

FINAL REGISTRATION REPORT

Part B

Section 8

Environmental Fate

Detailed summary of the risk assessment

Product code: SHA 0100 Y

Product name: DECIDE

Chemical active substance:

Deltamethrin, 50 g/L

Central Zone

Zonal Rapporteur Member State: Poland

CORE ASSESSMENT

Applicant: SHARDA Cropchem España S.L.

Submission date: August 2019

MS Finalisation date: 02.2021 ; update 07.2021 ; 04.2022

Version history

When	What
August 2019	Submitted for evaluation
June 2020	Updated by Applicant
February 2021	RMS evaluation
March 2021	Applicant update
April 2021	RMS evaluation
July 2021	Applicant update
July 2021	RMS evaluation
April 2022	The final version of RR

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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
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: develop- mental stages of the pest or pest group)	Application				Application rate			PHI (days)	Remarks: e.g. g saf- ener/ synergist per ha	Conclusion
					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 product/ha a) max. rate per appl. b) max. total rate per crop/season	g or kg as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max			
Zonal uses (field or outdoor uses, certain types of protected crops)														
1	CEU	Brassicas (cab- bage, Brussels sprouts, cauli- flower)	F	Aphids	Foliar spray	BBCH 11-43	a) 1 b) 1	-	a) 0.15 b) 0.15	a) 0.0075 b) 0.0075	200-600	7		
2	CEU	Brassicas (cab- bage, Brussels sprouts, cauli- flower)	F	Caterpillars	Foliar spray	BBCH 11-43	a) 1 b) 1	-	a) 0.15 b) 0.15	a) 0.0075 b) 0.0075	200-600	7		
3	CEU	Strawberry	F	Lepidoptera, Aphids	Foliar spray	BBCH 11-81	a) 1 b) 1	-	a) 0.15 b) 0.15	a) 0.0075 b) 0.0075	200-600	3		
4	CEU	Tomato	F	Aphids	Foliar spray	BBCH 11-85	a) 1 b) 1	-	a) 0.15 b) 0.15	a) 0.0075 b) 0.0075	300-1000	3		
5	CEU	Tomato	G*	Whitefly	Foliar spray	BBCH 11-85	a) 1 b) 1	-	a) 0.15 b) 0.15	a) 0.0075 b) 0.0075	300-1000	3		
6	CEU	Ornamentals	F,G	Aphids	Foliar spray	BBCH 10-89	a) 1 b) 1	-	a) 0.15 b) 0.15	a) 0.0075 b) 0.0075	300-1000	-	-	

* 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

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Use- No. *	Member state(s)	Crop and/or situation (crop-destination /purpose-of-crop)	F, Fn, Fpn G, Gn, Gpn or L**	Pests or Group of pests controlled (additionally: develop- mental stages of the pest or pest-group)	Application				Application-rate			PHI (days)	Remarks: e.g. g saf- ener/ synergist per-ha	Conclusion
					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 product/ha a) max. rate per appl. b) max. total rate per crop/season	g or kg as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max			
Zonal uses (field or outdoor uses, certain types of protected crops)														
1	CEU	Brassicacabbage, Brussels sprouts, cauli- flower)	F	Aphids	Foliar-Spray	BBCH 11-43	a) 2 b) 2	10-14	a) 0.10-0.25 b) 0.20-0.50	a) 0.005-0.0125 b) 0.010-0.025	200-600	7	-	
2	CEU	Brassicacabbage, Brussels sprouts, cauli- flower)	F	Caterpillars	Foliar-Spray	BBCH 11-43	a) 2 b) 2	10-14	a) 0.10-0.15 b) 0.20-0.30	a) 0.005-0.0075 b) 0.010-0.015	200-600	7	-	
3	CEU	Strawberry	F	Aphids	Foliar-Spray	BBCH 11-81	a) 3 b) 3	10-14	a) 0.25 b) 0.75	a) 0.0125 b) 0.0375	200-600	3	-	
4	CEU	Strawberry	F	Lepidoptera	Foliar-Spray	BBCH 11-81	a) 3 b) 3	10-14	a) 0.15 b) 0.45	a) 0.0075 b) 0.0225	200-600	3	-	
5	CEU	Tomato	F	Aphids	Foliar-Spray	BBCH 11-85	a) 3 b) 3	10-14	a) 0.25 b) 0.75	a) 0.0125 b) 0.0375	300-1000	3	-	
6	CEU	Tomato	G	Whitefly	Foliar-Spray	BBCH 11-85	a) 3 b) 3	10-14	a) 0.25 b) 0.75	a) 0.0125 b) 0.0375	300-1000	3	-	
7	CEU	Ornamentals	F	Aphids	Foliar-Spray	BBCH 10-89	a) 3 b) 3	10-14	a) 0.25 b) 0.75	a) 0.0125 b) 0.0375	300-1000	-	-	

Table 8.1-2: Assessed (critical) uses during approval of Deltamethrin concerning the Section Environmental Fate

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, G, Gn, Gpn or I **	Pests or Group of pests controlled (additionally: develop- mental stages of the pest or pest group)	Application				Application rate			PHI (days)	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 (days)	kg or L product/ha a) max. rate per appl. b) max. total rate per crop/season	g or kg as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max		
1	SEU	Olives	F	Biting and sucking insects	High volume spraying / band appl.	At any stage	a) 3 b) 3	14	-	12.5	1000-1500	7	Max/ season: 37.5 g as/ha
2	NEU-SEU	Pome fruits	F	Biting and sucking insects	High volume spraying	At any stage	a) 3 b) 3	14	-	12.5	500-1000	7	Max/ season: 37.5 g as/ha
3	SEU	Tree nuts	F	Biting and sucking insects	High volume spraying	At any stage	a) 3 b) 3	14	-	12.5	1000	30	Max/ season: 37.5 g as/ha
4	NEU	Strawberries	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 2 b) 2	14	-	12.5	1000	3	Max/ season: 25 g as/ha
5	SEU	Strawberries	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	14	-	12.5	1000	3	Max/ season: 50 g as/ha
6	NEU-SEU (radishes only NEU)	Root+tuber vegetables Carrots , Radishes	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	14	-	12.5	500	7	Max/ season: 37.5 g as/ha
7	NEU-SEU	Bulb vegetables Onion Garlic, Shallot	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	14	-	12.5	500	7	Max/ season: 37.5 g as/ha
8	SEU	Fruiting vegetables (Tomato)	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	7	-	12.5	500-1000	3	Max/ season: 37.5 g as/ha
9	EU	Fruiting vegetables (Tomato)	G	Biting and sucking insects	Normal volume spraying	At any stage	a) 4 b) 4	7	-	17.5	1000-1500	3	Max/ season: 70 g as/ha
10	NEU	Cucurbits Edible peel Cucumber Gherkin	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	14	-	12.5	500	3	Max/ season: 37.5 g as/ha

		Courgette											
11	SEU	Cucurbits Edible peel Cucumber Gherkin Courgette	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	14	-	12.5	500-1000	3	Max/ season: 37.5 g as/ha
12	EU	Cucurbits Edible peel Cucumber Gherkin Courgette	G	Biting and sucking insects	Normal volume spraying	At any stage	a) 3-4 b) 3-4	7	-	17.5	800-1000	3	Max/ season: 52.5 g as/ha
13	SEU	Cucurbits inedible peel Melon Watermelon	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	14	-	12.5	500-1000	3	Max/ season: 37.5 g as/ha
14	NEU	Flowering Brassica Cauliflower	F	Biting and sucking insects	Normal volume Spraying	At any stage	a) 3 b) 3	14	-	7.5	300	7	Max/ season: 12.5 g as/ha
15	SEU	Flowering Brassica Cauliflower	F	Biting and sucking insects	Normal volume Spraying	At any stage	a) 2 b) 2	14	-	12.5	400-500	7	Max/ season: 25 g as/ha
16	NEU	Leafy brassica Chinese cabbage Curly kale	F	Biting and sucking insects	Normal volume Spraying	At any stage	a) 3 b) 3	14	-	7.5	500	7	Max/ season: 22.5 g as/ha
17	NEU	Kohlrabi	F	Biting and sucking insects	Normal volume Spraying	At any stage	a) 3 b) 3	7	-	7.5	500	7	Max/ season: 22.5 g as/ha
18	NEU	Leaf vegetables : Spinach	F	Biting and sucking insects	Normal volume Spraying	At any stage	a) 3 b) 3	14	-	12.5	300	3	Max/ season: 37.5 g as/ha
19	NEU	Witloof (for root production = endive)	F	Biting and sucking insects	Normal volume Spraying	At any stage	a) 3 b) 3	7	-	12.5	500	14	Max/ season: 37.5 g as/ha
20	SEU	Stem vegetables: Artichokes	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	7	-	12.5	1000	3	Max/ season: 37.5 g as/ha
21	NEU-SEU	Stem vegetables: Asparagus	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 2 b) 2	14	-	12.5	1000	n.a	Max/ season: 25 g as/ha

22	NEU	Stem vegetables: Leek	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	14	-	12.5	400	7	Max/ season: 37.5 g as/ha
23	EU	Mushrooms (cult.)	I	Biting insects	Low volume mist	At any stage	a) 2 b) 2	*	-	7.5	900-1000	3	* 3 days before 1 st flush and 3 days before 2 nd flush
24	NEU-SEU	Pulses (legumes dry) post harvest	I	Biting insects	Low volume mist	Pst harvest before storage	a) 1 b) 1	-	-	1 g as/ton	n.a	n.a	
25	NEU	Oilseeds: Rape seed (spring varieties)	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	14	-	7.5	300	45	Max/ season: 22.5 g as/ha
26	NEU	Oilseeds: Rape Seed (winter varieties)	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 1+3 b) 1+3	See remarks 14 days in spring	-	7.5	300	45	1 st spray in autumn, following 3 in spring with 14-21 days spray interval Max/season: 7.5+22.5 g as/ha
27	NEU	Potatoes (foliar application)	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	14	-	7.5	600	7	Max/ season: 22.5 g as/ha
28	SEU	Potatoes (foliar application)	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	14	-	7.5-12.5	600	7	Max/ season: 37.5 g as/ha
29	NEU	Seed potatoes (foliar application)	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	7	-	5	300-600	n.a	Max/ season: 15 g as/ha
30	SEU	Potatoes (post harvest)	I	Tineidae	Dusting	Maturity before storage	a) 1 b) 1	-	-	1g/yon	n.a	n.a	Warehouse potatoes; minor use restricted to Portugal
31	NEU-SEU	Winter varieties wheat, rye barley, oat (foliar application)	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 3 b) 3	See remarks	-	6.25	250-400	30	1 st appl. In autumn following 2 in spring with spray interval: 14-21 d Max/ season: 6.25 + 12.5 g as/ha
32	NEU	Spring varieties wheat, rye barley, oat (foliar)	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 2 b) 2	14	-	6.25	300	30	Max/ season: 12.5 g as/ha

		application)											
33	SEU	All varieties Cereals (locusts) foliar	F	Locust	Ultra low volume spraying	At any stage	a) 1 b) 1	-	-	12.5	1-3L/ha *	30	* spray volume without water
34	NEU-SEU	Post harvest cereals (include Corn, rice, sorghum)	F	Stored grain insects including crawling and flying insects	Low volume spraying	Ready for consumption	a) 1 b) 1	-	-	1g/ton	n.a	n.a	
35	NEU-SEU	Maize/Corn + Sorghum (foliar treatment)	F	Biting insects	Normal volume spraying	At 1.5 m height	a) 3 b) 3	14	-	12.5	600	30	Max/ season: 37.5 g as/ha
36	SEU	Waste land/locust control	F	Locust	Ultra low volume spraying	At any stage	a) 1 b) 1	-	-	12.5	400	n.a	
37	NEU-SEU	Forest (m)	F	Biting and sucking insects	Normal volume spraying	At any stage	a) 1 b) 1	-	-	5.00	100-200*	n.a	Spray volume for ultra-low: 2-3L/ha without water
38	NEU-SEU	Forest Nurseries /Young Plantations	F	Biting and sucking insects	Dipping or Spray localised at the bottom of young trunk	At any stage	a) 1 b) 1	-	-	n.a	n.a.	n.a	
39	NEU-SEU	Flowers, ornamentals (outdoors), nurseries (m)	F	Biting and sucking insects	Normal volume Spraying / low volume mist	At any stage	a) 3 b) 3	7	-	12.5	1500	n.a	Max/ season: 37.5 g as/ha
40	NEU-SEU	Flowers	F, G	Biting and sucking insects	Normal volume Spraying / low volume mist	At any stage	a) 3 b) 3	7	-	12.5	1500	n.a	Max/ season: 37.5 g as/ha
41	NEU-SEU	Ornamentals	F	Biting and sucking insects	Normal volume Spraying / low volume mist	At any stage	a) 3 b) 3	7	-	12.5	1500	n.a	Max/ season: 37.5 g as/ha
42	NEU-SEU	Plant nurseries	F, I	Biting and sucking insects	Normal volume Spraying / low volume mist	At any stage	a) 3 b) 3	14	-	12.5	1500	n.a	Very small areas treated Max/ season: 37.5 g as/ha
43	NEU-SEU	Golf Greens	F	Biting insects	Normal volume Spraying	At any stage	a) 2 b) 2	-	-	12.5	150	n.a	Max/ season: 25 g as/ha
44	NEU-SEU	Christmas	F	Biting insects	Normal volume	At any stage	a) 1	-	-	7.5	1000	n.a	-

		trees			Spraying		b) 1						
45	NEU-SEU	Chablis (mixed forest)	F	Biting and sucking insects	Normal volume Spraying	At any stage	a) 1 b) 1	-	-	2.5g/hL	-	n.a.	-
46	NEU-SEU	Tobacco	F	Biting and sucking insects	Normal volume Spraying	At any stage	a) 3 b) 3	7	-	12.5	625	7	Max/ season: 37.5 g as/ha

* 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

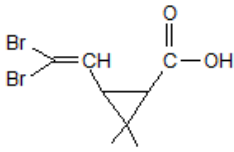
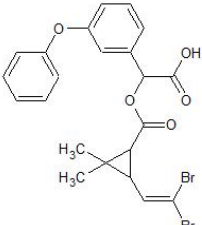
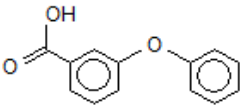
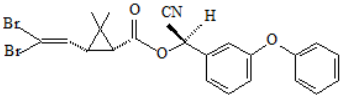
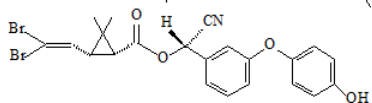
zRMS comments:

All comments and conclusions of the zRMS are presented in grey. Minor changes are introduced directly in the text and highlighted in grey. New data submitted by Applicant highlighted in yellow and green. Not agreed or not relevant information is struck through and shaded for transparency.

During the evaluation, the applicant changed the GAP limiting the number of applications to 1 and the dose to 7.5 g / ha. New calculations have been made. They were approved by the RMS.

8.2 Metabolites considered in the assessment

Table 8.2-1: Metabolites of Deltamethrin potentially relevant for exposure assessment

Metabolite	Molar mass	Chemical structure	Maximum observed occurrence in compartments	Exposure assessment required due to
Br ₂ CA (decamethrinic acid)	297.97 g/mol		Max in soil: 52%* Max in water: 53%**	PEC _{gw} : leaching potential to groundwater PEC _{soil} : if not covered by EU assessment PEC _{sw/sed} : if not covered by EU assessment
D-COOH ((1R, cis)-α-[[[3-(2,2-dibromoethenyl)-2,2-dimethylcyclopropyl]carbonyl]oxy]-3-phenoxy-benzeneacetic acid)	524.21 g/mol		Max in soil: 9%	PEC _{gw} : leaching potential to groundwater PEC _{soil} : if not covered by EU assessment PEC _{sw/sed} : if not covered by EU assessment
mPBacid (3-phenoxy-benzoic acid)	214.22 g/mol		Max in water/sediment: 6% Max in water :26%***	PEC _{sw/sed} : if not covered by EU assessment
α-R-deltamethrin	505.2 g/mol		Max in water/sediment: 24% Max in water: 46%**	PEC _{sw/sed} : if not covered by EU assessment
4'OH-deltamethrin	521.2 g/mol		Max in water/sediment: 8%	PEC _{sw/sed} : if not covered by EU assessment

* Worst case from anaerobic study

** From high tier studies

*** From photolysis study

8.3 Rate of degradation in soil (KCP 9.1.1)

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 Deltamethrin and its metabolites

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

Deltamethrin, Laboratory studies, aerobic conditions										
Soil name	Soil type (USDA)	pH	t.oC	FC %	DT50 (d)	DT90 (d)	DT50 (d) 20°C pF2/10kPa*	R ²	Kinetic model	Evaluated on EU level y/n/ Reference
Dubbs	Loam	5.9	10	75 (1/3 bar)	35	117	11.1	0.96	First order	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
Dubbs	Loam	5.9	10	75 (1/3 bar)	55	183	17.4	0.98		
Hagerstown	Silty clay loam	7.5	25	75 (1/3 bar)	18	58	23.6	0.90		
Dubbs	Loam	5.9	25	75 (1/3 bar)	20	66	26.3	-		
-	Sandy loam	8.1	25	75 (1/3 bar)	22	72	28.9	0.99		
Dubbs	Loam	5.9	25	75 (1/3 bar)	23	76	30.2	0.81		
Dubbs	Loam	5.9	25	75 (1/3 bar)	25	82	32.9	-		
Dubbs	Loam	5.9	25	75 (1/3 bar)	25	82	32.9	0.91		
-	Sandy loam	8.1	25	75 (1/3 bar)	26	85	34.2	0.96		
Hagerstown	Silty clay loam	7.5	25	75 (1/3 bar)	28	92	36.8	0.97		
Dubbs	Loam	5.9	25	75 (1/3 bar)	30	98	39.5	0.88		
Memphis	Silt loam	5.8	25	75 (1/3 bar)	30	100	39.4	0.94		
Dubbs	Loam	5.9	25	75 (1/3 bar)	34	112	44.7	0.90		
Memphis	Silt loam	5.8	25	75 (1/3 bar)	35	117	45.9	0.98		
Hagerstown	Silty clay loam	7.5	25	75 (1/3 bar)	28	94	36.8	0.90		
Hagerstown	Silty clay loam	7.5	25	75 (1/3 bar)	35	120	45.9	0.90		
Geometric mean (n=16)							31.1			
pH-dependency:							No			

* Normalized using the German Input Decision v3.3 Excel™ spreadsheet with a Q10 of 2.58

Table 8.3-2: Summary of aerobic degradation rates for Br₂CA - laboratory studies

Br ₂ CA, Laboratory studies, aerobic conditions									
Soil name	Soil type (USDA)	pH	t.oC	FC %	DT50 (d)	DT50 (d) 20°C pF2/10kPa*	R ²	Kinetic model	Evaluated on EU level y/n/ Reference
Hagerstown	Silty clay loam	7.5	25	75 (1/3 bar)	0.7	1.0	0.97	First order	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
Hagerstown	Silty clay loam	7.5	25	75 (1/3 bar)	0.7	1.0	0.95		
Dubbs	Loam	5.9	25	75 (1/3 bar)	0.8	1.1	0.60		
Dubbs	Loam	5.9	25	75 (1/3 bar)	1.1	1.4	0.92		
Saturated Hagerstown	Silty clay loam	7.5	25	75 (1/3 bar)	1.6	2.1	0.98		
Saturated Hagerstown	Silty clay loam	7.5	25	75 (1/3 bar)	1.9	2.6	0.99		
Casa grand	Sandy loam	-	25	75 (1/3 bar)	9.1	12.0	0.97		
-	Sandy loam	8.1	25	75 (1/3 bar)	21**	27.6	0.95		
Geometric mean (n=8)						2.7			
pH-dependency:						No			

*Normalized using the German Input Decision v3.3 Excel™ spreadsheet with a Q10 of 2.58

** estimated from study on deltamethrin (Wang, 1991a)

Table 8.3-3: Summary of aerobic degradation rates for metabolite 3PBA- laboratory studies

3-PBA, Laboratory studies, aerobic conditions										
Soil name	Soil type	pH	t.oC	MWHC %	DT50 (d)	DT90 (d)	DT50 (d) 20°C pF2/10kPa	Chi2 (%)	Kinetic model	Evaluated on EU level y Reference
-	Sandy clay	-	25	-	2.92	-	2.24	-	SFO	Alpha cypermethrin DAR Addendum Vol3 (B8) 2002
-	Sandy loam	-	25	-	0.729*	-	1.06*	-	SFO	
(n=1)							2.24			
pH-dependency: n										

* Not reliable, the confidence limit was below 40%

8.3.2 Anaerobic degradation in soil (KCP 9.1.1.1)

Table 8.3-4: Summary of anaerobic degradation rates for Deltamethrin - laboratory studies

Deltamethrin, Laboratory studies, anaerobic conditions									
Soil name	Soil type (USDA)	pH	t.oC	MWHC %	DT50 (d)	DT90 (d)	R²	Kinetic model	Evaluated on EU level y/n/ Reference
-	Sandy loam	8.1	25	75*	32	106	0.95	First order	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
-	Sandy loam	8.1	25	75*	36	119	0.96		
Dubbs	Loam	5.9	25	75* 24 (1/3 bar)	69	229	0.92		
Dubbs	Loam	5.9	25	75* 24 (1/3 bar)	100	349	0.96		
Dubbs	Loam	5.9	25	75* 24 (1/3 bar)	105	331	0.85		
Geometric mean (n=5)					62				
pH-dependency:					No				

* % FC

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 Deltamethrin and its metabolites

Triggering endpoints

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

Deltamethrin, Field studies – Triggering endpoints								
Soil type (USDA)	Location	pH	Depth (cm)	DissT50 (d) actual	DT90 (d) actual	R ²	Method of calculation	Evaluated on EU level y/n/ Reference
Sandy loam (cropped plot)	Minnesota	5.6	0-15	14*	> 4 months**	0.90	First order	y/ DAR, 1998, Addendum to Monograph
Sandy loam (bare plot)	Minnesota	5.6	0-15	69		0.56		

Deltamethrin, Field studies – Triggering endpoints								
Soil type (USDA)	Location	pH	Depth (cm)	DissT50 (d) actual	DT90 (d) actual	R ²	Method of calculation	Evaluated on EU level y/n/ Reference
Loamy sand	Stelle, Harburg District, Germany	4.7	0-20	29	n.a.	-	Second order	Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
Loam	Bornheim, Rhein-Sieg District, Germany	7.1	0-20	17	185	-	First order	
Loam	Gersthofen, Germany	5.8	0-20	17	189	-		
	Hattersheim, Ffm-Schwanheim, Germany	5.2	0-20	23	250	-		
Maximum (n=6)				69				
Geometric mean (n=6)				24				

* Mean residues from the 60-, 90- and 118-day post-application 10 cropped samples were not used in the estimations presented in the study, since these means were all < 0.01 mg/kg and therefore considered to be negligible. Including these data, which are still above the limit of quantification, results in DT₅₀ 64 days (r² = 0.64, calculated by RMS).

** for both cropped and bare plot

8.4.2 Soil accumulation testing (KCP 9.1.1.2.2)

No data provided, not required (DAR, 1998).

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 Deltamethrin and its metabolites

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

Deltamethrin							
Soil name	Soil type (USDA)	OM (%)	pH (-)	Kf (mL/g)	Kfoc (mL/g)	1/n (-)	Evaluated on EU level y/n/ Reference
Arizona I	Sandy loam	0.1	8.5	9600	16300000	0.77	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
Arizona II	Sandy loam	0.4	8.1	30000	12800000	1.20	
Arizona III	Clay	0.4	7.6	26700	11400000	0.74	
Mississippi	Silty clay loam	1.4	6.5	3790	460000	1.01	
Geometric mean (n=4)					5751287	-	
Arithmetic mean (n=4)					-	0.93	
pH-dependency:					No		

Table 8.5-2: Summary of soil adsorption/desorption for Br₂CA

Br ₂ CA							
Soil Name	Soil Type (USDA)	OM (%)	pH (-)	Kf (mL/g)	Kfoc (mL/g)	1/n (-)	Evaluated on EU level y/n/ Reference
Michigan	Clay loam	4.6	6.8	0.267	10.1	0.83	y/ DAR, 1998.Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
Mississippi	Silty clay loam	1.4	6.5	0.355	43.7	0.96	
USA	Sandy loam	4.4	6.4	0.587	23.0	0.89	
Arizona II	Sandy loam	0.4	8.1	0.089	38.2*	1.00	
Arizona III	Clay	0.4	7.6	0.109	46.8*	1.00	
Geometric mean (n=3)					21.6	-	
Arithmetic mean (n=3)					-	0.89	
pH-dependency:					No		

* Not included (EU Review Report, 2002)

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

mPBacid							
Soil Name	Soil Type (USDA)	OM (%)	pH (-)	Kf (mL/g)	Kfoc (mL/g)	1/n (-)	Evaluated on EU level y/n/ Reference
Michigan	Clay loam	4.6	6.8	1.340	50.650	0.92	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
Mississippi	Silty clay loam	1.4	6.5	1.542	189.90	1.00	
Arizona III	Clay	0.4	7.6	0.668	287.76	0.99	
Maryland	Silty clay loam	4.4	6.8	2.681	105.03	0.94	
Geometric mean (n=4)					130.6	-	
Arithmetic mean (n=4)					-	0.96	
pH-dependency:					No		

Soil adsorption/desorption for D-COOH (Carboxy Deltamethrin)

Estimated by KOCWIN v2.01

SMILES : CC1(C)C(C=C(Br)Br)C1C(=O)OC(C(=O)(O))c3cccc(Oc2cccc2)c3

Koc Estimate from MCI:

First Order Molecular Connectivity Index : 13.696

Non-Corrected Log Koc (0.5213 MCI + 0.60) : 7.7397

Fragment Correction(s):

1 Ether, aromatic (-C-O-C-) : -0.6791
* Organic Acid (-CO-OH) : -1.6249
1 Ester (-C-CO-O-C-) or (HCO-O-C) : -1.2970
Corrected Log Koc : 4.1388

Estimated Koc: 1.377e+004 L/kg

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Koc Estimate from Log Kow:

Log Kow (Kowwin estimate) : 6.41
Non-Corrected Log Koc (0.55313 logKow + 0.9251) : 4.4707
Fragment Correction(s):
1 Ether, aromatic (-C-O-C-) : 0.0559
* Organic Acid (-CO-OH) : -0.7694
1 Ester (-C-CO-O-C-) or (HCO-O-C) : -0.0656
Corrected Log Koc : 3.6916

Estimated Koc: 4916 L/kg

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NOTE:

The Koc of this structure may be sensitive to pH! The estimated Koc represents a best-fit to the majority of experimental values however, the Koc may vary significantly with pH.

The Koc value of 4916 L/kg has been chosen as worst case for calculations.

Soil adsorption/desorption for 4'OH-Deltamethrin

Estimated by KOCWIN v2.01

SMILES : BrC(Br)=CC3C(C(=O)OC(C(#N))c2cccc(Oc1ccc(O)cc1)c2)C3(C)C

Koc Estimate from MCI:

First Order Molecular Connectivity Index : 13.718
Non-Corrected Log Koc (0.5213 MCI + 0.60) : 7.7508
Fragment Correction(s):
1 Ether, aromatic (-C-O-C-) : -0.6791
1 Nitrile/Cyanide (-C#N) : -0.6677
1 Ester (-C-CO-O-C-) or (HCO-O-C) : -1.2970
1 Aromatic Hydroxy (aromatic-OH) : -0.0966
Corrected Log Koc : 5.0104

Estimated Koc: 1.024e+005 L/kg

=====

Koc Estimate from Log Kow:

Log Kow (Kowwin estimate) : 5.70
Non-Corrected Log Koc (0.55313 logKow + 0.9251) : 4.0779
Fragment Correction(s):
1 Ether, aromatic (-C-O-C-) : 0.0559
1 Nitrile/Cyanide (-C#N) : 0.3922
1 Ester (-C-CO-O-C-) or (HCO-O-C) : -0.0656
1 Aromatic Hydroxy (aromatic-OH) : 0.1668
Corrected Log Koc : 4.6273

Estimated Koc: 4.239e+004 L/kg

=====

The Koc value of 42390 L/kg has been chosen as worst case for calculations.

8.5.2 Column leaching (KCP 9.1.2.1)

Column leaching	> 96% of applied radioactivity in top 0-2.5 cm in columns with 2 different soils and 1 sand (DAR, 1998).
Aged residues leaching	No data provided, not required (DAR, 1998).

8.5.3 Lysimeter studies (KCP 9.1.2.2)

Lysimeter studies	No lysimeter study provided, not required.
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8.5.4 Field leaching studies (KCP 9.1.2.3)

Field leaching studies	US (Minnesota) field dissipation study: Deltamethrin residues mainly confined to upper 0-15 cm, Br ₂ CA sampled to 30 cm depth, not detected (limit of quantification 0.01 mg/kg)
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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 Deltamethrin and its metabolites

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

Deltamethrin Distribution (max. 22-23% (water) / 60-62% (sediment) day 0; max. 4-10 % (water) / 84% (sediment) day 4; max. 0% (water) / 39-70% (sediment) day 28.); Max. 38% (water)/ 89% (sediment) at days 0/4									
Water/sediment system	pH water/sed.	DegT50 whole syst. (d)	DegT90 whole syst. (d)	R ²	DissT50 water (d)	Kinetic, Fit	DissT50 sed. (d)	Kinetic, Fit	Evaluated on EU level y/n/ Reference
TNO ditch	-/7.1	40	130	0.81	*	-	-	First order	y/ DAR, 1998, Addendum to Monograph Annex B, 2002,

Deltamethrin Distribution (max. 22-23% (water) / 60-62% (sediment) day 0; max. 4-10 % (water) / 84% (sediment) day 4; max. 0% (water) / 39-70% (sediment) day 28.); Max. 38% (water)/ 89% (sediment) at days 0/4									
Water/sediment system	pH water/sed.	DegT50 whole syst. (d)	DegT90 whole syst. (d)	R ²	DissT50 water (d)	Kinetic, Fit	DissT50 sed. (d)	Kinetic, Fit	Evaluated on EU level y/n/ Reference
Kromme Rijn	-/7.5	90	290	0.93	*	-	-		SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
Geometric mean (n=2)		60	-		-		-		

* the ECCO agreed on a worst case DT₅₀ of 17 hours (0.71 d)

Table 8.6-2: Summary of observed metabolites

α-R-deltamethrin Water/sediment system	Max. in water/sediment 21-24 % after 1-2 weeks Max. 20% and 46% of ¹⁴ C in water after 2 and 8h	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
4'OH-deltamethrin Water/sediment system	Max. in water/sediment 8% after 7-14 days.	
mPBacid Water/sediment system	Max. in water/sediment 6%.	
Br₂CA Water/sediment system	Br ₂ CA not possible to detect due to position of ¹⁴ C-labelling Max. 53% and 23% of total radioactivity remaining in water at day 7, following spray drift and run-off simulation.	

8.7 Predicted Environmental Concentrations in soil (PEC_{soil}) (KCP 9.1.3)

8.7.1 Justification for new endpoints

Not relevant as there is no deviation to the EU/DAR, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002 agreed endpoints.

8.7.2 Active substance and relevant metabolites

Table 8.7-1: Input parameters related to application for PEC_{soil} calculations

Use No.	1, 2*	3, 4**	4, 5, 6	6, 7	
Crop	Brassicas (cabbage, Brussels sprouts, cauliflower)	Strawberry	Tomato	Ornamentals	
				Apple***	a)Onions****
Application rate (g as/ha)	Deltamethrin: 7.5-12.5				
Number of applications/interval	1/- 2/10 3/10				
Crop interception (%)	25	30	50	60	10
Depth of soil layer (relevant for plateau concentration) (cm)	20 cm (tillage)			5 cm (no tillage)	20 cm (tillage)

a) Worst-case for PEC_{soil} calculation

* Covered by use 1

** Covered by use 3

*** Surrogate crop for arbustive ornamentals

**** Surrogate crop for herbaceous and ornamental flowers

Table 8.7-2: Input parameter for active substance and relevant metabolite(s) for PEC_{soil} calculation

Compound	Molecular weight (g/mol)	Max. occurrence (%)	DT ₅₀ (days)	Value in accordance to EU endpoint y/n/ Reference
Deltamethrin	505.2	-	44.7 d (normalized worst case of lab. data)	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
Br ₂ CA	297.97	52%*	27.6 d (normalized worst case from lab studies)	
D-COOH	524.21	9%	1000 (default value)	

* Worst case from anaerobic study

8.7.2.1 Deltamethrin and its metabolites

Table 8.7-3: PEC_{soil} for Deltamethrin on Cabbage

PEC_{soil} (mg/kg)		Cabbage			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.008	-	-	-
Short term	24h	0.007	0.007	-	-
	2d	0.007	0.007	-	-
	4d	0.007	0.007	-	-
Long term	7d	0.007	0.007	-	-
	14d	0.006	0.007	-	-
	21d	0.005	0.006	-	-
	28d	0.005	0.006	-	-
	50d	0.003	0.005	-	-
	100d	0.002	0.004	-	-
Plateau concentration (20 cm) after year		-	-	-	-
$PEC_{accumulation}$ ($PEC_{act} + PEC_{soil\ plateau}$)		-	-	-	-

Table 8.7-4: PEC_{soil} for Deltamethrin on Strawberry

PEC_{soil} (mg/kg)		Strawberry			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.007	-	-	-
Short term	24h	0.007	0.007	-	-
	2d	0.007	0.007	-	-
	4d	0.007	0.007	-	-
Long term	7d	0.006	0.007	-	-
	14d	0.006	0.006	-	-
	21d	0.005	0.006	-	-
	28d	0.005	0.006	-	-
	50d	0.003	0.005	-	-
	100d	0.001	0.004	-	-
Plateau concentration (20 cm) after year		-	-	-	-
$PEC_{accumulation}$ ($PEC_{act} + PEC_{soil\ plateau}$)		-	-	-	-

Table 8.7-5: PEC_{soil} for Deltamethrin on Tomato

PEC_{soil}	Tomato
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(mg/kg)		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.005	-	-	-
Short term	24h	0.005	0.005	-	-
	2d	0.005	0.005	-	-
	4d	0.005	0.005	-	-
Long term	7d	0.004	0.005	-	-
	14d	0.004	0.004	-	-
	21d	0.004	0.004	-	-
	28d	0.003	0.004	-	-
	50d	0.002	0.003	-	-
	100d	0.001	0.003	-	-
Plateau concentration (20 cm) after year		-	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		-	-	-	-

Table 8.7-6: PEC_{soil} for Deltamethrin on Apple

PEC _{soil} (mg/kg)		Apple			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.004	-	-	-
Short term	24h	0.004	0.004	-	-
	2d	0.004	0.004	-	-
	4d	0.004	0.004	-	-
Long term	7d	0.004	0.004	-	-
	14d	0.003	0.004	-	-
	21d	0.003	0.003	-	-
	28d	0.003	0.003	-	-
	50d	0.002	0.003	-	-
	100d	0.001	0.002	-	-
Plateau concentration (5 cm) after year		-	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		-	-	-	-

Table 8.7-74: PEC_{soil} for Deltamethrin on Ornamentals (onions)

PEC _{soil} (mg/kg)		Ornamentals (onions)			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.009	-	-	-

Short term	24h	0.009	0.009	-	-
	2d	0.009	0.009	-	-
	4d	0.008	0.009	-	-
Long term	7d	0.008	0.009	-	-
	14d	0.007	0.008	-	-
	21d	0.006	0.008	-	-
	28d	0.006	0.007	-	-
	50d	0.004	0.006	-	-
	100d	0.002	0.005	-	-
Plateau concentration (20 cm) after year		-	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		-	-	-	-

PEC _{soil} (mg/kg)		Ornamentals (onions)			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.015	-	0.039	-
Short term	24h	0.015	0.015	0.038	0.039
	2d	0.015	0.015	0.038	0.038
	4d	0.014	0.015	0.037	0.038
Long term	7d	0.013	0.014	0.035	0.037
	14d	0.012	0.013	0.031	0.035
	21d	0.011	0.013	0.028	0.033
	28d	0.010	0.012	0.025	0.032
	50d	0.007	0.010	0.018	0.027
	100d	0.003	0.008	0.008	0.020
Plateau concentration (20 cm) after year		-	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		-	-	-	-

PEC_{soil} of metabolites

PEC_{soil} values for the metabolites were determined as for the parent with an application rate corrected taking into account the molecular weights (MW) and the maximum occurrence of the metabolite in soil as following:

$$\text{Application rate}_{\text{metabolite}} = (\text{MW}_{\text{metabolite}} / \text{MW}_{\text{parent}}) \times (\% \text{ maximum occurrence} / 100) \times \text{application rate}_{\text{parent}}$$

The corresponding application rates for each metabolite are summarized in the table below.

Table 8.7-85: Corrected application rates for the metabolites

Metabolite	Application rate of the parent	MW _{parent}	MW _{metabolite}	Maximum occurrence in soil	Corrected application rate
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	(g/ha)			(%)	(g/ha)
Br ₂ CA	1 x 7.5 3 x 12.5	505.2	297.97	52	1 x 2.300 3 x 3.834
D-COOH	1 x 7.5 3 x 12.5		524.21	9	1 x 0.700 3 x 1.167

The results of PEC_{soil} calculations are presented in the tables below.

Table 8.7-96: PEC_{soil} for Br₂CA on Cabbage

PEC _{soil} (mg/kg)		Cabbage			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.002	-	-	-
Short term	24h	0.002	0.002	-	-
	2d	0.002	0.002	-	-
	4d	0.002	0.002	-	-
Long term	7d	0.002	0.002	-	-
	14d	0.002	0.002	-	-
	21d	0.001	0.002	-	-
	28d	0.001	0.002	-	-
	50d	0.001	0.001	-	-
	100d	<0.001	0.001	-	-
Plateau concentration (20 cm) after year		-	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		-	-	-	-

Table 8.7-10: PEC_{soil} for Br₂CA on Strawberry

PEC _{soil} (mg/kg)		Strawberry			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.002	-	-	-
Short term	24h	0.002	0.002	-	-
	2d	0.002	0.002	-	-
	4d	0.002	0.002	-	-
Long term	7d	0.002	0.002	-	-
	14d	0.002	0.002	-	-
	21d	0.001	0.002	-	-
	28d	0.001	0.002	-	-
	50d	0.001	0.001	-	-
	100d	<0.001	0.001	-	-
Plateau concentration (20 cm) after year		-	-	-	-

PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})	-	-	-	-
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Table 8.7-11: PEC_{soil} for Br₂CA on Tomato

PEC _{soil} (mg/kg)		Tomato			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.002	-	-	-
Short term	24h	0.001	0.002	-	-
	2d	0.001	0.001	-	-
	4d	0.001	0.001	-	-
Long term	7d	0.001	0.001	-	-
	14d	0.001	0.001	-	-
	21d	0.001	0.001	-	-
	28d	0.001	0.001	-	-
	50d	<0.001	0.001	-	-
	100d	<0.001	0.001	-	-
Plateau concentration (20 cm) after year		-	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		-	-	-	-

Table 8.7-10: PEC_{soil} for Br₂CA on Apple

PEC _{soil} (mg/kg)		Apple			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.001	-	-	-
Short term	24h	0.001	0.001	-	-
	2d	0.001	0.001	-	-
	4d	0.001	0.001	-	-
Long term	7d	0.001	0.001	-	-
	14d	0.001	0.001	-	-
	21d	0.001	0.001	-	-
	28d	0.001	0.001	-	-
	50d	<0.001	0.001	-	-
	100d	<0.001	<0.001	-	-
Plateau concentration (5 cm) after year		-	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		-	-	-	-

Table 8.7-11: PEC_{soil} for Br₂CA on Ornamentals (onions)

PEC _{soil} (mg/kg)		Ornamentals (onions)			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.003	-	-	-
Short term	24h	0.003	0.003	-	-
	2d	0.003	0.003	-	-
	4d	0.002	0.003	-	-
Long term	7d	0.002	0.003	-	-
	14d	0.002	0.002	-	-
	21d	0.002	0.002	-	-
	28d	0.001	0.002	-	-
	50d	0.001	0.002	-	-
	100d	<0.001	0.001	-	-
Plateau concentration (20 cm) after year		-	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		-	-	-	-

PEC _{soil} (mg/kg)		Ornamentals (onions)			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA

Initial		0.004	-	0.010	-
Short term	24h	0.004	0.004	0.009	0.010
	2d	0.004	0.004	0.009	0.009
	4d	0.004	0.004	0.009	0.009
Long term	7d	0.003	0.004	0.008	0.009
	14d	0.003	0.003	0.007	0.008
	21d	0.002	0.003	0.006	0.008
	28d	0.002	0.003	0.005	0.007
	50d	0.001	0.002	0.003	0.006
	100d	<0.001	0.001	0.001	0.004
Plateau concentration (20 cm) after year		-	-	-	-
$\frac{PEC_{accumulation}}{(PEC_{act} + PEC_{soil\ plateau})}$		-	-	-	-

Table 8.7-127: PEC_{soil} for D-COOH on Cabbage

PEC_{soil} (mg/kg)		Cabbage			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.001	-	-	-
Short term	24h	0.001	0.001	-	-
	2d	0.001	0.001	-	-
	4d	0.001	0.001	-	-
Long term	7d	0.001	0.001	-	-
	14d	0.001	0.001	-	-
	21d	0.001	0.001	-	-
	28d	0.001	0.001	-	-
	50d	0.001	0.001	-	-
	100d	0.001	0.001	-	-
Plateau concentration (20 cm) after 8 years		0.001	-	-	-
$\frac{PEC_{accumulation}}{(PEC_{act} + PEC_{soil\ plateau})}$		0.002	-	-	-

Table 8.7-13: PEC_{soil} for D-COOH on Strawberry

PEC _{soil} (mg/kg)		Strawberry			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.001	-	-	-
Short term	24h	0.001	0.001	-	-
	2d	0.001	0.001	-	-
	4d	0.001	0.001	-	-
Long term	7d	0.001	0.001	-	-
	14d	0.001	0.001	-	-
	21d	0.001	0.001	-	-
	28d	0.001	0.001	-	-
	50d	0.001	0.001	-	-
	100d	0.001	0.001	-	-
Plateau concentration (20 cm) after 10 years		0.001	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.002	-	-	-

Table 8.7-14: PEC_{soil} for D-COOH on Tomato

PEC _{soil} (mg/kg)		Tomato			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		<0.001	-	-	-
Short term	24h	<0.001	<0.001	-	-
	2d	<0.001	<0.001	-	-
	4d	<0.001	<0.001	-	-
Long term	7d	<0.001	<0.001	-	-
	14d	<0.001	<0.001	-	-
	21d	<0.001	<0.001	-	-
	28d	<0.001	<0.001	-	-
	50d	<0.001	<0.001	-	-
	100d	<0.001	<0.001	-	-
Plateau concentration (20 cm) after 1 year		<0.001		-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		<0.001		-	-

Table 8.7-15: PEC_{soil} for D-COOH on Apple

PEC _{soil} (mg/kg)		Apple	
		Single application	Multiple applications

		Actual	TWA	Actual	TWA
Initial		<0.001	-	-	-
Short term	24h	<0.001	<0.001	-	-
	2d	<0.001	<0.001	-	-
	4d	<0.001	<0.001	-	-
Long term	7d	<0.001	<0.001	-	-
	14d	<0.001	<0.001	-	-
	21d	<0.001	<0.001	-	-
	28d	<0.001	<0.001	-	-
	50d	<0.001	<0.001	-	-
	100d	<0.001	<0.001	-	-
Plateau concentration (5 cm) after 3 years		0.001	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.001	-	-	-

Table 8.7-16: PEC_{soil} for D-COOH on Ornamentals (onions)

PEC _{soil} (mg/kg)		Ornamentals (onions)			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.001	-	-	-
Short term	24h	0.001	0.001	-	-
	2d	0.001	0.001	-	-
	4d	0.001	0.001	-	-
Long term	7d	0.001	0.001	-	-
	14d	0.001	0.001	-	-
	21d	0.001	0.001	-	-
	28d	0.001	0.001	-	-
	50d	0.001	0.001	-	-
	100d	0.001	0.001	-	-
Plateau concentration (20 cm) after 6 years		0.001	-	-	-
PEC _{accumulation} (PEC _{act} + PEC _{soil plateau})		0.002	-	-	-

PEC _{soil} (mg/kg)		Ornamentals (onions)			
		Single application		Multiple applications	
		Actual	TWA	Actual	TWA
Initial		0.001	-	0.004	-
Short term	24h	0.001	0.001	0.004	0.004
	2d	0.001	0.001	0.004	0.004

	4d	0.001	0.001	0.004	0.004
Long-term	7d	0.001	0.001	0.004	0.004
	14d	0.001	0.001	0.004	0.004
	21d	0.001	0.001	0.004	0.004
	28d	0.001	0.001	0.004	0.004
	50d	0.001	0.001	0.004	0.004
	100d	0.001	0.001	0.003	0.004
Plateau concentration (20 cm) after year 14		-	-	0.004	-
$PEC_{accumulation}$ ($PEC_{act} + PEC_{soil-plateau}$)		-	-	0.008	-

8.7.2.2 PEC_{soil} of DECIDE

Since DECIDE is rapidly broken down into its constituent parts on contact with soil and/or crop material, it is appropriate to calculate the PEC_s following a single application only, using the following equation:

$$PEC_s(mg/kg) = \frac{\text{Application rate (g/ha)} \times (1-F)}{100 \times \text{Soil depth (cm)} \times \text{Soil dry bulk density (g/cm}^3\text{)}}$$

Table 8.7-8: PEC_{soil} for DECIDE on all crops Ornamentals (onions)

Active substance / Preparation	Application rate (g/ha)	Crop interception (%)	PEC_{act} (mg/kg)
Deltamethrin / DECIDE	$1 \times 153.435^*$ $3 \times 255.725^*$	(Cabbage) 25	0.153
		(Strawberry) 30	0.143
		(Tomato) 50	0.102
		(Apple) 60	0.082
		(Onions) 10	0.184 0.921

* Based on density value of 1.0229 g/mol at 20.3°C.

ZRMS comments:

Calculations of PEC_s have been accepted.

Input parameters used by the Applicant in PEC_{soil} calculations have been accepted. Worst case DT_{50} values were used for deltamethrin Br₂CA in line with the Review Report of 2002. Applicant used worst case maximum occurrence of 52% from anaerobic study instead 23 % for Br₂CA.

The PEC_s provided for the in-field uses will be considered sufficient to cover the risk for the protected uses.

The uses in glasshouse was accepted on the base PEC_s calculated for field uses.

The above mentioned values should be used for risk assessment in the ecotoxicological section.

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

8.8.1 Justification for new endpoints

Not relevant as there is no deviation to the EU/DAR, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002 agreed endpoints.

8.8.2 Active substance and relevant metabolites (KCP 9.2.4.1)

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

Use No.	1, 2*	3, 4 **	4 , 5, 6	6 , 7	
Crop	Brassicas (cabbage, Brussels sprouts, cauliflower) 1 st crop	Strawberry	Tomato	Ornamentals	
				Apple***	Onion****
Application rate (g as/ha)	Deltamethrin: 7.5 12.5				
Number of applications/interval (d)	1/- 2/10 3/10				
Relative application date	7 day after emergence	3 days after emergence		1 day after emergence	
Crop interception (%)	25	30	50	60	10
Frequency of application	annual				
Models used for calculation	FOCUS PEARL v4.4.4, FOCUS PELMO v5.5.3				

*Covered by use 1

**Covered by use 3

*** Surrogate crop for arbustive ornamentals

**** Surrogate crop for herbaceous and ornamental flowers

It should be noted that as recommended in the Generic Guidance for Tier 1 FOCUS Ground Water Assessments (FOCUS 2011), a corrected application rate is calculated taking into account the interception by the crop canopy. Therefore, the substance is applied directly to the ground in the models, thus avoiding the internal interception routines in the models. The corrected application rate is 2 x 9.375g deltamethrin/ha for the use on Cabbage, 3 x 8.75 g deltamethrin/ha for the use on strawberry, 3 x 6.25 g deltamethrin/ha for the use on tomato 3 x 5.0 g deltamethrin/ha for apple and 3 x 10 g deltamethrin/ha for sunflower.

8.8.2.1 Deltamethrine and its metabolites

Table 8.8-2: Input parameters related to active substance Deltamethrin and metabolites for PEC_{gw} calculations

Compound	Deltamethrin	Br ₂ CA	D-COOH	Value in accordance with EU end-point y/n/ Reference*
Molecular weight (g/mol)	505.2	297.97	524.21	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
Water solubility (mg/L):	< 0.005, 20°C (pH 6.2)	1000 (default)		
Saturated vapour pressure (Pa):	1.24 x 10 ⁻⁸ , 25°C (6.45 x 10 ⁻⁹ , 20°C)*	0 (default)		
DT ₅₀ in soil (d)	31.1 d (geometric mean, normalisation to 10 kPa or pF2, 20 °C, Q ₁₀ 2.58, n=16)	2.7 d (geometric mean, normalisation to 10 kPa or pF2, 20 °C, Q ₁₀ 2.58, n=8)	1000 (default)	
K _{foc} / K _{fom} (mL/g)	5751287 / 3336013 (geomean, n=4)	21.6(geomean, n=3) / 12.53	4916/2852 (worst case from KOCWIN v2.01)	
1/n	0.93 (arithmetic mean, n=4)	0.89 (arithmetic mean, n=3)	0.9 (default)	
Plant uptake factor	0			
Formation fraction	-	1 from Deltamethrin (worst-case assumption)	1 from Deltamethrin (worst-case assumption)	

*Calculated by EVA 3.0 and used in PELMO simulations

In the PEC_{gw} tables no modifications have been done since the results are the same than simulating the new application rate. New calculations will be sent accordingly.

Table 8.8-3: PEC_{gw} for Deltamethrin and metabolites on Brassicas (cabbage 1st crop) (with FOCUS PEARL 4.4.4/PELMO 5.5.3)

Crop	Scenario	80 th Percentile PEC _{gw} at 1 m Soil Depth (µg/L)					
		Deltamethrin		Br ₂ CA		D-COOH	
		PEARL 4.4.4	PELMO 5.5.3	PEARL 4.4.4	PELMO 5.5.3	PEARL 4.4.4	PELMO 5.5.3
Brassicas (cabbage)	Châteaudun	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Hamburg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Jokioinen	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Kremsmünster	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Porto	< 0.001	< 0.001	< 0.001	< 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
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Table 8.8-4: PEC_{gw} for Deltamethrin and metabolites on Strawberry (with FOCUS PEARL 4.4.4/PELMO 5.5.3)

Crop	Scenario	80 th Percentile PEC _{gw} at 1 m Soil Depth (µg/L)					
		Deltamethrin		Br ₂ CA		D-COOH	
		PEARL 4.4.4	PELMO 5.5.3	PEARL 4.4.4	PELMO 5.5.3	PEARL 4.4.4	PELMO 5.5.3
Strawberry	Hamburg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Jokioinen	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Kremsmünster	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Sevilla	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001

Table 8.8-5: PEC_{gw} for Deltamethrin and metabolites on Tomato (with FOCUS PEARL 4.4.4/PELMO 5.5.3)

Crop	Scenario	80 th Percentile PEC _{gw} at 1 m Soil Depth (µg/L)					
		Deltamethrin		Br ₂ CA		D-COOH	
		PEARL 4.4.4	PELMO 5.5.3	PEARL 4.4.4	PELMO 5.5.3	PEARL 4.4.4	PELMO 5.5.3
Tomato	Châteaudun	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Porto	< 0.001	< 0.001	< 0.001	< 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 8.8-6: PEC_{gw} for Deltamethrin and metabolites on Ornamentals (apple) (with FOCUS PEARL 4.4.4/PELMO 5.5.3)

Crop	Scenario	80 th Percentile PEC _{gw} at 1 m Soil Depth (µg/L)					
		Deltamethrin		Br ₂ CA		D-CCOH	
		PEARL 4.4.4	PELMO 5.5.3	PEARL 4.4.4	PELMO 5.5.3	PEARL 4.4.4	PELMO 5.5.3
Apple	Châteaudun	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Hamburg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Jokioinen	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Kremsmünster	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Okehampton	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Piacenza	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Porto	< 0.001	< 0.001	< 0.001	< 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
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Table 8.8-8: PEC_{gw} for Deltamethrin and metabolites on Ornamentals (onion) (with FO-CUS PEARL 4.4.4/PELMO 5.5.3)

Crop	Scenario	80 th Percentile PEC _{gw} at 1 m Soil Depth (µg/L)					
		Deltamethrin		Br ₂ CA		D-CCOH	
		PEARL 4.4.4	PELMO 5.5.3	PEARL 4.4.4	PELMO 5.5.3	PEARL 4.4.4	PELMO 5.5.3
Onions	Châteaudun	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Hamburg	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Jokioinen	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Kremsmünster	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
	Porto	< 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

zRMS Comments:

The submitted PEC calculations for groundwater have been accepted.

The input parameters used was taken from the DAR and SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002.

Calculated by ZRMS PEC_{gw} of deltamethrin after application according GAP a were calculated to be <0.001µg/L for all scenarios. The calculations have been done according to proposed pattern use.

The PEC_{gw} for deltamethrin and its metabolite Br₂CA at 1 meter depth were always lower than the trigger value for drinking water of 0.1 µg/L.

PL: no are required calculations PEC_{gw} for surrogate crop to strawberry for scenario Châteaudun and for tomato for scenarios Hamburg and Kremsmünster due to the use of the same dose and very low PEC_{gw} values obtained for other crops for these scenarios under the same assumptions.

The PEC_{gw} provided for the in-field uses will be considered sufficient to cover the risk for the protected uses.

PEC_{gw} values were all below 0.001 µg/L for both deltamethrin, Br₂CA and D-COOH.

8.9 Predicted Environmental Concentrations in surface water (PEC_{sw}) (KCP 9.2.5)

8.9.1 Justification for new endpoints

Not relevant as there is no deviation to the EU/DAR, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002 agreed endpoints.

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

Table 8.9-1: Input parameters related to application for PEC_{sw/sed} calculations

Plant protection product	DECIDE					
Use No.	1, 2*	3, 4**	4, 5, 6	67		
Crop	Brassicas (cabbage, Brussels sprouts, cauliflower) (Leafy vegetables 1 st crop)	Strawberry (Fruiting vegetables) Leafy vegetables 1 st crop	Tomato (Fruiting vegetables and Potato for scenarios D3, D4 and R1)	Ornamentals (Apple)		Ornamentals (Bulb vegetables)
				Early	Late	
Application rate (kg as/ha)	Deltamethrin: 0.0075 0.0125					
Number of applications/interval (d)	1/- 2/10 3/10					
Application window	March-May Minimal interception				Jun-Sept Full canopy	March-May Minimal interception
Application method	Foliar spray					
CAM (Chemical application method)	CAM 2					
Soil depth (cm)	4					
Models used for calculation	FOCUS STEPS 1-2 v3.2, FOCUS SWASH v5.3, FOCUS PRZM v4.3.1, FOCUS MACRO v5.5.4, FOCUS TOXWA v5.5.3, SWAN v 5.0.0					

* Covered by use 1

** Covered by use 3

Table 8.9-2: FOCUS Step 3 Scenario related input parameters for PEC_{sw/sed} calculations for the application of DECIDE

Scenario	Application window used in modelling*						
	Leafy vegetables (brassicas)	Leafy vegetables*** (strawberry)	Potato**** (tomato)	Fruiting vegetables (strawberry and tomato)	Ornamentals		
					Apple Early (BBCH 10)	Apple Late (BBCH 85)	Bulb vegetables
D3	30/04	30/04**	13/05****	-	16/04	30/09	26/04
D3 2 nd	10/08	-	-	-	-	-	-

Scenario	Application window used in modelling*						
	Leafy vegetables (brassicas)	Leafy vegetables*** (strawberry)	Potato**** (tomato)	Fruiting vegetables (strawberry and tomato)	Ornamentals		
					Apple Early (BBCH 10)	Apple Late (BBCH 85)	Bulb vegetables
D4	18/05	18/05**	25/05****	18/05**	21/04	01/10	24/04
D5	-	-	-	-	02/04	07/09	-
D6	21/08	-	-	13/04	-	-	11/05
D6 2 nd	-	-	-	-	-	-	21/10
R1	25/04	25/04**	07/05****	-	16/04	30/09	21/04
R1 2 nd	05/08	-	-	-	-	-	-
R2	09/03	-	-	19/03	16/03	15/09	01/03
R2 2 nd	04/08	-	-	-	-	-	-
R3	08/03	-	-	13/05	02/04	11/09	02/03
R3 2 nd	22/06	-	-	-	-	-	-
R4	08/03	-	-	23/04	16/03	11/09	02/03
R4 2 nd	22/06	-	-	-	-	-	-

* First application according to AppDate v3.05 (30 April 2019)

**D3, D4 and R1 for Leafy vegetables at BBCH 11, single application covered by brassicas calculations in D3 and R1 scenarios

***According to AppDate v3.06 (28 June 2019)

**** For potato at BBCH 11

8.9.2.1 Deltamethrin and its metabolites

Table 8.9-3: Input parameters related to active substance Deltamethrin and metabolites for PEC_{sw/sed} calculations STEP 1/2 and 3/4

Compound	Deltame- thrin	Br ₂ CA	D-COOH	mPBacid	<i>α</i> -R- deltame- thrin	4'OH- deltame- thrin	Value in accordance to EU end- point y/n/ Reference
Molecular weight (g/mol)	505.2	297.97	524.21	214.22	505.2	521.2	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99- final 17 October 2002 and LoEP 16 July 2002
Saturated vapour pressure (Pa)	1.24 x 10 ⁻⁸ (25°C) (6.45 x 10 ⁻⁹ , 20°C)	Not required for steps 1/2					
Water solubility (mg/L)	< 0.005 (20°C, pH 6.2)	1000 (default)					

Compound	Deltame- thrin	Br ₂ CA	D-COOH	mPBacid	α -R- deltame- thrin	4'OH- deltame- thrin	Value in accordance to EU end- point y/n/ Reference
Diffusion coefficient in water (m ² /d)	4.3 x 10 ⁻⁵	Not required for steps 1/2					default
Diffusion coefficient in air (m ² /d)	0.43	Not required for steps 1/2					default
K _{foc} (mL/g)	5751287 (geomean, n=4)	21.6 (geomean, n=3)	4916 (calculated KOCWIN v2.01 worst case)	130.6 (geomean, n=4)	Like parent 5751287 (geomean, n=4)	42390 (calculated KOCWIN v2.01 worst case)	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99- final 17 October 2002 and LoEP 16 July 2002
Freundlich Exponent 1/n	0.9 (arithmetic mean, n=4)	Not required for steps 1/2					
Plant Uptake	0	Not required for steps 1/2					
Wash-Off factor from Crop (1/mm)	0.05 (MACRO) 0.50 (PRZM)	Not required for steps 1/2					
DT _{50,soil} (d)	31.1 d (geometric mean, normalisatio n to 10 kPa or pF2, 20 °C, Q ₁₀ 2.58, n=16)	2.7 d (geometric mean, normalisati on to 10 kPa or pF2, 20 °C, Q ₁₀ 2.58, n=8)	1000 (default)	2.24 (n=1, from Alpha cypermethri n DAR Addendum Vol3 (B8) 2002	1000 (default)		
DT _{50,water} (d)	1000 (default)						
DT _{50,sed} (d)	60 d (geomean, n=2)	1000 (default)					
DT _{50,whole system} (d)	60 d (geomean, n=2)	1000 (default)					
Maximum occurrence observed (% molar basis with respect to the parent)	Sed: 84	Soil: 52 ^{a)} Water: 53 ^{b)} Sediment: Total system: 53	Soil: 9 Water: Sediment: Total system: 0.00001 ^{c)}	Soil: < 5 Water: 26 ^{d)} Sediment: Total system:6 (26 ^{f)})	Soil: 0.0001 ^{e)} Water: 46 ^{b)} Sediment: Total system: 24 (46 ^{f)})	Soil: 0.0001 ^{e)} Water: Sediment: Total system: 8	

^{a)} From anaerobic study

^{b)} From high TIER studies

^{c)} Not detected on water/sediment studies

^{d)} From photolysis study

^{e)} Not detected on soil studies

^{f)} Used for calculations as worst case

PEC_{sw/sed}

Due to a bug in the FOCUS MACRO program the input parameters of the following scenarios have been modified:

- D4 and D5 for apple (early and late)
- D4 for leafy vegetables and onions

This issue has been reported to the Alterra and FOCUS support teams. The problem is that the FOCUS MACRO numerical solutions cannot handle a K_{foc} value as large as 5751287 mL/g and the masses entering via drainage are too high. To compensate this numerical artefact, the drainage inputs have been modified in the column "Pest_flux_to_drains_mg/m2/h" in the m2t file that was fixed to 0 according to the FOCUS support team experts' suggestion.

Table 8.9-4: FOCUS Step 1, 2 and 3 PEC_{sw} and PEC_{sed} for Deltamethrin following single/multiple applications of DECIDE to leafy vegetable (brassicas)

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Step 1	---	0.07	Drainage/Runoff	-	19.04
Step 2					
Southern Europe	March-May	0.07	Drainage/Runoff	-	5.63
Northern Europe		0.07		-	3.06
Step 3					
D3 (1 st season)	ditch	0.0028	Drainage	<0.001	0.064
D3 (2 nd season)	ditch	0.0028	Drainage	<0.001	0.070
D4	pond	<0.001	Drainage	<0.001	0.019
D4	stream	0.0021	Drainage	<0.001	0.003
D6	ditch	0.0836	Drainage	<0.001	0.254
R1 (1 st season)	pond	<0.001	Runoff	<0.001	0.047
R1 (2 nd season)	pond	<0.001	Runoff	<0.001	0.047
R1 (1 st season)	stream	0.0017	Runoff	<0.001	1.031
R1 (2 nd season)	stream	0.0018	Runoff	<0.001	0.962
R2 (1 st season)	stream	0.0024	Runoff	<0.001	0.267
R2 (2 nd season)	stream	0.0024	Runoff	<0.001	1.217
R3 (1 st season)	stream	0.00254	Runoff	<0.001	0.673
R3 (2 nd season)	stream	0.00255	Runoff	<0.001	0.169
R4 (1 st season)	stream	0.0017	Runoff	<0.001	1.043
R4 (2 nd season)	stream	0.0017	Runoff	<0.001	0.315

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Step 1	—	0.12 / 0.23	Drainage/Runoff	<0.01 / 0.01	31.74 / 63.48
Step 2					

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21-d-PEC _{sw,twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Southern Europe	March-May	0.12 / 0.10	Drainage/Runoff	0.01 / 0.01	9.39 / 16.81
Northern Europe		0.11 / 0.10		<0.01 / 0.01	5.10 / 9.09
Step 3					
D3 (1 st -season)	ditch	0.0049 / 0.0042	Drainage	<0.001 / <0.001	0.112 / 0.170
D3 (2 nd -season)	ditch	0.0049 / 0.0042	Drainage	<0.001 / <0.001	0.122 / 0.111
D4	pond	0.0001 / 0.0002	Drainage	<0.001 / <0.001	0.032 / 0.052
D4	stream	0.0037 / 0.0033	Drainage	<0.001 / <0.001	0.006 / 0.010
D6	ditch	0.0836 / 0.0834	Drainage	<0.001 / <0.001	0.255 / 0.257
R1 (1 st -season)	pond	0.0001 / 0.0002	Runoff	<0.001 / <0.001	0.079 / 0.155
R1 (2 nd -season)	pond	0.0001 / 0.0002	Runoff	<0.001 / <0.001	0.079 / 0.153
R1 (1 st -season)	stream	0.0031 / 0.0026	Runoff	<0.001 / <0.001	1.718 / 3.609
R1 (2 nd -season)	stream	0.0031 / 0.0026	Runoff	<0.001 / <0.001	1.603 / 3.272
R2 (1 st -season)	stream	0.0042 / 0.0036	Runoff	<0.001 / <0.001	0.378 / 0.788
R2 (2 nd -season)	stream	0.0043 / 0.0036	Runoff	<0.001 / <0.001	2.028 / 4.230
R3 (1 st -season)	stream	0.0045 / 0.0038	Runoff	<0.001 / <0.001	1.122 / 2.216
R3 (2 nd -season)	stream	0.0045 / 0.0038	Runoff	<0.001 / <0.001	0.282 / 0.587
R4 (1 st -season)	stream	0.0031 / 0.0026	Runoff	<0.001 / <0.001	1.738 / 3.468
R4 (2 nd -season)	stream	0.0030 / 0.0026	Runoff	<0.001 / <0.001	0.525 / 1.341

Table 8.9-5: FOCUS Step 1, 2 and 3 PEC_{sw} and PEC_{sed} for Deltamethrin following single/multiple applications of DECIDE to fruiting vegetables (strawberry and tomato)

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Step 1	---	0.07	Drainage/Runoff	<0.01	19.04
Step 2					
Southern Europe	March-May	0.07	Drainage/Runoff	<0.01	5.63
Northern Europe		0.07			3.06
Step 3					
D3*	ditch	0.0022	Drainage	<0.001	0.053
D4*	pond	0.0001	Drainage	<0.001	0.019
D4*	stream	0.0018	Drainage	<0.001	0.003
D6	ditch	0.0102	Drainage	<0.001	0.045
R1 *	pond	0.0001	Runoff	<0.001	0.025
R1 *	stream	0.0014	Runoff	<0.001	0.324
R2	stream	0.0023	Runoff	<0.001	0.244

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
R3	stream	0.00254	Runoff	<0.001	0.170
R4	stream	0.0017	Runoff	<0.001	0.455

*Scenarios simulated in potato according to the relevant Polish scenarios

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21-d-PEC _{sw,twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Step 1	—	0.12 / 0.35	Drainage/Runoff	<0.01 / 0.01	31.74 / 95.22
Step 2					
Southern Europe	March-May	0.12 / 0.08	Drainage/Runoff	0.01 / <0.01	9.39 / 22.55
Northern Europe		0.11 / 0.08			5.10 / 12.09
Step 3					
D4	pond	0.0001 / 0.0001	Drainage	<0.001 / <0.001	0.032 / 0.064
D4	stream	0.0037 / 0.0027	Drainage	<0.001 / <0.001	0.006 / 0.008
D6	ditch	0.0113 / 0.0113	Drainage	<0.001 / <0.001	0.050 / 0.084
R2	stream	0.0042 / 0.0030	Runoff	<0.001 / <0.001	0.407 / 0.927
R3	stream	0.0045 / 0.0032	Runoff	<0.001 / <0.001	0.285 / 0.975
R4	stream	0.0031 / 0.0022	Runoff	<0.001 / <0.001	0.758 / 1.521

Table 8.9-6: FOCUS Step 1, 2 and 3 PEC_{sw} and PEC_{sed} for Deltamethrin following single/multiple applications of DECIDE to ornamentals (apple early BBCH 10; apple tree scenario as a replacement plant for tall ornamental plants)

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Step 1	---	0.73	Drainage/Runoff	0.02	23.94
Step 2					
Southern Europe	March-May	0.73	Drainage/Runoff	0.03	10.67
Northern Europe					7.93
Step 3					
D3	ditch	0.0438	Drainage	0.002	0.975
D4	pond	0.0019	Drainage	0.001	0.468
D4	stream	0.0412	Drainage	<0.0001	0.050
D5	pond	0.0019	Drainage	0.001	0.469
D5	stream	0.0434	Drainage	<0.0001	0.043
R1	pond	0.0019	Runoff	0.001	0.452
R1	stream	0.0347	Runoff	0.0002	0.144
R2	stream	0.0473	Runoff	0.0001	0.095

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
R3	stream	0.0508	Runoff	0.0007	0.382
R4	stream	0.0349	Runoff	0.0003	0.170

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21-d-PEC _{sw,twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Step 1	—	1.22 / 3.65	Drainage/Runoff	0.03 / 0.09	39.91 / 119.72
Step 2					
Southern Europe	March-May	1.22 / 1.00	Drainage/Runoff	0.06 / 0.05	17.79 / 41.52
Northern Europe					13.22 / 30.36
Step 3					
D3	ditch	0.0770 / 0.0612	Drainage	0.004 / 0.006	1.693 / 3.024
D4	pond	0.0035 / 0.0054	Drainage	0.002 / 0.004	0.789 / 1.829
D4	stream	0.0724 / 0.0626	Drainage	<0.001 / <0.001	0.088 / 0.360
D5	pond	0.0035 / 0.0052	Drainage	0.002 / 0.003	0.791 / 1.898
D5	stream	0.0763 / 0.0659	Drainage	<0.001 / <0.001	0.076 / 0.264
R1	pond	0.0035 / 0.0049	Runoff	0.002 / 0.003	0.763 / 1.772
R1	stream	0.0609 / 0.0476	Runoff	<0.001 / <0.001	0.253 / 0.321
R2	stream	0.0830 / 0.0650	Runoff	<0.001 / <0.001	0.166 / 0.320
R3	stream	0.0893 / 0.0698	Runoff	0.001 / 0.003	0.668 / 1.192
R4	stream	0.0613 / 0.0479	Runoff	<0.001 / <0.001	0.298 / 0.585

Table 8.9-7: FOCUS Step 1, 2 and 3 PEC_{sw} and PEC_{sed} for Deltamethrin following single/multiple applications of DECIDE to ornamentals (apple late BBCH 85: apple tree scenario as a replacement plant for tall ornamental plants)

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw,twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Step 1	---	0.39	Drainage/Runoff	0.01	21.45
Step 2					
Southern Europe	June-Sept	0.39	Drainage/Runoff	0.02	6.91
Northern Europe					5.54
Step 3					
D3	ditch	0.0192	Drainage	0.001	0.658
D4	pond	0.0006	Drainage	<0.001	0.169
D4	stream	0.0188	Drainage	<0.001	0.070
D5	pond	0.0006	Drainage	<0.001	0.160

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
D5	stream	0.0209	Drainage	<0.001	0.187
R1	pond	0.0006	Runoff	<0.001	0.163
R1	stream	0.0144	Runoff	<0.001	0.080
R2	stream	0.0198	Runoff	<0.001	0.200
R3	stream	0.0209	Runoff	<0.001	0.356
R4	stream	0.0144	Runoff	<0.001	0.113

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d-PEC _{sw,twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	—	0.66 / 1.97	Drainage/Runoff	0.02 / 0.05	35.74 / 107.23
Step 2					
Southern Europe	June-Sept	0.66 / 0.46	Drainage/Runoff	0.03 / 0.02	7.66 / 16.15
Northern Europe					6.66 / 13.71
Step 3					
D3	ditch	0.0338 / 0.0236	Drainage	0.003 / 0.004	1.137 / 1.942
D4	pond	0.0011 / 0.0014	Drainage	<0.001 / <0.001	0.284 / 0.605
D4	stream	0.0330 / 0.0228	Drainage	<0.001 / <0.001	0.123 / 0.142
D5	pond	0.0011 / 0.0017	Drainage	<0.001 / 0.001	0.269 / 0.603
D5	stream	0.0369 / 0.0254	Drainage	<0.001 / 0.001	0.328 / 0.500
R1	pond	0.0011 / 0.0013	Runoff	<0.001 / <0.001	0.275 / 0.599
R1	stream	0.0252 / 0.0174	Runoff	<0.001 / <0.001	0.140 / 0.214
R2	stream	0.0349 / 0.0240	Runoff	<0.001 / <0.001	0.334 / 1.116
R3	stream	0.0368 / 0.0254	Runoff	<0.001 / <0.001	0.598 / 1.346
R4	stream	0.0252 / 0.0174	Runoff	<0.001 / <0.001	0.189 / 0.833

Table 8.9-8: FOCUS Step 1, 2 and 3 PEC_{sw} and PEC_{sed} for Deltamethrin following single/multiple applications of DECIDE to ornamentals (bulb vegetation as a replacement plant for low ornamental plants)

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw,twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Step 1	---	0.07	Drainage/Runoff	<0.01	19.04
Step 2					
Southern Europe	March-May	0.07	Drainage/Runoff	<0.01	6.66
Northern Europe					3.58
Step 3					

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
D3	ditch	0.0027	Drainage	<0.001	0.065
D4	pond	<0.0001	Drainage	<0.001	0.019
D4	stream	0.0020	Drainage	<0.001	0.002
D6 1 st	ditch	0.5368	Drainage	0.004	2.116
D6 2 nd	ditch	0.3397	Drainage	0.001	1.038
R1	pond	<0.0001	Runoff	<0.001	0.024
R1	stream	0.0017	Runoff	<0.001	0.305
R2	stream	0.0023	Runoff	<0.001	0.400
R3	stream	0.0025	Runoff	<0.001	0.085
R4	stream	0.0017	Runoff	<0.001	0.442

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21-d-PEC _{sw,twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Step 1	—	0.12 / 0.35	Drainage/Runoff	<0.01 / 0.01	31.74 / 95.22
Step 2					
Southern Europe	March-May	0.11 / 0.08	Drainage/Runoff	0.01 / <0.01	11.11 / 26.73
Northern Europe					
Step 3					
D3	ditch	0.0049 / 0.0035	Drainage	<0.001 / <0.001	0.113 / 0.189
D4	pond	0.0001 / 0.0002	Drainage	<0.001 / <0.001	0.032 / 0.066
D4	stream	0.0036 / 0.0026	Drainage	<0.001 / <0.001	0.004 / 0.007
D6-1 st	ditch	0.5368 / 0.5367	Drainage	0.004 / 0.004	2.116 / 2.116
D6-2 nd	ditch	0.3425 / 0.3388	Drainage	0.002 / 0.002	1.081 / 1.158
R1	pond	0.0001 / 0.0001	Runoff	<0.001 / <0.001	0.041 / 0.090
R1	stream	0.0031 / 0.0022	Runoff	<0.001 / <0.001	0.508 / 1.649
R2	stream	0.0042 / 0.0029	Runoff	<0.001 / <0.001	0.666 / 2.143
R3	stream	0.0045 / 0.003159	Runoff	<0.001 / <0.001	0.141 / 0.416
R4	stream	0.0030 / 0.0021	Runoff	<0.001 /	0.737 /

Table 8.9-9: FOCUS Step 3 PEC_{sw} and PEC_{sed} for Deltamethrin following single/multiple applications of DECIDE to strawberry (leafy vegetables 1st crop vegetation as a replacement plant for strawberry)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
D3 (1 st season)	ditch	0.0028	Drainage	<0.001	0.064

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
D4	pond	<0.001	Drainage	<0.001	0.019
D4	stream	0.0021	Drainage	<0.001	0.003
R1 (1 st season)	pond	<0.001	Runoff	<0.001	0.047
R1 (1 st season)	stream	0.0017	Runoff	<0.001	1.031

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
D3 (1 st season)	ditch	0.0049 / 0.0034	Drainage	<0.001 / <0.001	0.112 / 0.136
D4	pond	0.0001 / 0.0001	Drainage	<0.001 / <0.001	0.032 / 0.064
D4	stream	0.0037 / 0.0027	Drainage	<0.001 / <0.001	0.006 / 0.008
R1 (1 st season)	pond	0.0001 / 0.0001 / 0.0030	Runoff	<0.001 / <0.001	0.079 / 0.241
R1 (1 st season)	stream	0.0031 / 0.0023	Runoff	<0.001 / <0.001	1.718 / 5.790

Table 8.9-10: FOCUS Step 3 PEC_{sw} and PEC_{sed} for Deltamethrin following single/multiple applications of DECIDE to tomato (potato)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
D3	ditch	0.0039 / 0.0028	Drainage	<0.001 / <0.001	0.083 / 0.136
D4	pond	0.0001 / 0.0002	Drainage	<0.001 / <0.001	0.030 / 0.064
D4	stream	0.0033 / 0.0028	Drainage	<0.001 / <0.001	0.007 / 0.006
R1	pond	0.0026 / 0.0002	Runoff	<0.001 / <0.001	0.043 / 0.081
R1	stream	0.0026 / 0.0018	Runoff	<0.001 / <0.001	0.054 / 1.305

FOCUS Step 4

Table 8.9-109: Global maximum PEC_{sw} values for Deltamethrin, following single/multiple applications of DECIDE to leafy vegetables (brassicas) according to the central EU zone GAP according to surface water Step 4

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin
Nozzle reduction	Vegetative strip (m)	None
	No spray buffer (m)	5

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin
Nozzle reduction	Vegetative strip (m)	None
	No spray buffer (m)	5
None	D3 ditch 1 st *	0.0007
	D3 ditch 2 nd	0.0007
	D6 ditch	0.0836

*This scenario also covers Strawberry

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin	
Nozzle reduction	Vegetative strip (m)	None	
	No spray buffer (m)	5	10
None	D3 ditch (1 st season)	0.0012 / 0.0010	—
50 %		—	—
None	D3 ditch (2 nd season)	0.0012 / 0.0010	—
50 %		—	—
None	D4 stream	0.0012 / 0.0010	—
50 %		—	—
None	D6 ditch	0.0836 / 0.0835	0.0836 / 0.0835
50 %		0.0836 / 0.0835	—
None	R2 stream (1 st season)	0.0014 / 0.0011	—
50 %		—	—
None	R1 stream (1 st season)	0.0010 / —	—
50 %		—	—
None	R1 stream (2 nd season)	0.0010 / —	—
50 %		—	—
None	R2 stream (2 nd season)	0.0014 / 0.0012	—
50 %		—	—
None	R3 stream (1 st season)	0.0015 / 0.0012	—
50 %		—	—
None	R3 stream (2 nd season)	0.0015 / 0.0012	—
50 %		—	—
None	R4 stream (1 st season)	0.0010 / —	—
50 %		—	—
None	R4 stream (2 nd season)	0.0010 / —	—
50 %		—	—

Table 8.9-9: Global maximum PEC_{sw} values for Deltamethrin, following single/multiple applications of DECIDE to fruiting vegetables (strawberry and tomato) according to the central EU zone GAP according to surface water Step 4

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin
Nozzle reduction	Vegetative strip (m)	None
	No spray buffer (m)	5
None	D6 ditch	0.0102

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin	
Nozzle reduction	Vegetative strip (m)	None	
	No spray buffer (m)	5	10
None	D4 stream	0.0012/-	+/
50 %		+/	+/
None	D6 ditch	0.0112 / 0.0113	0.0113 / 0.0113
50 %		0.0112 / 0.0113	+/
None	R2 stream	0.0014 / 0.0010	+/
50 %		+/	+/
None	R3 stream	0.0015 / 0.0010	+/
50 %		+/	+/
None	R4 stream	0.0010 /	+/
50 %		+/	+/

Table 8.9-10: Global maximum PEC_{sw} values for Deltamethrin, following single/multiple applications of DECIDE to ornamentals (apple (early)) according to the central EU zone GAP according to surface water Step 4

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin				
Nozzle reduction	Vegetative strip (m)	None				
	No spray buffer (m)	5	10	15	20	30
None	D3 ditch	0.0336	0.0196	0.0081	0.0039	0.0013
50 %		0.0157	0.0091	0.0038	0.0018	-
75 %		0.0073	0.0042	0.0018	-	-
90 %		0.0027	0.0015	-	-	-

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin				
Nozzle reduction	Vegetative strip (m)	None				
	No spray buffer (m)	5	10	15	20	30
None	D4 stream	0.0348	0.0203	0.0084	0.0040	0.0013
50 %		0.0162	0.0095	0.0039	0.0019	-
75 %		0.0076	0.0044	0.0018	-	-
90 %		0.0028	0.0016	-	-	-
None	D5 stream	0.0368	0.0215	0.0089	0.0042	0.0014
50 %		0.0171	0.0100	0.0041	0.0020	-
75 %		0.0080	0.0046	0.0019	-	-
90 %		0.0029	0.0017	-	-	-
None	R1 stream	0.0293	0.0171	0.0071	0.0034	0.0012
50 %		0.0137	0.0080	0.0033	0.0016	-
75 %		0.0064	0.0037	0.0015	-	-
90 %		0.0023	0.0014	-	-	-
None	R2 stream	0.0400	0.0234	0.0096	0.0046	0.0016
50 %		0.0186	0.0109	0.0045	0.0021	-
75 %		0.0087	0.0050	0.0021	-	-
90 %		0.0032	0.0018	-	-	-
None	R3 stream	0.0430	0.0251	0.0104	0.0049	0.0017
50 %		0.0200	0.0117	0.0048	0.0023	-
75 %		0.0093	0.0054	0.0023	-	-
90 %		0.0034	0.0020	-	-	-
None	R4 stream	0.0295	0.0173	0.0072	0.0034	0.0012
50 %		0.0138	0.0080	0.0033	0.0016	-
75 %		0.0064	0.0037	0.0015	-	-
90 %		0.0023	0.0014	-	-	-

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin					
Nozzle reduction	Vegetative strip (m)	None					
	No spray buffer (m)	5	10	15	20	30	40
None	D3 ditch	0.0590 / 0.0458	0.0345 / 0.0256	0.0143 / 0.0135	0.0068 / 0.0058	0.0023 / 0.0017	7
50 %		0.0275 / 0.0213	0.0161 / 0.0119	0.0067 / 0.0063	0.0032 / 0.0027	—	7
75 %		0.0128 / 0.0099	0.0075 / 0.0055	0.0031 / 0.0029	0.0015* / 0.0012*	—	7

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin					
Nozzle reduction	Vegetative strip (m)	None					
	No-spray buffer (m)	5	10	15	20	30	40
90 %	D4-pond	0.0047 / 0.0036	0.0027 / 0.0020	0.0011 / 0.0011	—	—	—
95 %		0.0022 / 0.0017	0.0013 / —	—	—	—	—
None		0.0040 / 0.0062	0.0021 / 0.0033	— / 0.0016	—	—	—
50 %		0.0019 / 0.0029	— / 0.0016	—	—	—	—
75 %		— / 0.0014 ³	—	—	—	—	—
90 %		—	—	—	—	—	—
95 %	D4-stream	—	—	—	—	—	—
None		0.0612 / 0.0522	0.0358 / 0.0291	0.0148 / 0.0154	0.0070 / 0.0066	0.0024 / 0.0019	—
50 %		0.0285 / 0.0243	0.0167 / 0.0136	0.0069 / 0.0072	0.0033 / 0.0031	—	—
75 %		0.0133 / 0.0113	0.0078 / 0.0063	0.0032 / 0.0033	0.0015 / 0.0014 ³	—	—
90 %		0.0048 / 0.0041	0.0028 / 0.0023	0.0012 ³ / 0.0012	—	—	—
95 %		0.0023 / 0.0019	0.0013 / —	—	—	—	—
None	D5-pond	0.0040 / 0.0059	0.0021 / 0.0032	— / 0.0016 ³	—	—	—
50 %		0.0019 / 0.0028	— / 0.0015 ³	—	—	—	—
75 %		— / 0.0013 ³	—	—	—	—	—
90 %		—	—	—	—	—	—
95 %		—	—	—	—	—	—
None	D5-stream	0.0645 / 0.0550	0.0377 / 0.0307	0.0156 / 0.0162	0.0074 / 0.0069	0.0026 / 0.0020	—
50 %		0.0301 / 0.0256	0.0176 / 0.0143	0.0073 / 0.0076	0.0035 / 0.0032	—	—
75 %		0.0140 / 0.0119	0.0082 / 0.0066	0.0034 / 0.0035	0.0016 / 0.0015 ³	—	—
90 %		0.0051 / 0.0043	0.0030 / 0.0024	0.0012 / 0.0013	—	—	—
95 %		0.0024 / 0.0020	0.0014 / —	—	—	—	—
None	R1-pond	0.0040 / 0.0055	0.0021 / 0.0030	— / 0.0015 ³	—	—	—
50 %		0.0019 / 0.0026	— / 0.0014 ³	—	0.0003 / 0.0004	—	—
75 %		— / 0.0012 ³	—	—	0.0001 / 0.0002	—	—
90 %		—	—	—	—	—	—
95 %		—	—	—	—	—	—
None	R1-stream	0.0515 / 0.0397	0.0301 / 0.0221	0.0125 / 0.0117	0.0059 / 0.0050	0.0020 / 0.0015	—
50 %		0.0240 / 0.0185	0.0140 / 0.0103	0.0058 / 0.0055	0.0028 / 0.0023	—	—
75 %		0.0112 / 0.0086	0.0065 / 0.0048	0.0027 / 0.0025	0.0013 ³ / —	—	—
90 %		0.0041 / 0.0031	0.0024 / 0.0017	0.0010 / —	—	—	—
95 %		0.0019 / 0.0015	—	—	—	—	—
None	R2-stream	0.0702 / 0.0542	0.0411 / 0.0302	0.0170 / 0.0160	0.0081 / 0.0068	0.0028 / 0.0020	0.0013 / —
50 %		0.0327 / 0.0252	0.0191 / 0.0141	0.0079 / 0.0076	0.0038 / 0.0032	0.0013 / —	—

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin					
Nozzle reduction	Vegetative strip (m)	None					
	No spray buffer (m)	5	10	15	20	30	40
75 %		0.0152 / 0.0118	0.0089 / 0.0066	0.0037 / 0.0035	0.0017 / 0.0015*	—	—
90 %		0.0055 / 0.0043	0.0032 / 0.0024	0.0013 / 0.0013	—	—	—
95 %		0.00258 / 0.0020	0.0015 / —	—	—	—	—
None	R3 stream	0.0755 / 0.0582	0.0441 / 0.0325	0.0183 / 0.0172	0.0087 / 0.0073	0.0030 / 0.0022	0.0014 / —
50 %		0.0352 / 0.0271	0.0206 / 0.0151	0.0085 / 0.0080	0.0040 / 0.0034	0.0014 / —	—
75 %		0.0164 / 0.0126	0.0096 / 0.0070	0.0040 / 0.0037	0.0019 / 0.0016	—	—
90 %		0.0060 / 0.0046	0.0035 / 0.0026	0.0014 / 0.0014	—	—	—
95 %		0.0028 / 0.0021	0.0016 / —	—	—	—	—
None	R4 stream	0.0519 / 0.0400	0.0303 / 0.0223	0.0126 / 0.0118	0.0060 / 0.0050	0.0021 / 0.0015	—
50 %		0.0242 / 0.0186	0.0141 / 0.0104	0.0058 / 0.0055	0.0028 / 0.0023	—	—
75 %		0.0113 / 0.0087	0.0066 / 0.0048	0.0027 / 0.0026	0.0013 / —	—	—
90 %		0.0041 / 0.0032	0.0024 / 0.0018	0.0010 / —	—	—	—
95 %		0.0019 / 0.0015	—	—	—	—	—

*Calculation already sent in the first submission

Table 8.9-11: Global maximum PEC_{sw} values for Deltamethrin, following single/multiple applications of DECIDE to ornamental (apple (late)) according to the central EU zone GAP according to surface water Step 4

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin			
Nozzle reduction	Vegetative strip (m)	None			
	No spray buffer (m)	5	10	15	20
None	D3 ditch	0.0125	0.0051	0.0024	0.0014
50 %		0.0058	0.0024	0.0011	—
75 %		0.0027	0.0011	—	—
90 %		0.0010	—	—	—
None	D4 stream	0.0143	0.0059	0.0028	0.0016
50 %		0.0067	0.0027	0.0013	—
75 %		0.0031	0.0013	—	—
90 %		0.0011	—	—	—
None	D5 stream	0.0156	0.0066	0.0031	0.0018
50 %		0.0074	0.0030	0.0014	—
75 %		0.0035	0.0014	—	—

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin			
Nozzle reduction	Vegetative strip (m)	None			
	No spray buffer (m)	5	10	15	20
90%		0.0013	-	-	-
None	R1 stream	0.0109	0.0045	0.0021	0.0012
50 %		0.0051	0.0020	0.0010	-
75 %		0.0024	0.0010	-	-
90 %		0.0009	-	-	-
None	R2 stream	0.0151	0.0062	0.0029	0.0017
50 %		0.0070	0.0029	0.0014	-
75 %		0.0033	0.0013	-	-
90 %		0.0012	-	-	-
None	R3 stream	0.0160	0.0066	0.0031	0.0018
50 %		0.0074	0.0031	0.0014	-
75 %		0.0035	0.0014	-	-
90 %		0.0013	-	-	-
None	R4 stream	0.0109	0.0045	0.0021	0.0012
50 %		0.0051	0.0021	0.0010	-
75 %		0.0024	0.0010	-	-
90 %		0.0009	-	-	-

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin				
Nozzle reduction	Vegetative strip (m)	None				
	No spray buffer (m)	5	10	15	20	30
None	D3 ditch	0.0219 / 0.0156	0.0090 / 0.0067	0.0042 / 0.0031	0.0024 / 0.0017*	- / -
50 %		0.0102 / 0.0072	0.0042 / 0.0031	0.0020 / 0.0014*	- / -	- / -
75 %		0.0047 / 0.0034	0.0020 / 0.0014*	- / -	- / -	- / -
90 %		0.0017 / 0.0012	- / -	- / -	- / -	- / -
None	D4 stream	0.0251 / 0.0175	0.0103 / 0.0075	0.0049 / 0.0035	0.0028 / 0.0019	0.0013 / -
50 %		0.0117 / 0.0082	0.0048 / 0.0035	0.0023 / 0.0016	0.0013 / -	- / -
75 %		0.0054 / 0.0038	0.0022 / 0.0016	- / -	- / -	- / -
90 %		0.0020 / 0.0014	- / -	- / -	- / -	- / -
None	D5 stream	0.0281 / 0.0196	0.0115 / 0.0084	0.0054 / 0.0039	0.0032 / 0.0021	0.0015 / -
50 %		0.0131 / 0.0091	0.0054 / 0.0039	0.0025 / 0.0018	0.0015 / -	- / -

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin				
Nozzle reduction	Vegetative strip (m)	None				
	No spray buffer (m)	5	10	15	20	30
75 %	R1 stream	0.0061 / 0.0042	0.0025 / 0.0018	—	—	—
90 %		0.0022 / 0.0015	—	—	—	—
None		0.0192 / 0.0134	0.0079 / 0.0058	0.0037 / 0.0027	0.0022 / 0.0015*	—
50 %		0.0089 / 0.0062	0.0037 / 0.0027	0.0017 / 0.0012*	—	—
75 %		0.0042 / 0.0029	0.0017 / 0.0012*	—	—	—
90 %		0.0015 / 0.0011*	—	—	—	—
None	R2 stream	0.0265 / 0.0185	0.0109 / 0.0080	0.0051 / 0.0037	0.0030 / 0.0020	0.0014 / —
50 %		0.0124 / 0.0086	0.0051 / 0.0037	0.0024 / 0.0017	0.0014 / —	—
75 %		0.0057 / 0.0040	0.0024 / 0.0017	—	—	—
90 %		0.0021 / 0.0015	—	—	—	—
None	R3 stream	0.0280 / 0.0195	0.0115 / 0.0084	0.0054 / 0.0039	0.0032 / 0.0021	0.0015 / —
50 %		0.0131 / 0.0091	0.0054 / 0.0039	0.0025 / 0.0018	0.0015 / —	—
75 %		0.0061 / 0.0042	0.0025 / 0.0018	—	—	—
90 %		0.0022 / 0.0015	—	—	—	—
None	R4 stream	0.0192 / 0.0134	0.0079 / 0.0058	0.0037 / 0.0027	0.0022 / 0.0015*	—
50 %		0.0089 / 0.0062	0.0037 / 0.0027	0.0017 / 0.0012*	—	—
75 %		0.0042 / 0.0029	0.0017 / 0.0012*	—	—	—
90 %		0.0015 / 0.0011*	—	—	—	—

Table 8.9-12: Global maximum PEC_{sw} values for Deltamethrin, following single/multiple applications of DECIDE to ornamentals (onion) according to the central EU zone GAP according to surface water Step 4

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin
Nozzle reduction	Vegetative strip (m)	None
	No spray buffer (m)	5
None	D3 ditch	0.0007
	D6 ditch 1 st	0.5368
	D6 ditch 2 nd	0.3397

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin
Nozzle reduction	Vegetative strip (m)	None
	No spray buffer (m)	5
None	D3 ditch	0.0011 / 0.0008
	D4 stream	0.0012 / -
	D6 1 st ditch	0.5368 / 0.5367
	D6 2 nd ditch	0.3425 / 0.3388
	R1 stream	0.0010 / -
	R2 stream	0.0014 / -
	R3 stream	0.0015 / -
	R4 stream	0.0010 / -

Table 8.9-1: Global maximum PEC_{sw} values for Deltamethrin, following single/multiple applications of DECIDE to strawberry (leafy vegetables 1st crop) according to the central EU zone GAP according to surface water Step 4

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin
Nozzle reduction	Vegetative strip (m)	None
	No spray buffer (m)	5
None	D3 ditch (1 st season)	0.0012 / 0.0008
	D4 stream	0.0012 / 0.0009
	R1 stream (1 st season)	0.0010 / -

Table 8.9-1: Global maximum PEC_{sw} values for Deltamethrin, following single/multiple applications of DECIDE to tomato (potato) according to the central EU zone GAP according to surface water Step 4

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin
Nozzle reduction	Vegetative strip (m)	None
	No spray buffer (m)	5
None	D3 ditch+1 st season	0.0012 / 0.0008

PEC _{sw} (µg/L)	Scenario	STEP 4 Deltamethrin
Nozzle reduction	Vegetative-strip (cm)	None
	No-spray-buffer (cm)	5
	Drift-reduction	0.00416

Greenhouse uses

According to the Polish Authority comment made in the grey box below:

*“The applicant did not submit the PEC_{sw} for the intended uses in permanent greenhouse. On the other hand, the risk assessment provided for the in-field uses will be considered sufficient to cover the risk for the protected uses. The predicted concentrations in surface water have been calculated taking into account spray drift only.
An emission to surface water of 0.1 % of applied amount (12.5 g ai/ha) was assumed to a standard water body of 100 m length, 1 m width and 30 cm depth, resulting in a water volume of 30.000 L:

$$[(12.5 \text{ g} \times 0.001 (\text{drift})) : 100 (\text{m}^2)] : 30000 (\text{L}) = 4.16 \times 10^{-9} \text{ g} (= 0.00000416 \text{ µg/L})$$
This results initial PEC_{sw} of deltamethrin 0.00416 µg a.s./L for a standard water body of 30 cm depth”*

The Applicant have done the calculations according to the new application rate applying the following formula:

$$PEC_{sw} (\mu\text{g/L}) = \frac{\% \text{Drift}_{90th\%ile} \times \text{Application rate (g/ha)}}{\text{Water depth (cm)} \times 10}$$

Then the PEC_{sw} for Deltamethrin is

$$PEC_{sw} (\mu\text{L}) = \frac{0.1\% \times 7.5 (\text{g/ha})}{30 \times 10 (\text{cm})} = 0.0025 \mu\text{L}$$

For Deltamethrin soil metabolites Br₂Ca and D-COOH the PEC_{sw} has been calculated assuming a formation of 1 from Deltamethrin as worst case and doing the correction by molecular weight. Thus, the PEC_{sw} for Br₂Ca is:

$$PEC_{sw} (\mu\text{L}) = 0.0025 \times \frac{297.97}{505.2} = 0.0015 \mu\text{L}$$

And the PEC_{sw} of D-COOH is:

$$PEC_{sw} (\mu\text{L}) = 0.0025 \times \frac{524.21}{505.2} = 0.0026 \mu\text{L}$$

For greenhouse use GEM v3.3.2 for soilless scenarios has been used since the tomato crops are permanent and usually hydroponic. All the endpoints used are listed in Table 8.9 3, other endpoints needed for GEM are in table 8.9 14

Table 8.99-14: ~~Input parameters related to active substance Deltamethrin for GEM PEC_{sw} calculations~~

Compound	Deltamethrin	Value in accordance with EU endpoint y/n/ Reference*
Log Kow	4.6 @ 25°C, pH 7	y/ DAR, 1998, Addendum to Monograph Annex B, 2002, SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002
DT _{50,greenhouse floor} (d)	100 d (default)	
DT _{50,substrate} (d)	31.1 (geomean, normalisation to pF2, 20 °C with Q ₁₀ of 2.58, n=16)	
DT _{50,greenhouse air} (d)	0.67 (AOPwin-calculated) @ 25°C	
Molar act. energy _{greenhouse air}	45 kJ/mol	
DT _{50,recirculation water} (d)	31 @ 23°C, pH 8	
DT _{50,disinfection tank} (d)		
Molar act. energy _{recirculation water}	75 kJ/mol	

GEM v3.3.2 results

In the table below are reported the PEC_{sw} for single and multiple applications from GEM v3.3.2.

Table 8.9-15: ~~PEC_{sw} for Deltamethrin following single/multiple applications of DECIDE to tomatoes in greenhouse~~

Scenario	90-percentile peak concentration (µg/L)	7 d- PEC _{sw, twa} (µg/L)	21 d- PEC _{sw, twa} (µg/L)
GEM- Soilless			
Deltamethrin	0.0005 / 0.0011	0.0003 / 0.0007	0.0003 / 0.0004

Metabolites of Deltamethrin

Table 8.9-1713: **FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for Br₂CA following single/multiple applications to leafy vegetables (brassicac)**

Scenario	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
FOCUS					
Step 1	---	1.53 2.54 / 5.09	Drainage/Runoff	1.51 2.53 / 5.05	0.33 0.55 / 1.10
Step 2					
Southern Europe	March-May	0.31 0.52 / 0.83	Drainage/Runoff	0.31 0.51 / 0.82	0.07 0.11 / 0.18
Northern Europe		0.17 0.28 / 0.45		0.16 0.27 / 0.44	0.04 0.06 / 0.10

Table 8.9-1814: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for Br₂CA following single/multiple applications to fruiting vegetables (strawberry and tomato)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	1.53 2.54 / 7.63	Drainage/Runoff	1.51 2.53 / 7.57	0.33 0.55 / 1.65
Step 2					
Southern Europe	March-May	0.31 0.52 / 1.07	Drainage/Runoff	0.31 0.51 / 1.06	0.07 0.11 / 0.23
Northern Europe		0.17 0.28 / 0.57		0.16 0.27 / 0.57	0.04 0.06 / 0.12

Table 8.9-1945: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for Br₂CA following single/multiple applications to ornamentals (apple early, BBCH 10)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	1.73 2.89 / 8.67	Drainage/Runoff	1.71 2.86 / 8.57	0.37 0.62 / 1.86
Step 2					
Southern Europe	March-May	0.53 0.89 / 1.97	Drainage/Runoff	0.53 0.88 / 1.95	0.11 0.19 / 0.42
Northern Europe		0.38 0.63 / 1.44		0.37 0.62 / 1.42	0.08 0.13 / 0.31

Table 8.9-2016: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for Br₂CA following single/multiple applications to ornamentals (apple late BBCH 85)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	1.63 2.71 / 8.14	Drainage/Runoff	1.61 2.69 / 8.06	0.35 0.58 / 1.75
Step 2					
Southern Europe	June-Sept	0.22 0.37 / 0.77	Drainage/Runoff	0.22 0.36 / 0.76	0.05 0.08 / 0.16
Northern Europe		0.19 0.31 / 0.65		0.19 0.31 / 0.64	0.04 0.07 / 0.14

Table 8.9-2147: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for Br₂CA following single/multiple applications to ornamentals (onion)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	1.53 2.54 / 7.63	Drainage/Runoff	1.51 2.52 / 7.57	0.33 0.55 / 1.65
Step 2					
Southern Europe	March-May	0.37 0.61 / 1.27	Drainage/Runoff	0.36 0.61 / 1.26	0.08 0.13 / 0.27
Northern Europe		0.19 0.32 / 0.67		0.19 0.32 / 0.67	0.04 0.07 / 0.14

Table 8.9-2220: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for D-COOH following single/multiple applications to leafy vegetables (brassicas)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.03 0.05 / 0.10	Drainage/Runoff	0.03 0.05 / 0.10	1.52 2.53 / 5.06
Step 2					
Southern Europe	March-May	0.01 0.02 / 0.03	Drainage/Runoff	0.01 0.02 / 0.03	0.45 0.76 / 1.51
Northern Europe		<0.01 0.01 / 0.02		<0.01 0.01 / 0.02	0.23 0.38 / 0.75

Table 8.9-2348: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for D-COOH following single/multiple applications to fruiting vegetables (strawberry and tomato)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.03 0.05 / 0.15	Drainage/Runoff	0.03 0.05 / 0.15	1.52 2.53 / 7.60
Step 2					
Southern Europe	March-May	0.01 0.02 / 0.05	Drainage/Runoff	0.01 0.02 / 0.05	0.45 0.76 / 2.26
Northern Europe		<0.01 0.01 / 0.02		<0.01 0.01 / 0.02	0.23 0.38 / 1.13

Table 8.9-2419: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for D-COOH following single/multiple applications to ornamentals (apple, early, BBCH 10)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.03 0.05 / 0.15	Drainage/Runoff	0.03 0.05 / 0.15	1.52 2.53 / 7.60
Step 2					
Southern Europe	March-May	0.01 0.02 / 0.05	Drainage/Runoff	0.01 0.02 / 0.05	0.48 0.81 / 2.41
Northern Europe		<0.01 0.01 / 0.02		<0.01 0.01 / 0.02	0.24 0.40 / 1.20

Table 8.9-2520: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for D-COOH following single/multiple applications to ornamentals (apple, late, BBCH 85)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.03 0.05 / 0.15	Drainage/Runoff	0.03 0.05 / 0.15	1.52 2.53 / 7.60
Step 2					
Southern Europe	June-Sept	<0.01 0.01 / 0.02	Drainage/Runoff	<0.01 0.01 / 0.02	0.16 0.27 / 0.79
Northern Europe		<0.01 <0.01 / 0.01		<0.01 <0.01 / 0.01	0.11 0.18 / 0.53

Table 8.9-2621: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for D-COOH following single/multiple applications to ornamentals (onion)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.03 0.05 / 0.15	Drainage/Runoff	0.03 0.05 / 0.15	1.52 2.53 / 7.60
Step 2					
Southern Europe	March-May	0.01 0.02 / 0.06	Drainage/Runoff	0.01 0.02 / 0.05	0.55 0.91 / 2.71
Northern Europe		0.01 0.01 / 0.03		0.01 0.01 / 0.03	0.27 0.45 / 1.35

Table 8.9-2722: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for mPBacid following single/multiple applications to leafy vegetables (brassicas)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.29 0.48 / 0.96	Drainage/Runoff	0.28 0.47 / 0.95	0.37 0.62 / 1.25
Step 2					
Southern Europe	March-May	0.08 0.13 / 0.22	Drainage/Runoff	0.07 0.12 / 0.22	0.10 0.16 / 0.29
Northern Europe		0.04 0.07 / 0.12		0.04 0.07 / 0.12	0.05 0.09 / 0.16

Table 8.9-2823: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for mPBacid following single/multiple applications to fruiting vegetables (strawberry and tomato)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.29 0.48 / 1.44	Drainage/Runoff	0.28 0.47 / 1.42	0.37 0.62 / 1.87
Step 2					
Southern Europe	March-May	0.08 0.13 / 0.29	Drainage/Runoff	0.07 0.12 / 0.29	0.10 0.16 / 0.38
Northern Europe		0.04 0.07 / 0.16		0.04 0.07 / 0.16	0.05 0.09 / 0.21

Table 8.9-2924: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for mPBacid following single/multiple applications to ornamentals (apple, early BBCH 10)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.36 0.60 / 1.80	Drainage/Runoff	0.35 0.58 / 1.73	0.45 0.76 / 2.27
Step 2					
Southern Europe	March-May	0.14 0.24 / 0.58	Drainage/Runoff	0.14 0.23 / 0.56	0.18 0.31 / 0.74
Northern Europe		0.11 0.18 / 0.44		0.10 0.17 / 0.44	0.14 0.23 / 0.55

Table 8.9-3025: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for mPBacid following single/multiple applications to ornamentals (apple, late BBCH 85)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.32 0.54 / 1.62	Drainage/Runoff	0.31 0.52 / 1.57	0.41 0.69 / 2.07
Step 2					
Southern Europe	June-Sept	0.06 0.10 / 0.23	Drainage/Runoff	0.06 0.10 / 0.22	0.08 0.13 / 0.29
Northern Europe		0.05 0.09 / 0.20		0.05 0.09 / 0.19	0.07 0.11 / 0.25

Table 8.9-3126: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for mPBacid following single/multiple applications to ornamentals (onion)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.29 0.48 / 1.44	Drainage/Runoff	0.28 0.47 / 1.42	0.37 0.62 / 1.87
Step 2					
Southern Europe	March-May	0.09 0.15 / 0.35	Drainage/Runoff	0.09 0.15 / 0.34	0.12 0.19 / 0.45
Northern Europe		0.05 0.08 / 0.19		0.05 0.08 / 0.18	0.06 0.10 / 0.24

Table 8.9-3230: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for α-R-deltamethrin following single/multiple applications to leafy vegetables (brassicas)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.03 0.05 / 0.11	Drainage/Runoff	<0.01 <0.01 / <0.01	8.86 14.76 / 29.52
Step 2					
Southern Europe	March-May	0.03 0.05 / 0.05	Drainage/Runoff	<0.01 <0.01 / <0.01	2.60 4.34 / 7.79
Northern Europe					1.42 2.37 / 4.24

Table 8.9-3327: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for α -R-deltamethrin following single/multiple applications to fruiting vegetables (strawberry and tomato)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.03 0.05 / 0.16	Drainage/Runoff	<0.01 <0.01 / <0.01	8.86 14.76 / 44.28
Step 2					
Southern Europe	March-May	0.03 0.05 / 0.04	Drainage/Runoff	<0.01 <0.01 / <0.01	2.60 4.34 / 10.49
Northern Europe					1.42 2.37 / 5.67

Table 8.9-3428: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for α -R-deltamethrin following single/multiple applications to ornamentals (apple, BBCH 10)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.34 0.56 / 1.68	Drainage/Runoff	0.01 0.01 / 0.04	11.13 18.56 / 55.67
Step 2					
Southern Europe	March-May	0.34 0.56 / 0.46	Drainage/Runoff	0.02 0.03 / 0.02	5.03 8.39 / 20.49
Northern Europe					3.77 6.28 / 15.35

Table 8.9-3529: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for α -R-deltamethrin following single/multiple applications to ornamentals (apple, late BBCH 85)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.18 0.30 / 0.90	Drainage/Runoff	<0.01 0.01 / 0.02	9.97 16.62 / 49.87
Step 2					
Southern Europe	June-Sept	0.18 0.30 / 0.21	Drainage/Runoff	0.01 0.01 / 0.01	2.18 3.63 / 8.07
Northern Europe					1.90 3.17 / 6.94

Table 8.9-3630: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for α -R-deltamethrin following single/multiple applications to ornamentals (onion)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.03 0.05 / 0.16	Drainage/Runoff	<0.01 <0.01 / <0.01	8.86 14.76 / 44.28
Step 2					
Southern Europe	March-May	0.03 0.05 / 0.04	Drainage/Runoff	<0.01 <0.01 / <0.01	3.07 5.12 / 12.41
Northern Europe					1.66 2.76 / 6.64

Table 8.9-3731: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for 4'OH-deltamethrin following single/multiple applications to leafy vegetables (brassicas)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.01 0.02 / 0.03	Drainage/Runoff	<0.01 0.01 / 0.01	1.56 2.60 / 5.20
Step 2					
Southern Europe	March-May	0.01 0.01 / 0.01	Drainage/Runoff	<0.01 <0.01 / <0.01	0.46 0.76 / 1.37
Northern Europe					0.25 0.42 / 0.75

Table 8.9-3832: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for 4'OH-deltamethrin following single/multiple applications to fruiting vegetables (strawberry and tomato)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.01 0.02 / 0.05	Drainage/Runoff	<0.01 0.01 / 0.02	1.56 2.60 / 7.81
Step 2					
Southern Europe	March-May	0.01 0.01 / 0.01	Drainage/Runoff	<0.01 <0.01 / <0.01	0.46 0.76 / 1.85
Northern Europe					0.25 0.42 / 1.00

Table 8.9-3933: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for 4'OH-deltamethrin following single/multiple applications to ornamentals (apple, early, BBCH 10)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.06 0.11 / 0.32	Drainage/Runoff	0.01 0.01 / 0.03	1.96 3.27 / 9.82
Step 2					
Southern Europe	March-May	0.06 0.10 / 0.09	Drainage/Runoff	<0.01 0.01 / 0.01	0.89 1.48 / 3.61
Northern Europe					0.66 1.11 / 2.71

Table 8.9-4034: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for 4'OH-deltamethrin following single/multiple applications to ornamentals (apple, late, BBCH 85)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.04 0.06 / 0.18	Drainage/Runoff	<0.01 0.01 / 0.02	1.76 2.93 / 8.79
Step 2					
Southern Europe	June-Sept	0.03 0.05 / 0.04	Drainage/Runoff	<0.01 <0.01 / 0.01	0.38 0.81 / 1.85
Northern Europe					0.34 0.68 / 1.51

Table 8.9-4135: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for 4'OH-deltamethrin following single/multiple applications to ornamentals (onion)

Scenario FOCUS	Waterbody	Max PEC _{sw} (µg/L)	Dominant entry route	21 d- PEC _{sw, twa} (µg/L)	Max PEC _{sed} (µg/kg)
Step 1	---	0.01 0.02 / 0.05	Drainage/Runoff	<0.01 0.01 / 0.02	1.56 2.60 / 7.81
Step 2					
Southern Europe	March-May	0.01 0.01 / 0.01	Drainage/Runoff	<0.01 <0.01 / <0.01	0.54 0.90 / 2.19
Northern Europe					0.29 0.49 / 1.17

8.9.2.2 PEC_{sw/sed} of DECIDE

The PEC_{sw} for DECIDE was calculated using the following equation:

$$PEC_{sw} (\mu g/L) = \frac{\%Drift_{90th\%ile} \times Application\ rate\ (g/ha)}{Water\ depth\ (cm) \times 10}$$

The application of DECIDE is **1 x 0.15 L/ha** ~~3 x 0.25 L/ha~~, corresponding to **1 x 153.435** ~~3 x 255.725~~ g/ha (taking into account a density of 1.0229 g/cm³) for brassicas, strawberry, tomato and ornamentals. The depth of the static water body was assumed to be 30 cm. The resulting maximum instantaneous PEC_{sw} value is presented in the table 8.9-**429**.

Table 8.9-429: PEC_{sw} for DECIDE following single/multiple applications

Crop	Distance (m)	Drift (%)	Max PEC _{sw} (μg/L)
Brassicas (cabbage)	1	2.77/2.01	1.417 2.361 / 5.140
Strawberry and tomato			
Ornamentals (onions)			
Ornamentals (Aple early)	3	29.20/23.96	14.934 24.891 / 20.424
Ornamentals (Apple late)		15.73 14.73 / 11.01	8.045 12.556 / 9.385

The PEC_{sed} for DECIDE was calculated using the following equation:

$$PEC_{sed} (\mu g/kg\ dw) = \frac{\%Drift_{90th\%ile} \times Application\ rate\ (g/ha) \times \%Active\ substance\ in\ sediment}{1000 \times sediment\ density\ (g/cm^3) \times sediment\ height\ (cm)}$$

The application of DECIDE is **1 x 0.15 L/ha** ~~3 x 0.25 L/ha~~, corresponding to **1 x 153.435** ~~3 x 255.725~~ g/ha (taking into account a density of 1.0229 g/cm³) for brassicas, strawberry, tomato and ornamentals. The maximum percentage of Deltamethrin in the sediment is 84 %, **but the actual percentage of Deltamethrin in the formulated product is 5%, thus the total percentage in sediment is 84 x 0.05 = 4.2%**. The height of the sediment was assumed to be 5 cm and the sediment density was assumed to be 1.3 g/cm³. The resulting maximum instantaneous PEC_{sed} value is presented in the table 8.9-**432**.

Table 8.9-432: PEC_{sed} for DECIDE following single/multiple applications

Crop	Distance (m)	Drift (%)	% of Deltamethrin	Max PEC _{sed} (μg/kg) (based on maximum occurrence)
Brassicas (cabbage)	1	2.77/2.01	4.2 84	0.275 9.154 / 19.928
Strawberry and tomato				
Ornamentals (onions)				
Ornamentals (Apple aerly)	3	29.20/23.96		2.895 96.499 / 78.281
Ornamentals (Apple late)		15.73 14.73 / 11.01		1.560 48.679 / 36.385

zRMS Comments:

The submitted calculations results PEC_{sw} and PEC_{sed} for deltamethrin have been accepted.

The input parameters used was taken from the DAR and SANCO 6504/VI/99-final 17 October 2002 and LoEP 16 July 2002. The calculations have been done for STEP 1& 2 and Step3 and Step 4.

Applicant submitted new calculations. This calculations have been reviewed and approved, except the $PEC_{sw/sed}$ calculated for a 95% nozzle reduction for applications to ornamentals (apple (early)). The proposed risk mitigation measures at step 4 exceeded the 95% limit on mitigation of drift set up in FOCUS L&M GD (FOCUS, 2017). They cannot be used in the risk assessment for aquatic organisms, due to the possibility of exceeding the residual drift. The zRMS disagrees with the combination of 95% nozzle reduction with the no spray buffer zone for mitigate the risk, as it does not comply with European recommendations of FOCUS L&M GD (FOCUS, 2017).

The calculations $PEC_{sw/}$ made by using the GEM program should be considered at the national level. According PL harmonization guidance GEM is not acceptable.

Applications submitted in part A in label propose uses in greenhouses and other indoor. However, this uses must comply with the Guidance Document on Protected Crops (EFSA, 2014). It should be specified in which type of protected structure the representative use will be made (and whether the crop will remain within a permanent greenhouse throughout its entire life cycle). Due to the fact that the applicant did not provide the assessment in accordance with the guideline EFSA, 2014 zRMS was accepted only use the permanent greenhouse.

PL: According to GAP, the use of deltamethrin in tomato is restricted to the application in permanent greenhouse. Therefore an entry of deltamethrin to the environment after application to tomato and consequently of the compartment soil is very unlikely to occur. Nevertheless, for precautionary reasons calculations have been performed with the maximum application rate of 12.5 g a.s./ha demonstrating the safe use of the formulated product.

An emission to surface water of 0.1 % of applied amount was assumed according to the recommendations of the PL national authorities. Thus, the use of deltamethrin in tomato was not considered within the FOCUS Step 1 to Step 4 calculations. The applicant did not submit the PEC_{sw} for the intended uses in permanent greenhouse. On the other hand, the risk assessment provided for the in field uses will be considered sufficient to cover the risk for the protected uses. The predicted concentrations in surface water have been calculated taking into account spray drift only.

An emission to surface water of 0.1 % of applied amount (12.5 g ai/ha) was assumed to a standard water body of 100 m length, 1 m width and 30 cm depth, resulting in a water volume of 30.000 L:

$$[(12.5 \text{ g} \times 0.001 \text{ (drift)}) : 100 \text{ (m}^2\text{)}] : 30000 \text{ (L)} = 4.16 \times 10^{-9} \text{ g (= 0.00000416 } \mu\text{g/L)}$$

This results initial PEC_{sw} of deltamethrin 0.00416 $\mu\text{g a.s./L}$ for a standard water body of 30 cm depth

Property	deltamethrin	Br ₂ CA	D-COOH
Molar mass [g/mol]	505.2	297.97	524.21
$PEC_{sw} \mu\text{g/L}$	0.00416 $\mu\text{g/L}$	0.0027 $\mu\text{g/L}$	0.00036

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

Table 8.10-1 Summary of atmospheric degradation and behaviour

Compound	Deltamethrin
Direct photolysis in air	Not likely to occur (absorption max at 270 and 280 nm, cery little/no absorption above 290/300 nm)

Quantum yield of direct phototransformation	Data not provided, not required
Photochemical oxidative degradation in air	DT50 (h): 16 h (derived by the Atkinson model, AOPWIN-model) OH (12h) concentration assumed =
Volatilisation	<ul style="list-style-type: none"> - From plant surfaces over 24 hours: wind tunnels: negligible volatilisation - Field studies: larger loss by volatilisation was indicated by indirect measurements in the field (as % loss). - From water: Surface-sprayed (sterile): DT₅₀ 2.4 hours whereof = 70% accounted for by olatilisation Subsurface injected (sterile): only little volatilisation pond study, subsurface injected (10 g/ha): 10-100 ng/m³ measured above the surface 36 h after application. <p>Vapour pressure (Pa): 1.24×10^{-8} Pa, 25°C Henry's Law Constant (Pa.m³/mol): 3.1×10^{-2} Pa.3³/mol, 25°C</p>
Metabolites	No data provided, not required.

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

zRMS comments:

Accepted. Considering the characteristics of **deltamethrin** classified as non-volatile substance, no environmentally relevant impact to air or risk from exposure via air can be expected following use of DECIDE.

Appendix 1 Lists of data considered in support of the evaluation

Appendix 2 Detailed evaluation of the new Annex II studies

No new study was provided.

Appendix 3 Additional information provided by the applicant (e.g. detailed modelling data)

No additional information was provided.