FINAL REGISTRATION REPORT

Part B

Section 5

Analytical Methods

Detailed summary of the risk assessment

Product code: **102000025743**

Product name(s): **Foramsulfuron + Thiencarbazone-methyl**

(Active substance(s)) **OD 80 (50+30 g/L)**

Central Zone

Zonal Rapporteur Member State: Poland

CORE ASSESSMENT

(Re-Authorisation)

Applicant: **Bayer Crop Science Division**

Submission date: **31/08/2020 -Updated December 2021**

MS Finalisation date: **08/2021;12/2021**

Version history

When	What
31/08/2020	Initial Bayer CropScience submission (Regulation 1107/2009 - Art. 43) Foramsulfuron
August 2021	The renewal of the authorisation of the PPP (Art 43); zRMS evaluation
December 2021	Updated by applicant following commenting period (new information highlighted in yellow)
December 2021	Updated assessment following commenting period

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5 Analytical methods

Thiencarbazone-methyl (non renewed active ingredient):
According to the Guidance Document on the Renewal of Authorisations according to Article 43 of Regulation (EC) No 1107/2009 (SANCO/2010/13170), for products containing two or more active substances -and when the 1st substance is renewed- there is no need to evaluate data related to the 2nd substance.

We would like to bring to your attention the fact some analytical methods for thiencarbazone-methyl (plants/animal matrices) were submitted and therefore evaluated by ANSES (RMS, Thiencarbazone-methyl) and EFSA within the EU MRL review (Art.; 12 of Regulation 396/2005). These data are therefore considered as being EU peer reviewed and will not be summarized in Appendix 2.

5.1 Conclusion and summary of assessment

~~**Comments of zRMS:**~~	~~Final evaluation from ZRMS (Lithuania) Dec.15:~~ ~~*The description of method for foramsulfuron and thiencarbazone-methyl determination in their formulations as described in the study report M-426823-01-1 is acceptable (…).*~~ ~~*Validation results of the method AM017812MF2 for the determination of the active substances in the formulation Conviso One are acceptable.*~~ ~~No new studies were submitted during the renewal of authorisation. Please refer to the core dossier.~~

Analytical methods for the determination of residues:
Sufficiently sensitive and selective analytical methods are available for all analytes included in the residue definitions.
Noticed data gaps are: none
New methods for the determination of foramsulfuron are acceptable.
Reasons for providing new methods for post-authorization control and monitoring purposes:

- *KCP5.2.1/01 Modification 001 of analytical method 01360 for the determination of amidosulfuron, metsulfuron-methyl, iodosulfuron-methyl-sodium, mesosulfuron-methyl, and foramsulfuron in samples from plant origin by HPLC-MS/MS. Stuke, S.; 2015; MR-15/090; M-537921-01-1* :

The objective of the study was the validation of the analytical method 01360/M001 for Amidosulfuron, Metsulfuron-methyl, Iodosulfuron-methyl, Mesosulfuron-methyl, and Foramsulfuron for the additional sample material wheat grain determined with HPLC-MS/MS.

- *KCP 5.2.3/01 Analytical method 01478 for the determination of various pesticides and selected pesticide metabolites in plasma by HPLC-MS/MS. Kaussmann, M.; 2016; 01478; M-551992-01-1*:

Method of analysis for body fluids and tissues has been identified as a **data gap** in the EFSA conclusions (EFS Journal 2016, 14(3):4421). An analytical method has been provided and validated for the detrmination of formasulfuron in plasma with a LOQ=50µg/L.

- *KCP 5.2.5/01 Analytical method 01503 for the determination of AE F130619 in drinking and surface water by HPLC-MS/MS. Krebber, R.; Ruttmann, F.; 2016; P 684 167053; M-563516-01-1*

Method of analysis for AE F130619 in surface water has been identified as a **data gap** in the EFSA conclusions (EFS Journal 2016, 14(3):4421). An analytical method has been provided and validated for the detrmination of formasulfuron in surface water with a LOQ=0.05µg/L.

Methods submitted for Thiencarbazone-methyl were not evaluated. Renewal concerns only Foramsulfuron (see NL comment). The parts of the document that were not assessed are marked in light gray.

Commodity/crop	Supported/ Not supported
Sugar beet	Supported

5.2 Methods used for the generation of pre-authorization data (KCP 5.1)

5.2.1 Analysis of the plant protection product (KCP 5.1.1)

5.2.1.1 Determination of active substance and/or variant in the plant protection product (KCP 5.1.1)

Comments of zRMS:	Final evaluation from ZRMS (Lithuania) Dec.15: *The description of method for foramsulfuron and thiencarbazone-methyl determination in their formulations as described in the study report M-426823-01-1 is acceptable (…).* *Validation results of the method AM017812MF2 for the determination of the active substances in the formulation Conviso One are acceptable.* No new studies were submitted during the renewal of authorisation. Please refer to the core dossier.

An overview on the acceptable methods and possible data gaps for analysis of foramsulfuron and thiencarbazone-methyl in plant protection product is provided as follows:

Comments of zRMS:	

Additionally to the method(s) previously submitted and reviewed at European level, new methods have been developed and validated.

Method for the active substances in the formulation:

Reference:	**KCP 5.1.1/01**
Title:	Determination of foramsulfuron and thiencarbazone-methyl in formulations ; Assay HPLC, external standard
Report:	Michel, A.; 201[illegible]2; AM017812MF[illegible]1; M-426823-0[illegible]1-1
Authority registration No:	
Guideline(s):	REGULATION (EC) No 1107/2009 Comission Regulation 545/2011, 5.1 ; US EPA OCSPP 830.1800
Deviations:	--
GLP:	No
Acceptability:	
Duplication (if vertebrate study):	

Materials and methods

A defined amount of a homogeneous sample is weighed and dissolved in a mixture of trimethylamine and acetonitrile aided by sonication. Foramsulfuron and thiencarbazone-methyl are separated from formulation components and from each other on a reversed phase column using isocratic elution. After UV detection, the quantitative evaluation is carried out by comparing the peak areas with those of reference substances, using an external standard.

Equipment and operating conditions
Separation column

Packing material	:	Symmetry C18 or equivalent quality
Supplier	:	Waters or equivalent quality
Particle size	:	3.5 µm
Length	:	100 mm
I.D	:	4.6 mm

Chromatographic conditions

Injection volume	:	5 µL
Flow rate	:	2.0 mL/min
Column temperature	:	30 ° C
Eluent	:	A) phosphoric acid 0.01 mol/L B) acetonitrile

Gradient rinsing:

time (min)*	% A	% B
0.0	75	25
10.0	75	25
10.1	5	95
12.0	5	95
12.1	75	25
14.0	75	25

Running time : approx. 14 min

Total retention times : formsulfuron approx. 6.4 min
thiencarbazone-methyl approx. 8.5 min

Detection conditions
Measurement wavelength : 235 nm

Validation of the method for the active substances in the formulation
The HPLC method AM017812MF2 was validated for the formulation by checking the parameters linearity, precision, accuracy, specificity and interference from excipients.

Reference:	**KCP 5.1.1/02**
Title:	Validation of HPLC-method AM017812MF2 - Determination of foramsulfuron and thiencarbazone-methyl in formulations - foramsulfuron + thiencarbazone-methyl OD 80 (50+30 g/L)
Report:	Kienow, A.; Michel, A.; 2013; VB1-AM017812MF2; M-451436-01-1
Authority registration No:	
Guideline(s):	REGULATION (EC) No 1107/2009 , Comission Regulation 545/2011, 5.1, SANCO/3030/99 rev. 4 ; US EPA OCSPP 830.1800
Deviations:	--
GLP:	No
Acceptability:	
Duplication (if vertebrate study):	

Validation - Results and discussions

Table 5.2-1: Methods suitable for the determination of active substances foramsulfuron and thiencarbazone-methyl in plant protection product FSN+TCM OD 80

	Foramsulfuron	**Thiencarbazone-methyl**
Author(s), year	Kienow, A., Michel, A., 2013	Kienow, A., Michel, A., 2013
Principle of method	HPLC-UV	HPLC-UV
Linearity **Range: 50-150 % of expected concentration** **n = 6**	The function is linear in the operation range Correlation coefficient r_k: 1.00000 Regression equation: y = 1.3894x + 0.0951	The function is linear in the operation range Correlation coefficient r_k: 0.99997 Regression equation: y = 0.8268x + 0.0068
Precision – Repeatability Mean **n = 6**	The Relative Standard Deviation (RSD) of the analyte was determined to be 0.22 %. The precision is found to be acceptable. No outliers have been detected. Horwitz v.2.11 %	The Relative Standard Deviation (RSD) of the analyte was determined to be 0.24 %. The precision is found to be acceptable. No outliers have been detected. Horwitz v.2.27 %
Accuracy **n = 6**	Mean Recovery: 101.2 % Confidence interval of recovery: 101.21 ± 0.18 The method shows no constant systematic error. The method shows no proportional systematic error.	Mean recovery: 101.0 % Confidence interval of recovery: 101.02 ± 0.35 The method shows no constant systematic error. The method shows no proportional systematic error.
Interference/ Specificity	No interferences were found / The UV-spectra of analyte in the sample and reference items show no spectral difference; The retention times of analyte and reference items are identical.	No interferences were found / The UV-spectra of analyte in the sample and reference items show no spectral difference; The retention times of analyte and reference items are identical.
Comment	-	-

Conclusion

The analytical method AM017812MF2 is valid for the determination of foramsulfuron and thiencarbazone-methyl in this formulation via HPLC-UV.

Methods for the degradation products in the formulation:

Method 1 (AM020213MF1) for the degradation products in the formulation:

Reference:	**KCP 5.1.1/03**
Title:	Determination of foramsulfuron byproduct AE F092944, AE F153745 and AE F130619 in formulations ; Assay HPLC, external standard
Report:	Michel, A.; 2013; AM020213MF1; M-460493-01-1
Authority registration No:	
Guideline(s):	REGULATION (EC) No 1107/2009 , Comission Regulation 545/2011, 5.1 US EPA OCSPP 830.1800
Deviations:	--
GLP:	No
Acceptability:	
Duplication (if vertebrate study):	

The analytical method AM020213MF1 was developed for the determination of the foramsulfuron by-products AE F092944, AE F153745 and AE F130619 in formulations via HPLC-UV.

Materials and methods

A defined amount of a homogeneous sample is weighed and dissolved in a mixture of trimethylamine and acetonitrile aided by sonication. The foramsulfuron by-products AE F092944, AE F153745 and AE F130619 are separated from formulations components on a reversed phase column using gradient elution. After UV detection, the quantitative evaluation is carried out by comparing the peak areas with those of reference items, using an external standard.

Equipment and operating conditions
Separation column

Packing material : Symmetry C18 or equivalent quality
Supplier : Waters +
Particle size : 3.5 µm
Length : 100 mm
I.D : 4.6 mm

Chromatographic conditions

Injection volume : 5 µL
Flow rate : 2.0 mL/min
Column temperature : 30 °C
Eluent : A) Phosphoric acid 0.01 mol/L
B) Acetonitrile

	time (min)*	% A	% B
Separation	0.0	95	5
	4.0	95	5
	12.0	80	20
	29.0	80	20
Rinsing gradient	29.1	5	95
	31.0	5	95
	31.1	95	5
	33.0	95	5

Total retention times: AE F092944 approx. 1.8 min

AE F153745 approx. 6.8 min
AE F130619 approx. 25.9 min

Detection conditions
Measurement wavelength : 235 nm

Validation of the method 1 (AM020213MF1) for the degradation products in the formulation

Reference:	**KCP 5.1.1/04**
Title:	Validation of HPLC-method AM020213MF1 - Determination of foramsulfuron by-products AE F092944, AE F153745 and AE F130619 in formulations - foramsulfuron + thiencarbazone-methyl OD 80 (50+30 g/L)
Report:	Bastian-Bertrams, V.; Michel, A.; 2015; VB1.1-AM020213MF1; M-460499-02-1
Authority registration No:	
Guideline(s):	REGULATION (EC) No 1107/2009 , Comission Regulation 545/2011, 5.1, SANCO/3030/99 rev. 4, EPA OCSPP 830.1800
Deviations:	not specified
GLP:	No
Acceptability:	
Duplication (if vertebrate study):	

The HPLC method AM020213MF1 was validated for the formulation by checking the parameters linearity, precision, and accuracy, limits of detection / quantification, specificity and interference from excipients.

Method 2 (AM020313MF1) for the degradation products in the formulation:

Reference:	**KCP 5.1.1/05**
Title:	Determination of thiencarbazone-methyl byproduct AE 1364547 in formulations ; Assay HPLC, external standard
Report:	Michel, A.; 2013; AM020313MF1; M-454650-01-1
Authority registration No:	
Guideline(s):	REGULATION (EC) No 1107/2009 , Comission Regulation 545/2011, 5.1 US EPA OCSPP 830.1800
Deviations:	--
GLP:	No
Acceptability:	
Duplication (if vertebrate study):	

The analytical method AM020313MF1 was developed for the determination of thiencarbazone-methyl byproduct AE 1364547 in formulations via HPLC-UV.

Materials and methods

A defined amount of a homogeneous sample is weighed and dissolved in a mixture of acetonitrile and water aided by sonication. The by-product AE 1364547 is separated from formulations components on a reversed phase column using isocratic elution. After UV detection, the quantitative evaluation is carried out by comparing the peak area with those of reference item, using an external standard.

Equipment and operating conditions
Separation column
Packing material : XTerra MS C18 or equivalent quality
Supplier : Waters+
Particle size : 3.5 µm

Length : 50 mm
I.D : 4.6 mm

Chromatographic conditions
Injection volume : 5 µL
Flow rate : 3.0 mL/min
Column temperature : 50 °C
Eluent : A) Phosphoric acid 0.01 mol/L
B) Acetonitrile

	time (min)*	% A	% B
Separation	0.0	85	15
	1.5	85	15
Rinsing gradient	1.6	5	95
	3.5	5	95
	3.6	85	15
	5.0	85	15

Total retention time : AE 1364547 approx. 1.1 min

Detection conditions
Measurement wavelength : 215 nm

+ or equivalent quality

Validation of the method 2 (AM020313MF1) for the degradation products in the formulation

Reference:	**KCP 5.1.1/06**
Title:	Validation of HPLC-method AM020313MF1 - Determination of thiencarbazone-methyl byproduct AE 1364547 in formulations - foramsulfuron + thiencarbazone-methyl OD 80 (50+30 g/L)
Report:	Bastian-Bertrams, V.; Michel, A.; 2015; VB1-AM020313MF1; M-453185-02-1
Authority registration No:	
Guideline(s):	REGULATION (EC) No 1107/2009 , Comission Regulation 545/2011, 5.1, SANCO/3030/99 rev. 4 ; EPA OCSPP 830.1800
Deviations:	not specified
GLP:	No
Acceptability:	
Duplication (if vertebrate study):	

The HPLC method AM020313MF1 was validated for the formulation by checking the parameters linearity, precision, and accuracy, limits of detection / quantification, specificity and interference from excipients

Validation - Results and discussions

Table 5.2-2: Methods suitable for the determination of degradation products foramsulfuron and thiencarbazone-methyl in plant protection product FSN+TCM OD 80

	AE F092944	**AE F153745**	**AE F130619**	**AE 1364547**
Author(s), year	Bastian-Bertrams, V., Michel, A., 2015			Kienow, A., Michel, A., 2013

	AE F092944	**AE F153745**	**AE F130619**	**AE 1364547**
Principle of method	HPLC-UV			HPLC-UV
Linearity	The function is linear in the operation range (50 – 270%). Correlation coefficient r_k: 0.99969 Regression equation: y = 0.346x + 0.0001 n = 14	The function is linear in the operation range (50 – 200%). Correlation coefficient r_k: 0.99990 Regression equation: y = 0.8743x + 0.0021 n = 14	The function is linear in the operation range (50 – 170%). Correlation coefficient r_k: 0.99976 Regression equation: y = 1.2565x - 0.0052 n = 14	The function is linear in the operation range (50 – 250%). Correlation coefficient r_k: 0.99984 Regression equation: y = 1.6014x - 0.001 n = 12
Precision – Repeatability **Mean** **n = 6** **(%RSD)**	RSD: 6.13 % The precision is found to be acceptable. No outliers have been detected.	RSD: 6.59 % The precision is found to be acceptable. No outliers have been detected.	RSD: 4.56 % The precision is found to be acceptable. No outliers have been detected.	RSD: 2.09 % The precision is found to be acceptable. No outliers have been detected.
Accuracy **n = 6** **(% Recovery)**	Mean Recovery: 98.4 % Confidence interval of recovery: 98.44 ± 2.34 The method shows no constant systematic error. The method shows no proportional systematic error.	Mean Recovery: 102.8 % Confidence interval of recovery: 102.83 ± 1.22 The method shows no constant systematic error. The method shows no proportional systematic error.	Mean Recovery: 100.1 % Confidence interval of recovery: 100.11 ± 1.94 The method shows no constant systematic error. The method shows no proportional systematic error.	Mean Recovery: 101.7 % Confidence interval of recovery: 101.67 ± 1.65 The method shows no constant systematic error. The method shows no proportional systematic error.
Accuracy at LOQ **The blank formulation was fortified with reference standards at two concentration levels.**	Recovery level I (0.00753 %): 99.89 % (n=6) Recovery level II (0.10077 %): 100.0 % (n=6) The mean recovery I and II were found to be within the accepted range of 75 to 125 % for impurities < 0.1 % nominal content (in accordance with SANCO/3030/99/ rev.4).	Recovery level I (0.01872 %): 102.8 % (n=6) Recovery level II (0.18767 %): 102.6 % (n=6) The mean recovery I and II were found to be within the accepted range of 75 to 125 % for impurities < 0.1 % nominal content (in accordance with SANCO/3030/99/ rev.4).	Recovery level I (0.01142 %): 98.8 % (n=6) Recovery level II (0.09812 %): 100.7 % (n=6) The mean recovery I and II were found to be within the accepted range of 75 to 125 % for impurities < 0.1 % nominal content (in accordance with SANCO/3030/99/ rev.4).	-
Limits of quantification (LOQ)	LOQ = 0.00753 % (= 75.3 ppm)	LOQ = 0.01872 % (= 187.2 ppm)	LOQ = 0.01142 % (= 114.2 ppm)	0.00249 % (lowest value for recoveries)
Interference/ Specificity	No interferences were found / The UV-spectra of analyte in the sample and reference item show no spectral difference; The retention time of analyte and reference item is identical.	No interferences were found / The UV-spectra of analyte in the sample and reference item show no spectral difference; The retention time of analyte and reference item is identical.	No interferences were found / The UV-spectra of analyte in the sample and reference item show no spectral difference; The retention time of analyte and reference item is identical.	No interferences were found / The UV-spectra of analyte in the sample and reference item show no spectral difference; The retention time of analyte and reference item is identical.

	AE F092944	AE F153745	AE F130619	AE 1364547
Comment	-	-	-	-

Conclusion

The analytical methods AM020213MF1 and AM020313MF1 for the analysis of degradation products AE F092944, AE F153745, AE F130619 of foramsulfuron and degradation product AE 1364547 of thiencarbazone-methyl in plant protection product FSN+TCM OD 80 were found to be valid.

5.2.1.2 Description of analytical methods for the determination of relevant impurities (KCP 5.1.1)

The preparation specification 102000025743 does not contain any relevant impurities.

5.2.1.3 Description of analytical methods for the determination of formulants (KCP 5.1.1)

With respect to toxicological, eco-toxicological or environmental aspects the product FSN+TCM OD 80 does not contain any relevant formulants. Therefore, a special analytical method and validation is not needed.

5.2.1.4 Applicability of existing CIPAC methods (KCP 5.1.1)

There is no CIPAC method available for the determination of foramsulfuron or thiencarbazone-methyl.

5.2.2 Methods for the determination of residues (KCP 5.1.2)

Foramsulfuron

An overview on the acceptable methods and possible data gaps for analysis of residues of foramsulfuron for the generation of pre-authorization data is given in the following table. For the detailed evaluation of new/ additional studies it is referred to Appendix 2.

Validation data of method 01340 are submitted with this application as it was used for the determination of foramsulfuron and its metabolite AE F153745 during the storage stability study on sugar beet as well as several residue studies on sugar beet. Likewise, validation data of method 01207 are submitted as it was used for the determination of foramsulfuron and its metabolite AE F153745 during the short-term storage stability study on wheat grain and potato tuber.

In animal matrices, the residue definition for risk assessment “parent only” has been replaced in the conclusion on the peer review of foramsulfuron (EFSA, 2016) by foramsulfuron and AE F153745 (milk, kidney and eggs).

Table 5.2-4: Validated methods for the generation of pre-authorization data

Component of residue definition: foramsulfuron				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing / EU agreed**
Maize (grain, shoot and cob)	Primary **Method DGM F03/98***	Grain: 0.01 mg/kg foramsulfuron 0.01 mg/kg AE F153745 Shoot and cob 0.05 mg/kg foramsulfuron 0.05 mg/kg AE F153745	HPLC-MS/MS	Wrede, A., 1999 M-187207-01-1 EU agreed, DAR 2001
Maize green material	Primary **DGM Method F03/98/M001*** (Internal name 01376/M001)	0.01 mg/kg	HPLC-MS/MS	Stuke, S., 2013/ M-461902-01-1 EU agreed dRAR November 2015[1]
Maize grain	ILV	0.01 mg/kg	HPLC-MS/MS	Reichert, N., 2000 M-198922-01-1 EU agreed, DAR 2001
Wheat grain and potato tuber	Primary **Method 01207**	0.01 mg/kg	HPLC-MS/MS	Lakaschus, S.; Amann, S.; Winter, O.; Gizler, A., 2013/ M-424756-02-1 (S10-00279) used for the short storage stability Lakaschus, Gizler, 2015, M-480441-06-1 (S13-03307) Not EU peer review Appendix 2
Wheat grain Wheat green material Wheat straw Rape seed	Primary **Method 01376/M002**	0.01 mg/kg foramsulfuron and its metabolite AE F153745	HPLC-MS/MS (2 MRM transitions validated)	Kaussmann M.; 2017 M-587949-01-1 Not EU peer review Appendix 2
Wheat grain Wheat green material Wheat straw Barley grain Barley green material Barley straw	Primary **Method 01514**	0.01 mg/kg metabolite foramsulfuron: AE F092944	HPLC-MS/MS (2MRM transitions validated)	Kaussmann M., 2017 M-583894-01-1 Not EU peer reviewed Appendix 2

Sugarbeet : body/leaf with root collar/whole plant with root	Primary Method 01514 **Additional validation in the residue study 17-2033**	0.01 mg/kg AE F092944	HPLC-MS/MS	Kaussmann M., Houtermans M., 2018 M-642771-01-1 Not EU peer review Appendix 2
Sugarbeet body and leaf	Primary **Method 01340**	0.01 mg/kg foramsulfuron 0.01 mg/kg AE F153745	HPLC-MS/MS	Schulte, G. ; Oel , 2013 M-450947-01-1 Not EU peer review Appendix 2
Sugarbeet : body/leaf with root collar/whole plant with root	Primary **Method 01340** **Additional validation in the residue study 12-2138**	0.01 mg/kg foramsulfuron 0.01 mg/kg AE F153745	HPLC-MS/MS	Stuke, S. ; Diehl P. , 2014 M-480852-01-1 Not EU peer review Appendix 2
	Primary **Method 01340** **Additional validation in the residue study 12-2139**	0.01 mg/kg foramsulfuron 0.01 mg/kg AE F153745	HPLC-MS/MS	Stuke, S. ; Diehl P. , 2014 M-480864-01-1 Not EU peer review Appendix 2
	Primary **Method 01340** **Additional validation in the residue study 17-2033**	0.01 mg/kg foramsulfuron 0.01 mg/kg AE F153745	HPLC-MS/MS	Noss G., Nayyar B., 2018 M-642771-01-1 Not EU peer review Appendix 2
Animal products, food of animal origin,... (Residues)	Not relevant as no studies submitted.			
Soil, sediment,... (Environmental fate)	Not relevant as no studies submitted.			
Soil, water,... (Efficacy)	Not relevant as no specific methods for the support of efficacy studies were developed.			
Feed, body fluids,... (Toxicology)	Not relevant. In all reports about apical study types, like subchronic, chronic, carcinogenicity, neurotoxicity, reproduction and developmental toxicity studies the applied method used was a HPLC method. In all apical studies analyses were done to demonstrate identity, stability and homogeneity. The reporting of the used analytical methods was in agreement with the standards at that time. dRAR November 2015[1]			
Body fluids, air,.... (Exposure)	The risk evaluation for operators, workers, bystanders and residents demonstrates that experimental exposure studies in support of risk assessment are not necessary. Therefore, methods for body fluids and tissues are not required.			
Component of residue definition: foramsulfuron and its metabolite AE F130619				
Plants, (Residues)	Not relevant as residue definition does not apply.			
Animal products,				

food of animal origin,... (Residues)				
Soil, water, sediment,... (Environmental fate)	Not relevant as no studies submitted.			
Soil, water,... (Efficacy)	Not relevant as no studies submitted.			
Feed, body fluids,... (Toxicology)	Not relevant. In all reports about apical study types, like subchronic, chronic, carcinogenicity, neurotoxicity, reproduction and developmental toxicity studies the applied method used was a HPLC method. In all apical studies analyses were done to demonstrate identity, stability and homogeneity. The reporting of the used analytical methods was in agreement with the standards at that time. dRAR November 2015[1]			
Body fluids, air,.... (Exposure)	The risk evaluation for operators, workers, bystanders and residents demonstrates that experimental exposure studies in support of risk assessment are not necessary. Therefore, methods for body fluids and tissues are not required.			
Soil (Ecotoxicology)	Not relevant as no studies submitted.			
Water (Ecotoxicology)	Primary **Method 01350** (AE F130619)	AE F130619 0.01 µg/L	HPLC-MS/MS	Braune, M., Sandau, C., 2013/ M-445044-01-1 Not EU peer review Appendix 2 The analytical method referenced as **01350** was used in the following ecotoxicological study: M-574191-01-1
	Primary **Method 01387**	0.05 µg/L	HPLC-MS/MS	Krebber, R.; Braune, M., 2013 M-466732-01-1 EU agreed dRAR November 2015[1] The analytical method referenced as **01387** was used in the following ecotoxicological study: M-572386-03-1 Not EU peer review Appendix 2
Water (Ecotoxicology)	Primary **Method 01058**	0.05 µg/L	HPLC-MS/MS	The analytical method referenced as **01058** was used in the following ecotoxicological study: M-477103-01-1 Not EU peer review Appendix 2
Stock solution analysis (Ecotoxicology)	**Method AM017812MF1**	37 mg/L foramsulfuron	HPLC-UV	Michel, A.; 2012; M-426823-01-1 Not EU peer review Please refer to section 5.2.1.1

				The analytical method referenced as **AM017812MF1** was used in the following ecotoxicological study M-467676-01-1; M-491267-01-1; M-496996-01-1; M-502816-01-1.
Feeding diet for bees (Ecotoxicology)	Primary **Method 01340**	0.010 mg/kg foramsulfuron	HPLC-MS/MS	Schulte, G.; Oel, D.; 2013; M-450947-01-1 The analytical method referenced as **01340** was used in the following ecotoxicological study: M-604343-01-1 (study available upon request) Not EU peer review Appendix 2
Water, buffer solutions,... (Properties)	Not relevant as no additionnal phys chem studies are submitted.			

[1] Complete reference of source

* This method also allows analysing the metabolite AEF153745 in the same matrices.

Thiencarbazone-methyl

zRMS comment: methods submitted for Thiencarbazone-methyl were not evaluated. Renewal concerns only Foramsulfuron (see NL comment). The parts of the document that were not assessed are marked in light gray.

An overview on the acceptable methods and possible data gaps for analysis of residues of thiencarbazone-methyl for the generation of pre-authorization data is given in the following table. For the detailed evaluation of new/ additional studies it is referred to Appendix 2.

Table 5.2-4: Validated methods for the generation of pre-authorization data

Matrix type	Method type	Method LOQ	Principle of method (i.e. GC-MS or HPLC-UV)	Author(s), year / missing / EU agreed
Component of residue definition: thiencarbazone-methyl (BYH 18636), BYH 18636-N-desmethyl, and BYH 18636-MMT-glucoside				
Plants Corn (maize) kernel Corn (maize) forage Wheat straw (Residues)	Primary and confirmatory **Method 00962**	0.01 mg/kg*	HPLC-MS/MS	Zimmer, D.; Philipowski, C., 2006, M-278064-02-1 (Report MR-147/05) EU agreed, DAR, RMS UK, April 2012[1]
Plants Corn (maize) forage Corn (maize) kernel Sweet corn Corn (maize) stover Wheat Grain Soybean Seed Lemon Fruit Potato Tuber (Residues)	Primary **Method 00963**	0.01 mg/kg*	HPLC-MS/MS	Zimmer, D.; Philipowski, C., 2006, M-278045-02-2 (report MR-148/05) EU agreed, DAR, RMS UK, April 2012[1]
Animal products, food of animal origin,... (Residues)	Not relevant as residue definition does not apply.			
Soil, water, sediment,... (Environmental fate)	Not relevant as no studies submitted.			
Soil, water,... (Efficacy)	Not relevant as no studies submitted.			
Feed, body fluids,... (Toxicology)				

Matrix type	Method type	Method LOQ	Principle of method (i.e. GC-MS or HPLC-UV)	Author(s), year / missing / EU agreed
Body fluids, air,.... (Exposure)				
Soil, water (Ecotoxicology)	Not relevant as no studies submitted.			
Water, buffer solutions,... (Properties)	Not relevant as no studies submitted.			
Component of residue definition: sum of thiencarbazone-methyl (BYH 18636) and BYH 18636-MMT, expressed as thiencarbazone-methyl				
Animal products Milk Fat Muscle Kidney Liver (Residues)	Primary and confirmatory **Method 00990**	0.01 mg/kg*	HPLC-MS/MS	Brumhard, B.; 2006, M-281559-02-2 (report MR-185/05) EU agreed, DAR, RMS UK, April 2012[1]
Component of residue definition: thiencarbazone-methyl				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing / EU agreed**
Soil, water, sediment,... (Environmental fate)	Not relevant as no new studies.			
Soil, (Ecotoxicology)	Not relevant as no studies submitted.			
Water (Ecotoxicology)	Primary **Method 01387/M001**	0.05 µg/L (TCM)	HPLC-MS/MS	Krebber, R.; 2014 M-494841-02-1 Not EU peer review Appendix 2 refer to post-authorization part The analytical method referenced as **01387/M001** was used in the following ecotoxicological study: M-568404-02-1
	ILV **Method 01387/M001**	0.05 µg/L (TCM)	HPLC-MS/MS	Stanislowski, T.; 2015 M-509775-01-1 Not EU peer review Appendix 2

Matrix type	Method type	Method LOQ	Principle of method (i.e. GC-MS or HPLC-UV)	Author(s), year / missing / EU agreed
				refer to post-authorization part
	Primary **Method 01025**	0.05 µg/L	HPLC-MS/MS	Krebber, R, Leppelt, L, 2007 M-282614-01-1 EU agreed DAR[1], RMS UK, April 2012 The analytical method referenced as **01025** was used in the following ecotoxicological study: M-462568-01-1
	Primary Study 7SRLS13C11	0.1 ppb	HPLC-MS/MS	Banman, C.S., Moore, S., 2013 M-466233-01-1 Not EU peer review Appendix 2
Feeding diet for bees (Ecotoxicology)	**Method 01163**	0.01 mg/kg	HPLC-MS/MS	Schmeer, K.; Stuke, S.; 2009; M-354028-01-1 Not EU peer review Appendix 2 refer to post-authorization part The analytical method referenced as **011163** was used in the following ecotoxicological study: studies Grossmann, A.; 2016; M-576217-01-1 and Sekine, T.; 2018; M-615921-01-1 (study available upon request) Appendix 2

* LOQ for each analyte, expressed in parent equivalents

[1] United Kingdom, 2012. Draft Assessment Report on thiencarbazone-methyl (BYH 18636) prepared by the rapporteur Member State the United Kingdom in the framework of Directive 91/414/EEC, April 2012.

5.3 Methods for post-authorization control and monitoring purposes (KCP 5.2)

5.3.1 Analysis of the plant protection product (KCP 5.2)

Methods already submitted in accordance with the requirements set out in point 5.2.1 can be applied.

5.3.2 Description of analytical methods for the determination of residues of foramsulfuron (KCP 5.2)

5.3.2.1 Overview of residue definitions and levels for which compliance is required

According to the residue definition proposed in the EFSA Conclusions (EFSA Journal 2016; 14(3):4421), the

current legal residue definition for monitoring purposes is foramsulfuron only for food of plant and animal origins, environmental matrices (except surface water), body fluids and tissues. For surface water, the residue definition is foramsulfuron and the metabolite AE F130619.

Table 5.2-2: Relevant residue definitions for monitoring/enforcement and levels for which compliance is required

Matrix	Residue definition	MRL / limit	Reference for MRL/level Remarks
Plant, high water content	Foramsulfuron	LOQ 0.01 mg/kg	CR (EU) 289/2014
Plant, high acid content		LOQ 0.01 mg/kg	CR (EU) 289/2014
Plant, high protein/high starch content (dry commodities)		LOQ 0.01 mg/kg	CR (EU) 289/2014
Plant, high oil content		LOQ 0.02 mg/kg	CR (EU) 289/2014
Plant, difficult matrices (hops, spices, tea)		LOQ 0.05 mg/kg	CR (EU) 289/2014
Muscle	Foramsulfuron	LOQ 0.01 mg/kg	CR (EU) 289/2014
Milk		LOQ 0.01 mg/kg	CR (EU) 289/2014
Eggs		LOQ 0.01 mg/kg	CR (EU) 289/2014
Fat		LOQ 0.01 mg/kg	CR (EU) 289/2014
Liver, kidney		LOQ 0.01 mg/kg	CR (EU) 289/2014
Soil (Ecotoxicology)	Foramsulfuron	LOQ 0.1 µg/kg	NOEC ≥ 2.75 mg/kg dws* for earthworm, reproduction
Drinking water (Human toxicology)	Foramsulfuron	LOQ 0.05 µg/L	LOQ below the general limit for drinking water (0.1µg/L)
Surface water (Ecotoxicology)	Foramsulfuron Metabolite AE F130619	LOQ 0.01 µg/L	NOEC= 0.179 µg/L
Air	Foramsulfuron	LOQ: 12 µg/m3	AOEL sys: 0.1 mg/kg bw/d concentration c calculated from AOEL : 30 µg/m³**
Tissue (meat or liver)	Foramsulfuron	not required	not classified as T / T+
Body fluids	Foramsulfuron	not required	CR (EU) 289/2014 not classified as T / T+

CR: Commission Regulation
*: dws = dry weight soil;
**: According to SANCO/825/00 rev. 8.1 for monitoring method in air., the concentration calculated from the AOEL is included.

5.3.2.2 Description of analytical methods for the determination of residues in plant matrices (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of foramsulfuron in plant matrices is given in the following tables. For the detailed evaluation of new/ additional studies it is referred to Appendix 2.

Table 5.2-3: Validated methods for food and feed of plant origin (required for all matrix types, "difficult" matrix only when indicated by intended GAP)

Component of residue definition: foramsulfuron				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing / EU agreed**
High water content	Primary, includes a confirmatory procedure **Method 01360**	0.01 mg/kg	HPLC-MS/MS	Stuke, S., Ballmann, C., 2013/ M-455564-01-1 EU agreed dRAR November 2015[1]
	ILV	0.01 mg/kg	HPLC-MS/MS	Konrad, S., 2013 M-470160-01-1 EU agreed dRAR November 2015[1]
High acid content	Primary, includes a confirmatory procedure **Method 01360**	0.01 mg/kg	HPLC-MS/MS	Stuke, S., Ballmann, C., 2013/ M-455564-01-1 EU agreed dRAR November 2015[1]
	ILV	0.01 mg/kg	HPLC-MS/MS	Konrad, S., 2013 M-470160-01-1 EU agreed dRAR November 2015[1]
High oil content	Primary, includes a confirmatory procedure **Method 01360**	0.01 mg/kg	HPLC-MS/MS	Stuke, S., Ballmann, C., 2013 M-455564-01-1 EU agreed dRAR November 2015[1]
	ILV	0.01 mg/kg	HPLC-MS/MS	Konrad, S., 2013 M-470160-01-1 EU agreed dRAR November 2015[1]
Dry commodities (straw)	Primary, includes a confirmatory procedure **Method 01360**	0.01 mg/kg	HPLC-MS/MS	Stuke, S., Ballmann, C., 2013 M-455564-01-1 EU agreed dRAR November 2015[1]
	ILV	0.01 mg/kg	HPLC-MS/MS	Konrad, S., 2013 M-470160-01-1 EU agreed dRAR November 2015[1]
High protein/high starch content (cereal grain)	Primary, includes a confirmatory procedure **Method 01360/M001**	0.01 mg/kg	HPLC-MS/MS	Stuke, S., 2015 M-537921-01-1 (MR-15/090) Not EU peer review Appendix 2

[1] Finland, 2015. Renewal assessment report (RAR) on the active substance foramsulfuron prepared by the rapporteur member state, Finland, in the framework of Commission Implementing Regulation (EU) No 844/2012, March 2015. Available online: www.efsa.europa.eu.

For any special comments or remarkable points concerning the analytical methods for the determination of residues in plant matrices, please refer to Appendix 2.

Table 5.2-4: Statement on extraction efficiency

	Method for products of plant origin
Required, available from:	-
Not required, because:	As residues are not expected to be ≥LOQ in sugar beet body, extraction efficiency is not required according to SANCO/825/00 rev. 8.1.

5.3.2.3 Description of analytical methods for the determination of residues in animal matrices (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of foramsulfuron in animal matrices is given in the following tables. For the detailed evaluation of new/ additional studies it is referred to Appendix 2.

Table 5.2-5: Validated methods for food and feed of animal origin (if appropriate)

Component of residue definition: foramsulfuron				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (*i.e.* GC-MS or HPLC-UV)**	**Author(s), year / missing**
Milk, egg , Muscle, Fat, Liver, Kidney	Primary **Method EM F07/00-0**	0.01 mg/kg foramsulfuron	HPLC-MS/MS	Wrede, A., 2001 M-199702-02-1 EU agreed dRAR November 2015[1]
Milk, egg , Muscle, Fat, Liver, Kidney	Validation **Method EM F07/00-0**	0.01 mg/kg foramsulfuron	HPLC-MS/MS	Wrede, A., 2001 M-200439-01-1 EU agreed dRAR November 2015[1]
Milk, egg , Muscle, Fat, Liver, Kidney	ILV Method EM F07/00-0	0.01 mg/kg foramsulfuron	HPLC-MS/MS	Randolph,R., 2004/ M-240268-01-1 EU agreed dRAR November 2015[1]
Milk, Egg, Muscle, Fat, Liver, Kidney	Primary, includes a confirmatory procedure **Method 01208/M001**	0.01 mg/kg foramsulfuron	HPLC-MS/MS	Schmeer, K., 2011 M-389788-03-1 EU agreed dRAR November 2015[1]
	ILV	0.01 mg/kg foramsulfuron	HPLC-MS/MS	Moore, S., 2010 M-398300-01-1 (amended report M-398300-02-1, 2015, with no impact on the risk

Component of residue definition: foramsulfuron				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (*i.e.* GC-MS or HPLC-UV)**	**Author(s), year / missing**
				assessment) EU agreed dRAR November 2015[1]

[1] Finland, 2015. Renewal Assessment Report (RAR) on the active substance foramsulfuron prepared by the Rapporteur Member State, Finland, in the framework of Commission Implementing Regulation (EU) No 844/2012, november 2015.

For any special comments or remarkable points concerning the analytical methods for the determination of residues in animal matrices, please refer to Appendix 2.

Table 5.2-6: Statement on extraction efficiency

	Method for products of animal origin
Required, available from:	-
Not required, because:	In compliance with SANCO/825/00 rev. 8.1, residues are not expected to be ≥LOQ in animal matrices, so extraction efficiency is not required.

5.3.2.4 Description of methods for the analysis of body fluids and tissues (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of foramsulfuron in body fluids and tissues is given in the following table. For the detailed evaluation of new/ additional studies it is referred to Appendix 2.

Table 5.2-7: Methods for body fluids and tissues (if appropriate)

Component of residue definition: foramsulfuron			
Method type	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
Primary **Method 01478**	50 µg/L	HPLC-MS/MS	Kaussmann, M., 2016 M-551992-01-1 Not EU peer review Appendix 2
Confirmatory	Not required since two MRM transitions were validated during the primary method		

For any special comments or remarkable points concerning the analytical methods for body fluids and tissues please refer to Appendix 2.

5.3.2.5 Description of methods for the analysis of soil (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of foramsulfuron in soil is given in the following tables. For the detailed evaluation of new/ additional studies it is referred to Ap-

pendix 2.

Table 5.2-8: Validated methods for soil (if appropriate)

Component of residue definition: foramsulfuron			
Method type	**Method LOQ**	**Principle of method (*i.e.* GC-MS or HPLC-UV)**	**Author(s), year / missing**
Primary **Method 01115**	0.1 µg/kg	HPLC-MS/MS	Freitag, T., 2008 / M-310074-03-1 EU agreed dRAR November 2015[1]
Confirmatory	The HPLC-MS/MS method is highly specific (2 MRM transitions measured for each analyte and each matrix tested) and therefore an additional confirmatory method is not required.		

[1] Finland, 2015. Renewal Assessment Report (RAR) on the active substance foramsulfuron prepared by the Rapporteur Member State, Finland, in the framework of Commission Implementing Regulation (EU) No 844/2012, March 2015. Volume 3-B.5 (AS) November 2015. Available online: www.efsa.europa.eu.

For any special comments or remarkable points concerning the analytical methods for soil please refer to Appendix 2.

5.3.2.6 Description of methods for the analysis of water (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of foramsulfuron in surface and drinking water is given in the following tables. For the detailed valuation of new/ additional studies it is referred to Appendix 2.

Table 5.2-9: Validated methods for water (if appropriate)

Component of residue definition: foramsulfuron				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
Drinking water Surface water	Primary **Method 01058**	0.05 µg/L	HPLC-MS/MS	Krebber, R.; Braune, M.; 2007 M-291466-01-1 EU agreed dRAR November 2015[1]
	Primary **Method 01387**	0.05 µg/L	HPLC-MS/MS	Krebber, R.; Braune, M.; 2013 M-466732-01-1 EU agreed dRAR November 2015[1]
	ILV **Method 01387**	0.05 µg/L	HPLC-MS/MS	Stanislowski,T.; 2013 M-470714-02-1 EU agreed dRAR November 2015[1]
	Confirmatory	The HPLC-MS/MS method is highly specific (2 MRM transitions measured for each analyte and each matrix tested) and therefore an additional confirmatory method is not required.		

Component of residue definition: foramsulfuron				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
Component of residue definition: foramsulfuron + AE F130619				
Surface water	Primary **Method 01387**	0.05 µg/L	HPLC- MS/MS	Krebber, R.; Braune, M.; 2013 M-466732-01-1 EU agreed dRAR November 2015[1]
	Primary **Method 01503**	0.05 µg/L (AE F130619)	HPLC- MS/MS	Krebber, R.; Ruttmann, F., 2016 M-563516-01-1 Not EU peer reviewed Appendix 2
	ILV **Method 01387**	0.05 µg/L	HPLC- MS/MS	Stanislowski,T.; 2013 M-470714-02-1 EU agreed dRAR November 2015[1]
	Confirmatory	The HPLC-MS/MS method is highly specific (2 MRM transitions measured for each analyte and each matrix tested) and therefore an additional confirmatory method is not required.		

[1] Finland, 2015. Renewal Assessment Report (RAR) on the active substance foramsulfuron prepared by the Rapporteur Member State, Finland, in the framework of Commission Implementing Regulation (EU) No 844/2012, March 2015. Volume 3-B.5 (AS) November 2015. Available online: www.efsa.europa.eu.

For any special comments or remarkable points concerning the analytical methods for water please refer to Appendix 2.

5.3.2.7 Description of methods for the analysis of air (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of foramsulfuron in air is given in the following tables. No new analytical methods, besides the ones already evaluated at EU level, are presented.

Table 5.2-10: Validated methods for air (if appropriate)

Component of residue definition: foramsulfuron			
Method type	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
Primary **Method C08/99-0**	12 µg/m^3	GC-MSD	Sutton, A. L.;Everitt, S. L.; 1999 M-188704-01-1 EU agreed dRAR November 2015[1]
	For confirmation, three ions of m/z >100 were monitored		
Primary **Method IF-100/21281-00**	12 µg/m^3	HPLC-UV	Reichert, N.; 2002 M-227811-03-1

Component of residue definition: foramsulfuron			
Method type	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
			EU agreed dRAR November 2015[1]
	For confirmation a second HPLC method was developed by changing the eluent		

[1] Finland, 2015. Renewal Assessment Report (RAR) on the active substance foramsulfuron prepared by the Rapporteur Member State, Finland, in the framework of Commission Implementing Regulation (EU) No. 844/2012, March 2015. Volume 3-B.5 (AS) November 2015. Available online: www.efsa.europa.eu.

5.3.2.8 Other studies/ information

None.

5.3.3 Description of analytical methods for the determination of residues of thiencarbazone-methyl (KCP 5.2)

zRMS comment: methods submitted for Thiencarbazone-methyl were not evaluated. Renewal concerns only Foramsulfuron (see NL comment). The parts of the document that were not assessed are marked in light gray.

5.3.3.1 Overview of residue definitions and levels for which compliance is required

Compared to the residue definition proposed in the Draft Assessment Report (incl. its addenda) the current legal residue definition is identical.

Table 5.2-11: Relevant residue definitions for monitoring/enforcement and levels for which compliance is required

Matrix	Residue definition	MRL / limit	Reference for MRL/level Remarks
Plant, high water content	parent thiencarbazone-methyl (BYH 18636)	LOQ of 0.01 mg/kg	EFSA Journal, 2013; 11(7):3270 Default MRL of 0.01 mg/kg according to Art. 18(1)(b) Reg. 396/2005
Plant, high acid content		LOQ of 0.01 mg/kg	
Plant, high protein/high starch content (dry commodities)		LOQ of 0.01 mg/kg	
Plant, high oil content		LOQ of 0.01 mg/kg	
Muscle	sum of thiencarbazone-methyl (BYH 18636) and BYH18636-MMT, expressed as thiencarbazone-methyl	LOQ of 0.01 mg/kg*	EFSA Journal, 2013; 11(7):3270
Milk		LOQ of 0.01 mg/kg*	
Eggs		LOQ of 0.01 mg/kg*	
Fat		LOQ of 0.01 mg/kg*	
Liver, kidney		LOQ of 0.01 mg/kg*	

Matrix	Residue definition	MRL / limit	Reference for MRL/level Remarks
Soil (Ecotoxicology)	Thiencarbazone-methyl	0.4 µg/kg /LOQ	NOEC ≥ 1000 mg a.s. /kg dws earthworm reproduction, folsomia and hypoaspis
Drinking water (Human toxicology)	Thiencarbazone-methyl	0.05 µg/L / LOQ	General limit for drinking water 0.1µg/L
Surface water (Ecotoxicology)	Thiencarbazone-methyl	0.05 µg/L / LOQ	Lowest EC_{50}:1.31 µg/L (growth rate) and 0.8 µg/L (biomass). Lowest NOEC: 0.21 µg/L
Air	Thiencarbazone-methyl	3.75 µg/$m^{3/}$ / LOQ	AOEL: 0.12 mg/kg bw/day EFSA Journal, 2013; 11(7):3270 concentration calculated from AOEL : 36 µg/m^3**
Tissue (meat or liver)	Thiencarbazone-methyl and BYH 18636-MMT (M21), expressed as thiencarbazone-methyl	not required	Not classified as T / T+ EFSA Journal, 2013; 11(7):3270 ECHA (Nov.2018)
Body fluids (plasma)		not required	

* LOQ for each analyte, expressed in parent equivalents
** According to SANCO/825/00 rev. 8.1 for monitoring method in air, the concentration calculated from the AOEL is included.

5.3.3.2 Description of analytical methods for the determination of residues in plant matrices (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of thiencarcarbazone-methyl in plant matrices is given in the following tables. For the detailed evaluation of new/additional studies, please refer to Appendix 2.

Table 5.2-12: Validated methods for food and feed of plant origin (required for all matrix types, "difficult" matrix only when indicated by intended GAP)

Component of residue definition: thiencarbazone-methyl				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing / EU agreed**
High water content	Primary, includes a confirmatory procedure **Method 00963**	0.01 mg/kg	HPLC-MS/MS	Zimmer, D.; C. Philipowski, C., 2006 M-278045-02-2 (Report MR-148/05) EU agreed DAR[1], RMS UK, April 2012 Evaluation Report[2] (RMS: France, July 2019)
	ILV **Method 00963**	0.01 mg/kg	HPLC-MS/MS	Class, T. / 2006 / M-280706-01-2 (Report P/B 1125 G) EU agreed

Component of residue definition: thiencarbazone-methyl				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing / EU agreed**
				DAR[1], RMS UK, April 2012 Evaluation Report[2] (RMS: France, July 2019)
High acid content	Primary, includes a confirmatory procedure **Method 00963**	0.01 mg/kg	HPLC-MS/MS	Zimmer, D.; C. Philipowski, C., 2006 M-278045-02-2 (Report MR-148/05) EU agreed DAR[1], RMS UK, April 2012 Evaluation Report[2] (RMS: France, July 2019)
High oil content	Primary, includes a confirmatory procedure **Method 00963**	0.01 mg/kg	HPLC-MS/MS	/ D. Zimmer; C. Philipowski / 2006 / M-278045-02-2 (Report MR-148/05) EU agreed DAR[1], RMS UK, April 2012 Evaluation Report[2] (RMS: France, July 2019)
High protein/high starch content (dry)	Primary, includes a confirmatory procedure **Method 00963**	0.01 mg/kg	HPLC-MS/MS	Zimmer, D.; C. Philipowski, C., 2006 M-278045-02-2 (Report MR-148/05) EU agreed DAR[1], RMS UK, April 2012 Evaluation Report[2] (RMS: France, July 2019)
	ILV **Method 00963**	0.01 mg/kg	HPLC-MS/MS	Class, T. / 2006 M-280706-01-2 (Report P/B 1125 G) EU agreed DAR[1], RMS UK, April 2012 Evaluation Report[2] (RMS: France, July 2019)

[1] United Kingdom, 2012. Draft Assessment Report on thiencarbazone-methyl (BYH 18636) prepared by the rapporteur Member State the United Kingdom in the framework of Directive 91/414/EEC, April 2012.
[2]Evaluation Report Prepared under Article 12.1 of Regulation (EC) No 396/2005. Updated 26 July 2019. Review of the existing MRLs for thiencarbazone-methyl. Rapporteur Member State: France. M-677915-01-1.

Excerpt from the RMS (France) (Evaluation Report Prepared under Article 12.1 of Regulation (EC) No 396/2005. Updated 26 July 2019. Review of the existing MRLs for thiencarbazone-methyl):
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" An analytical method 00963 (Zimmer D, Philipowski C, 2006) and its ILV (Class, 2006), using HPLC-MS/MS (two transitions monitored) for the determination of thiencarbazone-methyl, BYH 18636-N-desmethyl and BYH18636-MMT-glucoside in plants have been provided in the DAR/Monograph of thiencarbazone-methyl. The method was considered fully validated with an LOQ = 0.01 mg/kg for each analyte in dried plants, acidic plants, plants with high water content, plants with high fat content and straw. The method was considered highly specific."

For any special comments or remarkable points concerning the analytical methods for the determination of residues in plant matrices, please refer to Appendix 2.

Table 5.2-13: Statement on extraction efficiency

	Method for products of plant origin
Available from:	Bongartz, R., 2006, (Report no. MEF-05/504), EU agreed DAR, April 2012
Not required, because:	As residues are not expected to be ≥LOQ in cereal grain, extraction efficiency is not required according to SANCO/825/00 rev. 8.1.

5.3.3.3 Description of analytical methods for the determination of residues in animal matrices (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of thiencarcarbazone-methyl in animal matrices is given in the following tables. For the detailed evaluation of new/additional studies, please refer to Appendix 2.

Table 5.2-14: Validated methods for food and feed of animal origin (if appropriate)

Components of residue definition: thiencarcarbazone-methyl and BYH 18636-MMT				
Matrix type	**Method type**	**Method LOQ[2]**	**Principle of method (*i.e.* GC-MS or HPLC-UV)**	**Author(s), year / missing**
Milk	Primary, includes a confirmatory procedure **Method 01022**	0.01[1] mg/kg	HPLC-MS/MS	Zimmer, D., Kuppels, U., 2007 / M-284284-01-2 (Report MR-06/175) EU agreed DAR[3], RMS UK, April 2012 Evaluation Report[4] (RMS: France, July 2019)
	ILV **Method 01022**	0.01 mg/kg	HPLC-MS/MS	Class, T., 2007 M-284346-02-2 (Report P/B 1138 G) EU agreed DAR[3], RMS UK, April 2012 Evaluation Report[4] (RMS: France, July 2019)
Eggs	Primary, includes a confirmatory procedure **Method 01022/M001**	0.01[1] mg/kg	HPLC-MS/MS	R. Schoening; P. Koester / 2013 M-459804-01-1 (Report MR-13/059) EU agreed Evaluation Report[4] (RMS: France, July 2019)
	ILV **Method 01022/M001**	0.01 mg/kg	HPLC-MS/MS	Wilde, N., / 2013 M-482949-01-1 (Report P 3025 G) Not EU peer review Appendix 2

Components of residue definition: thiencarcarbazone-methyl and BYH 18636-MMT				
Matrix type	**Method type**	**Method LOQ[2]**	**Principle of method (*i.e.* GC-MS or HPLC-UV)**	**Author(s), year / missing**
Muscle	Primary, includes a confirmatory procedure **Method 01022**	0.01[1] mg/kg	HPLC-MS/MS	Zimmer, D., Kuppels, U., 2007 M-284284-01-2 (Report MR-06/175) EU agreed DAR[3], RMS UK, April 2012 Evaluation Report[4] (RMS: France, July 2019)
Fat	Primary, includes a confirmatory procedure **Method 01022**	0.01[1] mg/kg	HPLC-MS/MS	Zimmer, D., Kuppels, U., 2007 / M-284284-01-2 (Report MR-06/175) EU agreed DAR[3], RMS UK, April 2012 Evaluation Report[4] (RMS: France, July 2019)
	ILV **Method 01022/M001**	0.01 mg/kg	HPLC-MS/MS	Class, T., 2007 M-284346-02-2 (Report P/B 1138 G) EU agreed DAR[3], RMS UK, April 2012 Evaluation Report[4] (RMS: France, July 2019)
Kidney, liver	Primary, includes a confirmatory procedure **Method 01022**	0.01[1] mg/kg	HPLC-MS/MS	Zimmer, D., Kuppels, U., 2007 M-284284-01-2 (Report MR-06/175) EU agreed DAR[3], RMS UK, April 2012 Evaluation Report[4] (RMS: France, July 2019)
	ILV **Method 01022/M001**	0.01 mg/kg	HPLC-MS/MS	Class, T., 2007 M-284346-02-2 (Report P/B 1138 G) EU agreed DAR[3], RMS UK, April 2012 Evaluation Report[4] (RMS: France, July 2019)

[1] LOQ of the metabolite expressed in parent equivalents
[2] LOQ per analyte
[3] United Kingdom, 2012. Thiencarbazone-methyl (BYH 18636) – Volume 3 / Annex B to the report and proposed decision of the United Kingdom made to the European Commission under Regulation 1107/2009 (Article 80 transitional measures). April 2012.
[4]Evaluation Report Prepared under Article 12.1 of Regulation (EC) No 396/2005. Updated 26 July 2019. Review of the existing MRLs for thiencarbazone-methyl. Rapporteur Member State: France. M-677915-01-1.

Excerpt from the RMS (France) (Evaluation Report Prepared under Article 12.1 of Regulation (EC) No 396/2005. Updated 26 July 2019. Review of the existing MRLs for thiencarbazone-methyl):

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"As no MRL has been set at EU level for thiencarbazone-methyl residue in foodstuff of animal origin, no analytical method is required. Nevertheless, an analytical method fully validated is available for the determination of thiencarbazone-methyl residue in animal matrices.

An analytical method 01022 (Zimmer D, Kuppel U, 2007, Schoening, R.; Koester, P.; 2013) and its ILV (Class, 2007), using HPLC-MS/MS (two transitions monitored) for the determination of thiencarbazone-methyl, BYH18636-MMT-glucoside have been provided. The method was considered fully validated with an LOQ = 0.01 mg/kg for each analyte in milk, muscle, fat, kidney, liver and eggs. The method was considered highly specific."

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"*Conclusion*
Method 01022/M001 was successfully validated to determine residues of BYH18636 and BYH18636-MMT in/on eggs (whole egg) with a LOQ = 0.01 mg/kg.

An analytical method 01022 (Zimmer D, Kuppel U, 2007), using LC-MS/MS (two transitions monitored) for the determination of thiencarbazone-methyl residue (thiencarbazone-methyl and its metabolite thiencarbazonemethyl-MMT) has been provided in the DAR of the active substance. As an ILV (Class, 2007) has been provided in the DAR/Monograph of thiencarbazone-methyl for this analytical method 01022, the method (Schoening, R.; Koester, P.; 2013) was considered fully validated with a LOQ = 0.01 mg/kg for each analyte in eggs, in accordance with sanco/825/00 rev.8.1."

For any special comments or remarkable points concerning the analytical methods for the determination of residues in animal matrices, please refer to Appendix 2.

Table 5.2-15: Statement on extraction efficiency

	Method for products of animal origin
Required, available from:	Schmeer, K. / 2007 M-282899-01-2 (Report MEF-06/292) EU agreed (DAR[3], RMS UK, April 2012)
Not required, because:	-

5.3.3.4 Description of methods for the analysis of body fluids and tissues (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of thiencarbazone-methyl and BYH18636-MMT in body fluids and tissues is given in the following table. For the detailed evaluation of new/additional studies it is referred to Appendix 2.

Table 5.2-16:

Component of residue definition: thiencarbazone-methyl and BYH18636-MMT expressed as thiencarbazone-methyl			
Method type	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	Author(s), year / missing
Primary, includes a confirmatory procedure **Method 01495** Report P683166506	0.05 µg/L	HPLC-MS/MS	Kaussmann, M., 2016 / M-570324-01-1 Not EU peer review Appendix 2
Primary includes a confirmatory procedure **Method 01022**	0.010 mg/kg (tissues)	HPLC-MS/MS	Zimmer, D., Kuppels, U., 2007, M-284284-01-2 (report MR-06/175) EU agreed, DAR, RMS UK, April 20121
Confirmatory	Not required since two MRM transitions were validated during the primary method		

[1] United Kingdom, 2012. Draft Assessment Report on thiencarbazone-methyl (BYH 18636) prepared by the rapporteur Member State the United Kingdom in the framework of Directive 91/414/EEC, April 2012.

5.3.3.5 Description of methods for the analysis of soil (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of thiencarbazone-methyl in soil is given in the following tables. For the detailed evaluation of new/ additional studies it is referred to Appendix 2.

Table 5.2-17: Validated methods for soil (if appropriate)

Component of residue definition: thiencarbazone-methyl			
Method type	**Method LOQ**	**Principle of method (*i.e.* GC-MS or HPLC-UV)**	**Author(s), year / missing**
Primary **Method 01028**	1 µg/kg	HPLC-MS/MS	Brumhard, B., Koch, V., 2006 M-281589-01-1 EU agreed DAR[1], RMS UK, April 2012
Confirmatory	Not required since two MRM transitions were validated during the primary method		
Primary **Method 01522**	0.4 µg/kg	HPLC-MS/MS	Koch, V.2017 M-583905-01-1 Not EU peer review Appendix 2

Component of residue definition: thiencarbazone-methyl			
Method type	**Method LOQ**	**Principle of method (*i.e.* GC-MS or HPLC-UV)**	**Author(s), year / missing**
Confirmatory	Not required since two MRM transitions were validated during the primary method		

[1] United Kingdom, 2012. Thiencarbazone-methyl (BYH 18636) – Volume 3 / Annex B to the report and proposed decision of the United Kingdom made to the European Commission under Regulation 1107/2009 (Article 80 transitional measures). April 2012.

For any special comments or remarkable points concerning the analytical methods for soil please refer to Appendix 2.

5.3.3.6 Description of methods for the analysis of water (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of thiencarbazone-methyl in surface and drinking water is given in the following tables. For the detailed valuation of new/ additional studies it is referred to Appendix 2.

Table 5.2-18: Validated methods for water (if appropriate)

Component of residue definition: thiencarbazone-methyl				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
Drinking water	Primary Confirmatory **Method 01025**	0.05 µg/L	HPLC-MS/MS	Krebber, R.; Leppelt, L.; 2007 M-282614-01-1 EU agreed DAR[1], RMS UK, April 2012
	Primary Confirmatory Method **01387/M001**	0.05 µg/L	HPLC-MS/MS	Krebber, R., 2014 / M-494841-02-1 Not EU peer review Appendix 2
	ILV Method **01387/M001**	0.05 µg/L	HPLC-MS/MS	Stanislowski, T., 2015 / M-509775-01-1 Not EU peer review Appendix 2
	Confirmatory	Not required since two MRM transitions were validated during the primary method		
Surface water	Primary Confirmatory **Method 01025**	0.05 µg/L	HPLC-MS/MS	Krebber, R.; Leppelt, L.; 2007 M-282614-01-1 EU agreed DAR[1], RMS UK, April 2012
	Primary Confirmatory Method **01387/M001**	0.05 µg/L	HPLC-MS/MS	Krebber, R., 2014 / M-494841-02-1 Not EU peer review Appendix 2
	ILV	0.05 µg/L	HPLC-MS/MS	Stanislowski, T., 2015 /

Component of residue definition: thiencarbazone-methyl				
Matrix type	**Method type**	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
	Method **01387/M001**			M-509775-01-1 Not EU peer review Appendix 2

[1] United Kingdom, 2012. Thiencarbazone-methyl (BYH 18636) – Volume 3 / Annex B to the report and proposed decision of the United Kingdom made to the European Commission under Regulation 1107/2009 (Article 80 transitional measures). April 2012.

For any special comments or remarkable points concerning the analytical methods for water please refer to Appendix 2.

5.3.3.7 Description of methods for the analysis of air (KCP 5.2)

An overview on the acceptable methods and possible data gaps for analysis of thiencarbazone-methyl in air is given in the following tables. For the detailed evaluation of new/ additional studies please refer to Appendix 2.

Table 5.2-19: Validated methods for air (if appropriate)

Component of residue definition: Thiencarbazone-methyl			
Method type	**Method LOQ**	**Principle of method (i.e. GC-MS or HPLC-UV)**	**Author(s), year / missing**
Primary **Report RAGSM003**	3.75 µg/m^3	HPLC-MS/MS	Ripperger, R.; 2007 M-284848-03-1 EU agreed DAR[1], RMS UK, April 2012; EFSA Scientific Report EFSA Journal 2013 11(7):3270
Confirmatory	Not required since two MRM transitions were validated during the primary method		

[1] United Kingdom, 2012. Thiencarbazone-methyl (BYH 18636) – Volume 3 / Annex B to the report and proposed decision of the United Kingdom made to the European Commission under Regulation 1107/2009 (Article 80 transitional measures). April 2012.

For any special comments or remarkable points concerning the analytical methods for air it is referred to Appendix 2.

5.3.3.8 Other studies/ information

None.

Appendix 1 Lists of data considered in support of the evaluation

Tables considered not relevant can be deleted as appropriate.

MS to blacken authors of vertebrate studies in the version made available to third parties/public.

List of data submitted by the applicant and relied on

Data Point	**Author(s)**	**Year**	**Title** **Company Report No.** **Source** **GLP or GEP status** **published or not**	**Vertebrate study Y/N**	**Owner**
KCP 5.1.1 / 01	Michel, A.	2013	Determination of foramsulfuron and thiencarbazone-methyl in formulations ; Assay HPLC, external standard Report No.: AM017812MF2, Edition Number: M-426823-02-1 Bayer CropScience AG, Monheim, Germany ... amended: 2013-04-09 GLP/GEP: No unpublished	No	Bayer
KCP 5.1.1 / 02	Kienow, A.; Michel, A.	2013	Validation of HPLC-method AM017812MF2 - Determination of foramsulfuron and thiencarbazone-methyl in formulations - foramsulfuron + thiencarbazone-methyl OD 80 (50+30 g/L) Report No.: VB1-AM017812MF2, Edition Number: M-451436-01-1 Bayer CropScience AG, Monheim, Germany GLP/GEP: No unpublished	No	Bayer
KCP 5.1.1 / 03	Michel, A.	2013	Determination of foramsulfuron byproduct AE F092944, AE F153745 and AE F130619 in formulations ; Assay HPLC, external standard Report No.: AM020213MF1, Edition Number: M-460493-01-1 Bayer CropScience AG, Monheim, Germany GLP/GEP: No unpublished	No	Bayer

Data Point	Author(s)	Year	Title Company Report No. Source GLP or GEP status published or not	Vertebrate study Y/N	Owner
KCP 5.1.1 / 04	Bastian-Bertrams, V.; Michel, A.	2015	Validation of HPLC-method AM020213MF1 - Determination of foramsulfuron byproducts AE F092944, AE F153745 and AE F130619 in formulations - foramsulfuron + thiencarbazone-methyl OD 80 (50+30 g/L) Report No.: VB1.1-AM020213MF1, Edition Number: M-460499-02-1 Bayer CropScience AG, Monheim, Germany ... amended: 2015-03-04 GLP/GEP: No unpublished	No	Bayer
KCP 5.1.1 / 05	Michel, A.	2013	Determination of thiencarbazone-methyl byproduct AE 1364547 in formulations ; Assay HPLC, external standard Report No.: AM020313MF1, Edition Number: M-454650-01-1 Bayer CropScience AG, Monheim, Germany GLP/GEP: No unpublished	No	Bayer
KCP 5.1.1 / 06	Bastian-Bertrams, V.; Michel, A.	2015	Validation of HPLC-method AM020313MF1 - Determination of thiencarbazone-methyl byproduct AE 1364547 in formulations - foramsulfuron + thiencarbazone-methyl OD 80 (50+30 g/L) Report No.: VB1.1-AM020313MF1, Edition Number: M-453185-02-1 Bayer CropScience AG, Monheim, Germany ... amended: 2015-03-03 GLP/GEP: No unpublished	No	Bayer
KCP 5.1.2.5 / 01	Lakaschus, S.; Amann, S.; Winter, O.; Gizler, A.	2013	Validation of the BCS method no. 01207 (based on modified QuEChERS method) for the determination of selected BCS analytes and their metabolites in carrot, apple, orange, oilseed rape seed and beans Report No.: S10-00279, Edition Number: M-424756-02-1 Eurofins Agroscience Services Chem GmbH (EAS Chem), Hamburg, Germany ... amended: 2013-12-11 GLP/GEP: Yes unpublished	No	Bayer

Data Point	**Author(s)**	**Year**	**Title** **Company Report No.** **Source** **GLP or GEP status** **published or not**	**Vertebrate study Y/N**	**Owner**
KCP 5.1.2.5 / 02	Schulte, G.; Oel, D.	2013	Analytical method 01340 for the determination of residues of foramsulfuron and its metabolite AE F153745 in/on plant matrix (sugar beet body and leaf) by HPLC-MS/MS Report No.: MR-12/046, Edition Number: M-450947-01-1 Bayer CropScience AG, Monheim, Germany GLP/GEP: Yes unpublished	No	Bayer
KCP 5.1.2.5 / 03	Kaussmann, M.	2017	Modification M002 of the residue analytical method 01376 for the determination of foramsulfuron, iodosulfuron-methyl, metsulfuron-methyl and AE F153745 in/on plant material by HPLC-MS/MS Report No.: 01376/M002, Edition Number: M-587949-01-1 Bayer AG, Crop Science Division, Monheim, Germany GLP/GEP: Yes unpublished	No	Bayer
KCP 5.1.2.5 / 04	Kaussmann, M.	2017	Analytical method 01514 for the determination of AE F092944, AE F059411 and AE 0031838 in/on plant by HPLC-MS/MS Report No.: P602166508, Edition Number: M-583894-01-1 Bayer AG, Crop Science Division, Monheim, Germany GLP/GEP: Yes unpublished	No	Bayer
KCP 5.1.2.6 / 01	Braune, M. Sandau, C.	2013	Method 01350 for the determination of AE F130619 in test water by HPLC-MS/MS Report No.: MR-12/082, Edition Number: M-445044-01-1 Bayer CropScience AG, Monheim, Germany GLP/GEP: No unpublished	No	Bayer
~~KCP 5.1.2.6 / 02~~	~~Schmeer, K.; Stuke, S.~~	~~2009~~	~~Description of the multi-residue analytical method 01163 for the simultaneous determination of pesticides by HPLC-MS/MS in plant materials and feeding stuff based on the official QuEChERS method~~ ~~Report No.: 01163, Edition Number: M-354028-01-1~~ ~~Method Report No.: MR-09/104~~ ~~Bayer CropScience AG, Monheim, Germany~~ ~~GLP/GEP: No~~ ~~unpublished~~	~~No~~	~~Bayer~~

Data Point	**Author(s)**	**Year**	**Title** **Company Report No.** **Source** **GLP or GEP status** **published or not**	**Vertebrate study Y/N**	**Owner**
KCP 5.2.1 / 01	Stuke, S.	2015	Modification 001 of analytical method 01360 for the determination of amidosulfuron, metsulfuron-methyl, iodosulfuron-methyl-sodium, mesosulfuron-methyl, and foramsulfuron in samples from plant origin by HPLC-MS/MS Report No.: MR-15/090, Edition Number: M-537921-01-1 Bayer CropScience AG, Monheim, Germany GLP/GEP: Yes unpublished	No	Bayer
~~KCP 5.2.2 / 01~~	~~Schoening, R.; Koester, P.~~	~~2013~~	~~Modification M001 of the analytical method 01022 for the determination of residues of BYH18636 and BYH18636-MMT in animal matrices~~ ~~Report No.: 01022/M001, Edition Number: M-459804-01-1~~ ~~Method Report No.: MR-13/059~~ ~~Bayer CropScience AG, Monheim, Germany~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~No~~	~~Bayer~~
~~KCP 5.2.2 / 02~~	~~Wilde, N.~~	~~2013~~	~~Independent laboratory validation of BCS analytical method no. 01022/M001 for the determination of residues of BYH18636 (thiencarbazone-methyl) and BYH18636-MMT in egg, using LC/MS/MS~~ ~~Report No.: P 3025 G, Edition Number: M-482949-01-1~~ ~~PTRL Europe GmbH, Ulm, Germany~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~No~~	~~Bayer~~
KCP 5.2.3 / 01	Kaussmann, M.	2016	Analytical method 01478 for the determination of various pesticides and selected pesticide metabolites in plasma by HPLC-MS/MS Report No.: 01478, Edition Number: M-551992-01-1 Bayer S.A.S., Bayer CropScience, Lyon, France GLP/GEP: Yes unpublished	No	Bayer
~~KCP 5.2.3 / 02~~	~~Kaussmann, M.~~	~~2016~~	~~Analytical method 01495 for the determination of various pesticides and selected pesticide metabolites in blood plasma by HPLC-MS/MS~~ ~~Report No.: 01495, Edition Number: M-570324-01-1~~ ~~Method Report No.: P683166506~~ ~~Bayer CropScience AG, Monheim, Germany~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~No~~	~~Bayer~~

Data Point	**Author(s)**	**Year**	**Title** **Company Report No.** **Source** **GLP or GEP status** **published or not**	**Vertebrate study Y/N**	**Owner**
~~KCP 5.2.4 / 01~~	~~Koch, V.~~	~~2017~~	~~Analytical method 01522 for the determination of thiencarbazone-methyl in soil by HPLC-MS/MS~~ ~~Report No.: 01522, Edition Number: M-583905-01-1~~ ~~Bayer AG, Crop Science Division, Monheim, Germany~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~No~~	~~Bayer~~
KCP 5.2.5 / 01	Krebber, R.; Ruttmann, F.	2016	Analytical method 01503 for the determination of AE F130619 in drinking and surface water by HPLC-MS/MS Report No.: P 684 167053, Edition Number: M-563516-01-1 Bayer CropScience AG, Monheim, Germany GLP/GEP: Yes unpublished	No	Bayer
~~KCP 5.2.5 / 02~~	~~Krebber, R.~~	~~2014~~	~~Modification M001 of the analytical method 01387 for the determination of various pesticides in drinking and surface water by HPLC-MS/MS~~ ~~Report No.: 01387/M001, Edition Number: M-494841-02-1~~ ~~Method Report No.: MR-14/053~~ ~~Bayer CropScience AG, Monheim, Germany~~ ~~... amended: 2014-10-23~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~No~~	~~Bayer~~
~~KCP 5.2.5 / 03~~	~~Stanislowski, T.~~	~~2015~~	~~Independent laboratory validation of BCS method 01387 (Modification 001) for the determination of various pesticides in surface water by DI-HPLC-MS/MS~~ ~~Report No.: P 3287-G, Edition Number: M-509775-01-1~~ ~~PTRL Europe GmbH, Ulm, Germany~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~No~~	~~Bayer~~

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

Please note that all data mentioned as part of DAR, RAR, or EFSA journals are considered as relied upon.

Bayer is the owner of the data package peer-reviewed for the EU re-approval of the active substance **foramsulfuron**.

Bayer is the owner of the data package peer-reviewed for the EU approval of the active substance **thiencarbazone-methyl.**

Data protection will be requested when relevant at MS level in the Part A.

Foramsulfuron

The following studies are considered as already evaluated at EU peer review as they are referenced in the document entitled ("Renewal under Regulation (EC) 1107/2009. Foramsulfuron - List of information, tests and studies which are considered as relied upon by the RMS for the evaluation with a view to approval of the active substance and for which the main data submitter has claimed data protection RMS: Finland Co-RMS: Slovakia. April 2016).

Data Point	**Author(s)**	**Year**	**Title** **Compagny Report No.** **Source (where different from company)** **GLP or GEP status** **Published or not**	**Verte-brate study Y/N**	**Owner**
B.5.1.2.1 KCA 4.1.2 /02	Stuke, S.	2013	Modification M001 of the residue analytical method DGM F03/98-0 for the determination of met-sulfuron-methyl (AE F075736), iodosulfuron -methyl-sodium (AE F115008), foramsulfuron (AE F130360), AE F153745 in corn (green material) by HPLC-MS/MS at a LOQ of 0.01 mg/kg Bayer CropScience, Report No.: MR-13/047, Edition Number:M-461902-01-1, Method Report No.: MR-13/047 GLP/GEP: Yes unpublished	N	Bayer
B.5.2.1 KCA 4.2 /20	Stuke, S.; Ballmann, C.	2013	Analytical method 01360 for the determination of amidosulfuron, metsulfuron-methyl, iodosulfu-ron-methyl-sodium, mesosulfuron-methyl, and foramsulfuron in samples from plant origin by HPLC-MS/MS Bayer CropScience, Report No.: MR-13/007, Edition Number:M-455564-01-1, MethodReport No.: MR-13/007 GLP/GEP: Yes unpublished	N	Bayer

Data Point	Author(s)	Year	Title Compagny Report No. Source (where different from company) GLP or GEP status Published or not	Verte-brate study Y/N	Owner
B.5.2.1 KCA 4.2 /21	Konrad, S.	2013	Independent lab validation of BCS method 01360 for the determination of residues of amidosulfuron, metsulfuron-methyl, iodosulfuron-methyl-sodium, mesosulfuron-methyl and foramsulfuron in samples from plant origin by HPLC-MS/MS Currenta GmbH & Co. OHG, Leverkusen, Germany BCS, Report No.: 2013/0060/01, Edition Number:M-470160-01-1 GLP/GEP: Yes unpublished	N	Bayer
B.5.2.2. KCA 4.2 /23	Wrede, A.	2001	Validation of the Enforcement Method EM F07/00-0 for Animal tissue, Milk and Egg by LC-MS/MS- Amidosulfuron (AE F075032) - Metsulfuron-methyl (AE F075736) -Iodosulfuron-methyl-sodium (AE F115008) -Mesosulfuron-methyl (AE F130060) -Foramsulfuron (AE F130360) Aventis CropScience GmbH, Frankfurt am Main, Germany Bayer CropScience, Report No.: C011226, Edition Number:M-200439-01-1, EPA MRID No.: 46229001 GLP/GEP: Yes unpublished	N	Bayer
B.5.2.2. KCA 4.2 /24	Randolph, R.	2004	Independent Laboratory Validation for Aventis CropScience GmbH Analytical method No. EM/F07/00-0, Enforcement method for animal Tissue, Milk and Egg by LC-MS/MS Pyxant Labs, Inc., Colorado Springs, CO, USA Bayer CropScience, Report No.: B004802, Report includes Trial Nos.: RAMMY004, Edition Number:M-240268-01-1 EPA MRID No.: 48080501 GLP/GEP: Yes unpublished	N	Bayer
B.5.2.2. KCA 4.2 /26	Moore, S.	2010	Independent laboratory validation of an analytical method 01208/M001 for the determination of amidosulfuron (AE F075032), metsulfuron-methyl (AE F075736), iodosulfuron-methyl-sodium (AE F115008), mesosulfuron-methyl (AE F130060), foramsulfuron (AE F130360) in animal tissues (meat, fat, liver, kidney), egg, and milk by HPLC-MS/MS Bayer CropScience LP, Stilwell, KS, USA Bayer CropScience, Report No.: RAMML014, Edition Number:M-398300-01-1 GLP/GEP: Yes unpublished	N	Bayer

Data Point	Author(s)	Year	Title Compagny Report No. Source (where different from company) GLP or GEP status Published or not	Verte-brate study Y/N	Owner
B.5.2.3. KCA 4.2 /27	Freitag, T.	2008	Amendment no. 0001 to report no.: MR-08/138-Analytical Method 01115 for the determination of residues of amidosulfuron, iodosulfuron-methyl-sodium, metsulfuron-methyl, mesosulfuron-methyl and foramsulfuron in soil by HPLC-MS/MS Bayer CropScience, Report No.:M-310074-03-1, Edition Number:M-310074-03-1, Method Report No.: MR-08/138 GLP/GEP: Yes unpublished	N	Bayer
B.5.2.4. KCA 4.2 /28	Krebber, R.; Braune, M.	2007	Analytical method 01058 for the determination of amidosulfuron, foramsulfuron, iodosulfuron-methyl-sodium, mesosulfuron-methyl and the metabolite metsulfuron-methyl (AE F075736) in drinking and surface water by HPLC-MS/MS Bayer CropScience, Report No.: 01058, Edition Number:M-291466-01-1, Method Report No.: MR-07/292 GLP/GEP: Yes unpublished	N	Bayer
B.5.2.4. KCA 4.2 /29	Krebber , R.; Braune, M.	2013	Analytical method 01387 for the determination of various pesticides in drinking and surface water by HPLC-MS/MS Bayer CropScience, Report No.: MR-13/085, Edition Number:M-466732-01-1, Method Report No.: MR-13/085 GLP/GEP: Yes unpublished	N	Bayer
B.5.2.4. KCA 4.2 /30	Stanislowski, T.	2013	Independant laboratory validation of BCS analytical methods 01333 and 01387 for determination of various pesticides in surface water by Di-HPLC-MS/MS PTRl Europe, Ulm, Germany Bayer CropScience, Report No.: P3117 G,Edition Number:M-470714-02-1 GLP/GEP: No unpublished	N	Bayer

~~Thiencarbazone-methyl~~

~~The following studies are considered as already evaluated at EU peer review as they are referenced in the document entitled ("Council Directive 91/414/EEC. Thiencarbazone-methyl (BYH 18636). Volume 2. Annex A to the Draft Report and Proposed Decision. List of tests and studies submitted and information available (by Annex point). 2012).~~

~~Data point~~	~~Author(s)~~	~~Year~~	~~Title~~ ~~Company Report No.~~ ~~Source (where different from company)~~ ~~GLP or GEP status~~ ~~Published or not~~	~~Vertebrate study Y/N~~	~~Owner~~
~~KIIA 4.3 /06~~	~~Zimmer, D.; Philipowski, C.~~	~~2006~~	~~Analytical method 00962 for the determination of residues of BYH18636 and its metabolites BYH18636-N-desmethyl and BYH18636-MMT-glucoside, and of AE 0001789 in/on plant matrices by HPLC-MS/MS~~ ~~Bayer CropScience AG,~~ ~~Report No.: 00962, Edition Number: M-278064-02-1, Method Report No.: MR-147/05~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~N~~	~~Bayer~~
~~KIIA 4.3 /09~~	~~Brumhard, B.~~	~~2006~~	~~Analytical method 00990 for the determination of residues of BYH 18636 and its metabolites in animal matrices~~ ~~Bayer CropScience AG,~~ ~~Report No.: 00990, Edition Number: M-281559-02-2~~ ~~GLP~~ ~~Unpublished~~	~~N~~	~~Bayer~~
~~KIIA 4.5 /01~~	~~Krebber, R.; Leppelt, L.~~	~~2007~~	~~Analytical method 01025 for the determination of thiencarbazone-methyl (BYH18636) in drinking and surface water by HPLC-MS/MS~~ ~~Bayer CropScience AG,~~ ~~Report No.: 01025, Edition Number: M-282614-01-1, Method Report No.: MR-96/173~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~N~~	~~Bayer~~
~~KIIA 4.3 /01~~	~~Zimmer, D.; Philipowski, C.~~	~~2006~~	~~Analytical method 00963 for the determination of residues of BYH18636 and its metabolites BYH18636-N-desmethyl and BYH18636-MMT-glucoside in/on plant matrices by HPLC-MS/MS~~ ~~Bayer CropScience AG,~~ ~~Report No.: 00963, Edition Number: M-278045-02-2, Method Report No.: MR-148/05~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~N~~	~~Bayer~~

~~Data point~~	~~Author(s)~~	~~Year~~	~~Title~~ ~~Company Report No.~~ ~~Source (where different from company)~~ ~~GLP or GEP status~~ ~~Published or not~~	~~Vertebrate study~~ ~~Y/N~~	~~Owner~~
~~KIIA 4.3 /03~~	~~Class, T.~~	~~2006~~	~~Independent laboratory validation of Bayer CropScience method No. 00963 for the determination of residues of BYH 18636 and its metabolites BYH 18636-N-desmethyl and BYH 18636-MMT-glucoside in/on plant materials by LC/MS/MS~~ ~~PTRL Europe, Ulm, Germany~~ ~~Bayer CropScience AG,~~ ~~Report No.: P/B 1125 G, Edition Number: M-280706-01-2, Method Report No.: MR-148/05, Method Report No.: P/B 1125 G~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~N~~	~~Bayer~~
~~KIIA 4.3 /02~~	~~Bongartz, R.~~	~~2006~~	~~[Dihydrotriazole-3-14C]BYH18636: Extraction efficiency of the residue analytical method for the determination of BYH18636 residues in plant matrices using aged radioactive residues~~ ~~Bayer CropScience AG,~~ ~~Report No.: MEF-05/504, Edition Number: M-274486-01-2~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~N~~	~~Bayer~~
~~KIIA 4.3 /07~~	~~Zimmer, D.; Kuppels, U.~~	~~2007~~	~~Analytical method 01022 for the determination of residues of BYH18636 and BYH18636-MMT in animal matrices~~ ~~Bayer CropScience AG,~~ ~~Report No.: 01022, Edition Number: M-284284-01-2, Method Report No.: MR-06/175~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~N~~	~~Bayer~~
~~KIIA 4.3 /08~~	~~Class, T.~~	~~2007~~	~~Independent laboratory validation of Bayer CropScience method no. 01022 for the determination of residues of BYH 18636 and its metabolite BYH 18636-MMT in animal matrices by LC/MS/MS~~ ~~PTRL Europe, Ulm, Germany~~ ~~Bayer CropScience AG,~~ ~~Report No.: P/B 1138 G, Edition Number: M-284346-02-2, Method Report No.:~~	~~N~~	~~Bayer~~

~~Data point~~	~~Author(s)~~	~~Year~~	~~Title~~ ~~Company Report No.~~ ~~Source (where different from company)~~ ~~GLP or GEP status~~ ~~Published or not~~	~~Vertebrate study Y/N~~	~~Owner~~
			~~P613065528~~ ~~GLP/GEP: Yes~~ ~~unpublished~~		
~~KIIA 4.3 /10~~	~~Schmeer, K.~~	~~2007~~	~~[Dihydrotriazole-3-14C]BYH18636 and [thiophene-4-14C]BYH18636: Extraction efficiency of the residue analytical method for the determination of BYH18636 residues in animal matrices using aged radioactive residues~~ ~~Bayer CropScience AG,~~ ~~Report No.: MEF-06/292, Edition Number: M-282899-01-2~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~N~~	~~Bayer~~
~~KIIA 4.4 /01~~	~~Brumhard, B.; Koch, V.~~	~~2006~~	~~Analytical method 01028 for the determination of residues of BYH18636 in soil by HPLC-MS/MS~~ ~~Bayer CropScience AG,~~ ~~Report No.: 01028, Edition Number: M-281589-01-1~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~N~~	~~Bayer~~
~~KIIA 4.5 /01~~	~~Krebber, R.; Leppelt, L.~~	~~2007~~	~~Analytical method 01025 for the determination of thiencarbazone-methyl (BYH18636) in drinking and surface water by HPLC-MS/MS~~ ~~Bayer CropScience AG,~~ ~~Report No.: 01025,~~ ~~Edition Number: M-282614-01-1, Method Report No.: MR-96/173~~ ~~GLP/GEP: Yes~~ ~~unpublished~~	~~N~~	~~Bayer~~
~~KIIA 4.7 /01~~	~~Ripperger, R. J.~~	~~2007~~	~~BYH 18636: Analytical method for the determination of BYH 18636 in air~~ ~~Bayer CropScience, Stilwell, KS, USA~~ ~~Bayer CropScience AG,~~ ~~Report No.: RAGSM003-1, Edition Number: M-284848-02-1~~ ~~GLP/GEP: Yes~~	~~N~~	~~Bayer~~

~~Data point~~	~~Author(s)~~	~~Year~~	~~Title~~ ~~Company Report No.~~ ~~Source (where different from company)~~ ~~GLP or GEP status~~ ~~Published or not~~	~~Vertebrate study~~ ~~Y/N~~	~~Owner~~
			~~unpublished~~		

The following tables are to be completed by MS

List of data submitted by the applicant and not relied on

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner

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

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner

Appendix 2 Detailed evaluation of submitted analytical methods

A 2.1 Analytical methods for foramsulfuron

A 2.1.1 Methods used for the generation of pre-authorization data (KCP 5.1)

A 2.1.1.1 Description of analytical methods for the determination of residues in plant matrices (KCP 5.1)

A 2.1.1.1.1 Analytical method 01207 (reduced validation)

A 2.1.1.1.1.1 Method validation

Comments of zRMS:	Method is accepted Validation was performed within the storage stability study

Reference:	**KCP 5.1.2.5/01**
Title:	Validation of the BCS method no. 01207 (based on modified QuEChERS method) for the determination of selected BCS analytes and their metabolites in carrot, apple, orange, oilseed rape seed and beans
Report:	Lakaschus, S.; Amann, S.; Winter, O.; Gizler, A.; 2013; S10-00279; M-424756-02-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, 11/07/00 Guidance document on residue analytical methods, SANCO/825/00/rev. 8.1, European Commission, Directorate General Health and Consumer Protection 16/11/2010 US EPA Residue Chemistry Test Guideline OCSSP 860.1340: Residue Analytical Method
Deviations:	not specified
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

The analytical method 01207 was validated for the determination of foramsulfuron and its metabolite AE F153745 residues in/on wheat grain and potato tubers. Validation was performed within the storage stability study M-480441-06-1 (please refer to chapter B7) using a reduced validation set (5 samples fortified at 1.0 mg/kg).
For extraction of foramsulfuron and its metabolite AE F153745, samples were mixed with acetonitrile-water at a ratio of (4/1, v/v) and shaken. Then, a salt mixture of Mg_2SO_4/NaCl/Na_3 citrate 2 H_2O/Na_2H citrate 6 H_2O (4/1/1/0.5, w/w/w/w) was added, the extract was shaken and the phases were separated by centrifugation. An aliquot of the acetonitrile phase was filled up with methanol-water (1/1, v/v). Final analysis was performed by LC-MS/MS with and LOQ of 0.01 mg/kg per analyte.

Extraction efficiency / Cross Validation:
Extraction efficiency was sufficiently demonstrated in study M-424756-02-1; complete validation of method 01207:
For cis-deltamethrin, propamocarb and NNI-0001 the extraction efficiency of the method BCS 01207 was compared with solvents applied in previous methods. For this purpose incurred residues were ex-tracted from selected matrices. For cis-deltamethrin lettuce (head) and wheat straw, for propamocarb lettuce (head) and potato (tuber) and for NNI-0001 cucumber was selected.
The tests indicated similar extraction efficiences for acetonitrile/water (4/1, v/v) and the solvents applied in previous methods.

Stability:
The recoveries of the stored samples showed that the residues of the analytes are stable in wheat (green material) for 8 hours at +1°C following 7 days and 22 days at -7°C. Mean uncorrected recoveries ranged between 70% and 114%.
The recoveries of the stored samples showed that the residues of the analytes are stable in potato (tuber) for 8 hours at +1°C following 7 days at -7°C. Mean uncorrected recoveries ranged between 73% and 117%.

Results and discussions

Table A 1: Recovery results from method validation of foramsulfuron and AE F153745 using the analytical method

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)	Comments
Foramsulfuron - Quantifier Mass Transition m/z 453→182					
Wheat grain	1.0	5	96	1.1	
Potato tuber	1.0	5	90	3.7	
AE F153745 - Quantifier Mass Transition m/z 272→227					
Wheat grain	1.0	5	99	3.7	
Potato tuber	1.0	5	102	2.8	
Foramsulfuron - Confirmatory Mass Transition m/z 453→272					
Wheat grain	1.0	5	96	1.7	
Potato tuber	1.0	5	91	2.7	
AE F153745 - Confirmatory Mass Transition m/z 272→80					
Wheat grain	1.0	5	99	4.8	
Potato tuber	1.0	5	99	4.3	

Table A 2: Characteristics for the analytical method used for reduced validation of foramsulfuron residues in wheat and potato

	Foramsulfuron	AE F153745
Specificity	Blank value < 30 % LOQ)	Blank value < 30 % LOQ)
Calibration (type, number of data points)	Individual calibration data and Calibration line equation	Individual calibration data and Calibration line equation

	Foramsulfuron	**AE F153745**
	presented in Appendix 2 of the report Wheat grain: y = 936485.4184x – 58990.1996; R^2 = 0.9998 Number of data points 6 Coefficient correlation >0.99	presented in Appendix 2 of the report Wheat grain: y = 35549.9182x + 1235.8564 R^2 = 0.9994 Number of data points 6 Coefficient correlation >0.99
Calibration range	Analyte concentration range: 0.75 µg/L to 10 µg/L in wheat grain and potato tuber, corresponding to 0.003 mg/kg to 0.04 mg/kg.	Analyte concentration range: 0.~~0~~50 µg/L to 50 µg/L in wheat grain and potato tuber, corresponding to 0.002 mg/kg to 50 mg/kg.
Assessment of matrix effects is presented	Yes (matrix-matched standards used)	Yes (matrix-matched standards used)
Limit of determination/quantification	Limit of quantification 0.01 mg/kg as validated in study S10-00279 for several analytes	Limit of quantification 0.01 mg/kg as validated in study S10-00279 for several analytes

Conclusion

The method is validated to determine residues of foramsulfuron and AE F153745 in/on samples from high starch content material at a LOQ of 0.01 mg/kg.

A 2.1.1.1.2 Analytical method 01207 (complete validation)

A 2.1.1.1.2.1 Method validation

Comments of zRMS:	Method is accepted Validation was performed within the storage stability study

Reference:	**KCP 5.1.2.5/01**
Title:	Validation of the BCS method no. 01207 (based on modified QuEChERS method) for the determination of selected BCS analytes and their metabolites in carrot, apple, orange, oilseed rape seed and beans
Report:	Lakaschus, S.; Amann, S.; Winter, O.; Gizler, A.; 2013; S10-00279; M-424756-02-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, 11/07/00 Guidance document on residue analytical methods, SANCO/825/00/rev. 8.1, European Commission, Directorate General Health and Consumer Protection 16/11/2010 US EPA Residue Chemistry Test Guideline OCSSP 860.1340: Residue Analytical Method
Deviations:	not specified
GLP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

In the initial analytical method 01207 validation, foramsulfuron was not included. However, a short summary of the principle of the method and the limit of quantification is given below to complete the reduced validation data generated within the storage stability study M-480441-03-1 (please refer to chapter B7).
The analytes (fluopyram, BYI 08330, deltamethrin, fenhexamid, fluopicolide, methoxyfenozide, propamocarb, prothioconazole, spirodiclofen, spiromesifen, tebuconazole, thiacloprid, trifloxystrobin, NNI-0001 and several of their metabolites) were extracted from apple fruit (high water content), orange whole fruit (high acid content), carrot root (high starch content), oilseed rape seed (high fat content) and bean dry seeds (high protein content) with acetonitrile/water (4/1, v/v). For clean-up, a salt mixture of Mg_2SO_4/NaCl/Na_3 citrate 2 H_2O/Na_2H citrate 6 H_2O (4/1/1/0.5, w/w/w/w) was added, the extract was shaken and the phases were separated by centrifugation. If necessary, an aliquot of the acetonitrile phase was purified with PSA (primary/secondary amines)/magnesium sulfate (40 mg/225 mg). An aliquot of the extract was taken and, when relevant, internal stable labelled standards were added. The solution was subjected to LC-MS/MS.

The internal standard procedure, using stable isotopically labelled internal standards was used for calibration, except for fenhexamid, fluopicolide, AE C653711 and propamocarb for which no internal standards are available. To quantify residues of fenhexamid, external standards in solvent were used and for fluopicolide, AE C656711 and propamocarb, matrix-matched standards were used. For AE C656948-pyridyl-acetic acid in apple also no internal standards were used. The calibration data obtained justified using the single point calibration method for the calculating of the residues. The concentrations and fortification levels of the metabolites were not converted into parent equivalents.

Matrix effects:
The internal standard procedure, using stable isotopically labelled internal standards, compensates for matrix effects. For compounds for which no internal standards were available (fenhexamid, fluopicolide, AE C653711 and propamocarb) matrix effects were assessed and if required matrix matched standards used. For AE C656948-pyridyl-acetic acid in apple also matrix matched standards were used.

Stability of Analytes in Sample Extracts:

The stability in final extracts was checked for the tested sample materials, apple fruit, carrot root, whole orange fruit, oilseed rape seed and dry bean seed after storage of the final samples at 4 °C ± 3°C under dark conditions over the given periods.
The samples for stability tests were fortified and worked up in the same way as validation samples. Three aliquots were transferred into HPLC vials and mixed with the internal standards at the day of preparation and measurement. After a period of approximately one week again three aliquots of the raw extract were taken and mixed with a freshly prepared internal standard. Calibration solutions were prepared freshly at the day of first and second analysis. Where no internal standards were available matrix-matched standards were used for quantification.
All analytes were found to be stable for at least 6 to 14 days.

Stability of Calibration Solutions:
The stability of the analytes in solvent standard solutions was tested. For this purpose aged solvent standard solutions were quantified against freshly prepared solvent standard solutions. The aged solutions were stored in HPLC vials in the dark in a refrigerator at 4°C ± 3°C until re-analysis. Fresh solutions were prepared at the date of analysis. No degradation was observed for all analytes over the tested periods (6-14 days).

Limit of Quantification
The limit of quantitation (LOQ) for each single analyte was 0.01 mg/kg in all matrices tested.

Specificity:
Up to three untreated control samples of different origin were examined. For all analytes the residues found were below the LOD (< 0.003 mg/kg), except for whole orange control sample V/10/25 where the residues of AE C656948-benzamide detected with the 2nd MRM were ≤ LOQ (0.01 mg/kg).
The recoveries were not corrected for interferences. Two MRM transitions were monitored for each analyte and each matrix tested. Therefore, the HPLC-MS/MS method is highly specific and an additional confirmatory method is not necessary.

Linearity:
The correlation between the injected amount of substance and the detector response was linear for all analytes. The standard concentrations in solvent ranged from 0.5 ng/mL to 50 ng/mL (0.05 ng/mL to 10.0 ng/mL for BYI 08830 and its metabolites; 1.25 ng/mL to 100 ng/mL for deltamethrin and 0.1 ng/mL to 50 ng/mL for spiromesifen and its metabolite). The coefficients of determination (R2) were >0.98.
The correlation between the injected amount of substance and the detector response was linear for matrix standards ranging from 5 ng/mL to 200 ng/mL for AE C656948-pyridyl-acetic acid and 0.1 ng/mL to 50 ng/mL for propamocarb, fluopicolide and its metabolite. The coefficients of determination (R2) were > 0.98.

Recovery Rates (Accuracy):
Mean recoveries for each fortification level and the overall mean recovery were within the 70 - 110% range for all matrices, except for prothioconazole on carrot, where the average recovery at LOQ was below 60 % (quantification 56% and confirmation 55%).

Repeatability (Precision):
Relative standard deviations were below 20% for all analytes and sample materials.

Extraction efficiency / Cross Validation:
For cis-deltamethrin, propamocarb and NNI-0001 the extraction efficiency of the method BCS 01207 was compared with solvents applied in previous methods. For this purpose incurred residues were extracted from selected matrices. For cis-deltamethrin lettuce (head) and wheat straw, for propamocarb lettuce (head) and potato (tuber) and for NNI-0001 cucumber was selected.
The tests indicated similar extraction efficiences for acetonitrile/water (4/1, v/v) and the solvents applied in previous methods.

A 2.1.1.1.3 Analytical method 01340

A 2.1.1.1.3.1 Method validation

Comments of zRMS:	Method is accepted The analytical method referenced as 01340 was used in the ecotoxicological study (Feeding diet for bees)

Reference:	**KCP 5.1.2.5/02**
Title:	Analytical method 01340 for the determination of residues of foramsulfuron and its metabolite AE F153745 in/on plant matrix (sugar beet body and leaf) by HPLC-MS/MS
Report:	Schulte, G.; Oel, D.; 2013; MR-12/046; M-450947-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, 11/07/00 Guidance document on residue analytical methods, SANCO/825/00/rev. 8.1, European Commission, Directorate General Health and Consumer Protection 16/11/2010 US EPA Residue Chemistry Test Guideline OCSSP 860.1340: Residue Analytical Method
Deviations:	not specified
GLP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

The analytical method 01340 was developed for the determination of foramsulfuron and AE F153745 residues in/on sugar beet. Foramsulfuron and its metabolite AE F153745 were extracted from sugar beet leaves twice and from sugar beet body three times, using a mixture of acetonitrile/water and subsequent microwave extraction. After centrifugation and filtration the solution was made up to volume. An aliquot of the extract was diluted and filtrated for measurement by reversed phase HPLC-MS/MS in turbo spray positive ion mode without further clean-up. Residues were quantified using matrix matched standards.

Two MRM transitions were monitored for each analyte and each matrix tested: m/z 453 → 182 for quantitation and m/z 453 → 272 for confirmation of foramsulfuron. For AE F153745 in sugar beet, leaves the mass transitions of m/z 272 → 227 for quantitation and m/z 272 → 80 for confirmation were used while for sugar beet, body mass transitions of m/z 272 → 227 for quantitation and m/z 272 → 163 for confirmation were used.
The HPLC-MS/MS method is highly specific and an additional confirmatory method is not necessary.

Results and discussions

Calibration
Matrix standard solutions were prepared from the corresponding control material. Preparation of calibration standards in matrix was done as follows: 0.2 mL of control extract was fortified with 0.1 mL of an appropriate standard mixture solution (foramsulfuron in acetonitrile/water 9/1, v/v + 0.1 mL/L NH_3 solu-

tion (25%) and AE F153745 in acetonitrile) and filled up to volume of 1 mL with water (containing 0.1 mL/L NH_3-Solution (25%)).

Linearity
The linearity of the detector used was tested for foramsulfuron and AE F153745 using standards in matrix by injecting concentrations between 0.025 µg/L to 2.5 µg/L, corresponding to 0.0025 mg/kg to 0.25 mg/kg (5 levels of concentration with n=3) for sugar beet, body and 0.05 µg/L to 2.5 µg/L, corresponding to 0.005 mg/kg to 0.25 mg/kg (5 levels of concentration with n=3) for sugar beet, leaf and a constant matrix content. The correlation coefficients were always > 0.99.

Stability
All analytes were stable in standard solutions for at least six weeks when stored at 4 °C ± 3 °C in the dark. All analytes were stable in plant extracts for at least six days when stored at 4 °C ± 3 °C in amber bottles.

Extraction efficiency
Two metabolism studies in sugar beets were conducted with [pyrimidine-2-14C]- (M-454046-02-1) and [phenyl-UL-14C]- (M-454861-02-1) foramsulfuron and have been submitted by the applicant to support the 1st registration of the product in the zone. These studies are summarized below. The detailed assessment of these studies is presented in B7, Appendix 2 as they were submitted at zonal level but not at EU level.
It was found that the TRR levels were generally very low. The radioactive residues were extracted with acetonitrile/water mixtures. The conventional extraction was sufficient for neither leaves nor beets, but combined with a subsequent microwave extraction, the extraction efficiencies were sufficient.

Table A 3: Recovery results from method validation of foramsulfuron and AE F153745 using the analytical method

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)	Comments
Foramsulfuron - Quantifier Mass Transition leaf and body m/z 453→182					
Sugar beet leaf	0.01	5	94	5.4	
Sugar beet leaf	0.10	5	93	5.1	
Sugar beet body	0.01	5	89	2.2	
Sugar beet body	0.10	5	81	2.7	
AE F153745 - Quantifier Mass Transition leaf and body m/z 272→227					
Sugar beet leaf	0.01	5	90	2.4	
Sugar beet leaf	0.10	5	95	5.8	
Sugar beet body	0.01	5	100	7.4	
Sugar beet body	0.10	5	91	2.7	

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)	Comments
Foramsulfuron - Confirmatory Mass Transition leaf and body m/z 453→272					
Sugar beet leaf	0.01	5	93	3.1	
Sugar beet leaf	0.10	5	91	4.1	
Sugar beet body	0.01	5	82	1.8	
Sugar beet body	0.10	5	84	4.7	
AE F153745 - Confirmatory Mass Transition leaf m/z 272→80; body m/z 272→163					
Sugar beet leaf	0.01	5	98	11.1	
Sugar beet leaf	0.10	5	90	5.1	
Sugar beet body	0.01	5	96	11.0	
Sugar beet body	0.10	5	92	2.5	

Table A 4: Characteristics for the analytical method used for validation of foramsulfuron residues in sugar beet

	Foramsulfuron	AE F153745
Specificity	Mass spectrum is provided in appendix 5 of the method report Blank value < 30 % LOQ)	Mass spectrum is provided in appendix 5 of the method reportBlank value < 30 % LOQ)
Calibration (type, number of data points)	Calibration line equation ("1 / x" weighting) presented in appendix 6 Sugar beet, Leaf, m/z 453 to 182: y = 1.64597e+006 x + -2854.18 r = 0.9996869 Number of data points 5 Sugar beet, Leaf; m/z 453 to 272: y = 368829 x + -1.82881 Number of data points 5 Coefficient correlation r = 0.9991231 Sugar beet, Body; m/z 453 to 182: y = 2.04557e+007 x + 104391 Number of data points 5 Coefficient correlation r= 0.9966 Sugar beet, Body; m/z 453 to 272: y = 5.14001e+006 x + 4354.44 Number of data points 5 Coefficient correlation r= 0.9978 Coefficient correlation >0.99	Calibration line equation ("1 / x" weighting) presented Sugar beet, Leaf; m/z 272 to 227: y = 116038 x + 2118.83 r = 0.9942349 Number of data points 5 Sugar beet, Leaf; m/z 272 to 80: y = 49907.5 x + 1873.1 Number of data points 5 Coefficient correlation r = 0.9979998 Sugar beet, Body; m/z 272 to 227: y = 1.26904e+006 x + 5277.66 Number of data points 5 Coefficient correlation r= 0.9971 Sugar beet, Body; m/z 272 to 163: y = 351150 x + -1651.3 Number of data points 5 Coefficient correlation r= 0.9954 Coefficient correlation >0.99
Calibration range	Analyte concentration range: 0.05 µg/L to 2.5 µg/L, corresponding to 0.005 mg/kg to 0.25 mg/kg in sugar beet leaf and 0.025	Analyte concentration range: 0.05 µg/L to 2.5 µg/L, corresponding to 0.005 mg/kg to 0.25 mg/kg in sugar beet leaf

	Foramsulfuron	**AE F153745**
	µg/L to 2.5 µg/L, corresponding to 0.0025 mg/kg to 0.25 mg/kg in sugar beet body	and 0.025 µg/L to 2.5 µg/L corresponding to 0.0025 mg/kg to 0.25 mg/kg in sugar beet body
Assessment of matrix effects is presented	Yes (matrix-matched standards used)	Yes (matrix-matched standards used)
Limit of determination/quantification	Limit of quantification 0.01 mg/kg representing the lowest validated level with sufficient recovery and precision	Limit of quantification 0.01 mg/kg representing the lowest validated level with sufficient recovery and precision

Conclusion

The method is validated to determine residues of foramsulfuron and AE F153745 in/on samples from sugar beet material at a LOQ of 0.01 mg/kg according to SANCO/3029/99 rev.4.

A 2.1.1.1.4 Additional validation of analytical method 01340 (studies M-480852-01-1, M-480864-01-1)

Comments of zRMS:	Method is accepted Additional validation in the residue study

Reference:	**Refer to KCA 6.3.1/01**
Title:	Determination of the residues of BYH 18636 and foramsulfuron in/on sugar beet after spray application of foramsulfuron & BYH 18636 OD 80 in the field in United Kingdom, Germany, France (North) and the Netherlands
Report:	Stuke, S.; Diehl, P.; 2014; 12-2138; M-480852-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC, EC Guidance working document 7029/VI/95 rev.5 (1997-07-22) OECD 509 Adopted 2009-09-07, OECD GUIDELINE FOR THE TESTING OF CHEMICALS, Crop Field Trial US EPA OCSPP Guideline No. 860.1500
Deviations:	Yes, see Appendix 5
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Reference:	**Refer to KCA 6.3.1/02**
Title:	Determination of the residues of BYH 18636 and foramsulfuron in/on sugar beet after spray application of foramsulfuron & BYH 18636 OD 80 in the field in United Kingdom, Germany, France (North) and the Netherlands
Report:	Stuke, S.; Diehl, P.; 2014; 12-2139; M-480864-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC, EC Guidance working document 7029/VI/95 rev.5 (1997-07-22) OECD 509 Adopted 2009-09-07, OECD GUIDELINE FOR THE TESTING OF CHEMICALS, Crop Field Trial US EPA OCSPP Guideline No. 860.1500
Deviations:	Yes, see Appendix 5
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

Full validation data for foramsulfuron and AE F153745 are documented with the method 1340 itself for the following matrices: for the matrices sugar beet (leaf) and sugar beet (body).

For the matrices relevant to this study but not included in original validations, a limited set (3 repetitions each at two fortification levels) of additional validation recoveries were analysed within the course of studies 12-2138/12-2139. The validation of the sample material "leaf with root collar" is also representative for the sample material "whole plant with root". The matrices and the validation results are summarized in the tables below.

Results and discussions

Apparent residues in control samples were below 30% of the LOQ. Mean recoveries per fortification level for both analytes were in a range of 70 – 110% with RSD < 20%.

Table A 5: **Recovery data for foramsulfuron and AE F153745, using the analytical methods (1340 and 0963)**

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)*	Comments
Foramsulfuron					
Beet, sugar/body	0.01	3	79	3.2	Appendix 4 of the residue report 12-2138/12-2139
	0.10	3	87	1.1	
Beet, sugar / leaf with root collar	0.01	3	79	1.9	Appendix 4 of the residue report 12-2138/12-2139

	0.10	3	94	0.6	
	0.10	3	98	0.6	
AE F153745					
Beet, sugar/body	0.01	3	101	7.0	Appendix 4 of the residue report 12-2138/12-2139
	0.10	3	96	3.6	
Beet, sugar / leaf with root collar	0.01	3	96	2.2	Appendix 4 of the residue report 12-2138/12-2139
	0.10	3	102	2.6	
	0.10	3	99	3.1	

*RSD – Relative standard deviation

Table A 6: Characteristics for the analytical methods (1340) used for validation of residues in sugar beet (body, leaf with root collar)

	Foramsulfuron & AE F153745 (1340)
Specificity	Mass spectra are provided in Appendix 5 of the original method 1340 blank values < 30% LOQ
Calibration (type, number of data points)	Calibration data and calibration line (linear regression (*1/x* weighted)) presented for Foramsulfuron and each sample material number of data points: at least 6 R > 0.999
Calibration range	Matrix-matched standards from 0.150 to 10.0 µg/L, corresponding calibration range in mass ratio units for the sample: 0.003 - 0.2 mg/kg
Assessment of matrix effects is presented	No. The quantification was done using external matrix-matched standards. It compensates for matrix effect.
Limit of determination/quantification	LOQ for sugar beet (body, leaf with root collar, and whole plant with root) **0.01** mg/kg

Conclusion

All validation data for 1340 (for foramsulfuron and AE F153745 respectively) are in compliance with the guideline criteria, and therefore can be considered successful for sugar beet (body, leaf with root collar and whole plant with root).

The limits of quantitation (LOQ) for foramsulfuron and AE F153745 are 0.01 mg/kg, for sugar beet (body, leaf with root collar and whole plant with root), corresponding to the lowest fortification level of successfully conducted recovery experiments.

A 2.1.1.1.5 Additional validation of analytical method 01340 (study 17-2033)

Comments of zRMS:	Method is accepted

	Additional validation in the residue study

Reference:	**Refer to KCA 6.3.1/05**
Title:	Determination of the residues of foramsulfuron in/on sugar beet after spray application of foramsulfuron & BYH 18636 OD 80 in the field in Germany, the United Kingdom and northern France
Report:	Kaussmann, M.; Houtermans, M.; 2018; 17-2033; M-642771-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market OECD Guideline for the Testing of Chemicals on Crop Field Trial (TG 509 published in September 2009) US EPA OCSPP 860.1500, Crop Field Trial
Deviations:	None
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

Full validation data for foramsulfuron is documented with the method 1340 itself for the following matrices: for the matrices sugar beet (leaf) and sugar beet (body).

For the matrices relevant to this study but not included in original validations, a limited set (one control sample, 3 repetitions each at two fortification levels) of additional validation recoveries were analysed within the course of this study (17-2033). The matrices and the validation results are summarized in the tables and text below.

Results and discussions

Apparent residues in control samples were below 30% of the LOQ. Mean recoveries per fortification level for both analytes were in a range of 70 – 110% with RSD < 20%.

Table A 7: **Recovery data for foramsulfuron using the analytical method 1340**

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)*	Comments
Foramsulfuron					
Beet, sugar/body	0.01	3	90	3.2	Appendix 5 of the residue report 17-2033
	0.10	3	92	1.9	
Beet, sugar / leaf with root collar	0.01	3	92	2.5	Appendix 5 of the residue report 17-2033
	0.10	3	97	3.1	
beet, sugar / whole plant with root	0.01	3	98	9.8	Appendix 5 of the residue report 17-2033
	0.10	3	99	0.6	

*RSD – Relative standard deviation

Table A 8: Characteristics for the analytical methods 1340 used for validation of residues in sugar beet (body, leaf with root collar, whole plant with root)

	Foramsulfuron
Specificity	Mass spectra are provided in Appendix 5 of the original method 1340 blank values < 30% LOQ
Calibration (type, number of data points)	Calibration data and calibration line (linear regression (*1/x* weighted)) presented for foramsulfuron and each sample material number of data points: at least 6 R > 0.999
Calibration range	Matrix-matched standards from 0.150 to 10.0 µg/L, corresponding calibration range in mass ratio units for the sample: 0.003 - 0.2 mg/kg
Assessment of matrix effects is presented	No. The quantification was done using external matrix-matched standards. It compensates for matrix effect.
Limit of determination/quantification	LOQ for sugar beet (body, leaf with root collar, whole plant with root) **0.01** mg/kg

Conclusion

All validation data for 1340 for foramsulfuron are in compliance with the guideline criteria, and therefore can be considered successful for sugar beet (body, leaf with root collar and whole plant with root).

The limit of quantitation (LOQ) for foramsulfuron is 0.01 mg/kg, for sugar beet (body, leaf with root collar and whole plant with root), corresponding to the lowest fortification level of successfully conducted recovery experiments.

A 2.1.1.1.6 Analytical method 01376/M002

A 2.1.1.1.6.1 Method validation

zRMS comment: Method is accepted
The analytical method 01376/M002 was developed for the determination of residues of foramsulfuron and AE F153745 (metabolite of foramsulfuron) in/on samples of plant origin (wheat (grain, green material, straw) and rape (seed)).

Reference:	**KCP 5.1.2.5/03**
Title:	Modification M002 of the residue analytical method 01376 for the determination of foramsulfuron, iodosulfuron-methyl, metsulfuron-methyl and AE F153745 in/on plant material by HPLC-MS/MS
Report:	Kaussmann, M.; 2017; 01376/M002; M-587949-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, 11/07/00 Guidance document on residue analytical methods, SANCO/825/00/rev. 8.1, European Commission, Directorate General Health and Consumer Protection 16/11/2010 US EPA Residue Chemistry Test Guideline OCSPP 860.1340: Residue Analytical Method OECD Guideline, ENV/JM/MONO (2007)17, Aug 13, 2007
Deviations:	--
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

The analytical method 01376/M002 was developed for the determination of residues of foramsulfuron, iodosulfuron-methyl, metsulfuron-methyl and AE F153745 (metabolite of foramsulfuron) in/on samples of plant origin (wheat (grain, green material, straw) and rape (seed)). In this report only data for foramsulfuron and its metabolite AE F153745 will be demonstrated.
Residues of foramsulfuron and its metabolite AE F153745 were extracted twice from sample materials with a mixture of acetonitrile/0.02M triethylamin in water (4:1, *v:v*). The extracts were submitted to the LC-MS/MS analysis without any further clean-up. The residues were quantified using matrix-matched standards.
Two MRM transitions were monitored for foramsulfuron and its metabolite AE F153745 in positive ionisation mode, namely:

Table A 9: MS/MS Parameters for the determination of foramsulfuron and AE F153745.

Analyte		Precursor Ion Q1 Mass (amu)	Product Ion Q3 Mass (amu)	Polarity
Foramsulfuron	1st MRM	453	272	positive
	2nd MRM	453	139	positive
AE F153745	1st MRM	272	255	positive
	2nd MRM	272	136	positive

The HPLC-MS/MS method is highly specific and an additional confirmatory method was not necessary. All solutions were prepared in a mixture of acetonitrile/0.02 M triethylamine in water (4:1, *v:v*).

Results and discussions

Extraction efficiency:
Extraction efficiency was sufficiently demonstrated in study Huang, MN, 2000; M-185906-01-1, which is already EU peer-reviewed (EFSA, 2012, 2016).
Weighed grain samples were extracted by blending with water two to three times followed by acetonitrile/water (1:1) with an Ultra Turrax T25 followed by vacuum filtration. Extraction efficiencies of more than 70%TRR are reported.

Stability of Analytes / Stability in Extracts:
Foramsulfuron and its metabolite AE F153745 were stable in stock and standard solutions as well as in the sample extracts during the course of the study for at least 7 days when stored at 4°C ± 3°C in the dark (due to the structure of the analyte a longer stability can be expected).
Method validation data are summarised in Table A ~~6~~ 10 and A ~~7~~ 11.

Specificity:
All residues of foramsulfuron and its metabolite AE F153745 in untreated control samples were below 30% of the LOQ (0.01 mg/kg).
Accuracy / Precision:
For validation of the method, recovery experiments were performed by fortifying control samples of plant matrices with foramsulfuron and its metabolite AE F153745 at levels of the LOQ (0.01 mg/kg) and 10 × LOQ (0.1 mg/kg).
Mean recoveries for foramsulfuron and its metabolite AE F153745 for both fortification levels and both mass transitions ranged between 77% and 103% (with the RSDs between 1.5% and 13.8%). For foramsulfuron in wheat, green material at the 1st MRM, only 4 single values were taken into account, because one value was identified as significant outlier according to the Dean-Dixon test.

Table A 10: Recovery results from method validation of foramsulfuron and its metabolite AE F153745 using the analytical method 01376/M002

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)	Comments
Foramsulfuron (quantification) (*m/z 453 → 272*)					
Wheat, grain	0.01	5	100	3.8	-
	0.10	5	101	2.3	-
Wheat, green material	0.01	4*	92	1.6	-
	0.10	5	77	13.8	-

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)	Comments
Wheat, straw	0.01	5	96	2.9	-
	0.10	5	97	1.6	-
Rape, seed	0.01	5	97	4.0	-
	0.10	5	99	1.8	-
Foramsulfuron (confirmation) ***(m/z 453 → 139)***					
Wheat, grain	0.01	5	99	4.5	-
	0.10	5	102	2.0	-
Wheat, green material	0.01	5	89	12.3	-
	0.10	5	77	12.8	-
Wheat, straw	0.01	5	99	2.8	-
	0.10	5	97	1.9	-
Rape, seed	0.01	5	99	3.6	-
	0.10	5	99	1.8	-
AE F153745 (quantification) (*m/z 272 →255)*					
Wheat, grain	0.01	5	99	3.4	-
	0.10	5	100	1.5	-
Wheat, green material	0.01	5	101	7.5	-
	0.10	5	78	12.9	-
Wheat, straw	0.01	5	98	2.0	-
	0.10	5	99	2.1	-
Rape, seed	0.01	5	93	3.1	-
	0.10	5	94	3.4	-
AE F153745 (confirmation) ***(m/z 272→ 136)***					
Wheat, grain	0.01	5	103	6.1	-
	0.10	5	99	2.7	-
Wheat, green material	0.01	5	93	7.1	-
	0.10	5	78	12.8	-
Wheat, straw	0.01	5	96	6.7	-
	0.10	5	99	2.3	-
Rape, seed	0.01	5	97	4.3	-
	0.10	5	94	4.1	-

*foramsulfuron in wheat at the 1st MRM, green material: only 4 single values were taken into account, because one value was identified as significant outlier according to the Dean-Dixon test

Table A 11: Characteristics for the analytical method used for validation of foramsulfuron and its metabolite AE F153745 residues in wheat, grain, wheat, green material, wheat, straw, and rape seed.

	foramsulfuron	**AE F153745**
Specificity	Representative mass spectrum is provided Blank value < 30% LOQ for all matrices The HPLC-MS/MS method is highly specific and an additional confirmatory method is not necessary.	Representative mass spectrum is provided Blank value < 30% LOQ for all matrices The HPLC-MS/MS method is highly specific and an additional confirmatory method is not necessary.
Calibration (type, number of data points)	Individual calibration data including calibration line equation presented in the study report; 1/x weighted linear regression model: 1st MRM transition (m/z 453 → 272): R2 ≥ 0.9995 Wheat grain: y = 67424.5x + 597.5; r = 0.9995 Wheat, green material: y = 79093.3x – 266.1; r = 0.9998 Wheat, straw: y = 87385.6x + 2242.6; r = 09996 Rape, seed: y = 115930x + 899.6; r = 0.9997 2nd MRM transition (m/z 453 →139): R2 ≥ 0.9996 Wheat grain: y = 48707.3x + 909.8; r = 0.9998 Wheat, green material: y = 57772.8x – 87.03; r = 0.9997 Wheat, straw: y = 63517.7x + 337.0; r = 0.9996 Rape, seed: y = 86078.4x + 54; r = 0.9998 Number of data points: 6	Individual calibration data including calibration line equation presented in the study report; 1/x weighted linear regression model: 1st MRM transition (m/z 272 → 255): R2 ≥ 0.9997 Wheat, grain: y = 50489.1x + 676.6; r = 0.9997 Wheat, green material: y = 51452.8x + 1574.3; r = 0.9997 Wheat, straw: 47615.4x + 977.7; r = 0.9997 Rape, seed: y = 41865.8x – 2106.3; r = 0.9999 2nd MRM transition (m/z 272 →136): R2 ≥ 0.9992 Wheat, grain: y = 8037.9x + 88.47; r = 0.9995 Wheat, green material: y = 8103.4x + 172.2; r = 0.9992 Wheat, straw: y = 7498.9x + 367.4; r = 0.9996 Rape, seed: y = 6606.5x – 130.2; r = 0.9993 Number of data points: 6
Calibration range	Accepted calibration range: For matrix-matched standards: 0.15 - 10 µg/L (corresponding to 0.003 – 0.2 mg/kg).	Accepted calibration range: For matrix-matched standards: 0.25 - 10 µg/L (corresponding to 0.003 – 0.2 mg/kg).
Assessment of matrix effects is presented	Yes. Matrix-matched standards were used for all matrices.	Yes. Matrix-matched standards were used for all matrices.
Limit of determination/quantification	The limit of quantitation (LOQ) for foramsulfuron was 0.01 mg/kg while the limit of detection (LOD) was 0.0007 to 0.0028 mg/kg for all matrices.	The limit of quantitation (LOQ) for AE F153745was 0.01 mg/kg while the limit of detection (LOD) was 0.0007 to 0.0028 mg/kg for all matrices.

Conclusion

The method 01376/M002 was successfully validated and meets all guideline criteria to determine residues

of foramsulfuron and its metabolite AE F153745 in/on samples from plant origin (represented here by wheat (grain, green material, straw) and rape (seed)) at LOQ of 0.01 mg/kg.

A 2.1.1.1.7 Analytical method 01514

A 2.1.1.1.7.1 Method validation

zRMS comment: Method is accepted
The analytical method 01514 was developed for the determination of residues of AE F092944 (metabolite of foramsulfuron) in wheat (grain, green material, straw) and barley (grain, green material, straw).

Reference:	**KCP 5.1.2.5/04**
Title:	Analytical method 01514 for the determination of AE F092944, AE F059411 and AE 0031838 in/on plant by HPLC-MS/MS
Report:	Kaussmann, M.; 2017; P602166508; M-583894-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, 11/07/00 Guidance document on residue analytical methods, SANCO/825/00/rev. 8.1, European Commission, Directorate General Health and Consumer Protection 16/11/2010 US EPA Residue Chemistry Test Guideline OCSPP 860.1340: Residue Analytical Method OECD Guideline, ENV/JM/MONO (2007)17, Aug 13, 2007
Deviations:	none
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

The analytical method 01514 was developed for the determination of residues of AE F092944 (metabolite of foramsulfuron), AE F059411 and AE 0031838 (metabolites of iodosulfuron-methyl-sodium) in wheat (grain, green material, straw) and barley (grain, green material, straw). In this report only data for AE F092944 (metabolite of foramsulfuron) will be demonstrated.
Residues of AE F092944 (metabolite of foramsulfuron) were extracted from sample materials with a mixture of acetonitrile:water (1:1, *v:v*). For AE F092944 the extracts were submitted to the LC-MS/MS analysis without any further clean-up. The residues were quantified using matrix-matched standards. Two MRM transitions were monitored for the metabolite of foramsulfuron AE F092944 by MS/MS (operated in positive ionisation mode), namely:

Analyte		**Precursor Ion Q1 Mass (amu)**	**Product Ion Q3 Mass (amu)**	**Polarity**
AE F092944	1st MRM	156	100	positive
	2nd MRM	156	82	positive

The HPLC-MS/MS method is highly specific and an additional confirmatory method was not necessary. Stock solutions were prepared in acetonitrile and in a mixture of acetonitrile:water (1:1, *v:v*). Standard solutions (secondary standard) were prepared in a mixture of acetonitrile:water (1:1, *v:v*).

Results and discussions

Extraction efficiency:
Extraction efficiency was sufficiently demonstrated in study Huang, MN, 2000; M-185906-01-1, which is already EU peer-reviewed (EFSA, 2012, 2016).
Weighed grain samples were extracted by blending with water two to three times followed by acetonitrile/water (1:1) with an Ultra Turrax T25 followed by vacuum filtration. Extraction efficiencies of more than 70%TRR are reported.

Storage stability:

AE F092944 was stable in stock and standard solutions for at least 10 days of storage in a refrigerator at 4°C ± 3°C under dark conditions. Due to the structure of the analytes a much longer stability is expected. The analytes in extracts were stable for at least 7 days of storage in a refrigerator at +4°C ± 3°C.
Method validation data are summarised in Table A ~~8~~ 12 and A ~~9~~ 13.
All residues of metabolite of foramsulfuron (AE F092944) in untreated control samples were below 30% of the LOQ (0.01 mg/kg).
Accuracy / Precision:
For validation of the method, recovery experiments were performed by fortifying control samples of plant matrices with AE F092944 at levels of the LOQ (0.01 mg/kg) and 10 × LOQ (0.1 mg/kg).
Mean recoveries for AE F092944 for both fortification levels and both mass transitions ranged between 77 and 103% (with the RSDs between 1.6% and 11.4%).

Table A 12: Recovery results from method validation of AE F092944 using the analytical method 01514

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)	Comments
AE F092944 (quantification) (*m/z* 156→ 100)					
Wheat, grain	0.01	5	88	2.1	-
	0.10	5	95	2.0	-
Wheat, green material	0.01	5	101	2.0	-
	0.10	5	101	5.0	-
Wheat, straw	0.01	5	80	1.6	-
	0.10	5	78	2.5	-
Barley, grain	0.01	5	89	8.9	-
	0.10	5	91	10.2	-
Barley, green material	0.01	5	99	7.8	-
	0.10	5	103	4.4	-
Barley, straw	0.01	5	98	4.7	-
	0.10	5	98	11.4	-
AE F092944 (confirmation) (*m/z* 156→ 82)					

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)	Comments
Wheat, grain	0.01	5	89	4.6	-
	0.10	5	94	1.6	-
Wheat, green material	0.01	5	98	4.3	-
	0.10	5	100	4.8	-
Wheat, straw	0.01	5	81	1.9	-
	0.10	5	77	2.0	-
Barley, grain	0.01	5	99	9.2	-
	0.10	5	91	10.6	-
Barley, green Material	0.01	5	102	7.9	-
	0.10	5	103	4.6	-
Barley, straw	0.01	5	101	6.6	-
	0.10	5	98	11.1	-

Analyte: AE F092944 Determination as: AE F092944 Calculation as: foramsulfuron

Table A 13: Characteristics for the analytical method used for validation of AE F092944 residues in wheat (grain, green material, straw) and barley (grain, green material, straw).

	AE F092944
Specificity	Representative mass spectrum is provided Blank value < 30% LOQ for all matrices The HPLC-MS/MS method is highly specific and an additional confirmatory method is not necessary.
Calibration (type, number of data points)	Individual calibration data including calibration line equation presented in the study report; 1/x weighted linear regression model: 1st MRM transition (*mz* 156 → 100): R^2: 0.9979 -0.9999 Wheat, grain: y = 84902.6x + 5771.5; r = 0.9979 Wheat, green material: y = 371306x + 19991.4; r = 0.9999 Wheat, straw: y = 390226x + 4168.5; r = 0.9997 Barley, grain: y = 39247.5x + 2291.7; r = 0.9991 Barley, green material: y = 171349x – 4104.1; r = 0.9969 Barley, straw: y = 213236x + 8715.2; r = 0.9996 2nd MRM transition (*mz* 156→ 82): R^2: 0.9977 -0.9999 Wheat, grain: y = 14033.1x + 615.6; r = 0.9977 Wheat , green material: y = 61670.8x – 1179.4; r = 0.9999 Wheat, straw: 64743.1x – 1482.6; r = 0.9997 Barley, grain: y = 6346.6x + 161.4; r = 0.9991 Barley, green material: y = 28208.3x – 1855.0; r = 0.9963 Barley, straw: y = 35316.8x + 1803; r = 0.9997 Number of data points: 5
Calibration range	Accepted calibration range:

	AE F092944
Specificity	Representative mass spectrum is provided Blank value < 30% LOQ for all matrices The HPLC-MS/MS method is highly specific and an additional confirmatory method is not necessary.
	For matrix-matched standards: 0.25 - 10 µg/L (0.005 mg/kg to 0.2 mg/kg).
Assessment of matrix effects is presented	Yes. Matrix-matched standards were used for all matrices.
Limit of determination/quantification	The limit of quantitation (LOQ) for iodosulfuron-methyl –sodium metabolites was 0.01 mg/kg while the limit of detection (LOD) was < 0.003 mg/kg for all matrices.

Conclusion

The method 01514 was successfully validated and meets all guideline criteria to determine residues of AE F092944 (metabolite of foramsulfuron) in/on samples from plant origin represented here by wheat (grain, green material and straw) and barley (grain, green material, and straw) at LOQ of 0.01 mg/kg.

A 2.1.1.1.8 Additional validation of analytical method 01514 (study 17-2033)

A 2.1.1.1.8.1 Method validation

Comments of zRMS:	Method is accepted Additional validation in the residue study

Reference:	**Refer to KCA 6.3.1/05**
Title:	Determination of the residues of foramsulfuron in/on sugar beet after spray application of foramsulfuron & BYH 18636 OD 80 in the field in Germany, the United Kingdom and northern France
Report:	Kaussmann, M.; Houtermans, M.; 2018; 17-2033; M-642771-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market OECD Guideline for the Testing of Chemicals on Crop Field Trial (TG 509 published in September 2009) US EPA OCSPP 860.1500, Crop Field Trial
Deviations:	None
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Method validation

Materials and methods

Full validation data for AE F092944 is documented with the method 01514 itself for matrices from wheat (grain), wheat (green material), wheat (straw), barley (grain), barley (green material) and barley (straw).

For the matrices relevant to this study but not included in original validations, a limited set (one control sample, 3 repetitions each at two fortification levels) of additional validation recoveries were analysed within the course of this study (17-2033). The matrices and the validation results are summarized in the tables and text below.

Results and discussions

Apparent residues in control samples were below 30% of the LOQ. Mean recoveries per fortification level for both analytes were in a range of 70 – 110% with RSD < 20%.

Table A 14 : Recovery data for foramsulfuron and AE F092944 using the analytical method 01514

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)*	Comments
AE F092944					
Beet, sugar/body	0.01	3	97	1.6	Appendix 5 of the residue report 17-2033
	0.10	3	96	3.8	
Beet, sugar / leaf with root collar	0.01	3	96	1.0	Appendix 5 of the residue report 17-2033

	0.10	3	98	3.6	
beet, sugar / whole plant with root	0.01	3	103	1.0	Appendix 5 of the residue report 17-2033
	0.10	3	101	2.5	

*RSD – Relative standard deviation

Table A 15 : Characteristics for the analytical method 01514 used for validation of residues in sugar beet (body, leaf with root collar, whole plant with root)

	AE F092944
Specificity	Mass spectra are provided in Appendix 5 of the original method 01514 blank values < 30% LOQ
Calibration (type, number of data points)	Calibration data and calibration line (linear regression (*1/x* weighted)) presented for AE F092944 and each sample material number of data points: at least 6 R > 0.999
Calibration range	Matrix-matched standards from 0.0515 to 3.43 µg/L, corresponding calibration range in mass ratio units for the sample: 0.003 - 0.2 mg/kg
Assessment of matrix effects is presented	No. The quantification was done using external matrix-matched standards. It compensates for matrix effect.
Limit of determination/quantification	LOQ for sugar beet (body, leaf with root collar, whole plant with root) **0.01** mg/kg

Conclusion

All validation data for 01514 are in compliance with the guideline criteria, and therefore can be considered successful for sugar beet (body, leaf with root collar, whole plant with root).

The limit of quantitation (LOQ) for AE F092944 is 0.01 mg/kg, for sugar beet (body, leaf with root collar, whole plant with root), corresponding to the lowest fortification level of successfully conducted recovery experiments.

A 2.1.1.2 Description of analytical methods for the determination of residues in animal matrices (KCP 5.1)

No new or additional studies have been submitted.

A 2.1.1.3 Description of analytical methods for the determination of residues in support to environmental fate studies (KCP 5.1)

No new or additional studies have been submitted.

A 2.1.1.4 Description of analytical methods for the determination of residues in support to toxicological studies (KCP 5.1)

No new or additional studies have been submitted

A 2.1.1.5 Description of analytical methods for the determination of residues in support of operator, worker, resident and bystander exposure studies (KCP 5.1)

The risk evaluation for operators, workers, bystanders and residents demonstrates that experimental exposure studies in support of risk assessment are not necessary. Therefore methods for body fluids and tuissues are not required.

A 2.1.1.6 Description of analytical methods for the determination of residues in of ecotoxicology studies (KCP 5.1)

A 2.1.1.6.1 Analytical method 01350

A 2.1.1.6.1.1 Method validation

Comments of zRMS:	Method is accepted This method was developed for the determination of the foramsulfuron metabolite AE F130619 in test water (ecotoxicological study)

Reference:	**KCP 5.1.2.6/01**
Title:	Method 01350 for the determination of AE F130619 in test water by HPLC-MS/MS
Report:	Braune, M. Sandau, C.; 2013; MR-12/082; M-445044-01-1
Authority registration No:	
Guideline(s):	not specified
Deviations:	not specified
GLP/GEP:	no
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

This method was developed for the determination of the foramsulfuron metabolite AE F130619 in test water samples from aquatic toxicity tests. The water samples are analysed by direct injection into the HPLC instrument or injected after appropriate dilution with test water. Identification and quantitative determination are done by HPLC with electrospray MS/MS-detection in the positive mode.

Results and discussions

The results of the method validation are summarized in the tables below.

Table A 16: Precision results from method validation of AE F130619 using the analytical method

Matrix	Analyte	Sample concentration (µg/L) (*n* = 10)	Peak area		Retention tiome	
			Mean	RSD (%)	Mean (min)	RSD (%)
water	AE F130619	0.01	5780	4.4	2.46	0.2
water	AE F130619	0.1	55092	2.2	2.46	0.2

Table A 17: Characteristics for the analytical method used for validation of AE F130619 residues in water

	AE F130619
Specificity	No residues of AE F130619 were detected in the test water control samples higher than 0.01 µg/L.
Calibration (seven datapoints)	Linear regression (1/x weighted); Calibration equation: $y = 5.65*10^5 x + 272$ Correlation coefficient r: 0.9998
Calibration range	0.01 – 5.0 µg/L
Assessment of matrix effects is presented	The calibration with test item in test item. It is therefore a matrix matched standard.
Limit of determination/quantification	The limit of quantitation (LOQ) for AE F130619 is 0.01 µg/L.

Conclusion

The analytical method 01350 complies with all guideline criteria according to SANCO 3029/99 rev. 4 and is suitable for the determination of AE F130619 in test water samples via HPLC-MS/MS. The method was used in the study Kuhl, K.; 2016; M-574191-01-1 and can be regarded as fit for purpose.

A 2.1.1.6.2 Concurrent validation of method 01350 in support of study M-574191-01-1

Comments of zRMS:	Method is accepted Used in thefollowing ecotoxicological study

Reference:	**Refer to KCP 10.2.1/03**
Title:	Lemna gibba G3 - Growth inhibition test with AE F130619 (BCS-AU59648) under peak exposure conditions - Final Report -
Report:	Kuhl, K.; 2016; EBFS0002; M-574191-01-1
Authority registration No:	
Guideline(s):	OECD Guideline 221 (March 23, 2006), US EPA OCSPP 850.4400
Deviations:	During the period of test preparation on day 0 and 7, the pH had risen from initial 7.5 (as recommended in the guideline) before test start to a pH of 7.7 and 7.9, respectively, in the controls at start of the exposures. This pH had no negative effect on Lemna growth as shown in a doubling time clearly below the validity criterion of 2.5 days doubling time. The medium for day 0 and 7 was prepared 3 days before use instead of 1 to 2 days as defined in the OECD guideline. Since this recommendation in the guideline was made to allow the pH to stabilise, this deviation has no impact on the outcome of the study. In replicate 1, concentration 3.52 µg p.m./L, design 1, 14 instead of 12 fronds were introduced in the test at day 0 (instead of 12) as given in the guideline and study plan. This replicate was excluded from the statistical evaluation. Between day 4 and 7 the pH in the control of design 1 shifted by more than 1.5 units as recommended in the guideline. Since all validity criteria were met, this deviation has no impact in the validity of the study.
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

For the determination of AE F130619 in test water the analytical method 01350 (Braune, M. Sandau, C.; 2013; M-445044-01-1) was used.
In the present study the method was validated concurrently with the sample analyses of the study by evaluation of the standard injections.

Because of the direct measurement of the samples recovery rates cannot be calculated. The evaluation of measurements based on HPLC-MS/MS for precision was done by comparison of the peak areas of the samples with the peak areas of the external standard solutions. For this purpose the AE F130619 standard injections were evaluated. The relative standard deviation of peak areas and retention times are shown in the table below.

Table A 18: Validation of method 01350 for AE F130619 by HPLC-MS/MS

AE F130619 standard concentration		AE F130619			
		Peak area		Retention time	
[µg/L]	n	Mean value [area counts]	Rel. std. dev. [%]	Mean value [min]	Rel. std. dev. [%]
0.100	5	9491	2.2	2.28	0.4
0.500	6	47994	1.3	2.28	< 0.1
1.00	6	96434	1.2	2.28	< 0.1
5.00	4	484353	1.5	2.28	< 0.1
10.0	6	958934	0.8	2.28	< 0.1

Conclusion
The applicability of the HPLC-MS/MS method 01350 for the analysis of AE F130619 in test water samples was tested. The data presented demonstrate that the method allows the determination of AE F130619 with satisfactory precision data, given as the relative standard deviation of 5 fortification levels with 4 to 6 replicates, far lower than the highest acceptable value of 20% according to SANCO 3029/99 rev. 4. In addition, the specificity of the method was demonstrated as no test item AE F130619 was found in control samples in a concentration higher than 0.100 µg/L. The method is suitable for the determination of AE F130619 in test water and can be regarded as fit for purpose with regard to the present study.

A 2.1.1.6.3 Concurrent validation of method 01387 in support of study M-572386-02-1

Comments of zRMS:	Method is accepted Used in the ecotoxicological study

Reference:	**Refer to KCP 10.2.1/02**
Title:	Amendment no. 2: Lemna gibba G3 - Growth inhibition test with foramsulfuron tech. (BCS-AH47624) under peak exposure conditions
Report:	Kuhl, K.; 2017; EBFS0001; M-572386-03-1
Authority registration No:	
Guideline(s):	EU Directive 91/414/EEC Regulation (EC) Number 1107/2009 US EPA OCSPP 850.4400
Deviations:	none
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

For the determination of foramsulfuron in drinking and surface water the analytical method 01387 (Krebber, R.; Braune, M.; 2013; M-466732-01-1) was used.
In the present study the method was validated concurrently with the sample analyses of the study by eval-

uation of the standard injections.
Because of the direct measurement of the samples recovery rates cannot be calculated. The evaluation of measurements based on HPLC-MS/MS for precision was done by comparison of the peak areas of the samples with the peak areas of the external standard solutions. For this purpose, the foramsulfuron standard injections were evaluated. The relative standard deviation of peak areas and retention times are shown in the table below.

Table A 19: Validation of method 01387 for foramsulfuron by HPLC-MS/MS

foramsulfuron standard concentration		**foramsulfuron**			
		Peak area		**Retention time**	
[µg/L]	**n**	**Mean value [area counts]**	**Rel. std. dev. [%]**	**Mean value [min]**	**Rel. std. dev. [%]**
0.130	8	7772	2.5	2.09	0.3
1.30	8	78264	1.5	2.09	0.2
5.00	8	295201	0.9	2.09	0.3
5.00	4	279894*	1.2	2.09	< 0.1
10.0	8	602834	1.2	2.09	0.2
50.0	4	3100640	1.1	2.09	< 0.1

*measurement on different states

Conclusion
The applicability of the HPLC-MS/MS method 01387 for the analysis of foramsulfuron in drinking and surface water samples was tested. The data presented demonstrate that the method allows the determination of foramsulfuron with satisfactory precision data, given as the relative standard deviation of 5 fortification levels with 4 to 8 replicates, far lower than the highest acceptable value of 20% according to SANCO 3029/99 rev. 4. In addition, the specificity of the method was demonstrated as no test item was found in control samples in a concentration higher than 0.130 µg/L. The method is suitable for the determination of foramsulfuron in test water and can be regarded as fit for purpose with regard to the present study.

A 2.1.1.6.4 Concurrent validation of method AM017812MF1 in support of studies M-491267-01-1 and M-467676-01-1

Comments of zRMS:	Method is accepted Used in the ecotoxicological study

Reference:	**Refer to KCP 10.6.2/02**
Title:	Thiencarbazone-methyl + foramsulfuron OD 80 (30 + 50 g/L) - Effects on the vegetative vigour of ten species of non-target terrestrial plants (Tier 2)
Report:	Koehler, P.; 2014; VV13/006; M-491267-01-1
Authority registration No:	
Guideline(s):	EU Directive 91/414/EEC Regulation (EC) No. 1107/2009 US EPA OCSPP 850.4150
Deviations:	not applicable
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Reference:	**Refer to KCP 10.6.2/01**
Title:	Thiencarbazone-methyl + Foramsulfuron OD 80 (30 + 50 g/L) - Effects on the seedling emergence and growth of ten species of non-target terrestrial plants (Tier 2)
Report:	Koehler, P.; 2013; SE13/007; M-467676-01-1
Authority registration No:	
Guideline(s):	EU Directive 91/414/EEC; Regulation (EC) No. 1107/2009; US EPA OCSPP 850.4100
Deviations:	none
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

For the determination of foramsulfuron the analytical method AM017812MF1 (Michel, A.; 2012; M-426823-01-1) was used and validated concurrently in both studies, as they use the same stock solutions and untreated controls.
For this purpose the accuracy of the method was proved by analysing a suitably diluted recovery solution, which was in the same concentration range as the sample solutions. The recovery rate and precision were determined by measuring two replicates. No test item was found in the blank samples demonstrating that no interfering peaks occur. Thus, the method AM017812MF1 can be applied, as it is stated in the original validation report, that the method may also be applied to other formulations containing the active ingredient if the absence of chromatographic interferences is ensured.

The results are listed in the table below.

Table A 20: Validation of method AM017812MF1

Sample	Expected value (g/L)	Result (g/L)	Recovery (%)	CV (%)
Blank study SE13/007	0	0	-	-
Blank study VV13/006	0	0	-	-
VV13/006-1A-001R	1.4486	1.4723	101.6	0.11
VV13/006-1A-002	1.2773	1.2941	101.3	0.28
SE13/007-2-002	1.2773	1.2198	95.6	1.80

Conclusion
The applicability of the HPLC-UV method AM017812MF1 for the analysis of foramsulfuron in the formulation TCM+FSN OD 80 (30+50 g/L) was tested. Although, within this study concurrent accuracy and precision to only two fortification levels with less than five determinations was performed, method AM017812MF1 itself is fully validated according to the requirements laid down by SANCO3030/99 rev.4. Besides, the data presented demonstrate that the recovery lies within 70-110% and the corresponding RSD lies well below 20%. Thus this method can be regarded as suitable for the determination of foramsulfuron and as fit for purpose with regard to the present study.

A 2.1.1.6.5 Concurrent validation of method AM017812MF1 in support of study M-496996-01-1

Comments of zRMS:	Method is accepted Used in the ecotoxicological study

Reference:	**Refer to KCP 10.6.2/03**
Title:	Thiencarbazone-methyl + foramsulfuron OD 80 (30 + 50 g/L) - Effects on the vegetative vigour of ten species of non-target terrestrial plants (Tier 2)
Report:	Koehler, P.; 2014; VV14/012; M-496996-01-1
Authority registration No:	
Guideline(s):	EU Directive 91/414/EEC; Regulation (EC) No. 1107/2009; US EPA OCSPP 850.4150; The study was conducted according to OECD 227 guideline for the testing of chemicals, Terrestrial Plant Test: Vegetative vigour (July 2006) and considers the recommendations of US EPA Ecological Effects Test Guideline OCSPP 850.4150
Deviations:	none
GLP/GEP:	yes
Acceptability:	yes
Duplication (if vertebrate study):	

For the determination of foramsulfuron the analytical method AM017812MF1 (Michel, A.; 2012; M-426823-01-1) was used and validated concurrently.
For this purpose the accuracy of the method was proved by analysing a suitably diluted recovery solution, which was in the same concentration range as the sample solutions. The recovery rate and precision were determined by measuring two replicates. No test item was found in the blank samples demonstrating that no interfering peaks occur. Thus, the method AM017812MF1 can be applied, as it is stated in the original validation report, that the method may also be applied to other formulations containing the active ingredient if the absence of chromatographic interferences is ensured.

The results are listed in the table below.

Table A 21: Validation of method AM017812MF1

Sample	Expected value (g/L)	Result (g/L)	Recovery (%)	CV (%)
Blank 1	0	0	-	-
Blank 2	0	0	-	-
VV14/012-1A-001R	1.33	1.35	101.2	0.25
VV14/012-1A-002	1.28	1.21	94.2	2.70
VV14/012-1B-002	1.28	1.23	96.0	1.39

Conclusion
The applicability of the HPLC-UV method AM017812MF1 for the analysis of foramsulfuron in the formulation TCM+FSN OD 80 (30+50 g/L) was tested. Although, within this study concurrent accuracy and precision to only two fortification levels with less than five determinations was performed, method AM017812MF1 itself is fully validated according to the requirements laid down by SANCO3030/99 rev.4. Besides, the data presented demonstrate that the recovery lies within 70-110% and the corresponding RSD lies well below 20%. Thus this method can be regarded as suitable for the determination of foramsulfuron and as fit for purpose with regard to the present study.

A 2.1.1.6.6 Concurrent validation of method AM017812MF1 in support of study M-502816-01-1

Comments of zRMS:	Method is accepted Used in the ecotoxicological study

Reference:	**Refer to KCP 10.6.4/01**
Title:	Thiencarbazone-methyl + foramsulfuron OD 80 (30 + 50 g/L) -Effects on the vegetative vigour of seven species of non-target terrestrial plants under semi-field conditions (Higher Tier)
Report:	Koehler, P.; 2014; HT14/016; M-502816-01-1
Authority registration No:	
Guideline(s):	EU Directive 91/414/EEC Regulation (EC) No. 1107/2009 US EPA OCSPP 850.4150
Deviations:	not applicable
GLP/GEP:	no
Acceptability:	Yes

For the determination of foramsulfuron the analytical method AM017812MF1 (Michel, A.; 2012; M-426823-01-1) was used and validated concurrently.
For this purpose the accuracy of the method was proved by analysing a suitably diluted recovery solution, which was in the same concentration range as the sample solutions. The recovery rate and precision were determined by measuring two replicates. No test item was found in the blank samples demonstrating that no interfering peaks occur. Thus, the method AM017812MF1 can be applied, as it is stated in the original validation report, that the method may also be applied to other formulations containing the active ingredient if the absence of chromatographic interferences is ensured.

The results are listed in the table below.

Table A 22: Validation of method AM017812MF1

Sample	Expected value (g/L)	Result (g/L)	Recovery (%)	CV (%)
Blank 1	0	0	-	-
Blank 2	0	0	-	-
HT14/016-1A-002	0.6386	0.5833	91.3	2.66
HT14/016-1A-001R	0.6653	0.6679	100.4	0.09
HT14/016-1B-002	0.6386	0.5935	92.9	0.73
HT14/016-1B-001R	0.6450	06530	101.2	0.01

Conclusion
The applicability of the HPLC-UV method AM017812MF1 for the analysis of foramsulfuron in the formulation TCM+FSN OD 80 (30+50 g/L) was tested. Although, within this study concurrent accuracy and precision to only two fortification levels with less than five determinations was performed, method AM017812MF1 itself is fully validated according to the requirements laid down by SANCO3030/99 rev.4. Besides, the data presented demonstrate that the recovery lies within 70-110% and the corresponding RSD lies well below 20%. Thus this method can be regarded as suitable for the determination of foramsulfuron and as fit for purpose with regard to the present study.

A 2.1.1.7 Description of analytical methods for the determination of residues in support of physical and chemical properties tests (KCP 5.1)

Analytical methods used for the generation of pre-authorization data are the same as the ones described in part B section 5.

A 2.1.2 Methods for post-authorization control and monitoring purposes (KCP 5.2)

A 2.1.2.1 Description of analytical methods for the determination of residues in plant matrices (KCP 5.2)

A 2.1.2.1.1 Analytical method 01360/M001 (cereal grain)

A 2.1.2.1.1.1 Method validation

Comments of zRMS:	Method is accepted The objective of the study was the validation of the analytical method 01360/M001 for Amidosulfuron, Metsulfuron-methyl, Iodosulfuron-methyl, Mesosulfuron-methyl, and Foramsulfuron for the additional sample material wheat grain determined with HPLC-MS/MS.

Reference:	**KCP 5.2.1/01**
Title:	Modification 001 of analytical method 01360 for the determination of amidosulfuron, metsulfuron-methyl, iodosulfuron-methyl-sodium, mesosulfuron-methyl, and foramsulfuron in samples from plant origin by HPLC-MS/MS
Report:	Stuke, S.; 2015; MR-15/090; M-537921-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC Guidance document on residue analytical methods, SANCO/825/00/rev. 8.1, European Commission, Directorate General Health and Consumer Protection 16/11/2010 US EPA Residue Chemistry Test Guideline OCSPP 860.1340: Residue Analytical Method OECD Guideline, ENV/JM/MONO (2007) 17, Aug 13, 2007
Deviations:	not specified
GLP:	Yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

The analytical method 01360 was developed for the determination of amidosulfuron, metsulfuron-methyl, iodosulfuron-methyl, mesosulfuron-methyl and foramsulfuron residues in/on plant materials. The 5 crop groups are represented by sugar beet body (high starch content), sugar beet leaf (high water content), lemon fruit (high acid content), oilseed rape (high oil/fat content) and wheat straw (dry commodities). The modification 001 of method 01360 was validated for the additional sample material wheat grain (high starch content, high protein content).

The sample preparation is based on the official QuEChERS method (unbuffered). Residues of these analytes were extracted from the plant samples with a mixture of acetonitrile/water 1/1, where the water content of the corresponding sample material is considered. 10 mL water was added to 5g of the wheat grain samples to adjust the water content of the extraction solvent. The extraction was conducted using an automated over-head shaker (shaking time 15 minutes considering the latest recommendations by Hepperle/Anastassiades, publisher of the QuEChERS method at the LVUA Stuttgart, Germany. Magnesium sulfate and sodium chloride were added and the samples were shaken again strongly for 1 minute. After centrifugation the supernatant was diluted with Milli-Q water/acetonitrile and triethylamine. After filtration an aliquot of the extract was injected into a high performance liquid chromatograph and analyzed

with reversed phased chromatography coupled with tandem mass spectrometry (LC-MS/MS) in the positive ionization mode. Residues were quantified against matrix-matched standards.

Results and discussions

The method meets all guideline criteria to determine residues of foramsulfuron in/on the additional sample material wheat grain at a LOQ of 0.01 mg/kg. An ILV is not needed as it has been performed successfully for all other matrices of method 01360.

Stability

The stability in final plant extracts was checked for the tested sample material wheat grain over a period of 15 days. Foramsulfuron was stable at the given conditions.

Extraction efficiency

The extraction efficiency of the QuEChERS extraction (15 minutes shaking in water/acetonitrile 1/1) has been demonstrated successfully (> 80% extraction yield) during the validation of the origin method 01360 (M-455564-01-1) and a supplementary cross-validation study (M-525863-01-1).

Table A 23: Recovery results from method validation of foramsulfuron using the analytical method

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)	Comments
Foramsulfuron (AE F130360); transition 453-182					
Wheat grain	0.01	5	91	4.4	
	0.10	5	94	5.8	
Foramsulfuron (AE F130360); transition 453-139					
Wheat grain	0.01	5	90	3.0	
	0.10	5	94	5.3	

Table A 24: Characteristics for the analytical method used for validation of foramsulfuron residues in cereal grain

	Foramsulfuron
Specificity	Mass spectrum is provided in Appendix 5 of the report Blank value < 30 % LOQ)
Calibration (type, number of data points)	Calibration line equation presented in Appendix 6 of the report: 1/x weighted linear regression for equation y = mx + c Number of data points: 6 The correlation coefficients ranged from 0.9974 to 0.9976.
Calibration range	Corresponding calibration range in mass ratio units for the sample: 0.2 to 50 µg/L
Assessment of matrix effects is presented	For all compounds matrix-matched standards were used to compensate the possible influence of the matrix.
Limit of determination/quantification	Limit of quantification 0.01 mg/kg representing the lowest validated level with sufficient recovery and precision. Limit of determination (LOD) calculated as 0.0015 mg/kg.

Conclusion

The modification M001 of method 01360 is acceptable and validated for the enforcement of foramsulfuron in cereal grain. It has been sufficiently validated.

A 2.1.2.2 Description of analytical methods for the determination of residues in animal matrices (KCP 5.2)

No new or additional studies have been submitted.

A 2.1.2.3 Description of Methods for the Analysis of Body Fluids and Tissues (KCP 5.2)

A 2.1.2.3.1 Analytical method 01478

A 2.1.2.3.1.1 Method validation

zRMS comment: Method is accepted
Method of analysis for body fluids and tissues has been identified as a data gap in the EFSA conclusions (EFS Journal 2016, 14(3):4421). An analytical method has been provided and validated for the detrmination of formasulfuron in plasma with a LOQ=50µg/L.

Reference:	**KCP 5.2.3/01**
Title:	Analytical method 01478 for the determination of various pesticides and selected pesticide metabolites in plasma by HPLC-MS/MS
Report:	Kaussmann, M.; 2016; 01478; M-551992-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market Guidance Document on Residue Analytical Methods, SANCO/825/00 rev. 8.1 of November 16, 2010 European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, July 11, 2000
Deviations:	not specified
GLP:	Yes
Acceptability:	Yes
Duplication (if vertebrate study):	

The method 01478 describes the determination of AE C415557 (RPA717879), isoxaflutole, isoxaflutole-diketonitrile, flurtamone, mesosulfuron-methyl, foramsulfuron and iodosulfuron-methyl in plasma by HPLC-MS/MS and provides validation data for Multiple Reaction Monitoring (MRM) using electrospray ionization. Only foramsulfuron data will be presented here.

Materials and methods

Cattle plasma samples were deproteinized by mixing with acetonitrile and subsequent centrifugation. An aliquot of the supernatant was subjected to HPLC-MS/MS analysis and the residues were quantified using matrix matched standards. Foramsulfuron was measured in positive ion mode.

Results and discussions

Limit of Quantification (LOQ)

The limit of quantification for foramsulfuron in plasma was established at 50 µg/L. The limit of detection (LOD) was estimated at 15 µg/L.

Interference
No signals/peaks interfering with the detection of the analyte were observed in solutions of untreated control specimens. Apparent concentrations in control samples of plasma were below 30% of the LOQ.

Linearity
Due to the high sensitivity of the used detector, the detector response of foramsulfuron was quadratic (1/x weighted) for matrix matched standard solutions ranging from 1.5 µg/L to 75 µg/L. The detector response might be linear if other detectors are used.
The measured concentration is calculated by comparison of the analyte response to the respective calibration curve (1/x weighted). The correlation coefficients were ≥ 0.99 for both MRM transitions.

Stability
The analytes were stable in plasma for at least four days when stored in a freezer at ≤ -18 °C. In addition the stability of the analytes in extracts was demonstrated for a period of four days when stored in a refrigerator at ≤ +6 °C under dark conditions.

Specificity
Full validation data were generated for two MS/MS transitions. The first transition (m/z 453 → m/z 182) is recommended for quantification and the second transition (m/z 453 → m/z 139) may be used for confirmatory analyses. The two MRM transitions were successfully validated for plasma. Therefore, an additional confirmatory method is not necessary.

Recovery
The method was validated using a sample of cattle plasma. Fortification experiments were performed at the limit of quantification and 10 x limit of quantification with 5 replicates per level.
For each sample the recovery-rate was determined using the two different mass transitions. An overview of the results is given in the table below. The mean recoveries ranged between 103% and 106% with relative standard deviations less than 3%.

Table A 25: Validation of the method 01478 for the determination of foramsulfuron in plasma

Substrate	Fortification level (µg/L)	Number of replicates	m/z 453 → 182		m/z 453 → 139	
			Mean (%)	RSD (%)	Mean (%)	RSD (%)
Cattle plasma	50	5	106	1.2	105	1.4
	500	5	103	2.4	103	2.5
	Overall	10	105	2.3	104	2.2

RSD: relative standard deviation.

Table A 26: Characteristics for the analytical method used for validation of foramsulfuron residues in plasma matrix

Method 01478	**Foramsulfuron in plasma**
Specificity	mass spectra provided in Appendix 4 of the report blank value < 30 % LOQ
Calibration (type, number of data points)	Calibration data presented in Appendix 6 of the report Calibration line equation presented in Appendix 5 of the report number of data points ≥ 5 (7 points) 1st MRM→R = 0.9998 2nd MRM→R = 0.9998
Calibration range	Due to the high sensitivity of the used detector, the detector response was quadratic (1/x weighted). Matrix matched standard solutions range from 1.5 µg/L to 75 µg/L. The detector response might be linear if other detectors are used.
Assessment of matrix effects is presented	Yes. Matrix effects were not found. Nevertheless, quantification was performed against matrix matched standards.
Limit of determination/quantification	LOQ= 50 µg/L

Conclusion

The method 01478 was developed for the determination of foramsulfuron in plasma. Quantification by means of LC-MS/MS with two MS/MS transitions ensures a high level of specificity. The results obtained during validation demonstrate accuracy and repeatability of the residue determination. The limit of quantification was established at 50 µg/L, expressed as foramsulfuron. The method validation data are in compliance with the guideline requirements for enforcement methods. An independent laboratory validation is not required for body fluid methods of analysis.

A 2.1.2.4 Description of Methods for the Analysis of Soil (KCP 5.2)

No new or additional studies have been submitted.

A 2.1.2.5 Description of Methods for the Analysis of Water (KCP 5.2)

A 2.1.2.5.1 Analytical method 01503

A 2.1.2.5.1.1 Method validation

zRMS comment: Method is accepted
Method of analysis for AE F130619 in surface water has been identified as a data gap in the EFSA conclusions (EFS Journal 2016, 14(3):4421). An analytical method has been provided and validated for the detrmination of formasulfuron in surface water with a LOQ=0.05µg/L.

Reference:	**KCP 5.2.5/01**
Title:	Analytical method 01503 for the determination of AE F130619 in drinking and surface water by HPLC-MS/MS
Report:	Krebber, R.; Ruttmann, F.; 2016; P 684 167053; M-563516-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC EC Guidance Document on Residue Analytical Methods, SANCO/825/00 rev. 8.1 of November 16, 2010 European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, July 11, 2000
Deviations:	None
GLP:	Yes
Acceptability:	yes
Duplication (if vertebrate study):	

Materials and methods

The analytical method 01503 describes the determination of foramsulfuron metabolite AE F130619 in drinking and surface water by HPLC-MS/MS with two MRM transitions.
AE F130619 was determined by direct injection into the HPLC-MS/MS instrument using the positive ion mode without further clean-up. An aliquot of the sample solution was injected into the high- performance liquid chromatograph and subjected to reversed phase chromatography coupled with tandem mass spectrometry (MS/MS) with electrospray ionisation. The MS/MS instrument was operated in the Multiple Reaction Monitoring mode (MRM).
Concentrations were quantified using external matrix-matched standard solutions.

The following MRM transitions were used for quantification and confirmation:
AE F130619: m/z = 425 → 182 (quantification)
m/z = 425 → 227 (confirmation)

A validation for drinking water was not necessary because the limit of quantitation for surface water is equal or below the drinking water limit of 0.1 µg/L.

For method validation surface water from the river Wupper sampled in Leverkusen-Opladen was used. Characteristics of the test system are listed in the table below.

Characteristics of the Surface Water from River Wupper, Sampled on 2015-01-13 in Leverkusen (Germany)

Parameter Wupper water	Value
Total organic carbon (TOC)	<2 mg/L
Dissolved organic carbon (DOC)	-
Conductivity	273 µS/cm
pH	7.5
Water hardness	4.6°dH
Filterable solids	<5 mg/L
Dry residue after filtration	170 mg/L

Results and discussions

Because of the direct measurement of the samples recovery rates cannot be calculated. Thus precision data are presented. The relative standard deviations for the peak areas were below 20 % for all analytes and MRM transitions.

Table A 27: Repeatability, Relative Standard Deviations (RSD) and Number of Replicates (n) for AE F130619

Matrix	Analyte	Fortification level (mg/kg) (n = x)	Mean recovery (Area Counts)	RSD (%)	Comments
Surface water	AE F130619 m/z = 425 → 182 (quantification)	0.05 (n=10)	21771	1.4	-
		0.5 (n=10)	216944	1.2	
	AE F130619 m/z = 425 → 227 (confirmation)	0.05 (n=10)	4487	2.6	
		0.5 (n=10)	43207	1.8	

Table A 28: Characteristics for the analytical method used for validation of AE F130619 residues in water

	AE F130619
Specificity	The high selectivity of the method resulted from the HPLC separation in combination with MS/MS detection. Two MRM transitions were monitored for each analyte. No signals/peaks interfering with the detection of the analytes were observed in solutions of untreated control specimens.
Calibration	Quantitation MRM (m/z 425 → m/z 182) Linear regression equation (1/x weighted): $y = 4.312*10^5 x + 844.04$ r = 0.999851 Confirmatory MRM (m/z 425 → m/z 227) Linear regression equation (1/x weighted): y = 86909 x + 168.61 r = 0.999823
Calibration range	The correlation between the injected amount of substance and the detector response was linear (1/x weighted) for standard solutions in surface water ranging from 0.015 µg/L to 10.0 µg/L for AE F130619.
Assessment of matrix effects is presented	The MS/MS detection of AE F130619 is slightly affected by the matrix. Peak area decreased for AE F130619 to 87 % for the quantitation and the confirmatory ion compared to the peak area in surface water sample containing 0.5 µg/L.
Limit of determination/quantification	0.05 µg/L for surface and drinking water (RSD 1.2 – 2.6%; n= 10)

Conclusion

The method meets the guideline criteria according SANCO/825/00 rev.8.1 to allow the determination of the foramsulfuron metabolite AE F130619 in surface water starting at an LOQ of 0.05 µg/L.

A 2.1.2.6 Description of Methods for the Analysis of Air (KCP 5.2)

No new or additional studies have been submitted

A 2.1.2.7 Other Studies/ Information

No new or additional studies have been submitted.

A 2.2 Analytical methods for thiencarbazone-methyl

A 2.2.1 Methods used for the generation of pre-authorization data (KCP 5.1)

A 2.2.1.1 Description of analytical methods for the determination of residues in plant matrices (KCP 5.1)

No new or additional studies have been submitted.

A 2.2.1.2 Description of analytical methods for the determination of residues in animal matrices (KCP 5.1)

No new or additional studies have been submitted

A 2.2.1.3 Description of analytical methods for the determination of residues in support to environmental fate studies (KCP 5.1)

No new or additional studies have been submitted.

A 2.2.1.4 Description of analytical methods for the determination of residues in support to toxicological studies (KCP 5.1)

No new or additional studies have been submitted

A 2.2.1.5 Description of analytical methods for the determination of residues in support of operator, worker, resident and bystander exposure studies (KCP 5.1)

No new or additional studies have been submitted.

A 2.2.1.6 Description of analytical methods for the determination of residues in of ecotoxicology studies (KCP 5.1)

A 2.2.1.6.1 Analytical method 7SRLS13C11

A 2.2.1.6.1.1 Method validation

Comments of zRMS:	Method is accepted

Reference:	**Refer to KCP 10.2.1/06**
Title:	Toxicity of thiencarbazone-methyl technical to the aquatic macrophyte, myriophyllum spicatum under peak exposure conditions
Report:	Banman, C. S.; Moore, S.; 2013; EBGSN048; M-466233-01-1
Authority registration No:	
Guideline(s):	EU Directive 91/414/EEC Regulation (EC) No.1107/2009 US EPA OCSPP.SUPP
Deviations:	none
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

After the test samples were taken a 10% aquous phosphoric acid solution was added. After that (if necessary) dilutions with hard water were carried out in order to bring the test temple in the concentration range of the method. The samples were then extracted three consecutive times with methyl-t-butyl ether (MTBE). Afterwards, samples were evaporated to dryness and reconstituted in 1 mL of a mixture of CAN and water containing 0.1% formic acid. The samples were then measured via HPLC-MS/MS.

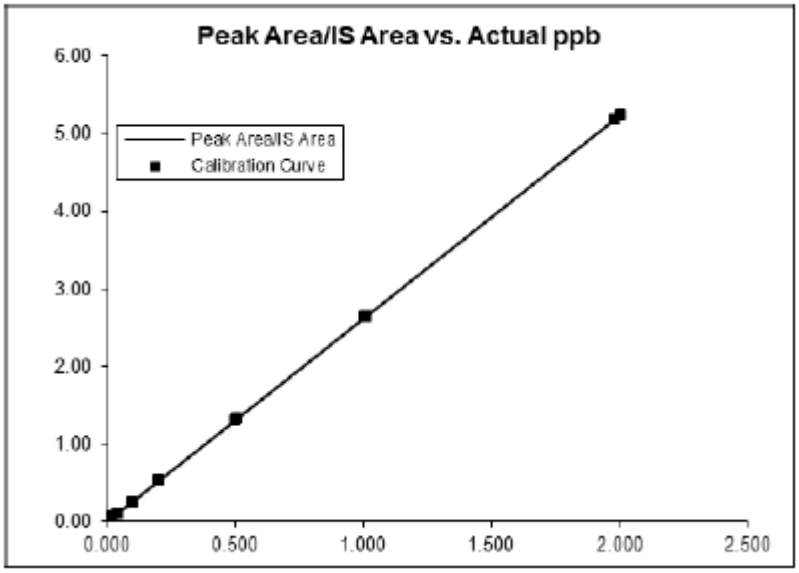
Results and discussions

The analytical method was validated by spiking control hard water with BYH 18636 at 0.10 ppb, 1.0 ppb, and 20 ppb concentrations. The mean recovery from 9 spikes was 101% with a relative standard deviation (RSD) of 0.040 %. The results of the method validation are summarized in the tables below.

Table A 29: Recovery results from method validation of thiencarbazone-methyl using the analytical method

Matrix	Analyte	Fortification level (ppb)	Measured concentration (ppb)	Recovery (%)
Hard water	Thiencarbazone-methyl	0.1	0.10477	105
		0.1	0.10846	108
		0.1	0.10332	103
		1.0	0.96957	97
		1.0	0.95068	95
		1.0	1.0011	100
		20.0	20.519	103
		20.0	19.882	99
		20.0	20.258	101
			Mean Recovery (%)	101
			RSD (%)	0.040

Table A 30: Characteristics for the analytical method used for validation of thiencarbazone-methyl residues in water

	thiencarbazone-methyl
Specificity	mass spectrum is provided blank value < 30% LOQ No signals/peaks interfering with the detection of the analyte were observed
Calibration (type, number of data points)	A 7-point standard calibration curve was analyzed before and after each analytical run. Linear regression with 1/X weighting using peak area of the native BYH 18636 / peak area of the IS was used to plot a calibration curve for calculating test solution concentrations. There was a good linearity for instrument response versus relative response of BYH 18636 native / BYH 18636-IS between 0.02 ppb and 2.0 ppb native concentrations. Samples at and above 2.0 ppb were diluted within the linearity curve. The regression coefficients R2 were greater than 0.99. 
Calibration range	The method/detector response was linear in the concentration range from 0.02 ppb and 2.0 ppb.
Assessment of matrix effects is presented	Yes. The MS/MS detection of thiencarbazone-methyl was not affected by the matrix.
Limit of quantification	LOQ = 0.1 ng/mL (ppb).

Conclusion

The analytical method complies with all guideline criteria according to SANCO 3029/99 rev. 4 with the minor exception of the precision data. Here only three instead of five determinations per fortification level were performed. However, this deviation can be regarded as acceptable due to the fact that one additional fortification level was presented and that the overall relative standard deviation is with 0.04% far lower than the highest acceptable value of 20%. The method is suitable for the determination of thiencarbazone-methyl in test water and can be regarded as fit for purpose with regard to the present study.

A 2.2.1.6.2 Concurrent validation of method 01387/M001 in support of study M-568404-02-1

Comments of zRMS:	Method is accepted

Reference:	**Refer to KCP 10.2.1/04**
Title:	Amendment no.1 - Lemna gibba G3 - Growth inhibition test with thiencarbazone-methyl tech. (BCS-AG17468) under peak exposure conditions - Final report -
Report:	Kuhl, K.; 2016; EBGS0002; M-568404-02-1
Authority registration No:	
Guideline(s):	OECD Guideline 221 (March 23, 2006); US EPA OCSPP 850.4400
Deviations:	The medium for day 0 and 7 was prepared 3 days before use instead of 1 to 2 days as defined in the OECD guideline. Since this recommendation was made to allow the pH to stabilise, this deviation has no impact on the outcome of the study
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

For the determination of thiencarbazone-methyl in drinking and surface water the analytical method 01387/M001 (Krebber, R.; 2014; M-494841-02-1) was used.
In the present study the modification M001 of the method 01387 was validated concurrently with the sample analyses of the study by evaluation of the standard injections.
Because of the direct measurement of the samples recovery rates cannot be calculated. The evaluation of measurements based on HPLC-MS/MS for precision was done by comparison of the peak areas of the samples with the peak areas of the external standard solutions. For this purpose, the thiencarbazone-methyl standard injections were evaluated. The relative standard deviation of peak areas and retention times are shown in the table below.

Table A 31: Validation of method 01387/M001 for thiencarbazone-methyl by HPLC-MS/MS

thiencarbazone-methyl standard concentration		**thiencarbazone-methyl**			
		Peak area		**Retention time**	
[µg/L]	**n**	**Mean value [area counts]**	**Rel. std. dev. [%]**	**Mean value [min]**	**Rel. std. dev. [%]**
0.200	8	2706	5.1	1.67	0.3
0.200	3	2794	5.6	1.68	0.3
1.50	8	20724	2.3	1.67	0.3
1.50	3	21722	2.0	1.67	< 0.1
5.00	8	67859	1.6	1.68	0.3
5.00	3	70666	0.5	1.67	0.3
10.0	8	136533	1.1	1.68	0.3
10.0	3	141682	0.7	1.67	< 0.1
60.0	8	849276	1.5	1.68	0.3
60.0	3	887728	1.5	1.67	0.3

Conclusion

The applicability of the HPLC-MS/MS method 01387/M001 for the analysis of thiencarbazone-methyl in drinking and surface water samples was tested. The data presented demonstrate that the method allows the determination of thiencarbazone-methyl with satisfactory precision data, given as the relative standard

deviation of 5 fortification levels with 3 to 8 replicates, far lower than the highest acceptable value of 20% according to SANCO 3029/99 rev. 4. In addition, the specificity of the method was demonstrated as no test item thiencarbazone-methyl was found in control samples in a concentration higher than 0.200 µg/L. The method is suitable for the determination of thiencarbazone-methyl in test water and can be regarded as fit for purpose with regard to the present study.

A 2.2.1.6.3 Concurrent validation of method 01025 in support of study M-462568-01-1

Comments of zRMS:	Method is accepted

Reference:	**Refer to KCP 10.2.1/05**
Title:	Lemna gibba G3 - Growth inhibition test with BYH 18636 (thiencarbazone-methyl) under peak exposure conditions
Report:	Bruns, E.; 2013; EBGSN002; M-462568-01-1
Authority registration No:	
Guideline(s):	Directive 91/414/EEC; Regulation (EC) No 1107/2009
Deviations:	none
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

For the determination of thiencarbazone-methyl (BYH 18636) in drinking and surface water the analytical method 01025 (Krebber, R.; Leppelt, L.; 2007; M-282614-01-1) was used.
In the present study, the method 01025 was validated concurrently with the sample analyses of the study by evaluation of the standard injections.
Because of the direct measurement of the samples recovery rates cannot be calculated. The evaluation of measurements based on HPLC-MS/MS for precision was done by comparison of the peak areas of the samples with the peak areas of the external standard solutions. For this purpose, the BYH 18636 standard injections were evaluated. The relative standard deviation of peak areas and retention times are shown in the table below.

Table A 32: Validation of method 01025 for thiencarbazone-methyl by HPLC-MS/MS

BYH 18636 standard concentration		**BYH 18636**			
		Peak area		**Retention time**	
[µg/L]	**n**	**Mean value [area counts]**	**Rel. std. dev. [%]**	**Mean value [min]**	**Rel. std. dev. [%]**
0.0500	22	686	7.7	1.33	0.5
0.500	12	7029	2.7	1.33	0.2
10.0	4	144616	2.6	1.33	0.4

Conclusion

The applicability of the HPLC-MS/MS method 01025 for the analysis of thiencarbazone-methyl (BYH 18636) in drinking and surface water samples was tested. The data presented demonstrate that the method allows the determination of BYH 18636 with satisfactory precision data, given as the relative standard deviation of 3 fortification levels with 4 to 22 replicates, lower than the highest acceptable value of 20% according to SANCO 3029/99 rev. 4. In addition the specificity of the method was demonstrated as no BYH 18636 was found in control samples in a concentration higher than 0.0500 µg/L. The method is suitable for the determination of BYH 18636 in test water and can be regarded as fit for purpose with

regard to the present study.

A 2.2.1.6.4 Concurrent validation of method 01058 in support of study M-477103-01-1

Comments of zRMS:	Method is accepted Used in the ecotoxicological study

Reference:	**Refer to KCP 10.2.1/07**
Title:	Lemna gibba G3 - Growth inhibition test with foramsulfuron + thiencarbazone-methyl OD 80 (50 + 30) G under static conditions
Report:	Bruns, E.; 2014; EBGSP149; M-477103-01-1
Authority registration No:	
Guideline(s):	EU Directive 91/414/EEC Regulation (EC) No. 1107/2009 US EPA OCSPP 850.4400
Deviations:	none
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

For the determination of foramsulfuron in test water the analytical method 01058 (Krebber, R.; Braune, M.; 2007; M-291466-01-1) was used.
In the present study the method was validated concurrently with the sample analyses of the study by evaluation of the standard injections.
The water samples were analysed with HPLC-MS/MS. The linearity of the MS-detector was checked for amidosulfuron in the range from 0.04 µg/L to 10 µg/L with an injection volume of 50 µL. The correlation coefficient was 0.9991 (1/x weighted).
Within the current study, the linearity was extended to the range 0.001 µg/L – 1.0 µg/L.
The correlation coefficient was 0.9989; linear regression (1 /x weighting): y = 3.06e+006x+32.6. The limit of quantitation was reduced to 0.001 µg/L..
Because of the direct measurement of the samples recovery rates cannot be calculated. The evaluation of measurements based on HPLC-MS/MS for precision was done by comparison of the peak areas of the samples with the peak areas of the external standard solutions. For this purpose foramsulfuron standard injections were evaluated. Standard solutions of foramsulfuron in acetonitrile/deionized water (4/1, v/v) were used. The relative standard deviation of foramsulfuron peak areas and retention times are shown in the table below.

Table A 33: Validation of method 01058 for foramsulfuron by HPLC-MS/MS

foramsulfuron standard concentration [µg/L]	n	foramsulfuron			
		Peak area		Retention time	
		Mean value [area counts]	Rel. std. dev. [%]	Mean value [min]	Rel. std. dev. [%]
0.001005	6	3416	1.4	2.07	0.4
0.1005	10	439633	1.0	2.07	0.3
0.1005	6	416816	4.8	2.07	0.2

Conclusion

The applicability of the HPLC-MS/MS method 01058 for the analysis of foramsulfuron in test water samples was tested. The data presented demonstrate that the method allows the determination of foramsulfuron with satisfactory precision data given as the relative standard deviation of 6 to 10 replicates, respectively with 1.0% and 4.8 %. In addition the specificity of the method was demonstrated as no test item was found in control samples. The method is suitable for the determination of foramsulfuron in

test water and can be regarded as fit for purpose with regard to the present study.

A 2.2.1.6.5 Concurrent validation of method 01340 in support of study M-604343-01-1

Comments of zRMS:	Accepted Used in the ecotoxicological study

Reference:	**Refer to KCP 10.3.1.3 section.** **Study report will be made available to zRMS upon request**
Title:	Foramsulfuron technical - Honey bee (Apis mellifera L.) 22 day larval toxicity test (repeated exposure) - Final report -
Report:	Oberrauch, S.; 2017; EBFS0004; M-604343-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 (2009); Directive 2003-01 (Canada/PMRA); US EPA OCSPP 850.SUPP; OECD (2016): Series on Testing and Assessment Number 239: Guidance Document on Honey Bee (Apis mellifera) Larval Toxicity Test, Repeated Exposure
Deviations:	Only mortality, but no other observations were assessed for the toxic reference item group(s)
GLP/GEP:	yes
Acceptability:	yes
Duplication (if vertebrate study):	

For the determination of foramsulfuron in/on bee larval diet by HPLC-MS/MS the analytical method 01340 (Schulte, G.; Oel, D.; 2013; M-450947-01-1) was used. The general method description and validation is to be found in the corresponding Section 5 Core section.
In the present study the method was validated concurrently with the sample analyses of the study.
Residues were quantified using matrix matched standards. Samples were injected twice.
For foramsulfuron method validation was done with a full set of concurrent recoveries at the LOQ (0.01 mg/kg), at 10 x LOQ (0.10 mg/kg) level and at 200 mg/kg in sugar solutions. Recoveries were performed by spiking the control material with the test item. Fortification levels, recovery and relative standard deviation (RSD) data are given in table below.

Table A 34: Recovery data for foramsulfuron in bee larval diet

Fortification level (FL) [mg/kg]	**Single recovery values [%]**			**Per FL**	
				Recovery [%]	**RSD [%]**
0.01	102	103	103	103	0.6
0.10	98	98	99	98	0.6
1.0	100	-	-	-	-
200	106	-	-	-	-
Overall mean				101	2.8

Conclusion
The applicability of the HPLC-MS/MS method 01340 for the analysis of foramsulfuron in/on bee larval diet was tested. The data presented demonstrate that the method allows the determination of foramsulfuron with satisfactory accuracy and precision data of 4 fortification levels given as an overall mean recovery of 101% and the corresponding overall relative standard deviation (RSD) of 2.8% (n=8). In addition

the specificity of the method was demonstrated as no foramsulfuron was found in control samples above the limit of detection (0.003 mg/kg). The method fulfils all criteria according to SANCO 3029/99 rev. 4 and SANCO 825/00 rev. 8.1 and can be regarded as fit for purpose for the determination of foramsulfuron with regard to the present study.

A 2.2.1.6.6 Concurrent validation of method 01163 in support of the study M-576217-01-1

Comments of zRMS:	Accepted

Reference:	**Refer to KCP 10.3.1.2 section** **Study report will be made available to zRMS upon request**
Title:	Thiencarbazone-methyl + cyprosulfamide SC 450 (225+225 g/L): Chronic oral toxicity test on the honey bee (Apis mellifera L.) in the laboratory
Report:	Grossmann, A.; 2016; M-576217-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No. 1107/2009; Directive 2003-01 (Canada/PMRA); US EPA OCSPP 850.SUPP.
Deviations:	none
GLP/GEP:	yes
Acceptability:	yes
Duplication (if vertebrate study):	

The analytical method 01163 (Schmeer, K.; Stuke, S.; 2009; M-354028-01-1) describes the simultaneous determination of pesticide residues in/on plant materials based on the official multi-residue method. In this study, sugar solutions were analyzed by direct injection into the HPLC-MS/MS instrument using the positive ion mode without further clean-up step. Concentrations were quantified using external standard in matrix solutions. Due to the fact that the concentration levels of thiencarbazone-methyl are very high it is only necessary to dilute the sugar solutions before the measurement.
For recovery samples 1 g of the control feeding solutions were taken and the respectively amounts of thiencarbazone-methyl were added and filled up to 25 mL with acetonitrile/water (1/1, v/v) + 2 mL/L conc. liquid ammonia. The samples were diluted (1/5, v/v) with acetonitrile/water (1/9, v/v). For higher recoveries a higher dilution step was taken.

The Limit of Quantitation (LOQ), defined as the lowest validated fortification level, was 0.010 mg/kg for thiencarbazone-methyl. The corresponding Limit of Detection (LOD) was 0.003 mg/kg.
No residues of thiencarbazone-methyl above the LOD were found in any of the control samples.
The individual recovery values of thiencarbazone-methyl in feeding solutions (method validation) ranged between 81 and 92%, with an overall mean recovery of 87%. The corresponding relative standard deviation (RSD) was 4.9% (n = 7). All residues in control samples used for recovery determination were below the LOD.

Table A 35: Method validation: recovery and RSD data for thiencarbazone-methyl in feeding solutions

Sample Material	Fortification level [mg/kg]	Recoveries – Single Values [%]					Mean Recovery [%]	RSD [%]
Sugar solution	0.01	89	92	89	-	-	90	1.9
	0.1	82	81	85	--	--	83	2.5
	4000	90	-	--	--	--	-	-
	Overall mean recovery and RSD						87	4.9

Conclusion

The applicability of the HPLC-MS/MS method 01163 for the analysis of thiencarbazone-methyl in/on plant materials was tested. The data presented demonstrate that the method allows the determination of thiencarbazone-methyl with satisfactory accuracy and precision data of 3 fortification levels given as an overall mean recovery of 87% and the corresponding overall relative standard deviation (RSD) of 4.9% (n=7). The method fulfils all criteria according to SANCO 3029/99 rev. 4 and SANCO 825/00 rev. 8.1 and can be regarded as fit for purpose for the determination of thiencarbazone-methyl with regard to the present study.

A 2.2.1.6.7 Concurrent validation of method 01163 in support of the study M-615921-01-1

Comments of zRMS:	Accepted

Reference:	**Refer to KCP 10.3.1.3 section** **Study report will be made available to zRMS upon request**
Title:	Thiencarbazone-methyl + cyprosulfamide SC 450 (225+225) G: Honey Bee (Apis mellifera L.) larval toxicity test, repeated exposure
Report:	Sekine, T.; 2018; M-615921-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No. 1107/2009 Directive 2003-01 (Canada/PMRA) US EPA Not Applicable OECD GD 239
Deviations:	Yes, but acceptable
GLP/GEP:	yes
Acceptability:	Yes
Duplication (if vertebrate study):	

The analytical method 01163 (Schmeer, K.; Stuke, S.; 2009; M-354028-01-1) describes the simultaneous determination of pesticide residues in/on plant materials based on the official multi-residue method. In this study, sugar solutions were analyzed by direct injection into the HPLC-MS/MS instrument using the positive ion mode without further clean-up step. Concentrations were quantified using external standard in matrix solutions. Due to the fact that the concentration levels of triadimenol are very high it is only necessary to dilute the sugar solutions before the measurement.
For recovery samples 1 g of the control feeding solutions were taken and the respectively amounts of thiencarbazone-methyl were added and filled up to 25 mL with acetonitrile/water (1/1, v/v) + 2 mL/L conc. liquid ammonia. The samples were diluted (1/5, v/v) with acetonitrile/water (1/9, v/v). For higher recoveries a higher dilution step was taken.

The Limit of Quantitation (LOQ), defined as the lowest validated fortification level, was 0.010 mg/kg for thiencarbazone-methyl. The corresponding Limit of Detection (LOD) was 0.003 mg/kg.
No residues of thiencarbazone-methyl above the LOD were found in any of the control samples.
The individual recovery values of thiencarbazone-methyl in feeding solutions (method validation) ranged between 82 and 98%, with an overall mean recovery of 91%. The corresponding relative standard deviation (RSD) was 6.8% (n = 7). All residues in control samples used for recovery determination were below the LOD.

Table A 36: Method validation: recovery and RSD data for thiencarbazone-methyl in feeding solutions

Sample Material	Fortification level [mg/kg]	Recoveries – Single Values [%]	Mean Recovery [%]	RSD [%]

Sugar solution	0.01	91	94	97	-	-	94	3.2
	0.1	82	85	87	--	--	85	3.0
	200	98	-	--	--	--	-	-
	Overall mean recovery and RSD						91	6.8

Conclusion

The applicability of the HPLC-MS/MS method 01163 for the analysis of thiencarbazone-methyl in larval diets was tested. The data presented demonstrate that the method allows the determination of thiencarbazone-methyl with satisfactory accuracy and precision data of 3 fortification levels given as an overall mean recovery of 91% and the corresponding overall relative standard deviation (RSD) of 6.8% (n=7). In addition the specificity of the method was demonstrated as no thiencarbazone-methyl was found in control samples above the limit of detection (30% of the LOQ). The method fulfils all criteria according to SANCO 3029/99 rev. 4 and SANCO 825/00 rev. 8.1 and can be regarded as fit for purpose for the determination of thiencarbazone-methyl with regard to the present study.

A 2.2.1.7 Description of analytical methods for the determination of residues in support of physical and chemical properties tests (KCP 5.1)

Analytical methods used for the generation of pre-authorization data are the same as the ones described in part B section 5.

A 2.2.2 Methods for post-authorization control and monitoring purposes (KCP 5.2)

A 2.2.2.1 Description of analytical methods for the determination of residues in plant matrices (KCP 5.2)

No new or additional studies have been submitted.

A 2.2.2.1.1 Analytical method 01163

A 2.2.2.1.1.1 Method validation

Comments of zRMS:	Accepted

Reference:	**KCP 5.1.2.6/02**
Title:	Description of the multi-residue analytical method 01163 for the simultaneous determination of pesticides by HPLC-MS/MS in plant materials and feeding stuff based on the official QuEChERS method
Report:	Schmeer, K.; Stuke, S.; 2009; 01163; M-354028-01-1
Authority registration No:	
Guideline(s):	91/414/EEC, 96/68/EC SANCO/825/00 rev. 7, Test Guideline OPPTS 860.1340:
Deviations:	not specified
GLP/GEP:	no
Acceptability:	Yes
Duplication (if vertebrate study):	

The analytical method (01163) as described below was used in the ecotox studies Grossmann, A.; 2016; M-576217-01-1 and Sekine, T.; 2018; M-615921-01-1.

Materials and methods

The objective of the method 01163 is to describe the work flow for the simultaneous determination of residues of pesticides in/on plant material and feeding stuff according to the official QuEChERS methodology by HPLC-MS/MS and meets also the relevant guideline SANCO 825/00 rev. 8. The method is based on the official multi-residue method according to M. Anastassiatis et al.
For the determination of pesticide residues the sample is weighed into a 50 mL centrifuge tube (5 g of dry sample material, 10 g for samples with high water content). Depending on the water content of the sample water is added to the sample followed by 10 mL acetonitrile. The sample is strongly shaken for approx. 1 minute. 4 g of $MgSO_4$, 1 g NaCl, 1 g Na_3-Citrate dihydrate and 0.5 g Na_2H-Citrate sesquihydrate are added to this mixture and the sample is strongly shaken for 1 minute again. The solution is centrifuged for 5 minutes at 3000 U/min. An aliquot of 1 mL of the supernatant is diluted to 5 mL (if 5 g were weighed) or 10 mL (if 10 g were weighed), respectively, with water (acidified to pH 4 with formic acid). This final solution is filtered and subjected to LC-MS/MS analysis operated in multiple reaction monitoring mode (MRM). In the following only validation data for thiencarbazone-methyl are presented.

Results and discussions

Recovery rates were determined at fortification levels of 0.01 mg/kg (= LOQ level), and 0.10 mg/kg. The recovery experiments were conducted by separate fortification of untreated control samples with defined amounts of a compound mixture prior to analysis. Results are presented in the table below. As a measure for the precision of the method, the intra-laboratory repeatability (n = 3) is given as relative standard deviation (% RSD) for all sample materials at fortification levels of 0.01 and 0.10 mg/kg.

Table A 37: Recovery results from method validation of thiencarbazone-methyl using the analytical method

Matrix	Analyte	Fortification level (mg/kg)	Recovery (%)	Mean overall (%)	RSD (%)	Mean overall (%)	RSD overall (%)
Plant material Whole plant	thiencarbazone-methyl	0.01	100, 102	99	3.1	96	6.1
		0.1	96				
Plant material Green material	thiencarbazone-methyl	0.01	98, 90	92	6.2		
		0.1	87				

Table A 38: Characteristics for the analytical method used for validation of thiencarbazone-methyl residues in water

	thiencarbazone-methyl
Specificity	mass spectrum is provided blank value < 30% LOQ The high selectivity of the method results from the HPLC separation in combination with MS/MS detection. As the HPLC-MS/MS method is highly specific an additional confirmatory method is not necessary.
Calibration (type, number of data points)	individual calibration data presented in the report regression equation: type: linear, weight: 1/x y = 3.71e+003 x + 644 r = 0.9971 n = 4 (in triplicate)
Calibration range	The method/detector response was linear in the concentration range from 0.5 – 50 µg/L.
Assessment of matrix effects is presented	Matrix matched standards were used.
Limit of quantification	LOQ = 0.01 mg/kg

Conclusion

The analytical method complies with all guideline criteria according to SANCO 825/00 rev. 8 with the minor exception of the precision data. Here only one or two instead of five determinations per fortification level were performed. However, this deviation can be regarded as acceptable due to the fact that currently this multi-residue method 01163 covers approx. 150 different compounds and will be extended continuously in the future. Thus, we refer on numerous validation results given which were determined and published by M. Anastassiatis et al.
Therefore, the method is suitable for the determination of thiencarbazone-methyl in feeding diets for bees and can be regarded as fit for purpose with regard to the study of Grossmann, A.; 2016; M-576217-01-1 and Sekine, T.; 2018; M-615921-01-1.

A 2.2.2.1.2 Extraction efficiency

A study on extraction efficiency (R. Bongartz, 2006, M-274486-01-2 [MEF-05/504]) was already peer reviewed (DAR, RMS UK, April 2012), even though residues are not expected to be ≥LOQ in sugar beet roots and therefore extraction efficiency is actually not required according to SANCO/825/00 rev. 8.1.

A 2.2.2.2 Description of analytical methods for the determination of residues in animal matrices (KCP 5.2)

A modification of the analytical method 01022 has been developed on eggs and submitted in the frame of this application. The analytical method 01022/M001 is to be considered as EU peer review (refer to Evaluation Report - RMS: France, July 2019); It is nevertheless presented in Appendix 2 in order to help for the review of its subsequent Independent Laboratory Validation.

A 2.2.2.2.1 Analytical method 01022/M001

A 2.2.2.2.1.1 Method validation

Comments of zRMS:	Accepted

Reference:	**KCP 5.2.2/01**
Title:	Modification M001 of the analytical method 01022 for the determination of residues of BYH18636 and BYH18636-MMT in animal matrices
Report:	Schoening, R.; Koester, P.; 2013; 01022/M001; M-459804-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No. 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration Data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, 11/07/00 Guidance document on residue analytical methods, SANCO/825/00/rev. 8.1, European Commission, Directorate General Health and Consumer Protection 16/11/2010 US EPA Residue Chemistry Test Guideline OCSPP 860.1340: Residue Analytical Method
Deviations:	not specified
GLP:	Yes
Acceptability:	yes
Duplication (if vertebrate study):	

Materials and methods

The residues were extracted twice from 5 g of eggs with acetonitrile/water (4/1, v/v). An aliquot of the raw extract was evaporated to dryness and redissolved in water. After filtration the solution was analysed by HPLC-MS/MS without further clean-up. Residues were quantified against matrix-matched standards.

The solution concentrations and residues of BYH18636-MMT are expressed as molar equivalents of parent BYH18636.

Results and discussions

Limit of Quantification (LOQ)

The limit of quantification (LOQ) for thiencarbazone-methyl (BYH18636) and BYH18636-MMT is 0.01 mg/kg in eggs (whole egg). The limit of determination (LOD) was estimated as the lowest measured standard concentration in the matrix matched standard linearity. The LODs were 0.003 mg/kg for each compound.

Calibration

The correlation between the injected amount of substance and the detector response was linear for solvent standards ranging from 0.05 µg/L to 2.0 µg/L (corresponding to 0.005 mg/kg to 0.20 mg/kg). The correlation coefficients (r) were always > 0.99.

Specificity

Residues in control samples were below 0.003 mg/kg. The recoveries were not corrected for interferences. Two MRM transitions were monitored for BYH18636 and BYH18636-MMT in eggs: For BYH18636, m/z 391 → 130 as the 1st MRM and m/z 391 → 359 as the 2nd MRM; and for BYH18636-MMT, m/z 130 → 115 as the 1st MRM and m/z 130 → 58 as the 2nd MRM. Therefore, the HPLC-MS/MS method is highly specific and an additional confirmatory method is not necessary. The confirmatory determination was fully validated, hence the quantitation and confirmation method can be used interchangeably, e.g. if the quantitation peak is superimposed by interferences.

Relative standard deviations were below 20% for thiencarbazone-methyl (BYH18636) and BYH18636-MMT in eggs. Mean recoveries for each fortification level and the overall mean recovery were within the range 70 - 110%.

Table A 39: Recovery results from method validation of thiencarbazone-methyl (BYH 18636) and BYH 18636-MMT using the analytical method

Matrix	Fortification level (mg/kg)	n	Mean recovery* (%)	RSD* (%)	Comments
BYH18636					
Egg (whole)	0.01	5	88	12.8	m/z = 391 → 130
Egg (whole)	0.10	5	93	6.9	m/z = 391 → 130
Egg (whole)	0.01	5	87	12.0	m/z = 391 → 359
Egg (whole)	0.10	5	93	7.4	m/z = 391 → 359
BYH18636-MMT					
Egg (whole)	0.01	5	88	2.6	m/z = 130 → 115
Egg (whole)	0.10	5	87	6.0	m/z = 130 → 115
Egg (whole)	0.01	5	88	1.4	m/z = 130 → 58
Egg (whole)	0.10	5	86	5.7	m/z = 130 → 58

* Some recoveries and RSDs are different in the report, but re-calculating proved the values here in this table to be correct

Table A 40: Characteristics for the analytical method used for validation of thiencarbazone-methyl residues in eggs

	Thiencarbazone-methyl (BYH18636)	BYH18636-MMT
Specificity	Mass spectrum is provided Blank value < 30 % LOQ	Mass spectrum is provided Blank value < 30 % LOQ
Calibration (type, number of data points)	Individual calibration data presented Calibration line equation presented: Linear regression with 1/x weighting Number of data points: 5	Individual calibration data presented Calibration line equation presented: Linear regression with 1/x weighting Number of data points: 5
Calibration range	At least 5 different concentrations ranging from 0.02 ng/mL to 2.0 ng/mL, corresponding to 0.002 mg/kg to 0.20 mg/kg	At least 5 different concentrations ranging from 0.02 ng/mL to 2.0 ng/mL, corresponding to 0.002 mg/kg to 0.20 mg/kg
Assessment of matrix effects is presented	yes	Yes
Limit of determination/quantification	Limit of quantification 0.01 mg/kg representing the lowest validated level with sufficient recovery and precision	Limit of quantification 0.01 mg/kg representing the lowest validated level with sufficient recovery and precision

Conclusion

Method 01022/M001 was successfully validated in egg. The method meets all guideline criteria to determine residues of BYH 18636 and BYH18636-MMT in/on eggs (whole egg) at 0.01 mg/kg.

A 2.2.2.2.1.2 Independent laboratory validation

Comments of zRMS:	Accepted

Reference:	**KCP 5.2.2/02**
Title:	Independent laboratory validation of BCS analytical method no. 01022/M001 for the determination of residues of BYH18636 (thiencarbazone-methyl) and BYH18636-MMT in egg, using LC/MS/MS
Report:	Wilde, N.; 2013; P 3025 G; M-482949-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No. 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, 11/07/00 Guidance document on residue analytical methods, SANCO/825/00/rev. 8.1, European Commission, Directorate General Health and Consumer Protection 16/11/2010 US EPA Residue Chemistry Test Guideline OCSPP 860.1340: Residue Analytical Method
Deviations:	not applicable
GLP:	Yes
Acceptability:	Yes
Duplication (if vertebrate study):	

Materials and methods

No deviations from method validation.

Results and discussions

See also method validation above.

Table A 41: Recovery results from independent laboratory validation of thiencarbazone-methyl (BYH 18636) and BYH 18636-MMT using the analytical method

Matrix	Fortification level (mg/kg)	n	Mean recovery (%)	RSD (%)	Comments
BYH18636					
Egg (whole)	0.01	5	84	2.8	m/z 391 → 130
Egg (whole)	0.10	5	102	2.6	m/z 391 → 130
Egg (whole)	0.01	5	90	3.5	m/z 391 → 359
Egg (whole)	0.10	5	103	2.3	m/z 391 → 359
BYH18636-MMT					
Egg (whole)	0.01	5	89	5.9	m/z 130 → 115
Egg (whole)	0.10	5	96	1.7	m/z 130 → 115
Egg (whole)	0.01	5	85	5.7	m/z 130 → 58
Egg (whole)	0.10	5	95	3.7	m/z 130 → 58

Table A 42: Characteristics for the analytical method used for independent laboratory validation of thiencarbazone-methyl residues in eggs

	Thiencarbazone-methyl (BYH18636)	BYH18636-MMT
Specificity	Mass spectrum is provided Blank value < 30 % LOQ	Mass spectrum is provided Blank value < 30 % LOQ
Calibration (type, number of data points)	Individual calibration data presented Calibration line equation with 1/x weighting presented Number of data points: 5	Individual calibration data presented Calibration line equation with 1/x weighting presented Number of data points: 5
Calibration range	0.02 ng/mL to 2.0 ng/mL, corresponding to 0.002 mg/kg to 0.20 mg/kg	0.02 ng/mL to 2.0 ng/mL, corresponding to 0.002 mg/kg to 0.20 mg/kg
Assessment of matrix effects is presented	Yes (refernce to original method is made)	Yes (refernce to original method is made)
Limit of determination/quantification	Limit of quantification 0.01 mg/kg representing the lowest validated level with sufficient recovery and precision	Limit of quantification 0.01 mg/kg representing the lowest validated level with sufficient recovery and precision

Conclusion

PTRL Europe successfully performed the independent laboratory validation (ILV) for the determination of residues of BYH 18636 and BYH18636-MMT in eggs by LC-MS/MS, demonstrating the LOQ of 0.01 mg/kg and the limit of detection (LOD) of 0.002 mg/kg.

The method meets all guideline criteria to determine residues of BYH 18636 and BYH18636-MMT in/on eggs.

A 2.2.2.2.1.3 Extraction efficiency

A study on extraction efficiency (Schmeer, K. / 2007 / Document M-282899-01-2 (Report MEF-06/292)) was already peer reviewed (DAR, RMS UK, April 2012).

Extraction efficiency was determined with data generation method 00990 for both components of the residue definition, i.e. thiencarcarbazone-methyl and BYH 18636-MMT, and additionally BYH 18636-methyl carbamate and BYH 18636-sulfonamide. As the extraction solvents and procedures are almost the same in enforcement method 01022 as well as its modification for the analysis of eggs, the extraction efficiency study is applicable to all these methods.

A 2.2.2.3 Description of Methods for the Analysis of Body Fluids and Tissues (KCP 5.2)

Comments of zRMS:	Accepted

Reference:	**KCP 5.2.3/02**
Title:	Analytical method 01495 for the determination of various pesticides and selected pesticide metabolites in blood plasma by HPLC-MS/MS
Report:	Kaussmann, M.; 2016; 01495; M-570324-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market Guidance Document on Residue Analytical Methods, SANCO/825/00 rev. 8.1 of November 16, 2010 European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, July 11, 2000
Deviations:	none
GLP/GEP:	yes
Acceptability:	yes
Duplication (if vertebrate study):	

Method 01495 is a multi-residue method for the determination of several active substances of plant protection products - including thiencarbazone-methyl and BYH18636-MMT - in plasma of blood by HPLC-MS/MS. Only the results relevant to thiencarbazone-methyl and BYH18636-MMT are reported here.

Materials and methods

In a first step, the plasma samples are denaturated by mixing with a solution of acetonitrile/water (6/1, v/v) containing 56 mg/L ammonium acetate and 0.14 mL/L formic acid. The samples are then subjected to centrifugation to separate sediment and supernatant. An aliquot of the supernatant is subjected to HPLC-MS/MS analysis and the residues are quantified using matrix matched standards. All compounds (including thiencarbazone-methyl) are measured in positive ion mode.
The quantification of thiencarbazone-methyl is done using the following mass transitions:

- primary method (for quantification): m/z 391 → 230
- confirmatory method: m/z 391 → 130

Results and discussions

Specificity
Apparent residues in control samples were below 0.3 x LOQ. Two MRM transitions were monitored. Therefore, the HPLC-MS/MS method is highly specific and an additional confirmatory method is not necessary.

Linearity
At least five calibration points were used. The correlation between the injected amount of thiencarbazone-methyl and the detector response was linear (1/x weighted) for matrix matched standard solutions ranging from 0.0015 to 0.075 µg/mL (corresponding to 15 µg/L to 750 µg/L in plasma).
The correlation coefficients were ≥ 0.99.

Accuracy
Fortification experiments were performed at the limit of quantitation (LOQ) and 10 x LOQ. Mean recoveries for each fortification level were within the 70 - 110 % range for both MRM transitions.

Precision
For both mass transitions monitored, relative standard deviations (RSD) per fortification level were below 20%.

Stability of Analytes

Thiencarbazone-methyl and BYH18636-MMT were stable in plasma for at least 3 days when stored in a freezer at ≤ -18 °C. In addition, the stability of thiencarbazone-methyl and BYH18636-MMT in extracts was demonstrated for a period of at least 3 days when stored in a refrigerator at ≤ +6 °C under dark conditions.

Table A 43: Recovery/ repeatability results from method validation in plasma, 1. MRM (quantification) and 2. MRM (confirmation)

Matrix	Fortification level (mg/L)	n	Mean recovery (%)	RSD (%)	Comments
Thiencarbazone-methyl (MRM: m/z 391 → 230, quantification)					
Plasma	0.05	5	103	3.0	
	0.5	5	103	3.1	
Thiencarbazone-methyl (MRM: m/z 391 →130, confirmation)					
Plasma	0.05	5	103	1.9	
	0.5	5	103	3.7	
BYH18636-MMT (MRM: m/z 130 → 115, quantification)					
Plasma	0.05	5	103	3.5	
	0.5	5	103	3.9	
BYH18636-MMT (MRM: m/z 130 → 73, confirmation)					
Plasma	0.05	5	102	5.1	
	0.5	5	103	3.9	

Table A 44: Characteristics for the analytical method 01495 used for validation of thiencarbazone-methyl and BYH18636-MMT residues in plasma

	Thiencarbazone-methyl	BYH18636-MMT
Specificity	The high selectivity of the method resulted from the HPLC separation in combination with MS/MS detection. Two MRM transitions were monitored for each compound. No signals/peaks interfering with the detection of the analytes were observed in solutions of untreated control specimens.	
Calibration (type, number of data points)	individual calibration data is presented calibration line equations are presented (1/x weighted): m/z 391 → m/z 230: y = 18619.4 x - 1794.64 (Thiencarbazone-methyl), m/z 391 → m/z 130: y = 17395.0 x - 497.14 (Thiencarbazone-methyl), Correlation coefficient: ≥ 0.999 number of data points: 7	individual calibration data is presented calibration line equations are presented (1/x weighted): m/z 130 → m/z 115: y = 15901.1 x – 2097.81 (BYH18636-MMT), m/z 130 → m/z 73: y = 2094.16 x – 365.21 (BYH18636-MMT), Correlation coefficient: ≥ 0.999 number of data points: 7
Calibration range	1.5 µg/L to 75 µg/L (corresponding to 0.015 mg/L to 0.75 mg/L in plasma)	
Assessment of matrix effects is presented	Yes, matrix matched standards were used for the evaluation of all analytes which compensate for matrix effects.	
Limit of determina-	LOQ = 0.05 mg/L for plasma	

tion/quantification	LOD = 0.015 mg/L for plasma

Conclusion

The method 01495 is validated and meets all guideline criteria of SANCO/825/00 rev. 8.1 to determine residues of thiencarbazone-methyl and BYH18636-MMT in blood plasma and is suitable as enforcement method.

A 2.2.2.4 Description of Methods for the Analysis of Soil (KCP 5.2)

A 2.2.2.4.1 Analytical method 01522

A 2.2.2.4.1.1 Method validation

Comments of zRMS:	Accepted

Reference:	**KCP 5.2.4/01**
Title:	Analytical method 01522 for the determination of thiencarbazone-methyl in soil by HPLC-MS/MS
Report:	Koch, V.; 2017; 01522; M-583905-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, 11/07/00 Guidance document on residue analytical methods, SANCO/825/00/rev. 8.1, European Commission, Directorate General Health and Consumer Protection 16/11/2010 US EPA Residue Chemistry Test Guideline OCSPP 860.1340: Residue Analytical Method
Deviations:	none
GLP/GEP:	yes
Acceptability:	yes
Duplication (if vertebrate study):	

Materials and methods

The analytical method 01522 was developed for the determination of thiencarbazone-methyl residues in/on soil.

The method was validated using two German soils “Hanscheider Hof” and “Dollendorf”. Soil samples of 5 g were extracted in a microwave extractor with a mixture of acetonitrile/water (4/1; v/v). The extracts were centrifuged to remove fine particles of the soil. Identification and quantitation of the active substance was done by HPLC using MS/MS detection in the Multiple Reaction Monitoring mode (MRM). Two MRM transitions were monitored for each compound and each soil tested m/z 391.0 → 359.0 for quantitation and m/z 391.0 → 229.8 for confirmation of thiencarbazone-methyl.

The stock solution was prepared by weighing a defined amount of reference item into a volumetric flask and making up to volume with acetonitrile.

The method was validated using the two German soils "Hanscheider Hof" and "Dollendorf". Two different soils were used in order to assess a possible influence of different soil characteristics. The soil samples were classified according to DIN and/or USDA specifications.

Soil Characteristics

Soil	**Hanscheider Hof**	**Dollendorf**
Description	0-20 cm soil layer BATCH 20160224	0-20 cm soil layer BATCH 20130726
pH (in $CaCl_2$ solution)	5.5	7.3
pH (in H_2O)	5.8	7.4
Organic Carbon [%]	2.4	5.2
Organic Matter [%] *	4.1	8.9
Cation Exchange Capacity [meq / 100 g dry soil]	10.0	20.1
max. Water Holding Capacity [g / 100 g dry soil]	62.0	82.5
Textural Description according to USDA [Fraction %]	Fraction [%]	Fraction [%]
Clay (<0.002 mm)	14	33
Silt (0.002-0.050 mm)	48	41
Sand (0.050-2.000 mm)	38	26
Soil type	Loam	Clay Loam

* Organic matter = Organic carbon x 1.72

Results and discussions

Mean recoveries for each fortification level were within the range of 70 – 84% and the overall mean recovery were within the range of 73 – 83% for thiencarbazone-methyl. Relative standard deviations (RSD) were below 20%, for each fortification level between 0.8 – 6.1% and for the overall between 4.9 – 5.2% for thidencarbazone-methyl.

Table A 45: Recovery/ repeatability results from method validation of thiencarbazone-methyl using the analytical method 01522 in soil samples

Matrix	**Fortification level [µg/kg] (n = 5)**	**Mean recovery [%]**	**RSD [%]**	**Overall mean recovery [%]**	**Overall RSD [%]**
Soil, Hanscheider Hof	0.4	83	6.1	83	5.2
	4.0	84	4.7		

Soil, Dollendorf	0.4	75	5.1	73	4.9
	4.0	70	0.8		

For confirmation of the individual residues a 2nd mass transition was used. Results of the confirmation procedure showed that the overall mean recovery rates for thiencarbazone-methyl were between 70 to 110%. The overall RSD were below 20% for all soils tested.

Table A 46: Characteristics for the analytical method 01522 used for validation of thiencarbazone-methyl in soil

	thiencarbazone-methyl
Specificity	Two MRM transitions were monitored; HPLC- MS/MS method is highly specific and an additional confirmatory method is not necessary The blank values (two untreated control samples) were below LOD (<1/3 x LOQ), demonstrating that no background level of thiencarbazone-methyl was present in the test systems.
Calibration (type, number of data points)	Individual calibration data is presented calibration line equations are presented (1/x weighted): y = 25475.9 x +867.96 (soil "Hanscheider Hof"), y = 24664.5 x + 243.45 (soil "Dollendorf"), Correlation coefficient r: 0.9983 (soil "Hanscheider Hof"), r: 0.9999 (soil "Dollendorf") number of data points: 6
Calibration range	0.06 µg/L – 10 µg/L (0.12 µg/kg – 20 µg/kg)
Limit of determination/quantification	LOQ = 0.4 µg/kg in soil LOD = 0.13 µg/kg in soil
Assessment of matrix effects is presented	Possible matrix effects of thiencarbazone-methyl are eliminated by using matrix standard solution.

Conclusion

The analytical method 01522 complies with all guideline criteria according to SANCO/825/00 rev. 8.1 and SANCO/3029/99 rev. 4 to determine residues of thiencarbazone.methyl in soil samples at a limit of quantification of 0.4 µg/kg.

A 2.2.2.5 Description of Methods for the Analysis of Water (KCP 5.2)

A 2.2.2.5.1 Analytical method 01387/M001

A 2.2.2.5.1.1 Method validation

Comments of zRMS:	Accepted

Reference:	**KCP 5.2.5/02**
Title:	Modification M001 of the analytical method 01387 for the determination of various pesticides in drinking and surface water by HPLC-MS/MS
Report:	Krebber, R.; 2014; MR-14/053; M-494841-02-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC EC Guidance Document on Residue Analytical Methods, SANCO/825/00 rev. 8.1 of November 16, 2010 European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, July 11, 2000
Deviations:	not specified
GLP:	Yes
Acceptability:	yes
Duplication (if vertebrate study):	

The analytical method 01387/M001 was developed for the determination of various pesticides in drinking and surface water via HPLC-MS/MS.

Materials and methods

The modification M001 of the analytical method 01387 describes the determination of thiencarbazone-methyl (among others) in drinking and surface water by HPLC-MS/MS using two MRM transitions. Water samples were determined by direct injection into the HPLC-MS/MS instrument uses the negative ion mode for thiencarbazone-methyl without further clean-up. Concentrations were quantified using external matrix-matched standard solutions. In the following only validation data for thiencarbazone-methyl are presented.

The analytical method was validated for surface water. A validation for drinking water was not necessary because the limit of quantitation for surface water is equal or below the drinking water limit of 0.1 µg/L.

For method validation surface water from the river Rhine sampled in Leverkusen-Hitdorf was used. Characteristics of the test system are listed in the table below.

Characteristics of the Surface Water from River Rhine, Sampled in Leverkusen-Hitdorf (Germany)

Parameter	Value
Total organic carbon (TOC)	3 mg/L
Dissolved organic carbon (DOC)	3 mg/L
Conductivity	481 µS/cm
pH	7.8
Water hardness	10.7 dH
Filterable solids	132 mg/L
Dry residue after filtration	280 mg/L

Results and discussions

Because of the direct measurement of samples, recovery rates cannot be calculated and repeatability was calculated instead.

Table A 47: Recovery/ repeatability results from method validation of thiencarbazone-methyl residues in water

Analyte	Matrix	Fortification level [µg/L] n = 10	Mean value [peak area]	RSD [%]
Thiencarbazone-methyl m/z 389 → m/z 113	Surface water	0.05	4587	4.2
		0.5	44771	3.5
Thiencarbazone-methyl m/z 389 → m/z 128		0.05	3538	5.0
		0.5	35974	1.7

Table A 48: Characteristics for the analytical method used for validation of thiencarbazone-methyl residues in water

	thiencarbazone-methyl
Specificity	mass spectrum is provided blank value < 30% LOQ No signals/peaks interfering with the detection of the analyte were observed
Calibration (type, number of data points)	Quantitation MRM (m/z 389→m/z 113) Calibration equation: $y = 9.21x10^4 – 196$ r = 0.9999 Confirmatory MRM (m/z 389→m/z 128) Calibration equation: $y = 7.2x10^4 – 171$ r = 0.9999
Calibration range	The method/detector response was linear in the concentration range from 0.015 µg/L to 10 µg/L.
Assessment of matrix effects is presented	Yes. The MS/MS detection of thiencarbazone-methyl was not affected by the matrix. The peak areas of the quantification and confirmatory ion in a surface water /formic acid (1000 / 0.1, v / v) sample containing 0.5 µg/L shows no significant difference to the corresponding peak areas in deionized water.
Limit of quantification	LOQ = 0.05 µg/L (surface water)

Conclusion

The method meets all guideline criteria according SANCO/825/00 rev. 8.1 to determine residues of thiencarbazone-methyl in drinking and surface water at a limit of quantitation (LOQ) of 0.05 µg/L and is therefore suitable as enforcement method. The method was used in the study Kuhl, K.; 2016; M-568404-02-1 and can be regarded as fit for purpose.

A 2.2.2.5.2 ILV of analytical method 01387/M001

A 2.2.2.5.2.1 Method validation

zRMS comment: method is accepted

Reference:	**KCP 5.2.5/03**
Title:	Independent laboratory validation of BCS method 01387 (Modification 001) for the determination of various pesticides in surface water by DI-HPLC-MS/MS
Report:	Stanislowski, T.; 2015; P 3287 G; M-509775-01-1
Authority registration No:	
Guideline(s):	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC European Commission Guidance Document for Generating and Reporting Methods of Analysis in Support of Pre-Registration data Requirements for Annex II (part A, Section 4) and Annex III (part A, section 5) of directive 91/414, SANCO/3029/99 rev. 4, 11/07/00 Guidance document on Pesticide Residue Analytical Methods, SANCO/825/00/rev. 8.1, European Commission, Directorate General Health and Consumer Protection 16/11/2010 Commission Regulation (EU) No 283/2013 (section 4.2) of 1 March 2013 setting out the data requirements for active substances, in accordance with Regulation (EC) No 1107/2009 of the European Parliament and of the Council concerning the placing of plant protection products on the market.
Deviations:	not specified
GLP:	Yes
Acceptability:	yes
Duplication (if vertebrate study):	

The analytical method 01387/M001 was independently validated for the determination of thiencarbazone-methyl (amongst other pesticides, not reported here) in drinking and surface water by direct injection into the (DI-) HPLC-MS/MS instrument without further clean-up.

Materials and methods

Identification and quantitation of thiencarbazone-methyl was performed by HPLC using MS/MS detection in the multiple reaction monitoring (MRM) mode and external matrix-matched standard solutions. A second MRM transition was used for confirmation. The method was validated using surface water from the river Danube.

The following MRM transitions were used for quantitation and confirmation of thiencarbazone-methyl:

m/z 389 → *m/z* 113 (quantitation)

m/z 389 → *m/z* 128 (confirmation)

For the independent laboratory validation, surface water from the river Danube sampled in Ulm was used. The water was characterized by accredited Institute Alpha (Ulm, Germany) following common DIN or EN guidelines and methods. Characteristics of the test system are listed in The method was validated using the two German soils "Hanscheider Hof" and "Dollendorf". Two different soils were used in order to assess a possible influence of different soil characteristics. The soil samples were classified according to DIN and/or USDA specifications. the table below.

Characteristics of the surface water from River Danube, sampled in Ulm (Germany)

Parameter	**Value**
Total organic carbon (TOC) (EN 1484:1997)	4.50 mg/L
Dissolved organic carbon (DOC) (EN 1484:1997)	4.2 mg/L
Conductivity (EN 27888:1993)	625 µS/cm (25°C)
pH (DIN 38 404-C 5)	8.27

Water hardness (calculated)	3.01 mmol/L (16.9°d)
Filterable solids (EN 872 Whatman GF 6)	4.0 mg/L

Results and discussions

Because of the direct measurement of samples, recovery rates cannot be calculated and repeatability was calculated instead.

Table A 49: Recovery/ repeatability results from independent laboratory validation of thiencarbazone-methyl using the analytical method 01387/M001

Matrix	Analyte	Fortification level (µg/L) (n = 5)	Mean recovery (area counts)	RSD (%)
surface water	thiencarbazone-methyl *m/z* 389 → 113 (quantitation)	0.05	3449	8.6
		0.5	32230	3.3
	thiencarbazone-methyl *m/z* 389 → 128 (confirmation)	0.05	2790	1.6
		0.5	26380	7.9

Table A 50: Characteristics for the analytical method used for independent laboratory validation of thiencarbazone-methyl residues in surface water

method	Thiencarbazone-methyl
Specificity	Residues in control samples were below 0.3 x LOQ. Two MRM transitions were monitored for quantitation and confirmation, therefore the HPLC-MS/MS method is highly specific.
Calibration	Regression equations: Quantitation MRM $y = 6.62*10^4 x – 397$, r = 0.9994 Confirmation MRM $y = 5.55*10^4 x – 191$, r = 0.9997 6 concentrations were measured.
Calibration range	The detector response was linear (1/x weighted) for standard solutions of thiencarbazone-methyl in surface water / formic acid (1000/0.1, v/v). Linear range 0.015 – 5 µg/L
Assessment of matrix effects is presented	Matrix-matched standard solutions were used.
Limit of quantification	The limit of quantification (LOQ) for thiencarbazone-methyl is 0.05 µg/L in surface water.

Conclusion

The independent laboratory validation (ILV) of the analytical method 01387/M001 for the determination of thiencarbazone-methyl in drinking and surface water is described in the present report. The method was shown to be selective and yield accurate and repeatable results and fulfils the requirements of the SANCO guideline 825/00 rev. 8.1.

A 2.2.2.6 Description of Methods for the Analysis of Air (KCP 5.2)

No new or additional studies have been submitted.

A 2.2.2.7 Other Studies/ Information

No new or additional studies have been submitted.