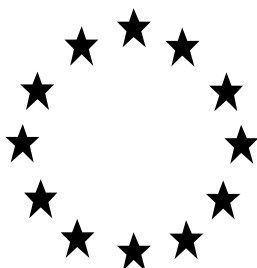


Draft Renewal Assessment Report
under Regulation (EC) 1107/2009



FORAMSULFURON

Volume 3 – B.7 (AS)

Rapporteur Member State: Finland
Co-Rapporteur Member State: Slovakia

March 2015

Volume 1

Level 1: Statement of subject matter and purpose for which this report has been prepared and background information on the application

Level 2: Summary of active substance hazard and of product risk assessment

Level 3: Proposed decision with respect to the application

Appendix 1: Guidance documents used in this assessment

Appendix 2: Reference list

Volume 2

Annex A: List of the tests, studies and information submitted

Volume 3

Annex B (Active Substance): Summary, evaluation and assessment of the data and information

Annex B.1 (AS): Identity

Annex B.2 (AS): Physical and chemical properties of the active substance

Annex B.3 (AS): Data on application

Annex B.4 (AS): Further information

Annex B.5 (AS): Methods of analysis

Annex B.6 (AS): Toxicology and metabolism data

Annex B.7 (AS): Residue data

Annex B.8 (AS): Environmental fate and behaviour

Annex B.9 (AS): Ecotoxicology data

Volume 3

Annex B (Plant Protection Product): Summary, evaluation and assessment of the data and information

Annex B.1 (PPP): Identity

Annex B.2 (PPP): Physical and chemical properties of the plant protection product

Annex B.3 (PPP): Data on application and efficacy

Annex B.4 (PPP): Further information

Annex B.5 (PPP): Methods of analysis

Annex B.6 (PPP): Toxicology and metabolism data and assessment of risks to humans

Annex B.7 (PPP): Residue data

Annex B.8 (PPP): Environmental fate and behaviour and environmental exposure assessment

Annex B.9 (PPP): Ecotoxicology data and assessment of risks for non-target species

Volume 4

Annex C: Confidential information and, where relevant, details of any task force formed for the purpose of generating tests and studies submitted

List of Endpoints

Version History

When	What
2015/March	First draft RAR

Table of Contents:

RAPPORTEUR MEMBER STATE: FINLAND	1
B.7. RESIDUE DATA.....	6
B.7.1. METABOLISM, DISTRIBUTION AND EXPRESSION OF RESIDUES IN PLANTS (ANNEX IIA, 6.1; ANNEX IIIA, 8.1).....	6
B.7.1.1. Metabolism in maize.....	6
B.7.1.2. Summary of studies on metabolism in plants.....	9
B.7.2. METABOLISM, DISTRIBUTION AND EXPRESSION OF RESIDUES IN LIVESTOCK (ANNEX IIA, 6.2; ANNEX IIIA, 8.1).....	12
B.7.2.1. Metabolism in laying hen	12
B.7.2.2. Lactating ruminants.....	12
B.7.2.3. Summary of studies on metabolism in livestock animals	14
B.7.2.4. Dietary burden calculation.....	14
B.7.2.5. Pigs.....	15
B.7.2.6. Fish.....	15
B.7.2.7. Summary of studies on metabolism in animals.....	15
B.7.3. DEFINITION OF THE RESIDUE (ANNEX IIA 6.7; ANNEX IIIA 8.6).....	15
B.7.4. USE PATTERN	16
B.7.5. IDENTIFICATION OF CRITICAL GAP(S)	16
B.7.6. RESIDUES RESULTING FROM SUPERVISED TRIALS (ANNEX IIA, 6.3; ANNEX IIIA, 8.2).....	16
B.7.6.1. Residue levels in maize	16
B.7.7. FEEDING STUDIES.....	20
B.7.7.1. Laying hen	20
B.7.7.2. Ruminants.....	21
B.7.7.3. Pigs.....	22
B.7.7.4. Fish.....	22
B.7.8. STORAGE STABILITY OF RESIDUES PRIOR TO ANALYSES	22
B.7.8.1. Studies submitted and evaluated for the original inclusion of foramsulfuron on Annex I:.....	22
B.7.8.2. Storage stability. "AIR3" process/ New studies submitted Justification for including this report in the "AIR" dossier.....	23
B.7.8.3. Storage stability "AIR3" process/ New studies submitted	26
B.7.9. EFFECTS OF PROCESSING.....	26
B.7.9.1. Nature of the residue	26
B.7.9.2. Distribution of the residue in peel and pulp	26
B.7.9.3. Magnitude of residues in processed commodities	26
B.7.10. RESIDUES IN SUCCEEDING OR ROTATIONAL CROPS.....	27
B.7.10.1. Metabolism in rotational crops.....	27
B.7.10.2. Magnitude of residues in rotational crops.....	28
B.7.11. OTHER STUDIES	28
B.7.11.1. Effect on the residue level in pollen and bee products.....	28
B.7.12. PROPOSED RESIDUE DEFINITIONS AND MAXIMUM RESIDUE LEVELS	28
B.7.12.1. Proposed residue definitions	28

B.7.12.2. Proposed MRLs and justification for the acceptability of those MRLs (Annex IIA, 6.7; Annex IIIA, 8.6)	29
B.7.13. MRLs IN OECD COUNTRIES	29
B.7.14. PROPOSED MRLs AND JUSTIFICATION FOR THE ACCEPTABILITY OF THOSE MRLs (ANNEX IIA, 6.7; ANNEX IIIA, 8.6).....	29
B.7.15. PROPOSED IMPORT TOLERANCES AND JUSTIFICATION FOR THE ACCEPTABILITY OF THOSE RESIDUES.....	30
B.7.16. BASIS FOR DIFFERENCES, IF ANY, IN CONCLUSIONS REACHED HAVING REGARD TO ESTABLISHED OR PROPOSED CAC MRLS.....	30
B.7.17. PROPOSED SAFETY INTERVALS	30
B.7.18. ESTIMATES OF POTENTIAL AND ACTUAL DIETARY EXPOSURE THROUGH DIET AND OTHER MEANS (ANNEX IIA, 6.9, ANNEX IIIA, 8.8).....	31
B.7.19. LITERATURE REVIEW.....	33
B.7.20. SUMMARY AND EVALUATION OF RESIDUE BEHAVIOUR (ANNEX IIA, 6.10, ANNEX IIIA, 8.9).....	33
B.7.21. REFERENCES RELIED UPON.....	36

B.7. RESIDUE DATA

Foramsulfuron was included in Annex I to Directive 91/414/EEC on July 1st in 2003. In order to cover the issues raised during the approval process and to reflect later changes in the evaluation protocols, new studies have been submitted by the applicant. These studies have been now evaluated in detail in the present document.

For B.7 Residue data, all individual studies, whether performed on the active substance or on formulated products, are evaluated in this Volume, i.e. Volume 3 (AS). The main reason to handle residue data different than data for the other sections is that the revised data requirements do not specify requirements for residue data on the formulated products. Additionally (and in contrast to other sections of the evaluation) there is no expected benefit for the product authorisation step to have residue data presented as per product. Consequently, uses and products are approved as applied on a case per case basis using the principles outlined in the evaluation and re-evaluation of the active substance preferably by the zonal evaluation processes.

The information included in this document covers the active substance foramsulfuron and representative formulations, which contains the said active substance and which are supported by Bayer Crop Science.

The studies evaluated in this Vol 3 B.7 document include the relevant studies evaluated in the DAR (2001) on the approval of foramsulfuron as a plant protection product and the studies presented by the applicants for the renewal.

Compared to the original inclusion, data covering the same representative formulation (foramsulfuron + isoxadifen-ethyl OD 45) and uses have been submitted.

B.7.1. METABOLISM, DISTRIBUTION AND EXPRESSION OF RESIDUES IN PLANTS (ANNEX IIA, 6.1; ANNEX IIIA, 8.1)

B.7.1.1. Metabolism in maize

In the original dossier, the behaviour and metabolism of foramsulfuron was only investigated in maize (corn) as foramsulfuron was not intended for use in any other crop. In these studies, foramsulfuron was radiolabelled with ¹⁴C in two different positions as presented in Figure 7.2.1-1.

It is concluded that the submitted studies gave sufficient information to propose a definition of residue for risk assessment in plant materials, as foramsulfuron. This was also recently confirmed by EFSA in their recent (2012) reasoned opinion for the MRLs of foramsulfuron.

Studies submitted and evaluated for the inclusion of foramsulfuron on Annex I:

Report:	KCA 6.2.1 /01;Huang, M. N.;2000;M-185906-01
Title:	Metabolism of (U- ¹⁴ C -phenyl)-AE F130360 and (2- ¹⁴ C -pyrimidyl)-AE F130360 in corn grown under field conditions Code: AE F130360
Report No:	C003293
Document No(s):	Report includes Trial Nos.: 512CF

	M-185906-01-1
Guidelines:	USEPA (=EPA): OPPTS 860.1300; Any deviation not specified
GLP/GEP:	yes
Previous evaluation	Draft assessment report 01 April 2001 (DAR RMS: DE), for an opinion see EFSA Journal 2012;10(11):2962
Material and methods:	
Test material:	U- ¹⁴ C -phenyl-labelled AE F130360 or 2- ¹⁴ C -pyrimidinyl-labelled AE F130360 diluted with cold parent as appropriate. Test material formulated as water dispersible granules (WG). The non-radioactive safener isoxadifen-ethyl was included at a ratio of 1:1 with foramsulfuron.
Lot/Batch No:	Two batches of the labeled compound were used.
Purity:	Not indicated
Reference compounds:	In these studies, foramsulfuron was radiolabelled with ¹⁴ C in two different positions as presented in Figure 7.2.1-1.
Test system/test conditions	<p>Maize plants were treated with one application at the developing stage of approximately BBCH 17 to 31 ((the 7 leaves unfolded to 1 First node detectable). The application rate was 60 g as/ha in each study representing the seasonal maximum 1X treatment of the GAP. Since residue levels were expected to be low, additional plots were treated at an exaggerated rate (240 g as/ha, termed 4X) as an aid to method development and metabolite identification.</p> <p>Samples including forage, stover and grain, were harvested and analysed. Additional immature samples were taken from the 1X plots approximately 14 days apart to follow the decline in residue level and for metabolite identification. The time points included Day 0 (immediately post-treatment), 14, 27 (phenyl label only), and 42.</p> <p>The residue was recovered by organic or water surface wash (for the early immature samples only) followed by extraction with organic solvents and water (all samples). Residue remaining in the extracted fibre was determined by combustion. Additional analysis of the fibre (by water Soxhlet, and base or acid hydrolysis) was performed as needed.</p> <p>Storage stability was based on visual inspection of chromatograms obtained from other matrixes at time points 13-18 days post-harvest and 32-41 months afterwards (see Chapter 7.8 for details).</p> <p>Samples of raw agricultural commodities, including forage, stover and grain, were harvested and analysed.</p>
Storage conditions	All samples and extracts were stored at -15 °C or lower. Preliminary chromatographic analyses of the principal extracts of the RACs were completed within 24 days of harvest, except for analysis of the grain. Due to the low residue levels, and consequent difficulties in method development, chromatography on the grain extracts was performed 32-38 months after harvest.

Results: At harvest, a maximum TRR of 1.874 to 1.945 mg-equiv./kg was found in stover, while the grain residue was very low, at 0.004 to 0.010 mg-equiv./kg. The principal extractable residue in forage, stover and grain was the parent compound. Two metabolites resulting from the cleavage of the sulfonylurea bridge, namely AE F153745 and AE F092944, were found in the extractable residue fraction of forage and stover. Another metabolite, resulting from the cleavage of the formamide moiety was also found (in very small amounts) in forage and stover.

Largest single unknown in forage was 9.0 % TRR. In stover and grain, the largest single unknown was 13.8 % TRR and 15.1 %.

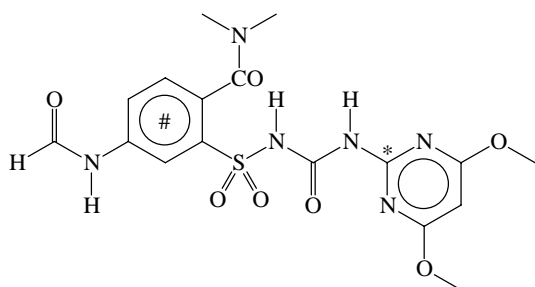


Figure 7.2.1-1. Radiolabel positions in maize (corn) metabolism studies (one alternate label in each study).

Table B.7.1-1: Mean TRR in immature and mature samples from 1X treatments.

¹⁴ C-Label	Stage	Sampling Timing (DAT)	TRR (1X Rate) [mg/kg]
Phenyl	Immature	0	2.281
		14	0.203
		27	0.121
		42	0.096
		Forage (60)	0.104
	Mature	Stover (77)	0.093
		Grain (77)	0.001
Pyrimidyl	Immature	0	2.284
		14	1.015
		28	not analysed
		42	0.366
		Forage (85)	0.413
	Mature	Stover (106)	0.401
		Grain (106)	0.001

Table B.7.1-2: Distribution of metabolites in maize forage, stover and grain from the 240 g/ha treatment with [U-14C-phenyl]-foramsulfuron and [2-14C-pyrimidyl]-foramsulfuron.

¹⁴ C-Label	RAC	TRR (4x rate)	URR	ERR	Foram- sulfuron (AE F 130360)	AE F 130619	AE F 153745	AE F 092944	Total Identified
		[mg/kg]	[mg/kg] (% TRR)	[mg/kg] (% TRR)	[mg/kg] (% TRR) ²	[mg/kg] (% TRR)	[mg/kg] (% TRR) ²	[mg/kg] (%TRR)	[mg/kg] (% TRR) ²
Phenyl	Forage	0.894	0.65 (72.7)	0.24 (27.3)	0.09 (9.90)	0.02 (2.1)	0.08 (8.8)	na na ³	0.19 (20.8)
	Stover	1.945	1.05 (54.0)	0.90 (46.0)	0.13 (6.80)	0.03 (1.4)	0.07 (3.6)	na na	0.23 (11.8)
	Grain	0.01	0.01 (51.5)	0.01 3.7	na (na ⁴)	na na	na na	na na	na (na)
Pyrimidyl	Forage	1.661	1.60 (96.3)	0.06 (4.0)	0.91 (54.70)	0.03 (1.7)	na na	0.05 (3)	0.99 (59.4)
	Stover	1.874	1.80 (95.8)	0.07 (3.7)	0.89 (47.60)	0.04 (1.9)	na na	0.07 (3.8)	1.00 (53.4)
	Grain	0.004	0.00 (42.6)	0.004	0.00 (15.50)	na na	na na	na na	<0.01 (15.5)

¹) mg-equiv. foramsulfuron (AE F130360)/kg matrix²) TRR = total radioactive residue³) na = not applicable⁴) nd = Not detected

Note: Largest single unknown in forage was 9.0 % TRR. In stover and grain, the largest single unknown was 13.8 % TRR and 15.1 % TRR, respectively, both of which were characterised as polar material remaining at the origin.

ERR extractable, and URR unextractable radioactive residues; Accountability = ERR + URR

Conclusion

To enhance the timing of the application in the GAP for foramsulfuron representative use has been defined through stages of leaf development (1 through 9 visible leaves). In the metabolism study the application has been carried out at the 9 visible leaves stage. Attempts with exaggerated application rate has also been used to enhance the identification process. In spite of these efforts only half of the pyrimidyl labeled residue species and one fifth of the phenyl labeled residue species were identified in forage and stover. This leaves some uncertainty in the residue burden evaluation for livestock animals.

In the grain the residue levels were so low that further identification is not necessary and in this respect the study fulfills its objectives.

B.7.1.2. Summary of studies on metabolism in plants

The metabolism has only been studied with plant species belonging to one commodity group. Consequently conclusions and definitions are not universal, but only refer to this selected group.

To sum up, two primary routes of degradation were found for foramsulfuron in maize (corn). One pathway involves hydrolytic cleavage of the sulfonylurea bridge yielding AE F153745 and the correspondig pyrimidyl metabolite, AE F092944. Foramsulfuron also hydrolyses at the formamide moiety at the phenyl ring to produce AE F130619. All these metabolites are subjected to further

degradation leading to the formation of highly polar water soluble components. The studies indicated low residue levels in all maize (corn) grain samples.

The major metabolite detected in plants 'N,N-dimethylated aminobenzenesulfonylamide' (i.e. AE F153745) was also identified in rodent metabolism studies. The minor metabolite AE F130619 has also been identified in the rat.

The metabolism studies in maize (corn) employing two labels were submitted as a part of the original EU dossier. In peer review the studies were considered to be valid.

In the rat approximately 20% of total radioactivity was absorbed and foramsulfuron residues were rapidly and extensively cleared from the tissues at both dose levels with an elimination half-life in the plasma of 5.4–18.5 hours at the low dose and 2.4–2.9 hours at the high dose level.

The data from the original submission is regarded as being sufficient. As no new uses have been developed since the first submission, and as maize (corn) – the AIR3 "safe use" – has already been tested, no new studies have been submitted for the Annex I Renewal by the notifier.

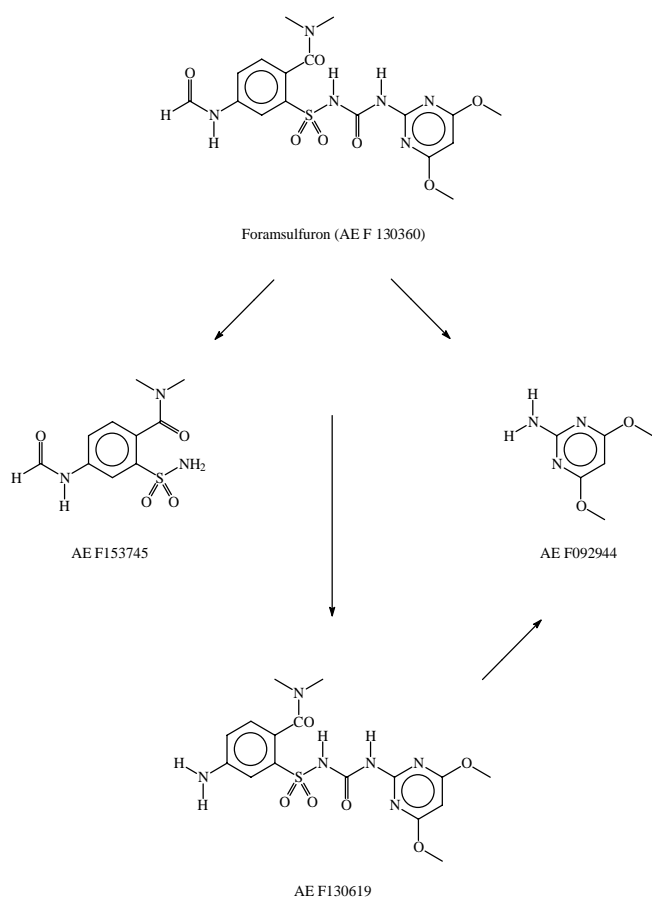


Figure 7.1.2-1 Metabolic pathways of foramsulfuron in maize.

Table 7.1.2-1, nomenclature and structures of the parent and its main metabolites.

Names	Structure	Occurrence
<p>AE F130360</p> <p>1-(4,6-dimethoxypyrimidin-2-yl)-3-(2-dimethylcarbamoyl-5-formamidophenylsulfonyl)urea</p> <p>Foramsulfuron</p> <p>CAS Number: 173159-57-4</p>		<p>Active substance</p> <p>Plants, rodents</p>
<p>AE F130619</p> <p>(= N,N-dimethyl-2-[3-(4, 6-dimethoxypyrimidin-2-yl)-ureidosulfonyl]-4-aminobenzamide,</p>		<p>Plants, rodents</p>
<p>F153745</p> <p>N,N-dimethyl-2-sulfamoyl-4-formylaminobenzamide</p> <p>'dimethylaminobenzenesulfonylamide' (by RMS)</p>		<p>Plants, rodents</p>
<p>4,6-Dimethoxypyrimidin-2-amine</p> <p>AE F092944</p>		<p>Plants</p> <p>Not reported in rodents</p>

B.7.2. METABOLISM, DISTRIBUTION AND EXPRESSION OF RESIDUES IN LIVESTOCK (ANNEX IIA, 6.2; ANNEX IIIA, 8.1)

Based on the “non-residue situation” in the grains of treated maize studies on metabolism in domestic animals were not considered necessary. However, corresponding investigations have been undertaken on lactating cows and laying hens. The resulting data have not been used for evaluation with respect to the inclusion of foramsulfuron in Annex I of the directive 91/414/EEC because they were not required according to document 7030/VI/95 rev.3.

The calculated dietary burden for dairy and meat ruminants were found to exceed the trigger value of 0.1 mg/kg DM. Further investigation of residues should therefore only required in these groups of livestock (for details, see Chapter 7.2.4, Dietary burden calculation). Since the LOQ value was used to replace subLOQ results, the requirement is not fully justified, but as a specific study was submitted, it is evaluated in the present document.

B.7.2.1. Metabolism in laying hen

Poultry can potentially be exposed via maize grain to foramsulfuron residues. Grain residue levels are however below LOQ. Even taking the LOQ level as observed residue level in the grain, the calculated dietary burden does not exceed the trigger value of 0.004 mg/kg bw/day for any different group of poultry. Therefore, any studies on poultry metabolism have been neither requested nor considered mandatory. For details see point B.7.7.1. Consequently, studies on poultry are not required.

B.7.2.2. Lactating ruminants

In the DAR and in the original review for foramsulfuron at EU level, it was stated that animal metabolism studies were not triggered and thus were not required.

A study summary has been provided at the request of the RMS Germany and the study is not considered to be a new study for the re-approval process and is present in the baseline dossier.

Reference:	██████████ Cow - Metabolism, distribution and nature of the residues in milk and edible tissues (28 OCT 1999).
Report No:	TOX 96079
Document No(s):	AEF130360 OOZE
Guidelines:	Any specific EU guideline was not followed. USEPA: Residue Chemistry Test Guidelines OPPTS 860.1300 Nature of the Residue, plant, Livestock, EU: 91/414/EEC
GLP/GEP:	No as the study has started prior to setting of GLP guidelines by OECD, but the study was internally inspected and audited by a Quality assurance unit.
Previous evaluation	Draft assessment report 01 April 2001 (DAR RMS: DE), RMS Germany (2012) for an opinion see EFSA Journal 2012;10(11):2962
Material and methods:	
Purity:	98.40% for the non-radioactive material; >99% for the radioactive material
Reference compounds:	AEF153745, AEF130619, AEF130360 In these studies, foramsulfuron was radiolabelled with ¹⁴ C in two different alternate positions as presented in Figure 7.2.1-1.
Test system/test conditions	Dairy cow was orally dosed for seven consecutive days with [¹⁴ C]-AE F130360 (labeled parent, i.e. foramsulfuron) with a single mean daily dose equivalent to 0.389 mg/kg body weight, corresponding to approximately 6.7 times the maximum expected exposure following dietary ingestion, and equivalent to 15.99 ppm in the diet.

Urine and faeces were collected daily, milk and blood were collected twice a day. At necropsy, 166 hours after initial dose, and approximately 22 hours after final dose, liver, kidney heart, lungs, renal fat, subcutaneous fat, omental fat, muscle (psoas, loin and hindquarter), rumen, abomasal fluid and bile were sampled and the radioactivity present quantified. Samples were kept in deep freezer until analysed. Identification of the metabolite residues was carried out in all edible tissues namely liver, kidney, muscle, fat and milk, and the metabolic profile of urine was also determined.

The ruminant metabolism study has already been evaluated by RMS Germany in 2012 and it has been reported in the reasoned opinion on the review of the existing maximum residue levels (MRLs) for foramsulfuron according to Article 12 of Regulation (EC)No 396/2005 (EFSA Journal 2012;10(11):2962). Based on the uses reported (maize grains and forage), significant exposure to foramsulfuron residues is expected for ruminants which is mainly driven by the consumption of treated maize forage and silage.

Residues of AE F1 30360 (0.001 ppm) were detected in milk at 6 hours post initial dose. The concentration of radioactive residues remained low and reached a plateau of only 0.006 ppm at 120 hours post initial dose.

The concentration of residues of the parent (AE F130360) and/or its metabolites were also generally low.

The highest residue levels were found in the kidney at 0.036 mg equivalents/kg, followed by the liver at 0.025 mg equivalents/kg. Residues in fat were between 0.010 and 0.024 mg equivalents/kg and the lowest residue levels were found in the muscle (0.004 mg equivalents/kg) and milk (0.006 mg equivalents/kg).

Following the first dose of ¹⁴C-labeled parent ([¹⁴C]-AE F130360), 36.31% of the administered dose was recovered within the first twenty hours of dosing in urine and faeces. The mean daily recovery in faeces was 75.22 ± 26.35% and 6.59 ± 2.01% in urine, giving a mean total daily recovery in excreta of 81.81%. For a summary of the experimental setting and main results, see Tables 7.2.2.-1 and 7.2.2.-2.

Table 7.2.2-1 The dosing schedule for ruminant metabolism study.

Group			Application details		Sample details	
Species	Label position	No of animals	Rate (mg/kg bw per day)	Duration (days)	Commodity	Timing
Lactating ruminants (Cow)	¹⁴ C - phenyl	1	0.389(*)	7	Milk and blood	Twice daily
					Urine and faeces	Daily
					Tissues	After sacrifice

(*): dose corresponding to 16 mg/kg DM feed

Table 7.2.2-2 Biodistribution and identification of radioactive residue species.

	Liver	Kidney	Muscle	Milk	Omental fat	Renal fat	Subcutaneous fat
Residue level (ppm)	0.025	0.036	0.004	0.006	0.013	0.024	0.010

Extracted	62 (0.015)	72 (0.026)	59 (0.002)	107 (0.006)	93 (0.012)	70 (0.017)	99 (0.01)
Identified/ characterized % (ppm)	60	67	56	102	90	70	99
foramsulfuron (AF130360) % (ppm)	49 (0.012)	14 (0.005)	34 (0.001)	34 (0.002)	11 (0.015)	27 (0.0065)	62 (0.006)
AE153745 % (ppm)	3 (<0.001)	53 (0.019)	21 (<0.001)	62 (0.003)	4 (0.001)	35 (0.0085)	37 (0.004)
Unknowns	8	-	-	6	76	35	37
Unknown radioactive residue % (URR)	48	33	44	5	85 (non- water soluble)	37	1
% Identified	52	67	56	96	15	63	99
Procedural losses %	2	5	-	5	7	0	-

Conclusions

All residue levels are low and do not trigger identification requirement. Omental fat has a non-polar unknown representing 85% of TRR. Otherwise the results fit in the metabolic picture obtained for rodents.

The study demonstrated that residues of foramsulfuron are not expected in significant amounts if the formulations are used according to GAP and no specific residue definition is necessary for animal derived products. Consequently MRLs for parent foramsulfuron in ruminants can be set at the LOQ. MRLs are not required for all poultry and pig products because they are not expected to be exposed to significant levels of foramsulfuron residues.

B.7.2.3. Summary of studies on metabolism in livestock animals

Even taking the LOQ level as observed residue level in the grain, the calculated dietary burden for poultry does not exceed the trigger value of 0.1 mg/kg bw/day. Consequently, metabolic studies on poultry are not required.

During the EU evaluation a study on ruminants (performed in 1999 for North America) was submitted and evaluated and is included in the Foramsulfuron Review Report (Appendix III) as a study which was submitted during the evaluation period but which was not cited in the draft assessment report

Since this study was considered as part of the first EU review a full study summary would normally not be provided for the renewal process however since the study is not summarised in the DAR the RMS requested that a study summary be provided for completeness.

It can be concluded that MRLs can be set at LOQ level for animal derived products and any further studies are not required.

B.7.2.4. Dietary burden calculation

Foramsulfuron is authorized on maize (corn) which might be fed to livestock. The median and maximum dietary burdens were therefore calculated for different groups of livestock using the OECD model.

Table 7.2.4- 1: Input values for the dietary burden calculation

Commodity	Dietary burden	
	Input value (mg/kg)	Comment
Risk assessment residue definition: foramsulfuron		
Maize silage	0.05	Highest residue
Maize grain	0.01	Median residue

Table 7.2.4- 2: Dietary burden calculations

	Residue level in total feed dry matter (mg/kg)	Residue intake (mk/kg bw/day)
Cattle – beef	0.102	0.002
Cattle – dairy	0.078	0.003
Sheep – rams/ewes	0.003	0
Sheep - lambs	0.041	0.002
Swine – breeding	0.033	0.001
Swine – finishing	0.008	0

The calculated dietary burdens for different groups of livestock do not exceed the trigger value of 0.004 mg/kg bw/day. Therefore, no livestock metabolism study is required. Nevertheless, a metabolism ruminant study had been conducted in 1999 for North America.

The ruminant metabolism study has already been evaluated by RMS Germany in 2012 and it has been reported in the reasoned opinion on the review of the existing maximum residue levels (MRLs) for foramsulfuron according to Article 12 of Regulation (EC)No 396/2005 (EFSA Journal 2012;10(11):2962).

The current evaluated study was designed to investigate the distribution, elimination, magnitude and nature of the foramsulfuron (AE F130360) residues in the edible tissues and milk of a dairy cow following oral administration. The study in ruminants showed that foramsulfuron was rapidly absorbed and excreted and radioactivity in major organs was very low.

B.7.2.5. Pigs

Any additional metabolism studies were neither performed nor requested on pig as such studies is only required when the metabolic pathways of rodents and ruminants differ qualitatively or quantitatively to a degree that it should be taken into account in consumer safety evaluations.

B.7.2.6. Fish

Any additional metabolism studies were neither performed nor requested on fish.

B.7.2.7. Summary of studies on metabolism in animals

Based on the “non-residue situation” in treated maize studies on metabolism in domestic animals are not necessary. However, corresponding investigations have been undertaken on lactating cows and laying hens. The resulting data are not used for evaluation with respect to the inclusion of foramsulfuron in Annex I of the directive 91/414/EEC because they are not required according to document 7030/VI/95 rev.3.

B.7.3. DEFINITION OF THE RESIDUE (ANNEX IIA 6.7; ANNEX IIIA 8.6)

For plants, the relevant residue definition in animal for monitoring and risk assessment is proposed as foramsulfuron as concluded earlier by EFSA (Nov. 2012; EFSA Journal 2012;10(11):2974).

For possible future uses, one must bear in mind that the residue definition is not universal and applies only for uses (see Appendix 3) covering the cereal crop group, i.e. those commodities, which can be extrapolated from the maize.

For products of animal origin: since no metabolism data concerning livestock animals are required any residue definition for products of animal origin is not considered necessary. As a default, given the low dietary burdens, the relevant residue definition in animal for monitoring and risk assessment is proposed as foramsulfuron as concluded earlier by EFSA (Nov. 2012; EFSA Journal 2012;10(11):2974).

B.7.4. USE PATTERN

Full details of the Good Agricultural Practice are given in Volume 1, (B.1.5.3 Summary of intended uses).

B.7.5. IDENTIFICATION OF CRITICAL GAP(S)

Slight modification of the critical GAPs has been taken place since Annex I inclusion of foramsulfuron: Final application latest at a growth stage of BBCH 18 has now been used (GS 16 for the original inclusion). For details see Volume 1, (1.5.3 Summary of intended uses).

Table 7.5.-1 The following GAP can be considered as the critical use within EU:

Crop and/or situation (a)	Zone / Country	Product name	F G or I (b)	Pests or Group of pests controlled (c)	Formulation		Application				Application rate per treatment			PHI (days) (l)	Remarks: (m)
					Type (d-f)	Conc. of as (f)	method kind (f-h)	growth stage & season (j)	number min max (k)	interval between applications (min) (min)	kg as/hL min max	water L/ha min max	g as/ha max		
Corn	Vario us	Monsoon® active FSS+TCM + CSA 31.46 + 10 + 15 g / L	F	Annual grasses and dicots	OD	31.5 g/L (1) 10.00 g/L (2) 15.00 g/L (3)	High volume, overall 1	BBCH 12-18	1-1	-	10.5-42 (1) 3.33-13.33 (2) 5-20 (3)	150-600	63 g/Ha (1) 20 g/Ha (2) 30 g/Ha (3)	-	Single application of Monsoon active at a maximum product rate of 2 L/ha

B.7.6. RESIDUES RESULTING FROM SUPERVISED TRIALS (ANNEX IIA, 6.3; ANNEX IIIA, 8.2)

B.7.6.1. Residue levels in maize

In the original dossier submitted in 2000 for Annex I inclusion, the use of foramsulfuron was supported in maize (corn). After Annex I evaluation no new studies have been conducted with foramsulfuron-containing formulations for use in European maize (corn). Maize (corn) is the "safe use" crop supported in the AIR3 process.

Complete data package in N-EU and S-EU has been reviewed in the original inclusion and found acceptable provided that validation of the performance of the analytical method (DGM F03/98-0

(Wrede, 1999) employed is ascertained. Some of the background documents of the method have not been available.

Notifier has submitted a new modified method. Compared to the original method, minor adaptations in the instrumental analysis reflect the different instrumentation like modern sub-2 μ HPLC fused-core-columns and more sensitive mass spectrometers while using the same mass transition. The extraction method has remained the same.

As supervised trials have been evaluated in the DAR on one hand and in the review of the existing maximum residue levels according to article 12 of regulation 396/2005, there is no need for extensive evaluations in the present document.

To support cGAP of the representative formulation: 1*60 g foramsulfuron/Ha; BBCH 12 – 18; PHI defined by growth stage.

Complete data package in N-EU & S-EU reviewed in the original inclusion 8 northern and 8 southern residue trials conducted with Equip performed at 2*45-60 g foramsulfuron/Ha; BBCH 12 – 18, Interval of max. 2 weeks; PHI defined by growth stage.

A sufficient number of 47 supervised residue trials applying different WG- and SCformulations containing foramsulfuron were conducted on maize in the northern and southern part of Europe.

The studies cited infra including sufficient number of decline studies have been evaluated in the RMS Germany DAR (2001), a summary of the data has been provided infra in the Table 7.6.1-1.

Reference:	Helgers, A.; Neuss, B.; Wrede, A. (1999) Decline of residues in maize European Union (southern zone) 1997 AE F130360 and AE F122006 water dispersible granule 50 % w/w Code: AE F130360 00 WG50 A106, AE F122006 00 WG50 A202
Report No.:	Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany : C004454,
Reference:	Helgers, A.; Wrede, A.; Neuss, B. (1999) Decline of residues in maize European Union (southern zone) 1997 AE F130360, AE F122006, AE F115008 water dispersible granule 50, 50, 20% w/w Code: AE F130360 00 WG50 A106, AE F122006 00 WG50 A202, AE F115008 00 WG20 A105
Report No.:	Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Bayer CropScience, C005041
Reference:	Helgers, A.; Neuss, B.; Wrede, A. (1999) Decline of residues in maize European Union (northern zone) 1997 AE F130360 and AE F122006 water dispersible granule 50 % w/w Code: AE F130360 00 WG50 A106, AE F122006 00 WG50 A202
Report No.:	Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Report No.: C003280
Reference:	Helgers, A.; Wrede, A.; Neuss, B. (1999) Decline of residues in maize European Union (northern zone) 1997 AE F130360, AE F122006, AE F115008 water dispersible granule 50, 50, 20% w/w Code: AE F130360 00 WG50 A106, AE F122006 00 WG50 A202, AE F115008 00 WG20 A105
Report No.:	Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Bayer CropScience, Report No.: C005042,
Reference:	Helgers, A.; Wrede, A.; Neuss, B. (1999) Decline of residues in maize European Union southern zone 1998 AE F130360, AE F122006, AE F115008 water dispersible granule 50, 50, 20 % w/w Code: AE F130360 00 WG50

	A108, AE F122006 00 WG50 A203, AE F115008 00 WG20 A108
Report No.:	Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Bayer CropScience, Report No.: C005800,
Reference:	Helgers, A.; Wrede, A.; Neuss, B. (2000) Decline of residues in maize European Union (northern and southern zone) 1998 AE F130360 and AE F122006 oil flowable (1K) 22.5 and 22.5 g/L Code: AE F130360 01 1K05 A201
Report No.:	Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Report No.: C006322,
Reference:	Helgers, A.; Wrede, A.; Neuss, B. (1999) Decline of residues in maize European Union northern zone 1998 AE F130360, AE F122006, AE F115008 water dispersible granule 50, 50, 20 % w/w Code: AE F130360 00 WG50 A108, AE F122006 00 WG50 A203, AE F115008 00 WG20 A108
Report No.:	Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Bayer CropScience, Report No.: C005799,
Reference:	Helgers, A.; Wrede, A.; Neuss, B. (2000) Decline of residues in maize European Union (northern zone) 1999 AE F130360 and AE F122006 oil flowable (1K) 22.5 + 22.5 g/L Code: AE F130360 01 1K05 A302
Report No.:	Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Report No.: C006632
Reference:	Helgers, A.; Wrede, A.; Neuss, B. (2000) Decline of residues in maize European Union (southern zone) 1999 AE F130360 and AE F122006 oil flowable (1K) 22.5 + 22.5 g/L Code: AE F130360 01 1K05 A302
Report No.:	Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Report No.: C006631
Reference:	Cole, M. G. (2000) At harvest AE F130360 and isoxadifen-ethyl derived residues in field corn following applications of AE F130360 and/or isoxadifen-ethyl WDG at the maximum proposed rates and the shortest proposed PHI, USA and Canada, 1997
Report No.:	Aventis CropScience USA LP, Residue Chemistry, Pikeville, NC, USA Report No.: B002604
Reference:	Cole, M. G. (2000) At harvest AE F130360 and isoxadifen-ethyl derived residues in field corn following applications of AE F130360 and/or isoxadifen-ethyl WDG at the maximum proposed rates and the shortest proposed PHI, USA and Canada, 1998: AE F130360 00 WG5 Aventis CropScience USA LP, Residue Chemistry, Pikeville, NC, USA
Report No.:	Report No.: B002465, Report includes Trial Nos.: CF98R001
Reference:	Cole, M. G. (2000) AE F130360 and isoxadifen-ethyl derived residues in field corn grain and processed corn commodities following applications of AE F130360 and AE F122006 WDG at an exaggerated rate and the shortest proposed PHI, USA, 1998 Aventis CropScience USA LP, Residue Chemistry, USA
Report No.:	Report No.: B002651, Report includes Trial Nos.: CF98R002
Reference:	Huang, M. N.; Faulkner, T. D. (1999) Uptake of residues of (U-phenyl-14C)-AE F130360 and (2-pyrimidyl-14C)-AE F130360 in soil by rotational crops under confined conditions AgrEvo USA Company, Environmental Chemistry, Pikeville, NC, USA
Report No.:	Report No.: C003287, Report includes Trial Nos.: 516CF

Reference: Cole, M. G. (2000) At-harvest AE F130360 and AE F122006 derived residues in rotational crops planted after treatment of a bare plot with AE F130360 WDG and AE F 122006 WDG at selected applications rates and rotational intervals, USA, 1997: AE F130360 00 WG50
Aventis CropScience USA LP, Residue Chemistry, Pikeville, NC, USA

Report No.: Report No.: B002716, Report includes Trial Nos.: CF97R002

Residues of parent foramsulfuron and (N,N-dimethylated aminobenzenesulfonylamide) metabolite AE F153745 were <LOQ= 0,01 mg/kg in grain and <LOQ=0,05 mg/kg in forage.

According to review of the existing MRLs for foramsulfuron published by EFSA, the MRL value for maize grain is not recommended for inclusion in Annex II to the Regulation because it requires further consideration by risk managers (see summary table footnotes for details). In particular, this tentative MRL still needs to be confirmed by the following data:

- a confirmatory method for enforcement of residues in maize grains and forage.

If the above reported data gap is not addressed in the future, EFSA recommends Member States to withdraw or modify the relevant authorisations at national level.

Consequently a new analytical method 01360 for the determination of foramsulfuron in samples from plant origin by HPLC-MS/MS has been submitted and evaluated under Vol 3 Part B.5.1.2. (*Methods for risk assessment / B.5.1.2.1 Methods in or on plants, plant products, processed food commodities, food of plant and animal origin, feed and any additional matrices used in support of residues studies*).

The method has been found valid for its purpose.

Table 7.6.1-1 Summary of supervised residue trials, Southern trials have been included as they are used to establish a no-residue situation, which is valid in the Northern zone as well.

Commodity	Residue region (a)	Outdoor/Indoor	Individual trial results (mg/kg)		Median residue (mg/kg) (b)	Highest residue (mg/kg) (c)	MRL proposal (mg/kg)	Median CF (d)	Comments
			Enforcement (foramsulfuron)	Risk assessment (foramsulfuron)					
Maize grain	NEU	Outdoor	25x<0.01	25x<0.01	0.01	0.01	0.01* (tentative)	1.00	Trials on maize supporting the GAP (2 x 43 - 58 g a.s./ha. BBCH 12 - 18. PHI 96 - 145 d).
	SEU	Outdoor	22x<0.01	22x<0.01	0.01	0.01	0.01* (tentative)	1.00	Trials on maize supporting the GAP (2

									x 43 - 58 g a.s./ha. BBCH 13 - 17. PHI 96 - 141 d).
Maize forage	NEU	Outdoor	25x<0.05	25x<0.05	0.05	0.05	0.05* (tentative)		
	SEU	Outdoor	22x<0.05	22x<0.05	0.05	0.05	0.05* (tentative)	1.00	Trials on maize supporting the GAP, sampling at the forage stage (2 x 43 - 58 g a.s./ha. BBCH 13 - 17. PHI 42 - 95 d).

PHI has been defined using growth stages at application. The supervised trials do not give uniform information in this respect. In some of the studies BBCH 13-18 have been indicated as corresponding to a PHI in the range 96-145, while BBCH 13 - 17 have been stated to correspond PHI values from 42 to 95. This can be explained noting that the former values refer to maize grain production and the latter to forage production.

A minimum PHI of 96 days is suggested by the RMS to be used alongside with the definitions based on growth stages.

Conclusion

At normal harvest no residues were detected in forage, silage, and cob, as well as in grain above the LOQ of 0.05 mg/kg or 0.01 mg/kg, respectively.

A new modified method has been submitted, but the question remains does it give the same results as the method used for the actual supervised residue trials. The new method is valid for its purpose.

B.7.7. FEEDING STUDIES

Foramsulfuron is authorised for use on maize (corn) that might be fed to livestock. The median and maximum dietary burdens were therefore calculated for different groups of livestock using the agreed European methodology (EC, 1996). The input values for all relevant commodities have been selected according to the recommendations of JMPR (FAO, 2009).

The dietary burden has been calculated according to current requirements and this is provided below. It can be seen that under the current requirements the calculated dietary burdens for different groups of livestock do not exceed the trigger value of 0.004 mg/kg bw/day.

B.7.7.1. Laying hen

Dietary burden calculation

Foramsulfuron is intended for use on maize (corn), a commodity which might be fed to poultry. The median and maximum dietary burdens were therefore calculated for different groups of livestock using the OECD model. It can be concluded that the calculated dietary burdens for poultry shall not exceed the trigger value of 0.004 mg/kg bw/day. Consequently, any poultry metabolism studies are neither required nor requested (for details see Table 7.7.1-1 and 7.7.1-2).

B.7.7.2. Ruminants

In the original review for foramsulfuron at EU level it is stated in the DAR that animal metabolism studies were not triggered and were thus not required. However, during the EU evaluation a study on ruminants (performed in 1999 for North America) was submitted, evaluated and was included in the Foramsulfuron Review Report (Appendix III) as a study submitted during the evaluation period, which was not cited in the draft assessment report. In addition this study was reviewed by the RMS Germany who provided an evaluation report during the consultation for Member States (2012). The characteristics of the study were presented by EFSA during their recent evaluation of the existing MRLs for foramsulfuron (EFSA Journal 2012; 10 (11):2962).

Since this study was considered as part of the first EU review a full study summary would normally not be provided for the renewal process however since the study has not been summarised in the DAR the RMS requested that a study summary should be provided for completeness. A review or peer review of this study has neither required nor carried out.

Based on the intended use, i.e. maize grains and forage, significant exposure to foramsulfuron residues is expected for ruminants, which is mainly driven by the consumption of treated maize forage. The RMS DE demonstrated during Annex 1 evaluation, on basis of a livestock metabolism study on dairy cows, that residues of foramsulfuron are not expected in significant amounts and MRLs for parent foramsulfuron in ruminants can be set at the LOQ. MRLs are not required for all poultry and pig products because they are not expected to be exposed to significant levels of foramsulfuron residues (for details see Table 7.7.1-1 and 7.7.1-2).

Table 7.7.2- 1: Input values for the dietary burden calculation Commodity. assessment residue definition: foramsulfuron

Risk assessment residue definition: foramsulfuron	Median dietary burden		Maximum dietary burden	
	Input value (mg/kg)	Comment	Input value (mg/kg)	Comment
Maize silage	0.05	Median residue	0.05	Highest residue
Maize grain	0.01	Median residue	0.01	Median residue

Table 7.7.2- 2: Results of the dietary burden calculation

Species	Maximum dietary burden (mg/kg bw per d)	Median dietary burden (mg/kg bw per d)	Highest contributing commodity	Max dietary burden (mg/kg DM)	Trigger exceeded(Y/N)
Dairy ruminants	0.009	0.009	Maize silage	0.253	Y
Meat ruminants	0.011	0.011	Maize silage	0.249	Y
Poultry	0.001	0.001	Maize grain	0.008	N

Pigs	0.002	0.002	Maize silage	0.042	N
------	-------	-------	--------------	-------	---

The calculation is based only on limit of quantification. In principle, any metabolism studies on ruminants was not required. Using LOQ as the value of residue level, the results in trigger exceedance. Notifier has earlier submitted a radiolabel study on foramsulfuron metabolism in ruminants. This has been evaluated in the present document. The study indicates that foramsulfuron is rather poorly absorbed and the absorbed fraction is eliminated in a relatively short period of time resulting in residue levels, which are below LOQ in all studied tissues.

B.7.7.3. Pigs

Feeding studies were neither performed nor requested on pig. A metabolism study is considered unnecessary also in the present evaluation.

B.7.7.4. Fish

Since any residues above 0.01 mg/kg were not found in maize (corn) grain and any accumulation is not to be expected in tissues ($\log Pow < 3$), the fish metabolism study is neither required nor requested.

B.7.8. STORAGE STABILITY OF RESIDUES PRIOR TO ANALYSES

B.7.8.1. Studies submitted and evaluated for the original inclusion of foramsulfuron on Annex I:

Since maize samples for analysis of the residue trials have been stored for more than 30 days a frozen storage stability study has been conducted (Cole, 2000, RIP2000-1669).

In the original dossier, a study was submitted to evaluate the storage stability of foramsulfuron in maize (corn) matrices (forage, stover and grain).

Report:	KCA 6.1 /01; Cole, M. G.; 2000; M-238478-01
Title:	Stability of AE F130360 and AE F153745 residues in corn (forage, stover and grain) during frozen storage, USA, 1998 (minimum storage interval of 209 days: AE F130360 00 1B99 0001: AE F153745 00 1B99 0001
Report No:	B002750
Document No(s):	Report includes Trial Nos.: CF98R004 M-238478-01-2
Guidelines:	USEPA (=EPA): 860.1380; Deviation not specified
GLP/GEP:	Yes
Previous evaluation	
Material and methods:	
Test material:	AEF130360; AEF153745
Purity:	99.0%
Storage conditions	-10 to -20 °C
Test system/test conditions	This study was initiated to establish the stability of foramsulfuron (AE F130360) and its the N,N-dimethylated aminobenzenesulfonylamide metabolite AE F153745 in corn forage, stover and grain during frozen storage for a period of over two years. This report presents data obtained at 866, 616 and 620 days of frozen storage, for grain, forage and stover, respectively. Pre-weighed samples of forage,

	stover and grain were fortified, separately, with foramsulfuron and the metabolite AE F153745, and then placed in frozen storage.
Analytical methods:	Samples were withdrawn from frozen storage at different intervals, and analysed for the appropriate analyte. Extractable residues of foramsulfuron and AE F153745 were removed from the crop matrix by blending with aqueous acetonitrile. After filtration, the extract was concentrated <i>in vacuo</i> to a reduced volume. The aqueous/organic extract was transferred to a separation funnel and washed with hexane. The extract was then cleaned up via SPE column chromatography and analysed by HPLC/MS.

Samples of maize forage, stover and grain were fortified with foramsulfuron and its main metabolite AE 153745 each at levels of 0.25, 0.25, and 0.1 mg/kg, respectively. The study was conducted during the overall period of more than 15 months. As summarised in Table B.7.6-3 the recovery data were found in the range of 58 - 126 %. Most of the data are in the acceptable range of 70 - 110 % of the initial concentration.

Table B.7.6-3: Results of the storage stability investigation

Matrix	Fortification level [mg/kg]	Storage period [d]	Foramsulfuron Recovery [%]	AE F153745 Recovery [%]
Forage	0.25	1	80	77
		71	105	80
		209	58	86
		243	71	-
Stover	0.25	1	57	77
		72	91	60
		209	65	80
Grain	0.1	0	60	72
		259	67	70
		330	114	58
		468	82	126

Conclusion:

The recoveries during storage show marked variation for the parent levels and it is difficult to interpret the results by statistical methods. For the metabolite AE F153745 the results are more coherent and it can be stated that the results show stability of this residue species.

B.7.8.2. Storage stability. "AIR3" process/ New studies submitted Justification for including this report in the "AIR" dossier

Since the Annex I inclusion, a new study with longer storage periods covered (minimum of 616 days) was generated. Table 6.1- 1 shows the maximum storage stability periods assessed.

Report:	KCA 6.1 /02; Cole, M. G.; 2001; M-238787-01
Title:	Stability of AE F1 30360 and AE F1 53745 Residues in Corn

	(forage, stover and grain) During Frozen Storage, USA, 1998 (Minimum Storage interval of 209 Days)
Report No:	CF-98R-004
Document No(s):	AEF1 30360 00 1B99 0001 AEF1 53745 00 1B990001
Guidelines:	USEPA (=EPA): 860.1380; Deviation not specified
GLP/GEP:	Yes
Previous evaluation	DAR (Germany, 2001)
Material and methods:	
Test material:	
Lot/Batch No:	
Purity:	AEF130360 99.0%; AEF153745 99.2%
Reference compounds:	
Storage conditions	The storage temperature range was mainly from -10 °C to -20 °C. There were occasional temperature excursions above the range but these were too short to cause thawing of the frozen samples. In metabolism studies all samples and extracts were stored at -15 °C or lower.
Test system/test conditions	Untreated maize (corn) forage, stover and grain were obtained from the maize (corn) residue study CF-97R-01. The forage, stover and grain were ground in a commercial food grinder to provide a bulk matrix. Pre-weighed samples of forage, stover and grain were fortified, separately, with foramsulfuron (AE F130360) and AE F153745, and then placed in frozen storage. Samples were withdrawn, at intervals, from frozen storage and analyzed for the appropriate analyte. Grains were extracted after 32-38 months after harvest. Consequently any day zero data or other data, which could be considered as initial, were not available. Storage stability was based on visual inspection of chromatograms obtained from other matrixes at time points 13-18 days post-harvest and 32-41 months afterwards. These other matrixes than cereal grain show that total radioactivity (TRR) remains the same in the extracts. Because the TRR remains the same in the extracts of other matrixes than grain, it is assumed that in the unextracted grains any change would not take place.
Analytical methods:	Aged samples were analyzed for parent foramsulfuron (AE F130360) and for the metabolite AE F153745. Extractable residues of foramsulfuron (AE F130360) and AE F153745 (N,N-dimethylated aminobenzene-sulfonylamide metabolite) are removed from the crop matrix by blending with aqueous acetonitrile. After filtration, the extract is rotary evaporated down to a reduced volume. The aqueous/organic extract is transferred to a separately funnel and washed with hexane. After the hexane wash the extract is cleaned up via spe column chromatography and analyzed by HPLC/MS. The mean procedural recoveries of foramsulfuron (AE F130360) and AE F153745 from freshly fortified samples were 84% and 92%, respectively. The respective standard deviations were 30% and 16%.

For the residue trials carried out with unlabeled active substance, a separate study on storage stability of foramsulfuron (AE F130360) and its metbolite AE-F153745 in maize (corn) had been submitted by the notifier and evaluated by DE.

The potential degradation of residues during storage of the residue trials samples was also assessed. In the framework of the peer review, storage stability of foramsulfuron was demonstrated for a period of

15 months at -10 °C in high water content (maize forage) and in dry (maize grain) commodities (Germany, 2001). According to the RMS, all residue trial samples reported in the PROFile were stored in compliance with the above reported storage conditions.

The mean recoveries of foramsulfuron and the metabolite AE F153745 from freshly fortified samples were 79% and 91%, respectively. The respective standard deviations were 25% and 12%.

Table 7.8.2-1: Storage stability of foramsulfuron and metabolite AE F153745 in corn/maize matrices

Matrix Maize/corn	Storage interval [days]	Recoveries Foramsulfuron [%]				Recoveries AE F153745 [%]			
		Individual			Mean	Individual			Mean
Maize grain	0	62	62	56	60	76	74	67	72
	259	72	62	16*	67	65	75	61	70
	330	116	101	126	114	58	49	66	58
	468	48	115	83	82	143	101	135	126
	866	60	67	60	62	86	84	82	84
Forage	1	79	75	87	80	70	87	73	77
	71	95	114	106	105	83	79	78	80
	209	58	58	58	58	81	91	87	86
	243	74	67	70	70	-	-	-	-
	616	53	62	66	60	86	85	91	87
Stover	1	47	65	57	56	78	77	76	77
	72	95	85	93	91	62	60	58	60
	209	68	60	66	65	81	76	82	80
	620	73	62	65	67	90	89	85	88

For foramsulfuron, according to previous peer-review in 2001, the data indicate storage stability, but in fact the data was not tested with statistical methods.

The Wilcoxon nonparametric test of individual samples does not support such conclusion.

If the forage and stover data are combined and then divided into two time sets, the first group comprising of the values at 1 and 71 or 72 days and the second group comprising of values at 209 and 616 or 620 days, the presented in Table 7.8.1-2 is obtained.

Table 7.8.1- 2

Summary for the first time set (days 1, 71, 72) is:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
47.00	72.50	82.00	81.88	95.00	114.00

Summary for the last time set (days 209, 616, 620)

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
53.00	61.50	64.50	64.88	69.25	74.00

For each time point parallel sampling was carried out.

The two sets of foramsulfuron data differ significantly with a $p < 0.05$ (Wilcoxon), indicating that the previous conclusions of storage stability of the parent are biased. The data indicates statistically significant decreasing levels of foramsulfuron during storage at a rate of approximately 20 to 25% per 100 days.

Otherwise the data have too much variation and does not provide enough degrees of freedom to be tested in a similar fashion. For grain matrix this is easy to understand as the levels are even initially low. For the metabolite AE F153745, the data are much more consistent and indicate no deterioration during the follow-up time.

Although not used for quantitative purposes the metabolism studies were conducted 960 - 1100 days after the harvest in the case of grains (Report CF96E512), there are stability issues, which may give a bias to the results.

A new analytical method 01360 for the determination of foramsulfuron in samples from plant origin by HPLC-MS/MS has been submitted.

The data indicates that the method employed for foramsulfuron analyses, is not suitable for this type of study. Furthermore there are indications that the storage stability has not been established. Calculation of the recovery for storage time of 70 days or higher, gives a mean recovery of 60%. For foramsulfuron the residue levels are in reality approximately twice as high as indicated in the individual supervised residue trials.

In conclusion the data show that storage stability of the parent foramsulfuron has not been fully established as approximately 20% of the residues representing parent have been lost after 70 days of storage. In contrast to parent, the metabolite AE F153745 has been shown by the present studies to be stable for 866 days, but again the variance is high, and the lowest recoveries are less than 50%. It can be stated that again method performance should be better. Analytical recoveries have not been shown in either case. In spite of these uncertainties, the metabolite is considered to be stable during storage.

B.7.8.3. Storage stability "AIR3" process/ New studies submitted

EFSA recently published their reasoned opinion on the existing MRLs for foramsulfuron, a copy of their report is provided in this dossier (KCA 6/01). EFSA concluded that a confirmatory method for enforcement of residues in maize grain and forage was required. During the development of the enforcement method [method number 01360 (Report MR-13/007)] for the determination of amidosulfuron, metsulfuron-methyl, iodosulfuron-methyl-sodium, mesosulfuron-methyl and foramsulfuron in samples from plant origin by HPLC-MS/MS, the stability in final plant extracts was checked for the tested sample materials over a period of 16 to 43 days. In addition in the Independent Laboratory Validation (ILV) the stability in extracts was rechecked over a shorter time period. The stability results from both studies are summarised below. Full details of the method and the ILV are presented in the method section (Section 4) of the active substance dossier (Stuke, S.; Ballmann, C. 2013; M-455564-01-1; KCA 4.2/20 and Konrad, S.; 2013; M-470160-01-1; KCA 4.2/21).

B.7.9. EFFECTS OF PROCESSING

B.7.9.1. Nature of the residue

As in maize grains, quantifiable residues of foramsulfuron are not expected and as the chronic exposure at the LOQ level does not exceed 10 % of the ADI, there is no need to investigate the effect of industrial and/or household processing.

B.7.9.2. Distribution of the residue in peel and pulp

As the relevant uses are limited only to maize, studies to clarify distribution of the residue in peel and pulp are not considered necessary.

B.7.9.3. Magnitude of residues in processed commodities

As quantifiable residues of foramsulfuron are not expected in maize grains and as the chronic exposure at the LOQ level is not exceeding 10 % of the ADI, there is no need to investigate the effect of industrial and/or household processing.

Specific processing factors for enforcement of processed commodities are therefore not proposed.

B.7.10. RESIDUES IN SUCCEEDING OR ROTATIONAL CROPS

B.7.10.1. Metabolism in rotational crops

Nature of residues

All data submitted for metabolism in plants and succeeding/rotational crops were considered to be acceptable during the EU review. In the Inclusion Directive and the Review Report there were no areas of potential concern highlighted for plant metabolism. Even though a confined rotational crop study was not triggered a study was available and submitted/reviewed for the EU approval. A short summary of the study is provided.

Report:	KCA 6.6.1 /01;Huang, M. N.; Faulkner, T. D.; 1999;
Title:	Uptake of residues of (U-phenyl-14C)-AE F130360 and (2-pyrimidyl-14C)-AE F130360 in soil by rotational crops under confined conditions.
Report No:	C003287. Report includes Trial Nos.: 516CF M-185898-01-1
Document No(s):	Report includes Trial Nos.: 516CF M-185898-01-1
Guidelines:	USEPA (=EPA): OPPTS 860.1850;Deviation not specified.
GLP/GEP:	yes
Previous evaluation	DAR (Germany, 2001).
Material and methods:	Metabolism studies (2 labels) in rotational crops (radish, soybean, wheat) were submitted in original EU dossier using dose rates of 60 or 90 g a.s./ha and plant back intervals of 30, 119 and 269 days (M-185898-01-1).
Test material:	¹⁴ C-phenyl or ¹⁴ C-pyrimidyl labeled foramsulfuron,
Storage conditions	Samples and extracts were stored at approximately -15 °C or less. The crops requiring analysis were extracted within two months of harvest. Preliminary chromatographic analysis of the 59 day wheat straw residue was performed within 65 days of harvest. The 119 day wheat straw residue chromatography was delayed until a sufficient clean-up method was developed, so initial chromatography was performed 10 months after harvest.

Total residue levels were very low and no relevant metabolite was found in any commodity above the LOQ.

Although not required, the metabolism of foramsulfuron in rotational crops –radish, soya bean and wheat –has been evaluated (Germany, 2001). A confined rotational crop study investigating the nature of residues following different plant-back intervals is available. The characteristics of these studies are summarised in the Table B.7.10.1-1

Table B.7.10.1-1 Summary of available metabolism studies in rotational crops

Crop group	Crop	Label position	Application and sampling details			
			Method, F or G ^(a)	Rate (kg a.s./ha)	Sowing intervals (DAT)	Harvest Intervals (DAT)

Root and tuber vegetables	Radish	¹⁴ C-phenyl or ¹⁴ C-pyrimidyl	Soil, G	0.06 or 0.09 ^(b)	59 ^(c) , 119, 269	n.r.
Pulses and oilseeds	Soya bean				30, 119, 269	n.r.
Cereals	Wheat				59 ^(c) , 119, 269	n.r.

n.r.: not reported.

(a): Outdoor/field application (F) or glasshouse/protected/indoor application (G)

(b): 0.06 kg/ha after 119 days of ageing and 0.09 kg/ha after 30 and 269 days of ageing.

(c): wheat and radishes planted after 30 days were replanted after 59 days due to phytotoxic effects of the soil residues.

The initially low residue levels were further declined with soil ageing. Foramsulfuron with pyrimidyl labeled tended to give higher residue levels than with phenyl label. The former yielded residue levels below 0.02 mg/kg in soya bean forage and hulls, while in wheat straw from later rotations levels obtained were 0.083 and 0.022 mg/kg. With phenyl labelled parent the only residues above 0.01 mg/kg were seen in wheat straw from each rotation (0.011 to 0.014 mg/kg). Wheat straw from the 59 and 119 day treatment with pyrimidyl labelled foramsulfuron contained aqueous extractable residues at 0.053 to 0.054 mg/kg TRR. The non-extractable residue was low in all crops (<0.03 mg/kg).

B.7.10.2. Magnitude of residues in rotational crops

The potential incorporation of soil residues into succeeding and rotational crops was investigated in radish, soya bean and wheat.

The study showed a comparable metabolism to that in primary crops and significant residues in rotational crops are not expected, provided that foramsulfuron is applied in compliance with the GAPs..

The metabolism study on rotational crops has shown that the same residue definitions can be used as for primary uses and no relevant residues at or above the LOQ of 0.01 mg/kg are expected in succeeding crops. Specific plant back restrictions related to the use of foramsulfuron are therefore not required.

B.7.11. OTHER STUDIES

The summary for the active substance sufficiently addresses aspects of the residue situation. Therefore, other special studies are not needed.

B.7.11.1. Effect on the residue level in pollen and bee products

Foramsulfuron is applied on corn early in the growing season (latest at BBCH 18) and no residues are expected in pollen and bee products.

Studies on honey, pollen or royal jelly have neither been submitted nor requested.

B.7.12. PROPOSED RESIDUE DEFINITIONS AND MAXIMUM RESIDUE LEVELS

B.7.12.1. Proposed residue definitions

Table 7.12.1-1: Current proposed residue definitions

Matrices		Residue definition	Reference
Food of plant origin	Risk assessment and Monitoring	Foramsulfuron	DAR (01 April 2001)
Food of animal origin	Risk assessment and Monitoring	Foramsulfuron	EFSA Journal 2012; 10(11):2962

Table 7.12.1-2: Current MRLs established by EFSA

Commodity	MRL (mg/kg)	Reference
Maize grain	0.01* (a)	Regulation (EC) No 149/2008 (29 January 2008) EFSA Journal 2012; 10(11):2962
Bovine meat, fat, liver, kidney	0.01*	Regulation (EC) No 149/2008 (29 January 2008) EFSA Journal 2012; 10(11):2962
Sheep meat, fat, liver, kidney	0.01*	Regulation (EC) No 149/2008 (29 January 2008) EFSA Journal 2012; 10(11):2962
Goat meat, fat, liver, kidney	0.01*	Regulation (EC) No 149/2008 (29 January 2008) EFSA Journal 2012; 10(11):2962
Cattle, sheep, goat milk	0.01*	Regulation (EC) No 149/2008 (29 January 2008) EFSA Journal 2012; 10(11):2962

B.7.12.2. Proposed MRLs and justification for the acceptability of those MRLs (Annex IIA, 6.7; Annex IIIA, 8.6)

As no residues above the analytical limit of quantification were detectable in any of the trials on corn, a maximum residue level (MRL) of 0.01 mg/kg, expressed as parent substance, was proposed for foramsulfuron. This value was based on the evaluation of data packages submitted with the original dossier.

According to the EFSA review, MRLs and risk assessment values for the relevant commodities in ruminants can be established at the LOQ level (0.01 mg/kg). For poultry and pigs, MRLs are not required because they are not expected to be exposed to significant levels of foramsulfuron residues.

Consequently no new MRLs are proposed and those listed in Regulation (EC) No 149/2008 (29 January 2008) lend support also to the representative GAP evaluated in this documentation. The 25 trials in N-EU & 22 trials in S-EU submitted support the MRLs. corresponding to the representative GAP on maize.

No MRLs have been set for forage. At the time of harvest no residues above LOQ (0.05 mg/kg) in maize (corn) forage have been found and the LOQ can be used as a 'pseudo MRL' for forage.

MRL of 0.01* mg/kg is recommended for bovine, sheep and goat commodities.

B.7.13. MRLs IN OECD COUNTRIES

The Joint FAO/WHO Meeting on Pesticide Residues (JMPR) has not yet addressed foramsulfuron.

B.7.14. PROPOSED MRLs AND JUSTIFICATION FOR THE ACCEPTABILITY OF THOSE MRLs (ANNEX IIA, 6.7; ANNEX IIIA, 8.6)

The principles underlying the current MRLs have been laid in the DAR evaluated by RMS (Germany 2001) prepared for foramsulfuron Annex I inclusion to Directive 91/414/EEC on 01 July 2003, which

is before the entry into force of Regulation (EC) No 396/2005 on 02 September 2008. Reasoned opinion on the review of the existing maximum residue levels (MRLs) for foramsulfuron according to Article 12 of Regulation (EC) No 396/2005 have been prepared by the RMS Germany and published by EFSA (EFSA Journal 2012;10[11]:2962). The profile prepared by RMS comprised only uses on maize.

In the DAR by RMS DE, maize served as the only representative use. Also the studies on plant metabolism only comprised of studies on maize. Consequently, any other uses are not covered by the data as the residue definitions are not universal. No changes to the original residue definitions are proposed in the present document.

At normal harvest no residues were detected in forage, silage, and cob, as well as in grain above the LOQ of 0.05 mg/kg or 0.01 mg/kg, respectively.

From the available data and the validated limit of quantification of the corresponding analysis method the following MRL is proposed:

0.01 mg/kg maize grain and other food of plant origin

The consumer safety is guaranteed from the resulting TMDI of 0.00036 mg/kg bw (German model) or 0.0002 mg/kg bw (WHO model). Both values contribute only at 0.07 or 0.04 % to the proposed ADI of 0.5 mg/kg bw/d (see point B.7.16).

For maize grains and forage sufficient number of residue trials are available (see Chapter 7.8 for details).

While any risks to consumers have not been detected, data were only sufficient to derive tentative MRLs on maize grains and forage because additional data on the analytical method for enforcement are still required. A new method has been submitted and found acceptable. The results submitted to support the MRL evaluated here were obtained by the old method, which was not fully documented. The MRL of 0.01 mg/kg is proposed for all plant derived products.

B.7.15. PROPOSED IMPORT TOLERANCES AND JUSTIFICATION FOR THE ACCEPTABILITY OF THOSE RESIDUES

There are no relevant import tolerances reported at EU level; no CXL is available. Either a specific LOQ or the default MRL of 0.01 mg/kg may be considered (combination A-I in Appendix D).

B.7.16. BASIS FOR DIFFERENCES, IF ANY, IN CONCLUSIONS REACHED HAVING REGARD TO ESTABLISHED OR PROPOSED CAC MRLS

Not applicable since no Codex MRLs have been established.

B.7.17. PROPOSED SAFETY INTERVALS

The proposed safety intervals below are those evaluated during the first approval of foramsulfuron. No modifications/changes are required.

Pre-harvest interval:

It is not necessary to define a pre-harvest interval. Instead, the pre-harvest interval is given by the growing period between the growth stage at treatment and harvest.

Re-entry period for livestock to areas to be grazed:

Foramsulfuron is not intended for use in areas where livestock animals may be grazed. Therefore there is no need to propose any no re-entry period.

Re-entry period for man to crops, buildings or spaces treated:

Foramsulfuron is intended for use in maize. Re-entry in treated fields is generally not necessary. Therefore no re-entry period needs to be proposed for European product labels.

Withholding period (in days) for animal feedingstuffs:

Due to the time between last treatment and harvest, as defined by the GAPs, it is not necessary to set a withholding period for use of treated plants as animal feeding-stuff. Residues of foramsulfuron in maize (corn) grain were found to be below the limit of quantification (< 0.01 mg/kg) at harvest. Residues were also found to be below the limit of quantification (< 0.05 mg/kg) in green plants which might be used for silage. Due to the recommended application of products containing foramsulfuron, the withholding period is covered by the vegetation period of the crop.

Waiting period between the last applications and sowing or planting the crops to be protected:

Foramsulfuron is intended for use in maize (corn). Treatment takes place post-emergence. Due to the selectivity of the herbicide, the crops to be protected are sufficiently resistant to its activity. Therefore no waiting period needs to be proposed. Replanting tests with application on bare soil have shown that the effects are few, and also acceptable, when maize (corn) is planted 2 to 3 weeks after application. Even in emergency cases maize (corn) will not be sown less than 3 weeks after a previous treatment. Therefore no waiting period needs to be proposed for emergency replanting.

B.7.18. ESTIMATES OF POTENTIAL AND ACTUAL DIETARY EXPOSURE THROUGH DIET AND OTHER MEANS (ANNEX IIA, 6.9, ANNEX IIIA, 8.8)

The toxicological assessment of foramsulfuron was peer reviewed under Directive 91/414/EEC

Acute Reference Dose (ARfD) and Dietary Exposure Calculation

Acute exposure calculations were not carried out because no ARfD was allocated or deemed necessary.

Acceptable Daily Intake (ADI) and Dietary Exposure Calculation

An ADI = 0.5mg/kg bw/day (rabbit developmental study; $\text{SF} \times 100$) was established by the European Commission in 2002.

The median residue values selected for chronic intake calculations. Chronic consumer exposure resulting from for this evaluation has been calculated using revision 2 of the EFSA PRIMo sheet calculator. The highest chronic exposure represented less than 0.1 % of the ADI (Dutch child). Acute exposure calculations were not carried out because an ARfD was not deemed necessary for this active substance.

Large variation exists in the PRIMo ver 2.0 model in chronic maize intake, e.g. for IE adults the given consumption rate is $2,295\text{ g/kg bw/d}$, while for the UK the consumption level employed is $0,0023\text{ g/kg bw/d}$. No data exist for a few countries e.g. FR.

It is concluded that no chronic risk for the consumer could be identified, see tabled PRIMo values in the next page.

Foramsulfuron			
Status of the active substance:	Included	Code no.	
LOQ (mg/kg bw):		proposed LOQ:	
Toxicological end points			
ADI (mg/kg bw/day):	0,5	ARfD (mg/kg bw):	n.n.
Source of ADI:	COM	Source of ARfD:	COM
Year of evaluation:	2003	Year of evaluation:	2003

Chronic risk assessment - refined calculations								
Highest calculated TMDI values in % of ADI	MS Diet	Highest contributor to MS diet (in % of ADI)	Commodity / group of commodities	2nd contributor to MS diet (in % of ADI)	Commodity / group of commodities	3rd contributor to MS diet (in % of ADI)	Commodity / group of commodities	
0,1	NL child	0,1	Milk and milk products: Cattle	0,0	Bovine: Meat	0,0	Maize	
0,1	FR infant	0,1	Milk and milk products: Cattle	0,0	Bovine: Meat		FRUIT (FRESH/ FROZEN)	
0,0	DE child	0,0	Milk and milk products: Cattle	0,0	Bovine: Meat	0,0	Maize	
0,0	ES child	0,0	Milk and milk products: Cattle	0,0	Bovine: Meat	0,0	Maize	
0,0	SE general population 90 th percent.	0,0	Milk and milk products: Cattle		FRUIT (FRESH/FROZEN)		FRUIT(FRESH/FROZEN)	
0,0	NL general	0,0	Milk and milk products: Cattle	0,0	Bovine: Meat	0,0	Maize	
0,0	WHO Cluster diet B	0,0	Milk and milk products: Cattle	0,0	Maize	0,0	Bovine: Meat	
0,0	WHO cluster diet D	0,0	Milk and milk products: Cattle	0,0	Bovine: Meat	0,0	Maize	
0,0	WHO regional European diet	0,0	Milk and milk products: Cattle	0,0	Bovine: Meat	0,0	Sheep: Meat	
0,0	IE adult	0,0	Milk and milk products: Cattle	0,0	Maize	0,0	Bovine: Meat	
0,0	ES adult	0,0	Milk and milk products: Cattle	0,0	Bovine: Meat	0,0	Sheep: Meat	
0,0	WHO Cluster diet F	0,0	Milk and milk products: Cattle	0,0	Bovine: Meat	0,0	Maize	
0,0	WHO cluster diet E	0,0	Milk and milk products: Cattle	0,0	Bovine: Meat	0,0	Maize	
0,0	LT adult	0,0	Milk and milk products: Cattle	0,0	Bovine: Meat	0,0	Bovine: Liver	
0,0	FR all population	0,0	Milk and milk products: Cattle	0,0	Bovine: Meat		FRUIT FRESH/FROZEN)	
0,0	FR toddler	0,0	Bovine: Meat		FRUIT (FRESH/FROZEN)		FRUIT(FRESH/FROZEN)	
0,0	UK Infant	0,0	Maize	0,0	Bovine: Liver	0,0	Bovine: Kidney	
0,0	DK adult	0,0	Bovine: Meat	0,0	Bovine: Liver		FRUIT(FRESH/FROZEN)	
0,0	PT General population	0,0	Maize		FRUIT (FRESH/FROZEN)		FRUIT(FRESH/FROZEN)	
0,0	DK child	0,0	Bovine: Liver		FRUIT FRESH/FROZEN)		FRUIT(FRESH/FROZEN)	
0,0	UK Toddler	0,0	Bovine: Liver	0,0	Maize	0,0	Bovine: Kidney	
0,0	IT kids/toddler	0,0	Maize		FRUIT (FRESH/FROZEN)		FRUIT(FRESH/FROZEN)	
0,0	FI adult	0,0	Maize		FRUIT (FRESH/FROZEN)		FRUIT(FRESH/FROZEN)	
0,0	IT adult	0,0	Maize		FRUIT (FRESH/FROZEN)		FRUIT(FRESH/FROZEN)	
0,0	UK Adult	0,0	Bovine: Liver	0,0	Bovine: Kidney	0,0	Maize	
0,0	UK vegetarian	0,0	Maize		FRUIT (FRESH/FROZEN)		FRUIT(FRESH/FROZEN)	
0,0	PL general population	0,0	Maize		FRUIT (FRESH/FROZEN)		FRUIT(FRESH/FROZEN)	

B.7.19. LITERATURE REVIEW

Abstracts of all references have been downloaded and evaluated by the Notifier. Patents were not considered in the literature search, as according to the notifier they are not covered by the definition “scientific peer-reviewed open literature”.

While brochures and advertisements are not peer-reviewed articles, patents have to fulfil three basic criteria, novelty, inventivity and applicability, which are carefully reviewed

This is a novel area in the a.s. assessments. RMS has the opinion that mere references and even abstracts should not fill this requirement.

Some of the references, which are relevant to foramsulfuron residue section have been misinterpreted as belonging to the scope of environmental fate section (Inoue et al. 2011, and Nougadere et al. 2011). According to the notifier these articles are judged as being not relevant since they do not contain environmental data. Reasons for not including in dossier provided by notifier is to a significant part nonsense from the residue point of view.

The article by Inoue et al. (2011, and 2010) is about behavior of foramsulfuron residues during processing to produce beer. As the intended use is on maize, the study is relevant. In notifier opinion the full text article has not been submitted because:

"Test system not relevant to representative uses/GAPs; the fate of pesticides during brewing cannot be transferred to the behaviour of the pesticide in the environment".

The title of the article contains word fate, which does not mean that the scope is environmental.

As such the article will not change the outcome of this assessment, since residue levels are low and do not trigger processing studies. However the article as such provides some additional information, which might be needed later on.

Another article is by Nougadere et al. (2011). Similar articles can be found from many sources. The article contains information and data, which lend support to present conclusions.

In spite of this RMS has the opinion that these studies provide additional information only and would not change the outcome or conclusions of the residue section of foramsulfuron assessment. This conclusion has been reached on basis of the abstracts. Notifier has not submitted any full text articles.

This situation reveals that more attention should be paid on the literature search.

B.7.20. SUMMARY AND EVALUATION OF RESIDUE BEHAVIOUR (ANNEX IIA, 6.10, ANNEX IIIA, 8.9)

Foramsulfuron was included in Annex I to Directive 91/414/EEC on 01 July 2003.

Based on the conclusions derived in the framework of Directive 91/414/EEC by the joint Member State and EFSA peer review with Germany being the Rapporteur Member State and the additional information provided by the notifier

The toxicological profile of foramsulfuron was evaluated in the framework of Directive 91/414/EEC, which resulted in an ADI of 0.5 mg/kg bw per d. No ARfD was deemed necessary.

Primary crop metabolism of foramsulfuron was investigated in maize following foliar application, hereby covering the cereal crop group. The relevant residue for both enforcement and risk assessment on this crop group was proposed as parent foramsulfuron.

Validated analytical methods for enforcement of the residue definition in cereals are available with an LOQ of 0.01 mg/kg in dry commodities and 0.05 mg/kg in straw.

During the peer-review a confirmatory method was requested and this has now been fulfilled with new methods submitted by the Notifer. The requirement was justified as the submitted information concerning the analytical method was not complete. Although the new method have not been used to ascertain the very results obtained in the residue trials, only slight modifications including novel HPLC MS/MS instrymnt, have taken plaee. Consequently, it is concluded that the previous data is valid and can be used to propose MRLs.

Regarding the magnitude of residues in all crops reported by the RMS, GAPs were supported by a sufficient number of supervised residue trials, which allowed EFSA to estimate the expected residue concentrations in the relevant plant commodities.

However data presented in the DAR were only sufficient to derive tentative MRLs on maize grains and forage because additional data on the analytical method for enforcement were not validated.

In maize grains, quantifiable residues of foramsulfuron are not expected and as the chronic exposure does not exceed 10 % of the ADI, there was no need to investigate the effect of industrial and/or household processing. Specific processing factors for enforcement of processed commodities are therefore not proposed.

The potential incorporation of soil residues into succeeding and rotational crops was investigated in radish, soya bean and wheat. The study showed a comparable metabolism to the one in primary crops and significant residues in rotational crops are not expected, provided that foramsulfuron is applied in compliance with the GAPs reported in Appendix A.

Based on the representative use on corn (maize grains and forage), significant exposure to foramsulfuron residues is expected for ruminants, which is mainly driven by the consumption of treated maize forage. The RMS Germany reported a livestock metabolism study on dairy cows, which demonstrated that residues of foramsulfuron are not expected in significant amounts and MRLs for parent foramsulfuron in ruminants can be set at the LOQ. MRLs are not required for all poultry and pig products because they are not expected to be exposed to significant levels of foramsulfuron residues defined as parent.

Half of the total residue in straw was unidentified in radiolabel studies and could not be taken into residue definitions.

Chronic consumer exposure resulting from the authorised uses reported in the framework of this review was calculated using revision 2 of the EFSA PRIMo. The highest chronic exposure represented less than 0.1 % of the ADI (Dutch child). Acute exposure calculations were not carried out because an ARfD was not deemed necessary for this active substance.

Appendix A – Good Agricultural Practices (GAPs) for the intended uses

The GAP-table below is based on the Good Agricultural Practice given in Volume 1, Table 1.5.3. The crops have been arranged to conform to Annex I of Regulation (EC) 396/2005.

Use patterns (GAPs) for the spray application of the formulation Equip in/on maize (corn) in Europe (northern and southern zones), as described in the 2000 dossier

Crop and/	Zone	Product	F / G	Pests or Group of pests controlled	Formulation		Application			Application rate per treatment			PHI (days)	Remarks:
					Type (d-f)	Conc. of as (i)	method, kind (f-h)	growth stage & season (j)	number min-max (k)	Interval between applications (min)	g as/hl min-max	water l/ha min-max		
Maize (corn), without sweet corn and seed production use	Europe North/South	Equip	F	Grassy weeds species and dicot. Weed species	Oily SD*	22.5g/L foramsulfuron +22.5 g/L isoxadifen-ethyl	Broad-cast High volume spraying	BBCH scale: 12-16	1 per season	15-60	100-400	45-60 g foramsulfuron + 45-60 g isoxadifen-ethyl	Is covered by the normal vegetative period between last application and harvest	
Maize (corn), without sweet corn and seed production use	Europe North/South	Equip	F	Grassy weeds species and dicot. Weed species	Oily SD*	22.5g/L foramsulfuron +22.5 g/L isoxadifen-ethyl	Broad-cast High volume spraying	BBCH scale: 12-16	2 per season	7-14 days	100-400	30 g foramsulfuron + 30 g isoxadifen-ethyl followed by 30 g foramsulfuron + 30 g isoxadifen-	Split application in 7-14 days interval	Split application in 7-14 days interval
Maize (corn), without sweet corn and seed production use	Europe North/South	Equip	F	Grassy weeds species and dicot. Weed species	Oily SD*	22.5g/L foramsulfuron +22.5 g/L isoxadifen-ethyl	Broad-cast High volume spraying	BBCH scale: 12-16	2 per season	7-14 days	100-400	40 g foramsulfuron + 40 g isoxadifen-ethyl followed by 20 g foramsulfuron + 20 g isoxadifen	Split application in 7-14 days interval	Split application in 7-14 days interval

*Formulation type now classified as an OD (oil dispersion)

(i) g/kg or g/l

(a) The EU and Codex classifications (both) should be used

(b) Outdoor or field use (F), glasshouse application (G) or indoor application (I)

(c) e.g. biting and suckling insects, soil born insects, foliar fungi, weeds

(d) e.g. wettable powder (WP), emulsifiable concentrate (EC), granule (GR)

(e) GIFAP Codes - GIFAP Technical Monograph No 2, 1989

(f) All abbreviations used must be explained

(g) Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench

(h) Kind, e.g. overall, broadcast, aerial spraying, row, individual plant, between the plants

(j) Growth stage at last treatment

(k) Indicate the minimum and maximum number of applications possible under practical use conditions

(l) PHI - Pre-harvest interval; n.a - not applicable

(m) Remarks: SI - intervals between applications (in days); Max. appl. rate/season (in g as/ha)

B.7.21. REFERENCES RELIED UPON

RMS comment

The literature search that was carried out by the applicant is summarised in Document MCA section 9. While RMS considers the literature search provided as acceptable as such, original articles were not submitted. Notifier has not submitted the full texts of all these studies.

Databases: STN, a scientific information platform hosted by CAS, itself a division of the American Chemical Society, was selected as the preferred provider. Following data bases were used for the literature search: Agricola, Biosis, CABA, Chemical Abstracts, Derwent Drug File (DRUGU), EMBASE, Esbiobase, IPA, Medline, Pascal, PQSciTech, Registry, Scisearch, Toxcenter, Ulidat and FSTA.

Notifier states that

Time window: January 1st 2004 – August 2nd 2013 for the parent compound and metabolites.

Input parameters: IUPAC name, CAS number, common name, code and abbreviation, molecular structure, molecular formula, molar mass and/or other names/codes, as far as available.

Results: A total of 430 identified and evaluated for potential relevance for foramsulfuron and its metabolites. Of these, 384 summary records were excluded after a rapid assessment of relevance, and 46 full-text documents were assessed in detail.

As a summary 45 studies were excluded from the risk assessment because the publications did not meet the relevance criteria for the detailed assessment. Moreover, one study was unclear of relevance and only one study from the whole literature search was revealed for further examination (KCA 8.6.2).

A reference list containing these 46 documents were included in Doc MCA section 9.

Some of the original articles were misinterpreted to belong to environmental section, but in fact were in the scope of residues.

As such the articles by Nougadere et al. (2011) and Inoue et al. (2011) do not contain information, which will change the conclusion of the assessments, but do contain additional information and help to form an overall picture of the residue load on consumers on a population level.

The literature search contains at least two articles [Nougadere et al. (2011) and Inoue et al. (2011)] with relevance for this section as additional data, though no impact on the conclusions has been identified.

Annex point / reference number	Author(s)	Year	Title Source (where different from company) Company name, Report No., Date, GLP status (where relevant), published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
KCA Section 6 /01	Anon.	2012	Reasoned opinion on the review of the existing maximum residue levels (MRLs) for foramsulfuron according to Article 12 of Regulation (EC) No 396/2005 Publisher:European Food Safety Authority, Journal:EFSA Journal, Volume:10(11), Issue:2962, Year:2012, Report No.: M-466418-01-1, Edition Number: M-466418-01-1 Date: 2012-12-31 GLP/GEP: n.a., published	N	N	Not relevant	Bayer CropScience	N
KCA Section 6 /01	H. Bleiholder E. Weber, M. Hess, H. Wicke, T. van den Boom, P. D. Lancashire, L. Buhr, H. Hack, R. Klose, R. Stauss, and R. Stauss Uwe Meier (editor)	2001	BBCH Monograph, Growth stages of mono-and dicotyledonous plants. 2. Edition,	N	N	Not relevant	Federal Biological Research Centre for Agriculture and Forestry	-
KCA 6.1 /01	Cole, M. G.	2000	Stability of AE F130360 and AE F153745 residues in corn (forage, stover and grain) during frozen storage, USA, 1998 (minimum storage interval of 209 days: AE F130360 00 1B99 0001: AE F153745 00 1B99 0001 Aventis CropScience USA LP, Residue Chemistry, USA Report No.: B002750, Report includes Trial Nos.: CF98R004 Edition Number: M-238478-01-2 Date: 2000-02-23 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	In DAR (2001)

Annex point / reference number	Author(s)	Year	Title Source (where different from company) Company name, Report No., Date, GLP status (where relevant), published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
KCA 6.1 /02	Cole, M. G.	2001	Stability of AE F130360 and AE F153745 Residues in Corn (forage, stover and grain) During Frozen Storage, USA, 1998 (Minimum Storage Interval of 616 Days) Aventis CropScience USA LP, Residue Chemistry, USA Report No.: B003134, Report includes Trial Nos.: CF98R004 Edition Number: M-238787-01-1 Date: 2001-02-06 GLP/GEP: yes, unpublished	N	Y	New study to extend storage periods.	Bayer CropScience	N
KCA 6.1 /03	Stuke, S.; Ballmann, C.	2013	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 Bayer CropScience, Report No.: MR-13/007, Edition Number: M-455564-01-1 Method Report No.: MR-13/007 Date: 2013-05-28 GLP/GEP: yes, unpublished ...also filed: KCA 4.2 /20	N	Y	New data on the stability of foramsulfuron in plant extracts.	Bayer CropScience	N
KCA 6.1 /04	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 Date: 2013-10-18 GLP/GEP: yes, unpublished ...also filed: KCA 4.2 /21	N	Y	New data on the stability of foramsulfuron in plant extracts.	Bayer CropScience	N
KCA 6.2.1 /01	Huang, M. N.	2000	Metabolism of (U-14C-phenyl)-AE F130360 and (2-14C-pyrimidyl)-AE F130360 in corn grown under field conditions Code: AE F130360 Aventis CropScience USA LP, Environmental Chemistry, Pikeville, NC, USA Report No.: C003293, Report includes Trial Nos.: 512CF Edition Number: M-185906-01-1 Date: 2000-02-08 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	In DAR (2001)

Annex point / reference number	Author(s)	Year	Title Source (where different from company) Company name, Report No., Date, GLP status (where relevant), published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
KCA 6.2.1 /02	Drexler, D. M.	2000	Discussions on the different methods of evaluating growth stages of maize Aventis CropScience GmbH, Frankfurt am Main, Germany Report No.: C007621, Edition Number: M-196292-01-1 GLP/GEP: no, unpublished	N	N	Not relevant	Bayer CropScience	N
KCA 6.2.2 /01	[REDACTED]	1999	AE F130360: Poultry - Metabolism and nature of the residues in the eggs and edible tissues in the laying hen [REDACTED] Report No.: C005081, Report includes Trial Nos.: Tox96080 Edition Number: M-191323-01-1 EPA MRID No.: 45109624 Date: 1999-10-12 GLP/GEP: yes, unpublished	Y	N	Not relevant	Bayer CropScience	N
KCA 6.2.3 /01	[REDACTED]	1999	Cow - metabolism, distribution and nature of the residues in milk and edible tissues AE F130360 Code: AE F130360 00 ZE [REDACTED] Report No.: C005046, Report includes Trial Nos.: TOX6079 Edition Number: M-191251-01-1 EPA MRID No.: 45109625 Date: 1999-10-28 GLP/GEP: yes, unpublished	Y	N	Not relevant	Bayer CropScience	N
KCA 6.3.1 /01	Helgers, A.; Neuss, B.; Wrede, A.	1999	Decline of residues in maize European Union (southern zone) 1997 AE F130360 and AE F122006 water dispersible granule 50 % w/w Code: AE F130360 00 WG50 A106, AE F122006 00 WG50 A202 Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Report No.: C004454, Edition Number: M-187968-01-1 EPA MRID No.: 45132203 Date: 1999-09-03 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer	In DAR (2001)

Annex point / reference number	Author(s)	Year	Title Source (where different from company) Company name, Report No., Date, GLP status (where relevant), published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
KCA 6.3.1 /02	Helgers, A.; Wrede, A.; Neuss, B.	1999	Decline of residues in maize European Union (southern zone) 1997 AE F130360, AE F122006, AE F115008 water dispersible granule 50, 50, 20% w/w Code: AE F130360 00 WG50 A106, AE F122006 00 WG50 A202, AE F115008 00 WG20 A105 Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Bayer CropScience, Report No.: C005041, Edition Number: M-191238-01-1 EPA MRID No.: 45108503 Date: 1999-09-27 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	In DAR (2001)
KCA 6.3.1 /03	Helgers, A.; Neuss, B.; Wrede, A.	1999	Decline of residues in maize European Union (northern zone) 1997 AE F130360 and AE F122006 water dispersible granule 50 % w/w Code: AE F130360 00 WG50 A106, AE F122006 00 WG50 A202 Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Report No.: C003280, Edition Number: M-185891-01-1 EPA MRID No.: 45109701 Date: 1999-08-31 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	In DAR (2001)
KCA 6.3.1 /04	Helgers, A.; Wrede, A.; Neuss, B.	1999	Decline of residues in maize European Union (northern zone) 1997 AE F130360, AE F122006, AE F115008 water dispersible granule 50, 50, 20% w/w Code: AE F130360 00 WG50 A106, AE F122006 00 WG50 A202, AE F 115008 00 WG20 A105 Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Bayer CropScience, Report No.: C005042, Edition Number: M-191242-01-1 EPA MRID No.: 45108504 Date: 1999-09-27 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	In DAR (2001)
KCA 6.3.1 /05	Helgers, A.; Wrede, A.; Neuss, B.	1999	Decline of residues in maize European Union southern zone 1998 AE F130360, AE F122006, AE F115008 water dispersible granule 50, 50, 20 % w/w Code: AE F130360 00 WG50 A108, AE F122006 00 WG50 A203, AE F115008 00 WG20 A108 Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Bayer CropScience, Report No.: C005800, Edition Number: M-192667-01-1 EPA MRID No.: 45108505 Date: 1999-12-09 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer	In DAR (2001)

Annex point / reference number	Author(s)	Year	Title Source (where different from company) Company name, Report No., Date, GLP status (where relevant), published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
KCA 6.3.1 /06	Helgers, A.; Wrede, A.; Neuss, B.	2000	Decline of residues in maize European Union (northern and southern zone) 1998 AE F130360 and AE F122006 oil flowable (1K) 22.5 and 22.5 g/L Code: AE F130360 01 1K05 A201 Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Report No.: C006322, Edition Number: M-193664-01-1 EPA MRID No.: 45109702 Date: 2000-01-24 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	In DAR (2001)
KCA 6.3.1 /07	Helgers, A.; Wrede, A.; Neuss, B.	1999	Decline of residues in maize European Union northern zone 1998 AE F130360, AE F122006, AE F115008 water dispersible granule 50, 50, 20 % w/w Code: AE F130360 00 WG50 A108, AE F122006 00 WG50 A203, AE F115008 00 WG20 A108 Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Bayer CropScience, Report No.: C005799, Edition Number: M-192663-01-1 EPA MRID No.: 45108506 Date: 1999-12-09 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	In DAR (2001)
KCA 6.3.1 /08	Helgers, A.; Wrede, A.; Neuss, B.	2000	Decline of residues in maize European Union (northern zone) 1999 AE F130360 and AE F122006 oil flowable (1K) 22.5 + 22.5 g/L Code: AE F130360 01 1K05 A302 Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Report No.: C006632, Edition Number: M-194328-01-1 EPA MRID No.: 45109703 Date: 2000-02-08 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	In DAR (2001)
KCA 6.3.1 /09	Helgers, A.; Wrede, A.; Neuss, B.	2000	Decline of residues in maize European Union (southern zone) 1999 AE F130360 and AE F122006 oil flowable (1K) 22.5 + 22.5 g/L Code: AE F130360 01 1K05 A302 Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Report No.: C006631, Edition Number: M-194325-01-1 EPA MRID No.: 45109704 Date: 2000-02-08 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	In DAR (2001)

Annex point / reference number	Author(s)	Year	Title Source (where different from company) Company name, Report No., Date, GLP status (where relevant), published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
KCA 6.3.1 /10	Cole, M. G.	2000	At harvest AE F130360 and isoxadifen-ethyl derived residues in field corn following applications of AE F130360 and/or isoxadifen-ethyl WDG at the maximum proposed rates and the shortest proposed PHI, USA and Canada, 1997 Aventis CropScience USA LP, Residue Chemistry, Pikeville, NC, USA Report No.: B002604, Report includes Trial Nos.: CF97R001 Edition Number: M-238344-01-1 EPA MRID No.: 45109705 Date: 2000-03-09 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	N
KCA 6.3.1 /11	Cole, M. G.	2000	At harvest AE F130360 and isoxadifen-ethyl derived residues in field corn following applications of AE F130360 and/or isoxadifen-ethyl WDG at the maximum proposed rates and the shortest proposed PHI, USA and Canada, 1998: AE F130360 00 WG5 Aventis CropScience USA LP, Residue Chemistry, Pikeville, NC, USA Report No.: B002465, Report includes Trial Nos.: CF98R001 Edition Number: M-238212-01-1 EPA MRID No.: 45109706 Date: 2000-03-15 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	N
KCA 6.5.3 /01	Cole, M. G.	2000	AE F130360 and isoxadifen-ethyl derived residues in field corn grain and processed corn commodities following applications of AE F130360 and AE F122006 WDG at an exaggerated rate and the shortest proposed PHI, USA, 1998 Aventis CropScience USA LP, Residue Chemistry, USA Report No.: B002651, Report includes Trial Nos.: CF98R002 Edition Number: M-238387-01-1 EPA MRID No.: 45109707 Date: 2000-02-28 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	N

Annex point / reference number	Author(s)	Year	Title Source (where different from company) Company name, Report No., Date, GLP status (where relevant), published or not	Vertebrate study Y/N	Data protection claimed Y/N	Justification if data protection is claimed	Owner	Previous evaluation
KCA 6.6.1 /01	Huang, M. N.; Faulkner, T. D.	1999	Uptake of residues of (U-phenyl-14C)-AE F130360 and (2-pyrimidyl-14C)-AE F130360 in soil by rotational crops under confined conditions AgrEvo USA Company, Environmental Chemistry, Pikeville, NC, USA Report No.: C003287, Report includes Trial Nos.: 516CF Edition Number: M-185898-01-1 EPA MRID No.: 45109708 Date: 1999-06-10 GLP/GEP: yes, unpublished	N	N	Not relevant	Bayer CropScience	In DAR (2001)
KCA 6.6.1 /02	Cole, M. G.	2000	At-harvest AE F130360 and AE F122006 derived residues in rotational crops planted after treatment of a bare plot with AE F130360 WDG and AE F 122006 WDG at selected applications rates and rotational intervals, USA, 1997: AE F130360 00 WG50 Aventis CropScience USA LP, Residue Chemistry, Pikeville, NC, USA Report No.: B002716, Report includes Trial Nos.: CF97R002 Edition Number: M-238450-01-1 EPA MRID No.: 45109709 Date: 2000-02-22 GLP/GEP: yes, unpublished	N	Y	Confined rotational crop study performed for the USA. Added by request of the RMS.	Bayer CropScience	N
KCA 6.9 /01	Wrede, A.	2000	TMDI estimation of dietary intake of AE F130360 from residues in maize (statement) Code: AE F130360 Hoechst Schering AgrEvo GmbH, Frankfurt am Main, Germany Report No.: C007058, Edition Number: M-195132-01-1 EPA MRID No.: 45109710 GLP/GEP: no, unpublished	N	N	Not relevant	Bayer CropScience	N