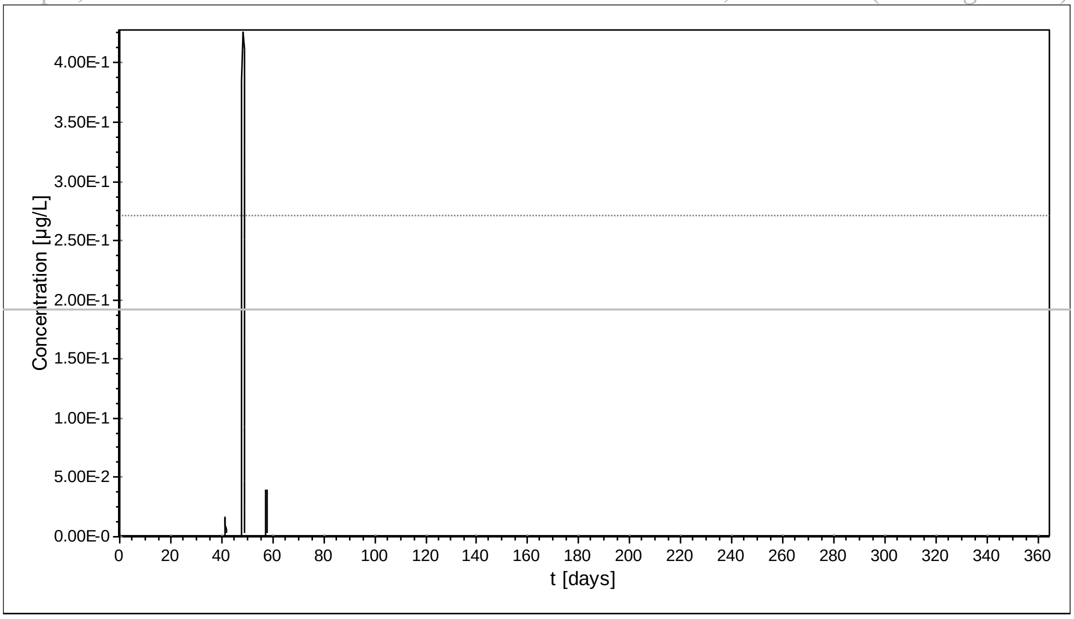
~~Step 4; 10 m buffer + 10 m fractional runoff reduction values; R4 Stream (1 × 40 g a.s./ha)~~



~~Step 4; 20 m buffer + 20 m fractional runoff reduction values; R3 Stream (1 × 40 g a.s./ha)~~

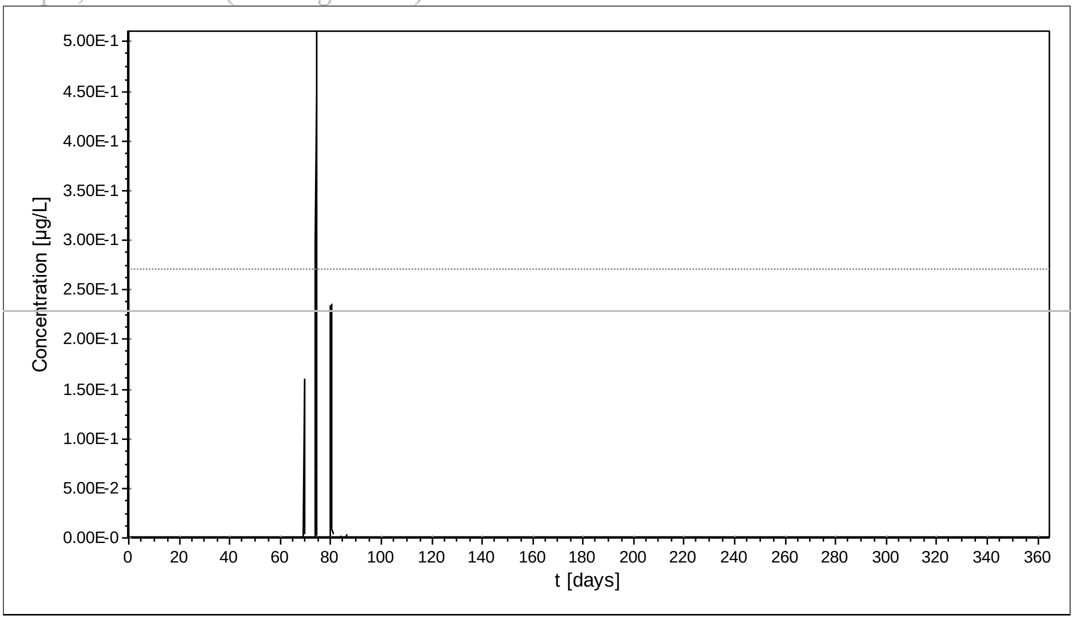


~~Step 4; 20 m buffer + 20 m fractional runoff reduction values; R4 Stream (1 × 40 g a.s./ha)~~

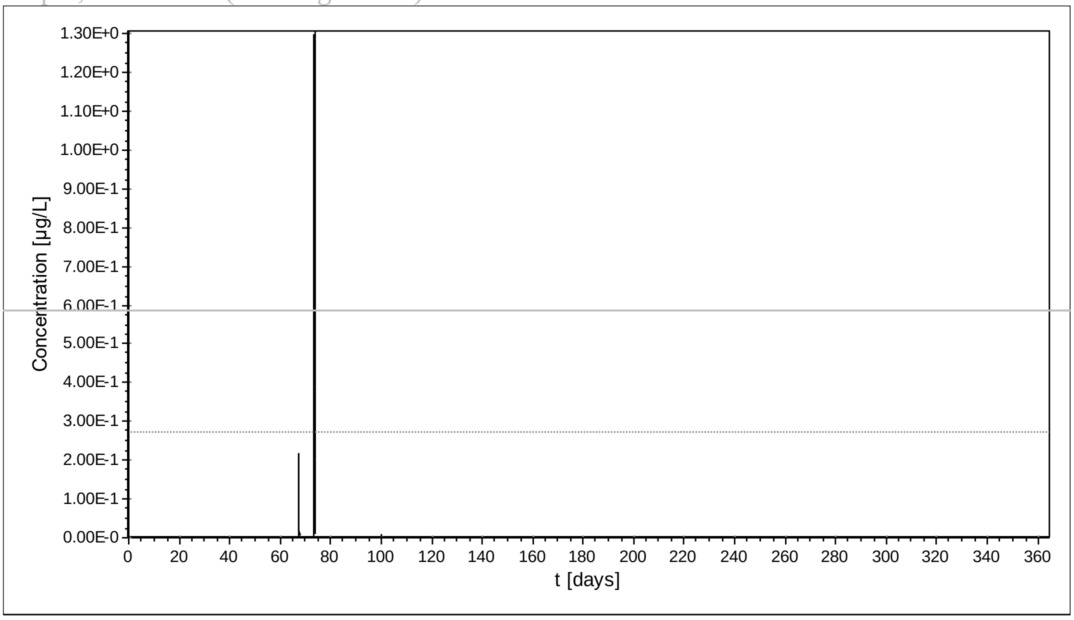


~~**1 × 45 g a.s./ha**~~

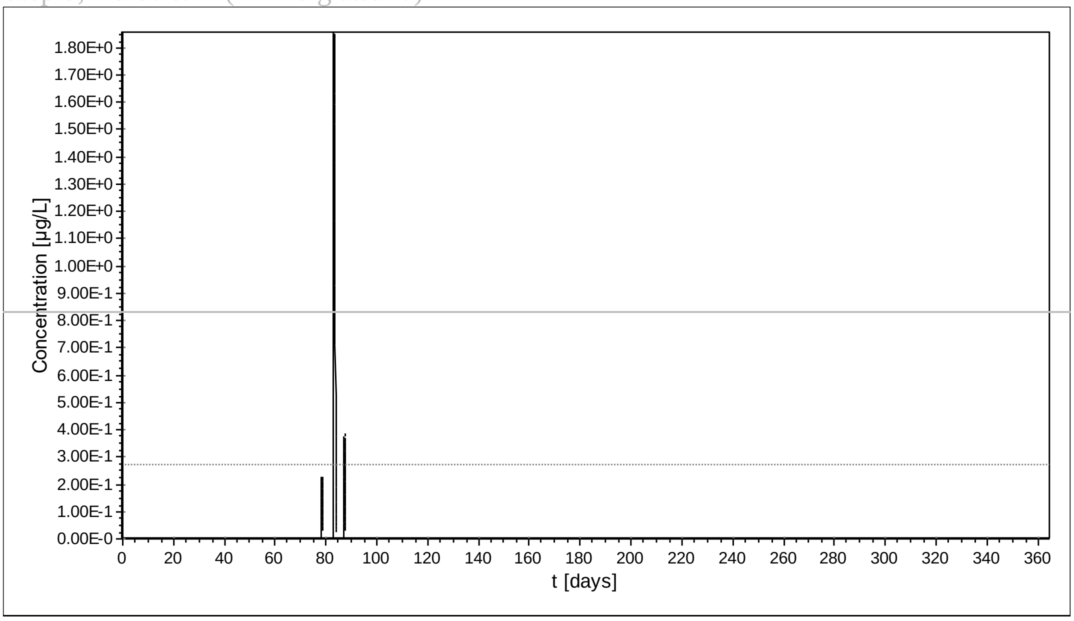
~~Step 3; R1 Stream (1 × 45 g a.s./ha)~~



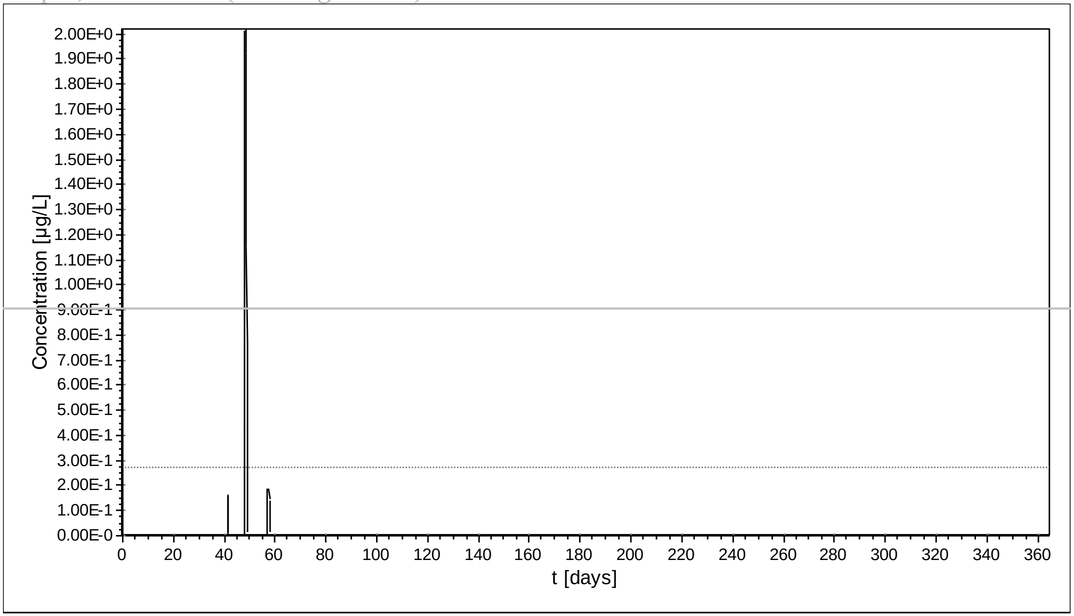
Step 3; R2 Stream (1 × 45 g a.s./ha)



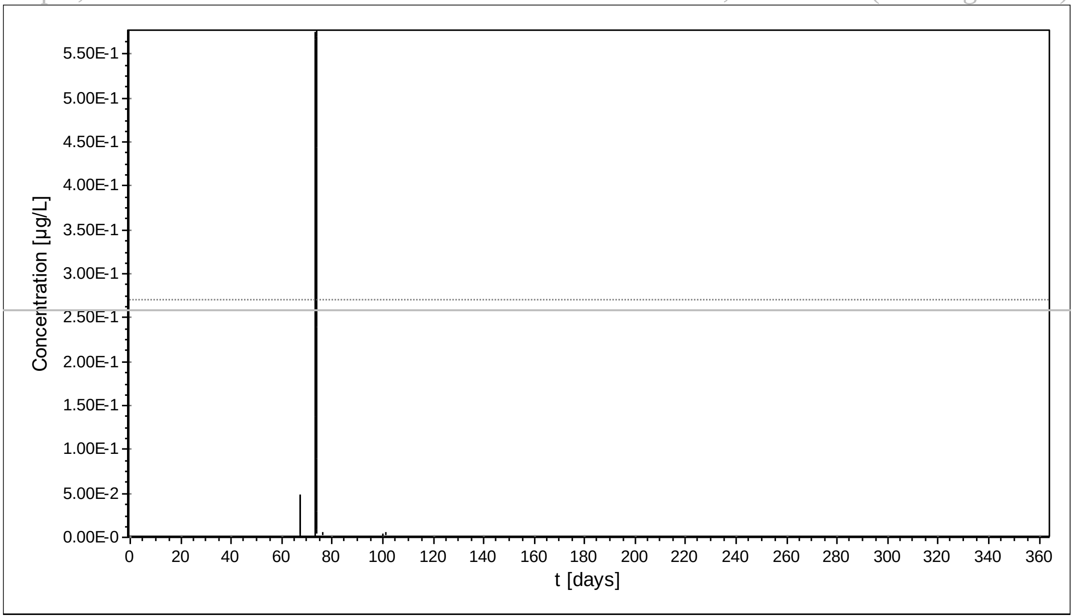
Step 3; R3 Stream (1 × 45 g a.s./ha)



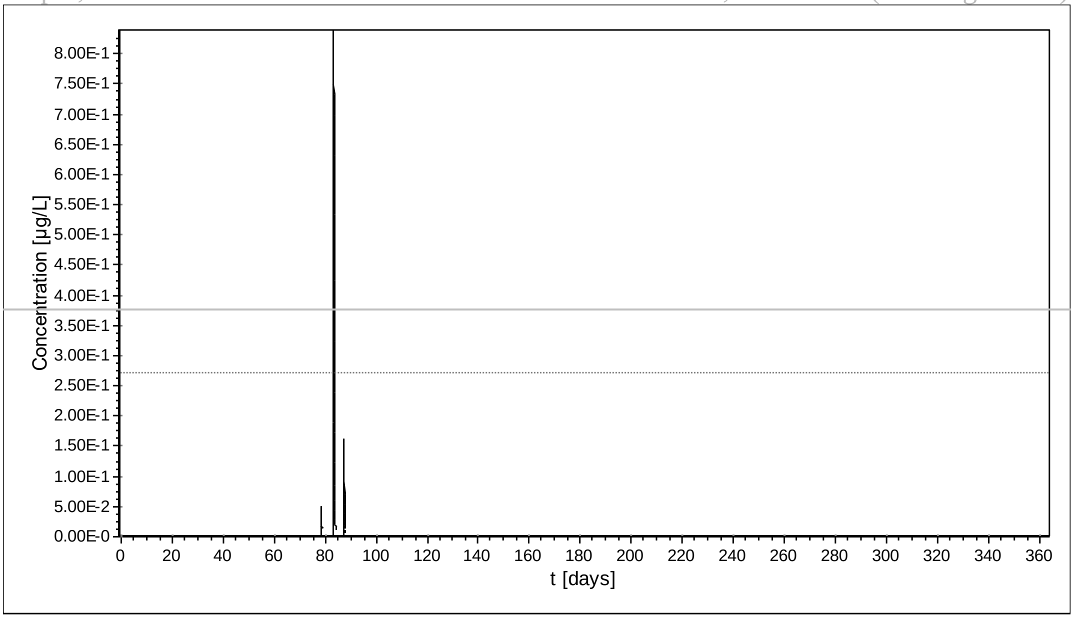
~~Step 3; R4 Stream (1 × 45 g a.s./ha)~~



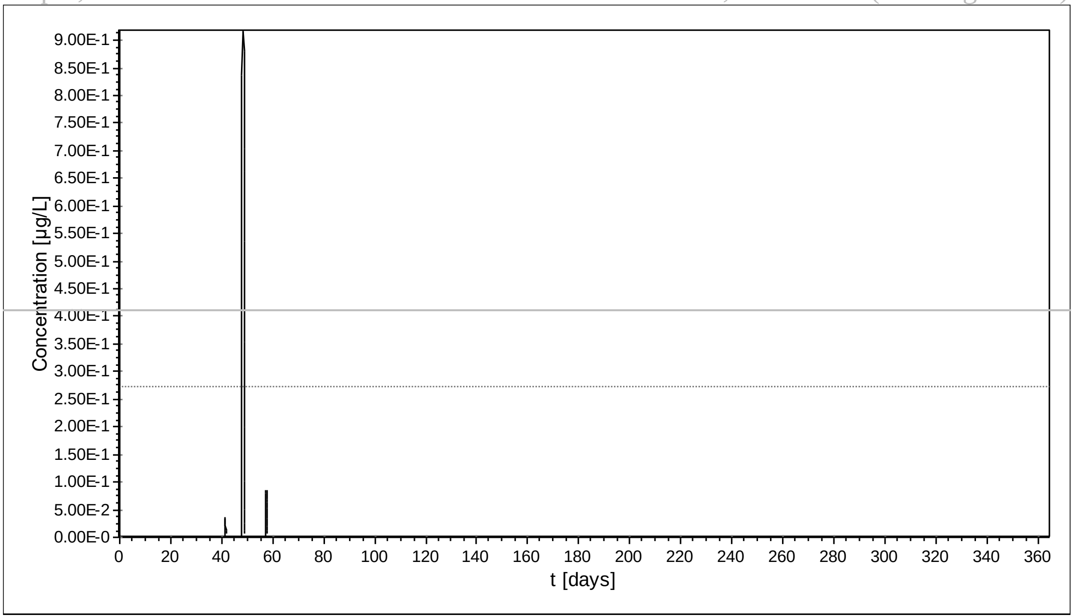
~~Step 4; 10 m buffer + 10 m fractional runoff reduction values; R2 Stream (1 × 45 g a.s./ha)~~



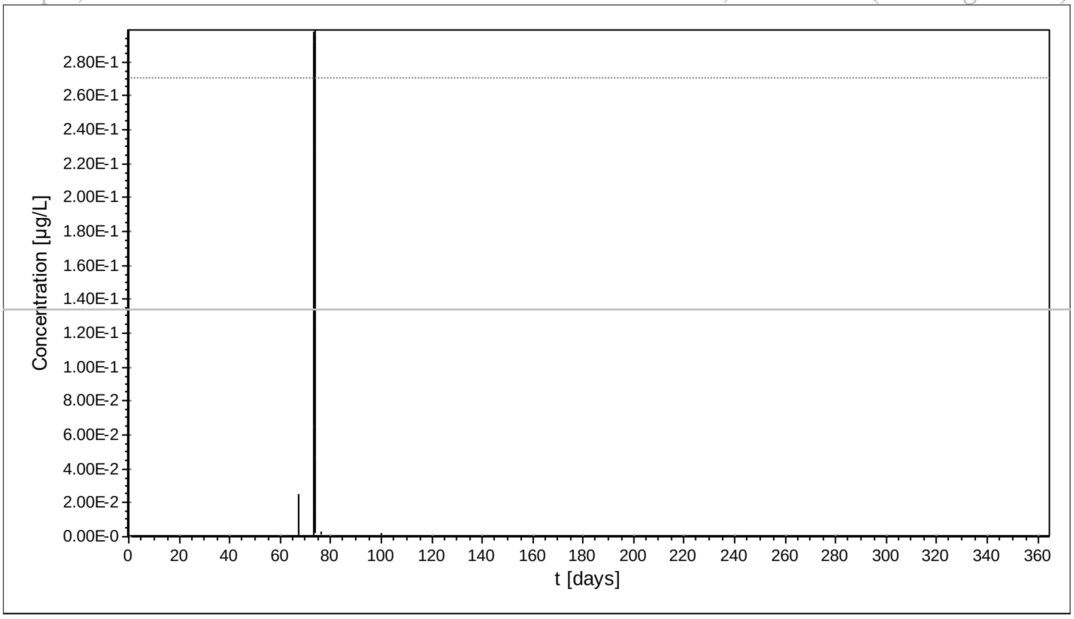
Step 4; 10 m buffer + 10 m fractional runoff reduction values; R3 Stream (1 × 45 g a.s./ha)



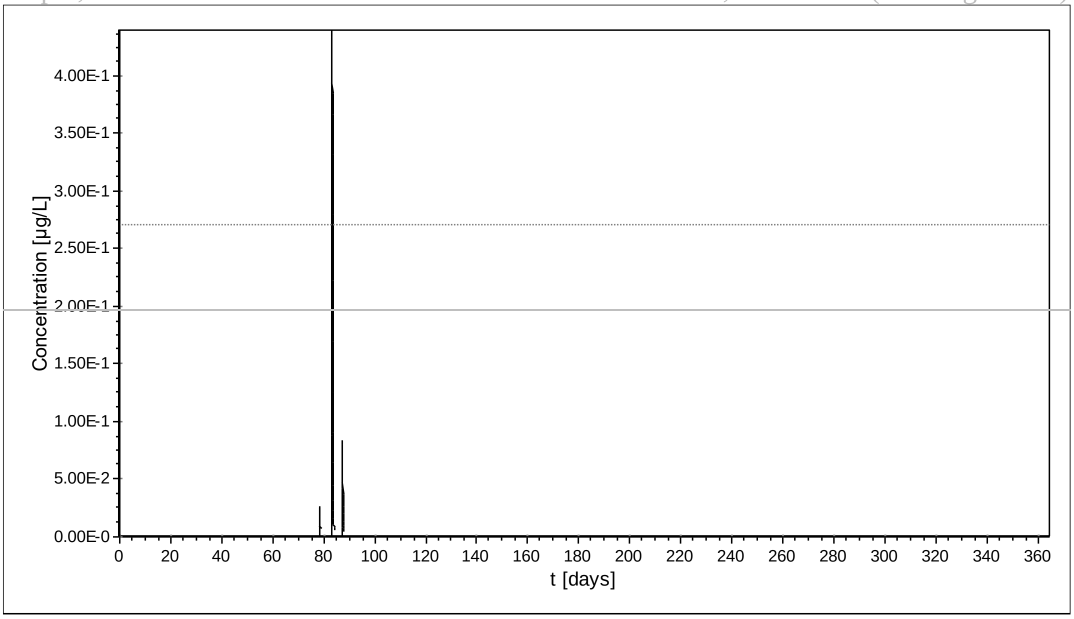
Step 4; 10 m buffer + 10 m fractional runoff reduction values; R4 Stream (1 × 45 g a.s./ha)



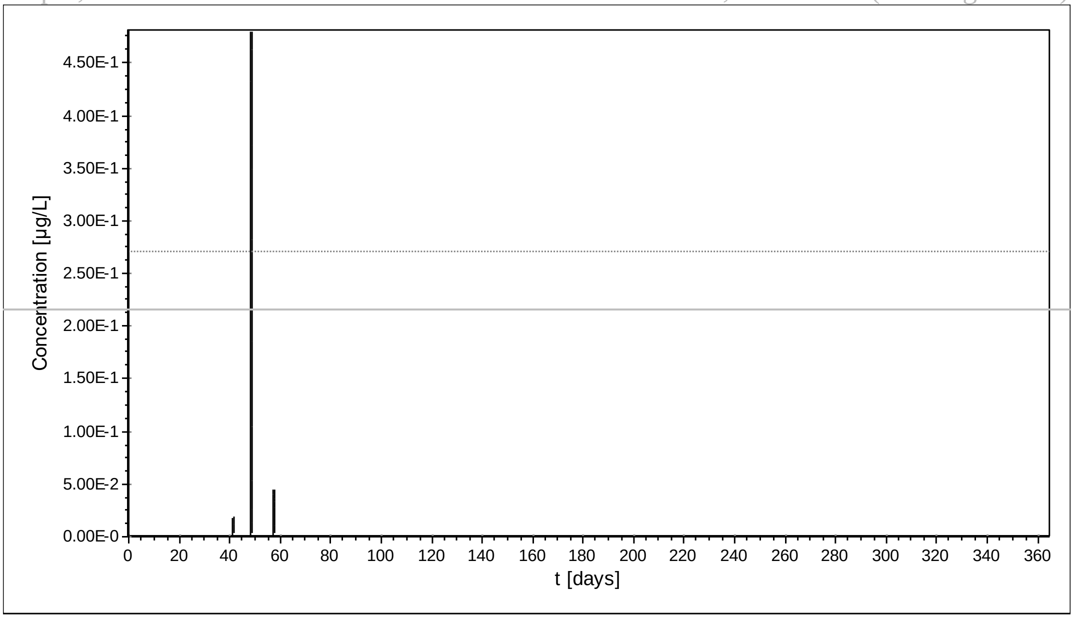
~~Step 4; 20 m buffer + 20 m fractional runoff reduction values; R2 Stream (1 × 45 g a.s./ha)~~



~~Step 4; 20 m buffer + 20 m fractional runoff reduction values; R3 Stream (1 × 45 g a.s./ha)~~

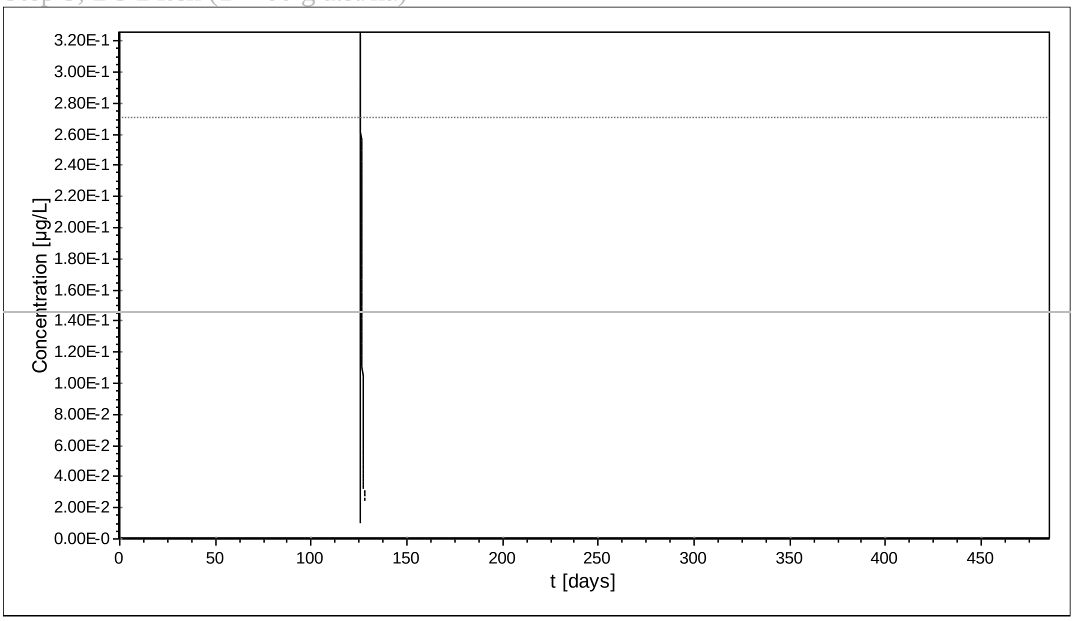


~~Step 4; 20 m buffer + 20 m fractional runoff reduction values; R4 Stream (1 × 45 g a.s./ha)~~

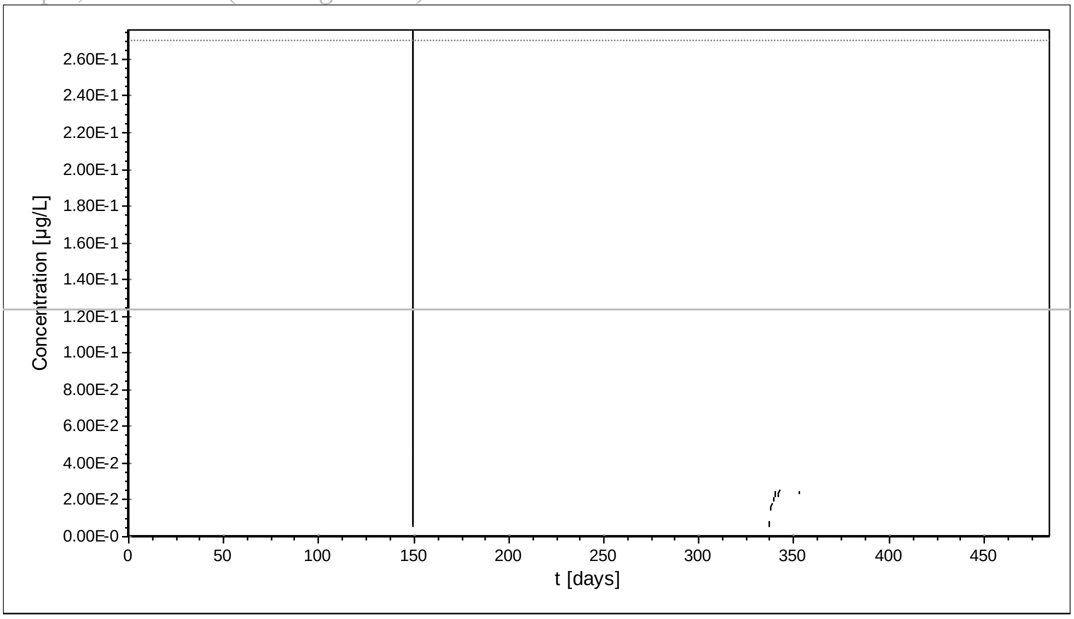


~~**1 × 60 g a.s./ha**~~

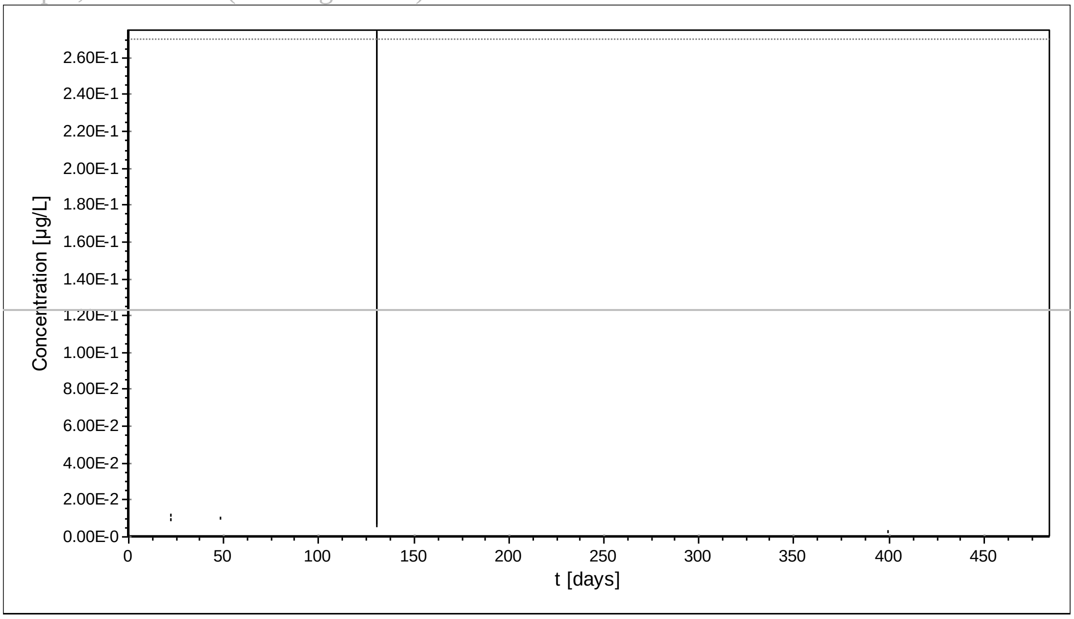
~~Step 3; D3 Ditch (1 × 60 g a.s./ha)~~



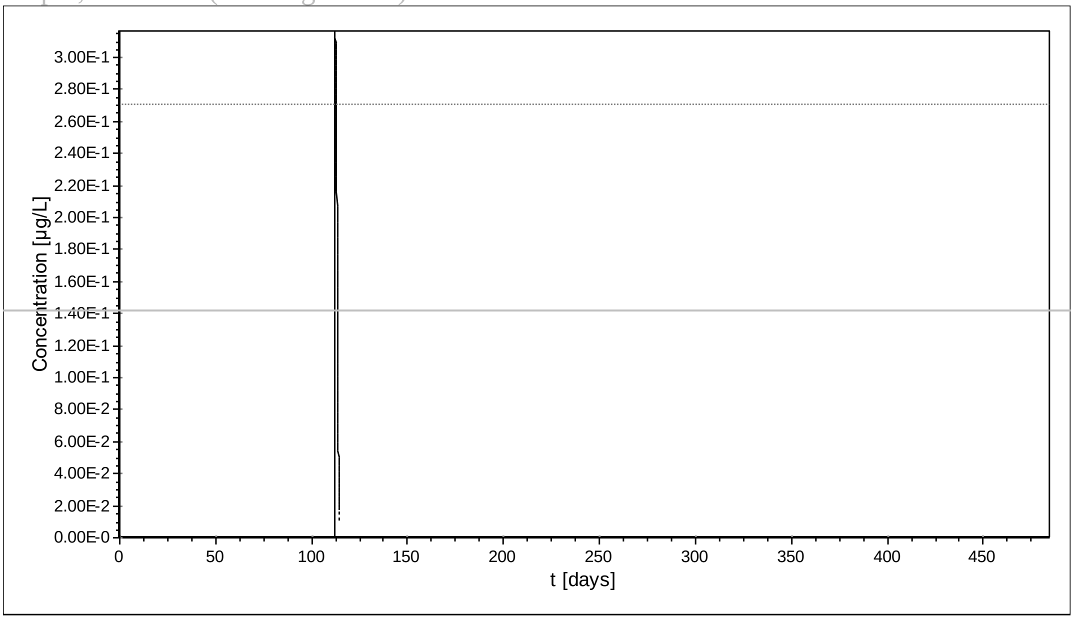
~~Step 3; D4 Stream (1 × 60 g a.s./ha)~~



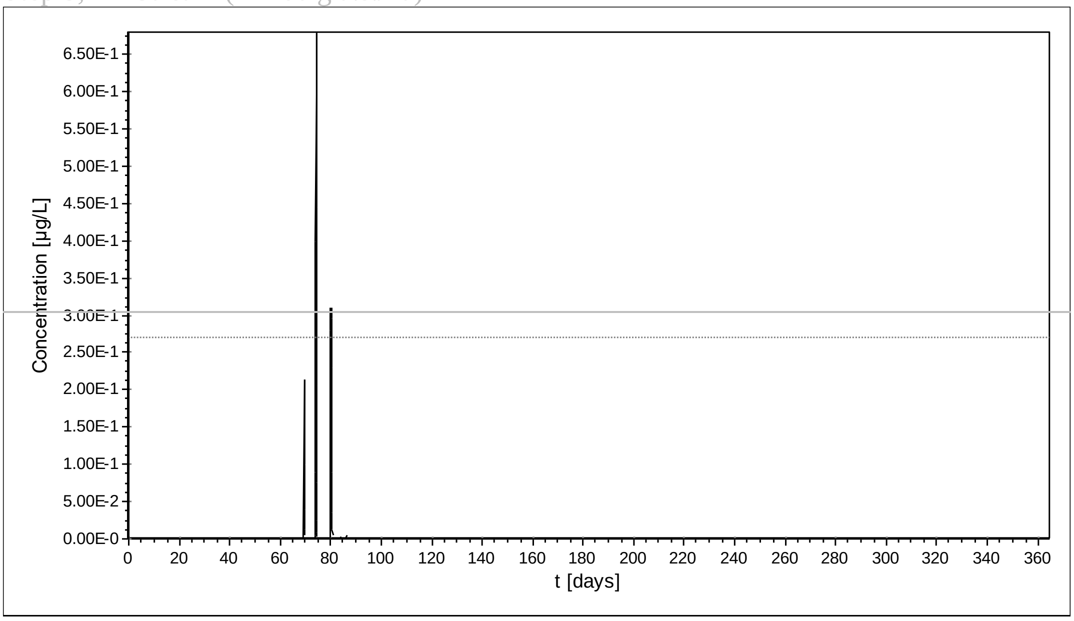
~~Step 3; D5 Stream (1 × 60 g a.s./ha)~~



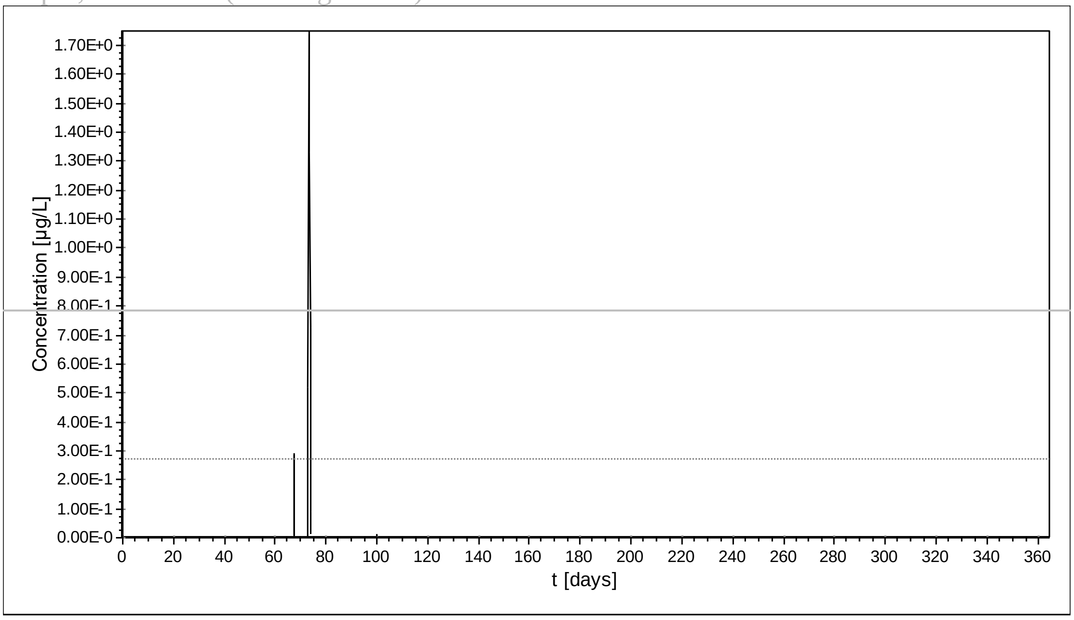
Step 3; D6 Ditch (1 × 60 g a.s./ha)



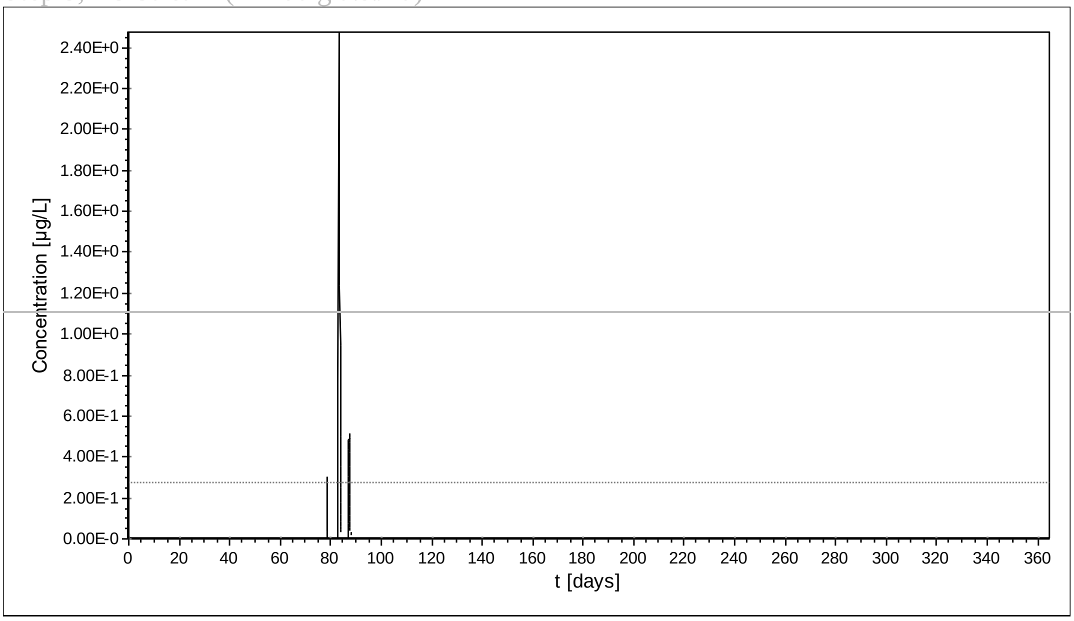
Step 3; R1 Stream (1 × 60 g a.s./ha)



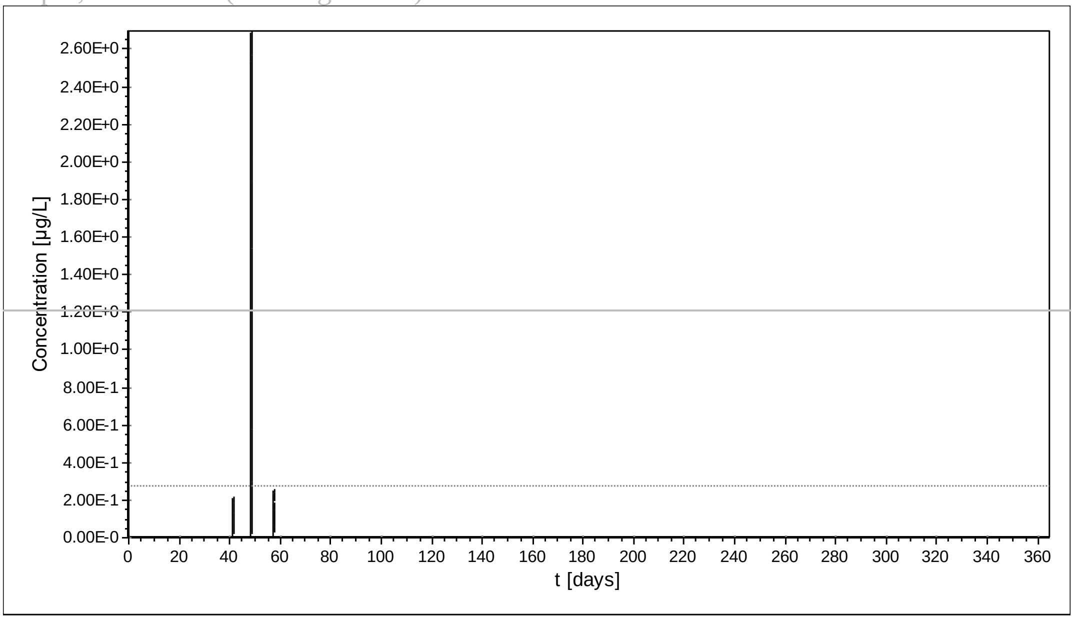
~~Step 3; R2 Stream (1 × 60 g a.s./ha)~~



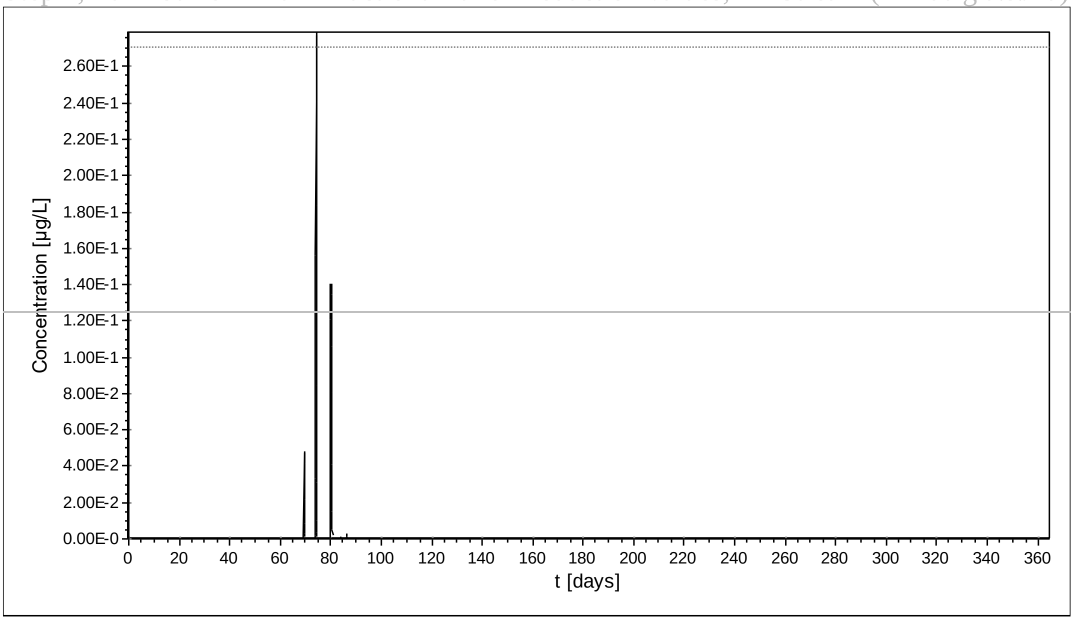
~~Step 3; R3 Stream (1 × 60 g a.s./ha)~~



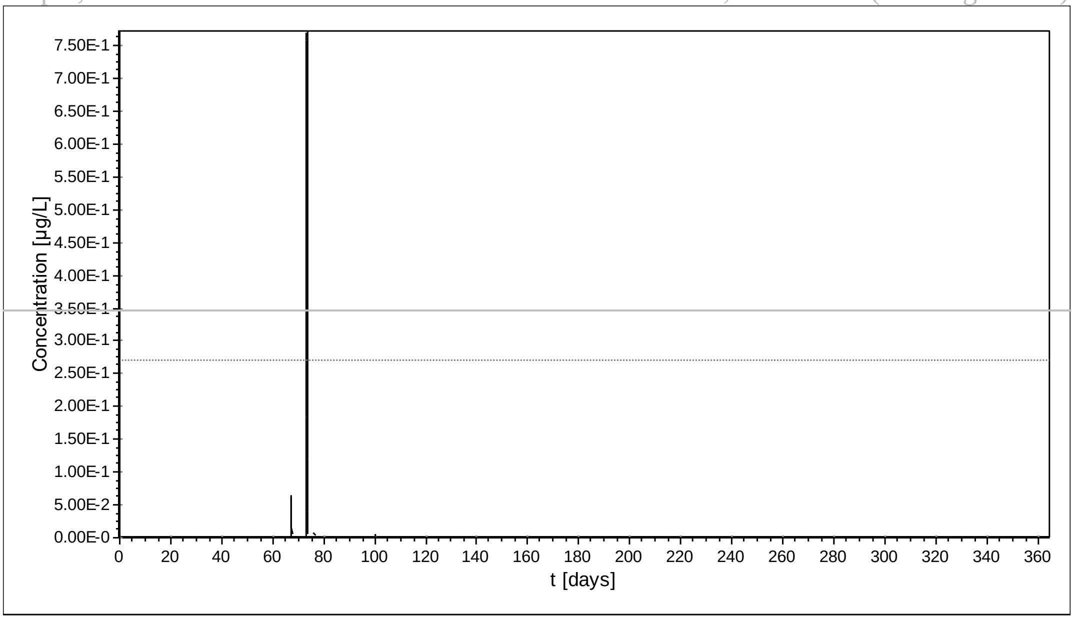
~~Step 3; R4 Stream (1 × 60 g a.s./ha)~~



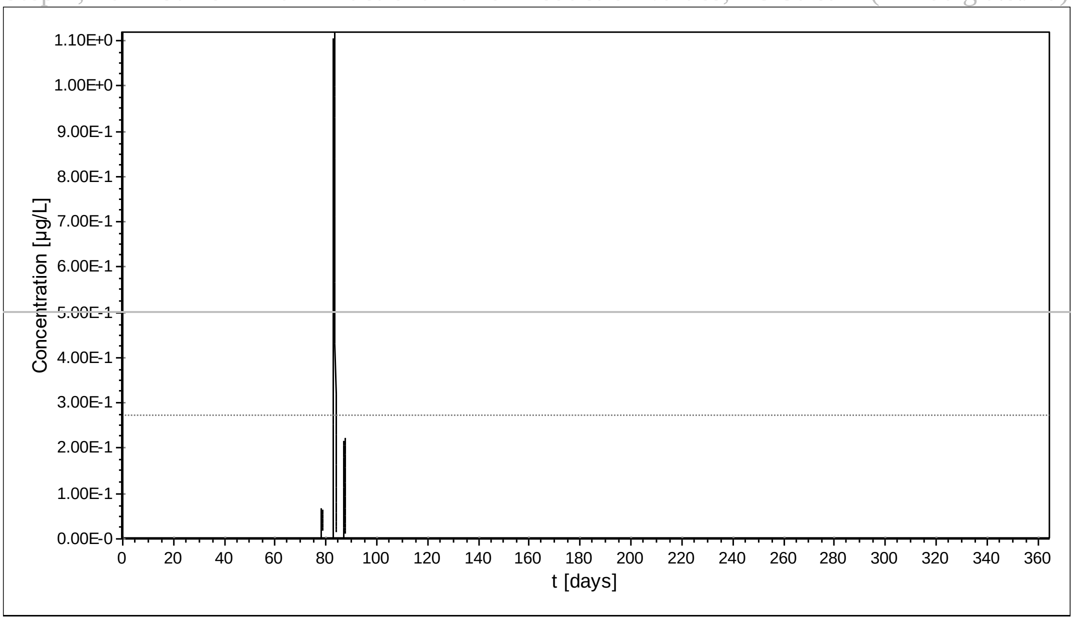
~~Step 4; 10 m buffer + 10 m fractional runoff reduction values; R1 Stream (1 × 60 g a.s./ha)~~



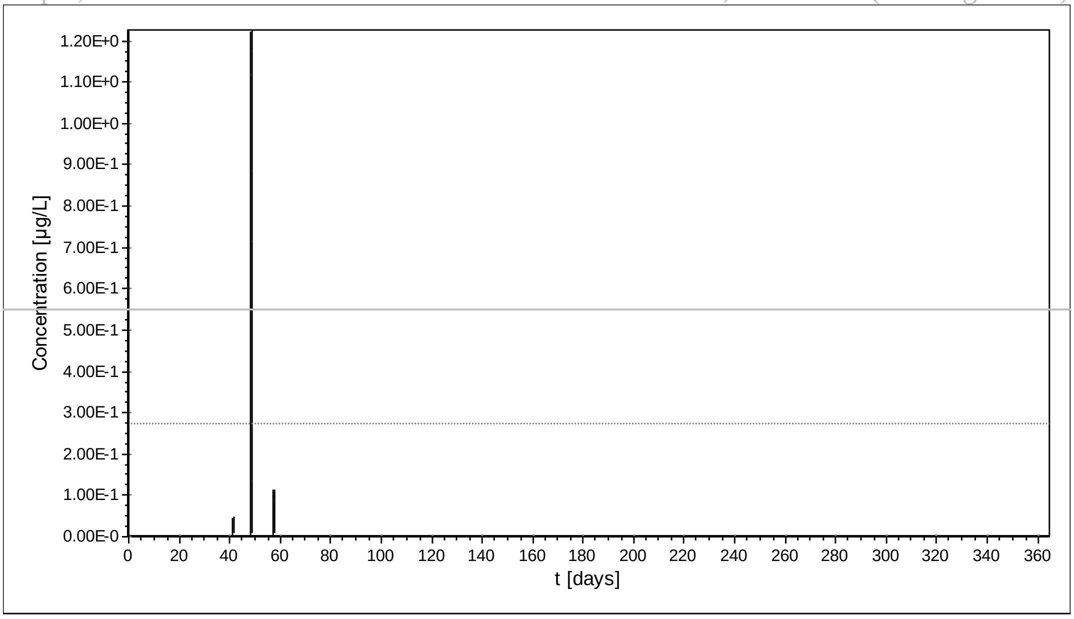
~~Step 4; 10 m buffer + 10 m fractional runoff reduction values; R2 Stream (1 × 60 g a.s./ha)~~



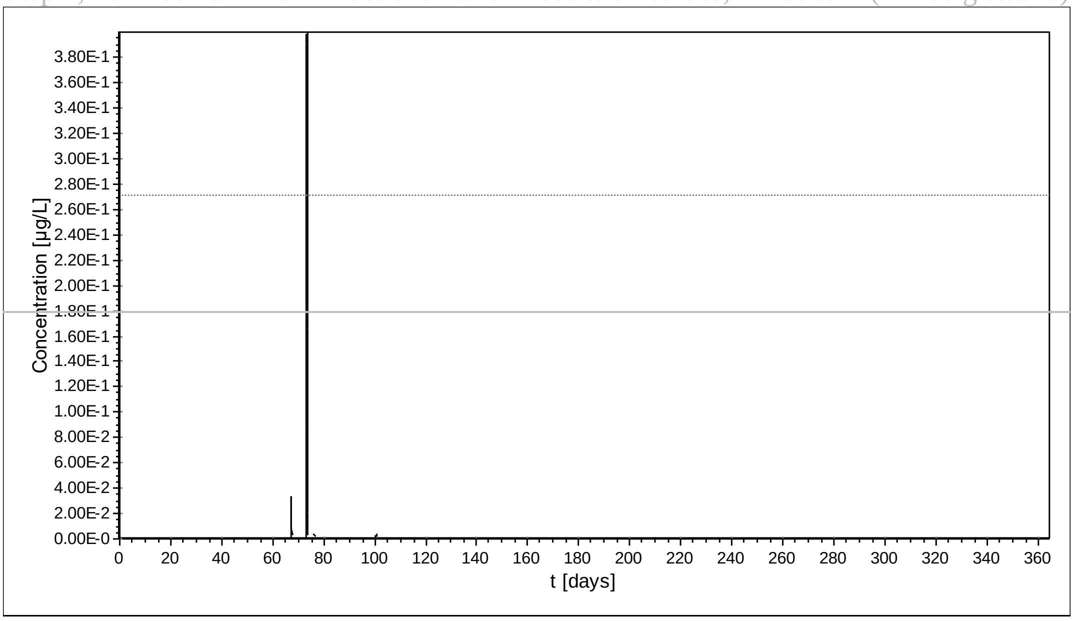
~~Step 4; 10 m buffer + 10 m fractional runoff reduction values; R3 Stream (1 × 60 g a.s./ha)~~



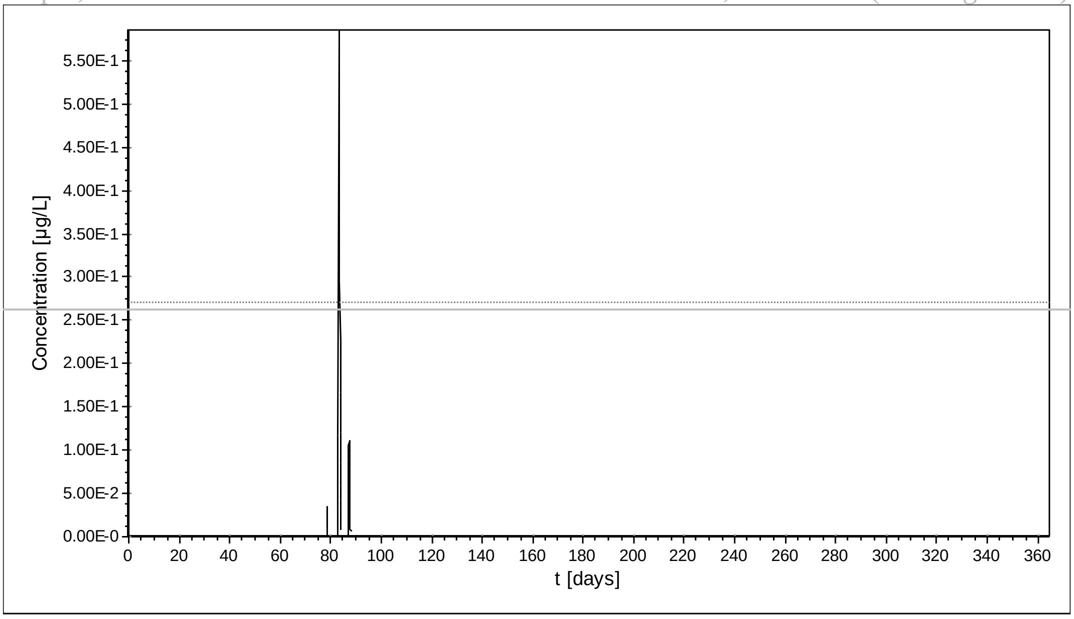
~~Step 4; 10 m buffer + 10 m fractional runoff reduction values; R4 Stream (1 × 60 g a.s./ha)~~



~~Step 4; 20 m buffer + 20 m fractional runoff reduction values; R2 Stream (1 × 60 g a.s./ha)~~



~~Step 4; 20 m buffer + 20 m fractional runoff reduction values; R3 Stream (1 × 60 g a.s./ha)~~



~~Step 4; 20 m buffer + 20 m fractional runoff reduction values; R4 Stream (1 × 60 g a.s./ha)~~