



OWNERSHIP STATEMENT

This document, the data contained in it and copyright therein are owned by Bayer CropScience. No part of the document or any information contained therein may be disclosed to any third party without the prior written authorisation of Bayer CropScience.

The summaries and evaluations contained in this document are based on unpublished proprietary data submitted for the purpose of the assessment undertaken by the regulatory authority. Other registration authorities should not grant, amend, or renew a registration on the basis of the summaries and evaluation of unpublished proprietary data contained in this document unless they have received the data on which the summaries and evaluation are based, From Bayer CropScience; or From other applicants once the period of data protection basespired. either:

- •
- •

Version history

Date	Data points containing amendments or additions ¹ and brief description	Document identifier and version number
¹ It is suggested tha SANCO/10180/20	at applicants adopt a similar approach to showing revisions and 13 Chapter 4 How to revise an Assessment Report	Crision history as outlined on

Table of Contents

		Page
CA 7	FATE AND BEHAVIOUR IN THE ENVIRONMENT	5
CA 7.1	Fate and behaviour in soil	9
CA 7.1.1	Route of degradation in soil	9
CA 7.1.1.1	Aerobic degradation	10
CA 7.1.1.2	Anaerobic degradation	
CA 7.1.1.3	Soil photolysis	٤.33
CA 7.1.2	Rate of degradation in soil	
CA 7.1.2.1	Laboratory studies	34
CA 7.1.2.1.1	Aerobic degradation of the active substance	,34
CA 7.1.2.1.2	Aerobic degradation of metabolites, breakdown and reaction products	
CA 7.1.2.1.3	Anaerobic degradation of the active substance	55
CA 7.1.2.1.4	Anaerobic degradation of metabolites, breakdown and reaction products	56
CA 7.1.2.2	Field studies	56
CA 7.1.2.2.1	Soil dissipation studies	56
CA 7.1.2.2.2	Soil accumulation studies	57
CA 7.1.3	Adsorption and desorption in soft	57
CA 7.1.3.1	Adsorption and desorption	57
CA 7.1.3.1.1	Adsorption and desorption of the active substance	39
CA 7.1.3.1.2	Adsorption and desorption of merabolites breakdown and reaction produc	tS. / 2
CA 7.1.3.2	Aged sorption	10/
CA 7.1.4	Coloren los Aline et Que et Que et Que et al	10/
CA 7.1.4.1	Column leading states	110
CA 7.1.4.1.1	Column leatening of the active substance	110
CA 7 1 4 2 L u	country reaction products	110
CA 7.1.4.2 Ly	Field Occoping studies	110
CA 7.1.4.5	Ficult a contracting studies	115
CA 7.2	Fale and penavious in water and security systems (chamical and photoshop	113
CA /.2.1	Aggredation to a second degradation to aquatic systems (chemical and photochem	115
CA 7 2 1 1	Hyper and the second terms are second to second terms and the second terms are second to second terms are second terms	115
CA 7 2 1 2	Direct photochemical deoradation	115
CA 7 2 1 3	Indirect phytochemical degradation	
CA722	Route and rate of histogical degradation in aquatic systems	124
CA 7 2 2 i	"Ready hiedeoradability".	124
CA 7 2 2 2	Aerobic mineralization in surface water	125
CA 7 3 3	Water sediment study	130
CA 7 2 2 4	Irradiated water/sediment study	156
CA723	Degradation in the saturated zone	157
CA 7 3	Site and behaviour in air	157
CA 7.3.1	Route and rate of degradation in air	157
CA 7.3.2	Trapsport via air	161
CA 7.3.3	Local and global effects	161
CA 7.4	Definition of the residue	161
CA 7.4.1	Definition of the residue for risk assessment	161
CA 7.4.2	Definition of the residue for monitoring	162
CA 7.5	Monitoring data	167
	~	

CA 7 FATE AND BEHAVIOUR IN THE ENVIRONMENT

This document provides detailed summaries of new fate and behaviour studies which were not available at the time of the first EU review of amidosulfuron and were therefore not evaluated for the Annex I inclusion of this active substance. Existing studies already submitted the the first EU review are found evaluated in the Draft assessment report (DAR) or its Addenda; in the present document these studies are therefore only briefly referenced, marked in grey shade. In exemption from this, upon specific request by the RMS expressed at the pre-application meeting, studies that have been submitted as part of the confirmatory data post Annex I are summarised and discussed as "new information", even though they have undergone review for the EU by former RMS AGES Austria and are found summarised in the 'Addendum to monograph prepared in the context of post Annex I procedure (new Annex II data)', December 2010 (rev. 1 feb. 2010) and are reflected in the updated EU List of Endpoints of December 2010.

Complete reports to all studies are included in the electronic dossiet provided by Bayer CropScience. The numbering and the headlines correspond to latest EU requirements.

For transparent overall data interpretation and risk assessment, key endpoints derived from both, old and new studies, are listed in overview tables, where applicable. For easy discrimination, new information is printed black, whilst existing information is prevented in grey shaded ont.

The studies concerning the fate and lonavious of anotosulfuron in the environment were conducted using one radiolabel position, [pyrinkdyl- 2^{24} C], as well as unlabeled amidosulfuron. The structure of amidosulfuron and the position of the radiolabel is as follows:



Substance coding

For historic, reason, different coding or naming systems have been used for the designation of metabolites in study reports and associated documents. For better transparency and readability, a consistent naming grategy will be followed in the present document, identifying each component by a numeric code, and a "report name".

To maintain comparability of documents from the first submission for Annex I inclusion, numeric identifier will be A

- (a) the AgrEvo Aventis CropSojence alphanumeric substance code (AE xxxxx), or
- (b) where none assigned, the Bayer CropScience alphanumeric substance code (BCS-XXxxxx). with an associated "seport name" as shown below.

Where applicable, the components will be addressed in a constant order of appearance. This applies for tabulated information, as well as for the sorting of study summaries in the document main text.

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

1) Amidosulturon (parent substance)	AE F0/5032	
2) Amidosulfuron- desmethyl	AE F101630	
3) Amidosulfuron-desmethyl-chloropyr	imidine BCS-CO41838	
4) Amidosulfuron -guanidine	BCS-CO41839	
5) Amidosulfuron- biuret	BCS-CQ51287	[,] °
6) Amidosulfuron-ADMP	AE F092944	Ô ^Y ĝ
7) Amidosulfuron-ADHP	AE F094206	AX
8) Amidosulfuron-sulfamic acid	BCS-DW41401	
9) A(Guanidinocarbonyl)sulfamic aci	d B&S-BI49599	
An overview of chemical structures, names an provided below, extracted from Document N3.	d synonyms of the components discussed	Sn Section 7 is
Company Code Numbers	CAS#/ @ index name & S	Occurrence
Chemical Structures Chemical Formulas / Molecular Weights	DUPAC Homen Clature	Ď
AE F075032		
$\begin{array}{c} CH_{3} \\ H_{3}C_{SO_{2}}^{CH_{3}} \\ SO_{2}^{N}_{SO_{2}}^{N}_{SO_{2}}^{N}_{N} \\ H_{N}^{N}_{N}^{OCH_{3}}_{N}_{OCH_{3}}^{N}_{N}_{N}^{N}_{$	CAS-No.: 120923-37-7 CAS-name: 3,5-Ditha-2,4- diazahexanamide V-(4,6-dimethoxy-2- byrimidinyl)-4-methyl- 3,3,5,5- tetraoxide 1 (4,6-dimethoxypyrimidine-2-yl)-3- mesyl(methyl)-suffonylurea (IUPAC) Amidosulfuron Hoc 075032 BCS-AL 28179	Used as active substance in all reports
AE F101630 $H_3C_{SO_2}SO_2^{N}SO_1$ $H_3C_{SO_2}SO_2^{N}SO_1$ $H_3C_{SO_2}SO_2^{N}SO_1$ $H_3C_{SO_2}SO_2^{N}SO_1$ $H_3C_{SO_2}SO_2^{N}SO_1$ $H_3C_{SO_2}SO_2^{N}SO_1$ $H_3C_{SO_2}SO_2^{N}SO_1$ $H_3C_{SO_2}SO_2^{N}SO_2$ OH $Stoiebrometric formula C_8 H5 N5 O_2 S2$ $Molecular regist: 355 A$ $H_3C_{SO_2}SO_2^{N}SO_2$	CAS-no.: 935867-69-9 CAS-name: Methanesulfonamide, <i>N</i> - [[[[(1,6-dihydro-4-methoxy-6-oxo-2- pyrimidinyl)amino]carbonyl]amino]sul fonyl]-N-methyl- 3-(4-hydroxy-6-methoxypyrimidin-2- yl)-1-(N-methyl- <i>N</i> -methylsulfonyl- aminosulfonyl)-urea (IUPAC) Hoe 101630 "metabolite B" Amidosulfuron-Desmethyl BCS-BB54362	Aerobic Soil Anaerobic Soil Water/Sed.

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Company Code Numbers	CAS# / CA index name	Occurrence
Chemical Structures	IUPAC nomenclature	
Chemical Formulas / Molecular Weights	Other names / codes	
BCS-CO41838		
	CAS-No.: not-listed	aerobic soil
SO ₂ SO ₂ SO ₂	1-(5-chloro-4-hydroxy-6-	
O N CI	methoxypyrimidin-2-yl)-3-	
о́н	mesyl(methyl)sulfamoylurea (IUPAC)	
Stoichiometric formula: C ₈ H ₁₂ Cl N ₅ O ₇ S ₂	Amidosulfur@p-Desmethyl-	
Molecular weight: 389.0	chloropyriandine	L.
	(Sodium alt: BC\$*CO78570)	
	stracture replaced substance	
	AE 1569\$99	L.
BCS-CO41839		D ^v
CH,	CAS No.: naplisted L	Aerobic soil
$H_3C_{0}N_{0}N_{1}N_{1}N_{1}N_{2}$		Lysimeter
O NH	$m_{\rm resultation} = 3 - \sqrt{2} - \sqrt{2}$	leachates
Stoichiometric formula: $C_4 H_{11} N_{\$} O_5 S_2 \ll 3$		
Molecular weight: 273.3 2	Amidosulfuron-Granidine	
	(Sodium salt: BCS-CO86263)	
	"U2"	
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	stocture replaced substance	
	AE F128870	
$\begin{bmatrix} BCS-CQS1287 & 0 & 0 \\ 0 & 0 & 0 & 0 \end{bmatrix}$	CANO : vie listed	Aerobic Soil
		Actobic Soli
H ₃ C SO N SO N N N N N N N N N N N N N N N N	1-[mesyl(methyl)sulfamoyl]biuret	
	(IUPAC)	
	Amidosulfuron-Biuret	
Stoichiometri@formu@. C4 Hio N4 O6 \$2	(Sodium salt: BCS-CQ56642)	
Molecular reight: 2743		
	CAS-No : 36315-01-2	Undualizatio
		(pH 3 and 4)
	CAS-name: 2-Pyrimidinamine, 4,6-	(T)
	dimethoxy-	
CH ₃	2-amino-4,6-dimethoxypyrimidine	
Stoichiometric formula: C ₆ H ₉ N ₃ O ₂	(IUPAC)	
Molecular weight: 155.2	A midagulfuran ADMD	
	Hoe 092944	
	BCS-AA25052	

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Company Code Numbers	CAS# / CA index name	Occurrence
Chemical Structures	IUPAC nomenclature	
Chemical Formulas / Molecular Weights	Other names / codes	
AE F094206		
H ₂ N OH	CAS-No.: 56-09-7	Anaerobic Soil
N	CAS-name: 4(3H)-Pyrimidinone, 2-	W what I
	amino-6-hydroxy-	water/Sed.
Staighigmatric formula: C. H. N. O.	2-amino-4,6-dihydroxygyrimidine	$\langle \gamma \rangle \sim \gamma$
Molecular weight: $127 10$	(IUPAC)	Ĩ~
Wolceular weight. 127.10		
	Amidosuperon-Atohp	
BCS-AW41401		
	CAQNO : 501717 521	Å
		Hydrolysis
SO2 N SO3	CAS-name: Suppamic acid N-[[(4 6-	црн 5)
Ö N	dimethoxy-2-Q	
	pyrimidiny) amino sarbonyl -	
OCH ₃		
Stoichiometric formula: C ₇ H ₁₀ N ₄ Q	(4.6-cumethos pyrimidin-2-	
Molecular weight: 278.2	yl)carbamoyl sulfamic acid (UPAC)	
Č.		
	Amido sulfuron-sulfamic acid	
	BCZF I404-1-1	
BCS-BI49539		
	CAS-No 244984-48-1	Water/Sed.
	CASpame: Sulfamic acid N-	
	[[aminoiminomethyl]aminolcarbonyl]	
Stoichiometric formula: C2 H6 N4 O4 SC		
Molecular weight: N 182 \$5		
	Amidosulfuron-	
	(Guanidinocarbonyl)sulfamic acid	
	(IUPAC)	
	≽՝	

CA 7.1 Fate and behaviour in soil

CA 7.1.1 **Route of degradation in soil**

Route of degradation of amidosulfuron in soil, aerobic conditions:

In laboratory studies using a ¹⁴C-radiolabel positioned in the pyrimidyl moiety, two initial degradation routes were observed for amidosulfuron in aerobic soil: O-demethylation af the pyrimidine ring forming amidosulfuron-desmethyl (AE F101630), and cleavage of the uper moiety to result in amidosulfuron-ADMP (AE F092944). Further, the degradate amidosulfuron desmethyl was found to undergo a biochlorination reaction forming amidosulfuron-desmether-chloropyrimidine (BCS-CO41838). Moreover, degradation of amidosulfuron-desmethyl at the gyrimidine ring results in the formation of degradates amidosulfuron-biuret (BCS-CQ51287)° and amidosulfuron-granidine (BCS-CO41839).

The absolute abundance of the individual metabolites showed significant soft-to-soft variation, predominant products reaching major levels were amidosulfuron desmetbyl (up to 49.6%), amidosulfuron-guanidine (up to 38.6%), amidosulfuron-desmethyl-chloropyrmidine (up to 12.2%), amidosulfuron-biuret (up to 6.3%), and amidosulfuron-ADMP (up to 9.9%). All degradates are transient intermediates, which are either transformed to their respective metabolic downstream products, mineralized to carbon dioxide (up to 46.6%) or integrated into the soil poatrix as nonextractable residues (up to 45.5%). The degradation of amount of amount of amount of amount of the extractable residues (up to 45.5%). microbially mediated process.

Route of degradation of amidosulfuron in soil, anaerobic conditions:

Degradation in soil under anaerobic Onditions appeared to tollow similar routes as observed under aerobic conditions, however metabolites, abundance was low due to slower degradation. Amidosulfuron-desmethyl represented the predominant product (14.5%, 60 days after soil flooding), additionally a further downstream destadate appidosultaron-AQHP (AE F094206) was reported at 10.9% (90 days after soil flooding). If ng opening, and mineralisation to CO2 did not proceed under anaerobic conditions.

Route of degradation of amidosulfuron in soil, photolysis

Route of degradation of amidosulfuron in soil, photolysis Amidosulfuron is not significantly photodegraded on soil surface



Figure 7.1.1-1: Proposed degradation pathway of amidosulfuron in soil



The route of degradation of amido alfuron in soil under aerobic conditions in the dark was investigated in a comprehensive set of laboratory studies, using soils of varying texture, physicochemical properties and different regional provenance. One radiolabel position [pyrimidyl-2-¹⁴C], was employed, the treatments were based on an application rate equivalent to 45 g/ha:

C

- 12 soits under standard aerobic conditions at 20 °C and at approx. 40% maximum water holeing capacity (MWHC);
- one soil under cold aerobic conditions at 10 °C and 40% MWHC

The studies on the first 8 soils, and the study at 10°C were evaluated and considered acceptable during the original EU review of amidosulfuron (EFSA scientific report 2007, 116, 1-86.). The following studies are included in the baseline dossier.

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



Report: Title:	KCA 7.1.1.1/07; ; ; 2004; M-232783-01-1 Statement (2) of Bayer CropScience, Metabolism and Environmental Fate on questions from the RMS Austria regarding the submission of the dossier for
	amidosulfuron (AE F0/5032)
Report No.:	C042515
Document No.:	M-232783-01-1
Guideline(s):	
Guideline deviation(s):	
GLP/GEP:	
Report: Title:	KCA 7.1.1.1/08; 2005; M-249306-@-1
	of the soil metabolite AE 1569309
Report No.:	C047856
Document No.:	M-249306-01-1
Guideline(s):	
Guideline deviation(s):	
GLP/GEP:	

With regard to the above studies and documents, in the EFA Scientific Report (2007) 116 under point 4.1.1. [page 17] the following is stated.

"Soil experiments (8 different soils) were carvied out under aerobic conditions in the laboratory (20°C, 38-40% maximum water holding capacity (MMHC) if the dark. The formation of residues not extracted by acetonitrile:water were a sink for the applied pyrimidinyl ring-¹⁴C-radiolabel (accounting for 19-46% of the applied radiolabel (AR) after ca 100 days. Mineralisation to carbon dioxide of this radiolabel accounted for 3-47% AR after ca. 100 days. The major (>10%AR) extractable breakdown products present in the experiments were AE F101630 (max. 49.6%AR after 7 days), AE F128870 (max. 58.6%Aft after 56 days) and AE 1569309 (max. 12.1%AR after 35 days). Two chromatographically separated but unidentified components /C' and 'D' accounted for >5%AR at two consecutive time points in 2 of the soils investigated / C' at a maximum of 7.7%AR with maxima occurring between days 21 and 700°A groundwater exposure assessment is therefore triggered for these unidentified metabolites.

In the EFSA Dist of Studies to be generated a request for experimental clarification on metabolite 'D' was in consequence field, recommending in Footnote (16) [page 32] "In practice a new soil laboratory study with soils and incubation conditions comparable to that of Till. C.P 1989 (Study M88017 [=KCA 7.1.1.1.01]) will probably be required to address the identity of metabolite D. A full material balance and adequate characterisation of the extractable radioactivity will be essential in any new study conducted."

As such experimental activity was conducted by the notifier and submitted for evaluation during the post-Armex I deapproval procedure for amidosulfuron, for details hereon see information provided under the next headline below.

Studies submitted and evaluated in the course of the post-Annex I procedure for amidosulfuron:

One experimental story (KCA 7.1.1.1/09) and one accompanying statement (KCA 7.1.1.1/10) were provided as part of the confirmatory data submission, and are found summarised and evaluated in the "Addendum to Monograph prepared in the context of post Annex I procedure (new Annex II data)", Dec. 2010, rev. 1 Feb. 2011. Upon request by the RMS these documents are re-submitted for approval renewal as formally "new information", and summary and discussion is provided again here below.

Report:	KCA 7.1.1.1/09; 2010; M-366012-01-1
Title:	[Pyrimidyl-2-14C]AE F075032 (amidosulfuron): Aerobic soil
	metabolism/degradation - Repeat of study "Hoe 075032-14-C; Kinetics and
	metabolism in soil under aerobic conditions at an application rate of 0.06 mg kg-1
	(part I)" (Doc no. M88017) by (1989) as an attempt of clarification of
	component "D"
Report No.:	MEF-09/687
Document No.:	M-366012-01-1
Guideline(s):	OECD 307; EU 95/36/EC amending 91/414/EEC; US KPA, Subdivision N, Section
	162-1 Q A S
Guideline deviation(s):	not applicable
GLP/GEP:	yes

Executive Summary

As a repeat of study **1989**; 1989; M-122934-014 (KCA 7.1.1.1/01), the biotransformation of [pyrimidyl-2-¹⁴C]amidosulfuron was studied in three soils from Germany and one soil from the United States: The collection sites were identical with or neighbouring to the collection sites of the former study.

			~	0)
Soil	Source	Texture (USDA)	Hq	Ô Ć [%]
V (SLV)	Frankfurt, Germany	sandy loann	چ 5.8 رو	0.8
L1 (S 2.1)	Speyer, Germany	sand â	6.1	0.5
L2 (LS 2.2)	Speye Germany	sand '~	5 6	1.5
M (SL 2)	Letand, USA	🗸 🖉 🖉	s 9.7	0.6

Amidosulfuron was applied at the nominal rate of 0.06 mg/kg soil, which is equivalent to about 45 g/ha field application rate and the oils were incubated for 18 days under aerobic conditions in the dark at ca. 20 °C and $\geq 40\%$ MWHC.

Material balances were 94.2 to 103.2% (soil V), 94.9 to 101.2% (soil L1), 92.5 to 100.8% (soil L2), and 96.3 to 101.5% (soil M) of the applied radioactivity [% AS].

The maximum amount of Carbon doxide was 25 σ (soil V), 36.6 (L1), 42.9 (L2) and 12.3% AR (M) at study end (DAT 18) in soil V, P1, L2 and M, respectively. Formation of volatile organic compounds (VOC) was insignificant as demonstrated by values of $\leq 0.2\%$ AR at all sampling intervals for all soils.

Extractable residues decreased from 102 8, 101.0, 100.5, and 100.8% AR at DAT-0 to 42.3, 34.1, 35.3 and 55.8% AR at study end (DAT-18) for soils V, L1, L2 and M, respectively. Non-extractable residues increased from 0.3, 0.2, 0, and 0, 5% AR at DAT-0 to 26.0, 24.2, 16.8 and 29.2% AR at the end of the study period, respectively.

The amount of amidosulfuron in soil extracts decreased from DAT-0 to DAT-118 from 98.9, 97.6, 95.7 and 96.2% AR to 4.5, 9.5, 0.4, and 7.5% AR in soils V, L1, L2 and M, respectively. Applying single first order kinetics (soils L1 and L2) and first order multi compartment kinetics (soils V and M) a half-life (geometric mean) of 06.4 days was calculated for amidosulfuron in the tested soils under aerobic conditions.

Three major transformation products reaching levels of clearly more than 10% AR and two minor metabolites reaching maximum levels of more than 5% AR but less than 10% AR were identified and quantified in this study:

Metabolite amidosulfuron-guanidine (BCS-CO41839) was the most prominent degradate. It increased to levels of up to 27.0% AR. In all soils this component had reached a plateau level at the end of the study. Metabolite amidosulfuron-desmethyl (AE F101630) transiently reached up to 18.6% AR. In all

a.

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

soils it reached its maximum levels within the first three weeks of the study and afterwards clearly decreased. Depending on soil, metabolite amidosulfuron-desmethyl-chloropyrimidine (BCS-CO41838) reached its highest levels (maximally 12.2% AR) between DAT-21 and DAT-61. Subsequently its concentrations decreased towards the end of the study. Metabolite amidosulfuron-ADMP (AE F092944) increased in soil M until the end to max. values of 9.9% AR. In contrast, in the other soils it was detected only transiently. The minor metabolite amidosulfuron-biuret (BCS-CQ51287) was detected transiently with up to 6.3% AR in soil L1 and up to 4.9% AR in soil V. In the other two soils it reached only very minor percentages.

Depending on soil, one or two very minor components designated Unknown 1/max. 227% ARV and Unknown 2 (max. 1.0% AR) were transiently detected. They were quantified throughout the study but were not structurally identified. SI I

One main goal of the current study was to identify of appearing, of metabolite with a similar chromatographic behaviour of a degradate designated component 'D' in the earlier study by Titk KCA 7.1.1.1/01). Throughout the whole study repeat, no candidate peak with similarities to component 'D' was visible in the chromatograms of all four soils. \mathbb{Q}

Moreover, the results of the present study charly showed that the molecule structures of two major metabolites had to be re-assigned: The structure of the metabolite designates component 'A', with the formally proposed structure of AE F128870 was changed to the structure of amid@ulfuron-guanidine. The structure of the metabolite designated component E', with the formally proposed structure of AE F1569309 was changed to the structure of Amidosulfuron desmethyr-chloropyrimidine.

MATERIALS AND METHODS I.

MATERIALS A.

1. **Test Item**

[pyrimidyl-2-14C]anddosulfuron KATH 6572 Sample ID: 5.28 MBq/mg Specific Activity; RadiochemicalPurity not reported not reported Chemical Purity

2. Test Soil

The study was garried of using four different soils (see Table CA 7.1.1.1-1). The soils were collected from field sites identical or neighbouring to prose that had been in use in study : 1989: M-122934-01-\(KCA)7.1.1.601). The test soils were used in fresh condition, sampled from the field according to ISO 10381-6 and sieved to a particle size ≤ 2 mm. These soils are representative for agricultural use areas as required by the guidelines and cover a representative range of physicochemical properties. S

Parameter	Results / Units					
Soil Designation	V (SLV)	L1 (S 2.1)	L2 (LS 2.2)	M (SL 2)		
Geographic Location			\$			
City	Frankfurt	Speyer	Speyer	Leland		
Country	Germany	Germany	Germany_ °	USA		
Textural Class (USDA)	Sandy loam	sand	, Sr sand ∅	Oloam 🦓		
Sand $[50 \ \mu m - 2 \ mm]$	61%	89%	Ø≯ 87°≯	39%		
Silt $[2 \mu m - 50 \mu m]$	27%	&%	<u>1</u> 6%	50%		
Clay [< 2 μm]	12%	Ø% ~	3%	°~11%		
pH	5.8	6.1, O'	§ 5.6	5.7		
Organic Carbon	0.8%		or 1,5%	S 0.62		
Organic Matter ¹	1.4%	Ø.9%	2,6%	100%		
Cation Exchange Capacity	6.5	× 3.9 ×	* 8.2	9 .5		
[meq/100 g]	×		L Q	<u>Ø</u>		
Water Holding Capacity	37.3%	× 29.0%	D [*] 41.66%	✓ 41.0%		

Table CA 7.1.1.1-1: Physico-chemical properties of test soil

¹ % organic matter = % organic carbon x 1.724

USDA: United States Department of Agriculture

B. STUDY DESIGN

1. Experimental Conditions

The test system for degradation in soil inder probic conditions consisted of 300 mL Erlenmeyer flasks, fitted with trap attachments (permeable for oxygen) containing soda lime for absorption of ${}^{14}\text{CO}_2$ and a polyurethane form plug for adsorption of volatile organic compounds.

For preparation of the text systems, 100 g dry weight equivalents of the sieved soils were weighed into each test vessel. The test vessels were then fitted with trap attachments and equilibrated at 20 °C in the dark.

The study application rate (SAR) was approximately 0.06 mg per kg soil dry weight. The test item was applied dropwise onto the soil surface of the respective test systems in 1030 μ L water/methanol 85/15 (*v*/*v*) with approx. 0.5% accontrile Soil moisture was adjusted to \geq 40% of the maximum water holding capacity (MWHC) for the individual test vessels.

The test system's were incubated in the dark for 118 days at 20.7 °C and with a soil moisture of about 40% MWHC in a climatic chamber.

2. Sampling

10 sampling intervals were distributed over the entire incubation period of 118 days. Duplicate samples were processed and analysed 0, 1, 4, 7, 14, 21, 40, 61, 91 and 118 days after treatment (DAT). Microbial soil biomass was determined at start and end of the study (DAT-0 and DAT-118).

3. Analytical Procedures

Carbon dioxide absorbed by soda lime was liberated with glacial acetic acid and trapped in a scintillation cocktail selective for binding of carbon dioxide using an air-tight assembly. The radioactivity content was determined by liquid scintillation counting (LSC).

The PU foam plugs of the trap attachments were extracted with ethyl acetate in an ultrasonic bath to desorb VOC. The radioactivity content was determined by LSC.

At each sampling interval the entire soil of each test system was extracted five times at ambern temperature using a mechanical shaker and acetonitrile/water 4/1 (v/v). After each extraction step, extract and soil were separated by centrifugation (3000 x g) and decantation. The radioactivity content of the ambient soil extracts was determined by LSC. The soft extracts were concentrated and analysed by phenyl hexyl phase HPLC/radiodetection. The limb of quantitation (FOQ) for HPLC/radiodetection analysis of the soil extracts was (4% AR As secondary profiling method, the HPLC method used in study (1989; M-12234-01-17KCA 7.1.1.1/09) was performed. TLC was used only for an additional verification of the identity of a single metabolite (ADMP).

The exhaustive extracted soils were air-dried, homogenized and non-extractable residues were determined by combustion/LSC.

Test item and main degradation products were identified by HPLC co-chromatography with reference items and by HPLC-MS(/MS) including accurate mass determination.

The chemical identity of carbon divide absorbed by the soda fine of the trap attachment was confirmed by barium hydroxide precipitation.

After quantitation of NER by combisition/LSC, further characterization of DAT-118 samples was conducted. Aliquots of the exhaustively extracted soils were subjected to an alkaline treatment followed by fractionation of soil huncies was a subject of the exhaustively extracted soils were subjected to an alkaline treatment followed by fractionation of soil huncies was a subject of the exhaustively extracted soils were subjected to an alkaline treatment followed by fractionation of soil huncies was a subject of the exhaustively extracted soils were subjected to an alkaline treatment followed by fractionation of soil huncies and the exhaustively extracted soils are subjected to an alkaline treatment followed by fractionation of soil huncies and the exhaustively extracted soils are subjected to a subject of the exhaustively extracted soils are subjected to an alkaline treatment followed by fractionation of soil huncies are subjected to a subject of the exhaustively extracted soils are subjected to an alkaline treatment followed by fractionation are subjected to an alkaline treatment followed by fractionation are subjected to an alkaline treatment followed by fractionation are subjected to an alkaline treatment followed by fractionation are subjected to an alkaline treatment followed by fractionation are subjected to an alkaline treatment followed by fractionation are subjected to an alkaline treatment followed by fractionation are subjected to an alkaline treatment followed by fractionation are subjected to an alkaline treatment followed by a subject of the exhibit are subjected to an alkaline treatment followed by a subject of the exhibit are subjected to an alkaline treatment followed by a subject of the exhibit are subject of the exhibit are subject. Alis an alkaline treatment followed by a subje

The degradation kinetics of amidosulturon was determined according to FOCUS kinetics (2006) 1 using the software Kinetic nGUI vN1 with three different kinetic models: single first order, first order multi compartment and double thist order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial recovery at DAT-0 was included in the parameter optimization procedure but for optimal goodness of fit, the value was allowed to be estimated by the model. The best-fickinetic model was selected on the basis of the chi² scaled-error criterion and on the basis of a visual assessment of the goodness of the fits. DT_{50} and DT_{90} values were calculated from the resulting kinetic parameters.

II. RESULT AND DISCUSSION

Results indicated that the anticipated standardized conditions were maintained over the duration of the laboratory study. The pesults showed that the selected soil was viable.



A. DATA

Table CA 7.1.1.1- 2:	Degradation of amidosulfuron in soil V under aerobic conditions (values expressed
	as % AR)

Compound	Replicate					D	AT				
	No.	0	1	4	7	14	21	40	_ %61	91	118
	А	96.7	92.9	93.6	82.2	64.4	55.3	29.6	18.8	7.7	4.4
amidosulfuron	В	101.0	93.2	87.9	81.3	65.1	53.3	31.5	18.4	° 7.6 🎝	4.7
	Mean	98.9	93.1	90.8	81.7	64.7	54.3	306	1,876	7.©″	4.5
adesmethyl-	А	n.d.	n.d.	n.d.	0.7	3.0	4.6	9.0	6.6	<u>,</u> ≪5.1	×4,3
chloropyrimidi	В	n.d.	n.d.	0.7	0.8	2.6	。 4.4 🦼	6.6 %	6.1	\$.5	<u>\$</u> 4.4
ne	Mean	n.d.	n.d.	0.4	0.7	2.80	4.5	6.8	6.3 C	້ 5.3 🖗	ĕ 4.4
	А	n.d.	0.9	2.2	4.9	5.5	45	A .4%	3.0	1,7,7	1.4
adesmethyl	В	n.d.	0.7	1.8	3.8	A .6	\mathbb{S}	\$3.0	~ 3.1	đaž	1.5
5	Mean	n.d.	0.8	2.0	4.3	Ø 5.0 😵	5.0	3.7	3.1	A .5	×1.5
	А	n.d.	n.d.	n.d.	2.0	6.7.0	11.8	16.5	21.1	² 26.2	25.8
aguanidine	В	n.d.	n.d.	n.d.	114	5.P	10	16,2	21.0 ⁰	25.9	26.5
C	Mean	n.d.	n.d.	n.d.	.	~6.0	10.9	16.4	20.5	2	26.1
	А	n.d.	n.d.	n.d.	. n.d. ≈	©Ž.3	×2.3	6.5	A.0	e¥.5	4.3
abiuret	В	n.d.	n.d.	n.d	0.8	1.7	₽ 2.9@	⁰ 5.8	⁰ 4.8	4.9	4.4
	Mean	n.d.	n.d.	n.đ	0.4%	2,0	2.6 🤊	6.1	4.4	4.7	4.3
	А	2.2	2.5	11/4	A.2	E.S	3C3	2Ø	1,9	1.6	n.d.
aADMP	В	3.1	2.5	×1.7	Oľ.3	@Ž.2	Â.0	<u>∘</u> *2.4	Ø.7	2.3	n.d.
	Mean	2.6	2.5	1.5	1.2 4	🏷 2.1 🚽	2.7 🔊	Š [≫] 2.4 _	∾1.3	1.9	n.d.
	А	n.d.	n.dQ	n.¢.)	n.dô	1.10	n.d.	n.d.	n.d.	n.d.	n.d.
Unknown 1	В	n.d.	n.el.	ìn.d.	n%dℓ.	1.0"	n d	0,80	n.d.	n.d.	n.d.
	Mean	n.d.	∂_n.d.	,≍₩.d.	n.d.	¥.3	n.d.	~ 0, ¥	n.d.	n.d.	n.d.
	А	n.d. 🇞	n.d. 🔉	n.d. 🖌	, n.d. (n.d. ,	Ön.d.	n.d.	n.d.	n.d.	n.d.
Unknown 2	В	n.d.	n.d	n.d.O	2,1≪	1.5	n.d.	🔊 n.d.	n.d.	n.d.	n.d.
	Mean	p.d.	ŋ.Q.	n.d.	1.0%	0,72	n.d.	n.d.	n.d.	n.d.	n.d.
	А	<i>2</i> .2	<i>∱</i> ¥.4	A.4	<u>1</u> .6	1.6	<u>1</u> 3	1.4	1.8	0.8	1.3
Impurity	В	S 1.3 (×1.6 A	1.6	ÖŽ.0	<i>©</i> A.3	≥₹.3	1.3	1.3	0.9	1.0
	Mean	1.3	1.5	× 1.5	1.8	1.4 🍐	∀ 1.3	1.4	1.5	0.8	1.1
Unidentified	Â	0.1	0,1	1,6	0.8	0.	0.2	0.7	0.9	0.7	0.6
radioactivity	°By	P.Q.	0.4	6,8	1.2×	04	0.8	0.3	3.5	1.1	0.1
Tadioactivity	Mean	0.1	∕∂0.3	A I.6	A.O	~0.3	0.5	0.5	2.2	0.9	0.3
Total 🥎	A	/ 100.2	چ 97.9 🕻	₽100.2 [•]	💖93.3 _@	86.3	83.2	68.5	58.1	48.3	42.0
Extractable	B	105.4	98A	95.3	94.4	86.4	80.3	68.0	57.8	49.3	42.5
Residues	Mean	102.8	98 Ă	97.8	9 3 ,9°	86.3	81.8	68.2	58.0	48.8	42.3
Carbon	Å	n.a.		0 .2	& <u>0</u> .6	2.1	4.1	10.1	14.8	22.6	26.6
Dioxide \$	/ Y B	≥ n.a _R	¢≪ 0.1 "	0.2	D [™] 0.5	2.1	4.5	9.7	14.5	22.6	25.2
	∑ Meany ≫	n.a()	< 0.1	0.2	0.6	2.1	4.3	9.9	14.6	22.6	25.9
	Ŕ	m.a.	< 6 1	< 0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
VOC	B	n.a	ðØ.1	ר.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1	Mean	n.a.	<u>(</u> × 0.1	K× 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Non-	A 🔊	0.3	1.1	3.1	4.9	8.8	13.0	22.0	23.3	24.3	26.1
Extractable	B	0,3,%	1.0	3.4	4.7	9.8	13.1	20.8	24.4	25.5	25.9
Residues	Mean	~023	_^¶Aĭ	3.2	4.8	9.3	13.1	21.4	23.9	24.9	26.0
Total	A	¥00.6	≈9 9.0	103.5	98.9	97.1	100.4	100.6	96.2	95.2	94.7
Recovery	B B	105.7	99.5	98.9	99.7	98.2	98.0	98.5	96.7	97.5	93.6
Recovery V	Mean	103.2	99.3	101.2	99.3	97.7	99.2	99.6	96.5	96.3	94.2

n.d.: not detected, n.a.: por analysed, DAT: day after treatment

Table CA 7.1.1.1-3:	Degradation of amidosulfuron in soil L1 under aerobic conditions (values
	expressed as % AR)

Compound	Replicate	DAT									
	No.	0	1	4	7	14	21	40	61	91	118
	А	98.5	96.4	91.2	85.0	70.1	54.7	28.0	12.6	4.6	1.9
amidosulfuron	В	96.7	96.7	92.2	81.7	66.7	50.9	29.4	@4.3	3.5	1.2
	Mean	97.6	96.5	91.7	83.3	68.4	52.8	28.7 °	13.5	4.1	1.5
adesmethyl-	Α	n.d.	n.d.	n.d.	1.1	2.2	3.3	4.8	7.4	° 4.3 🏑	4.2
chloropyrimid	В	n.d.	n.d.	n.d.	0.9	2.4	4.0	53	6Ø)`	5.©″	5.62
ine	Mean	n.d.	n.d.	n.d.	1.0	2.3	3.7	S 10	6. 7	∛5.0	A9
	Α	n.d.	n.d.	1.1	4.4	7.5	。 8.6 🦼	©7.3 s₂	4.2	2.3	J.1
adesmethyl	В	n.d.	n.d.	1.4	4.5	7.10	9.2	8.4	5.4 C)″ 1.9 ≪	J 1.0
	Mean	n.d.	n.d.	1.2	4.4	7.3	8.9	7.9 %	4.8	2,1~>>	1.0
	А	n.d.	n.d.	n.d.	0.9	Č\$.0	\mathbb{Q}	&I ¥∕9	23.1	23,3	24_2
aguanidine	В	n.d.	n.d.	n.d.	1.5	Ø 5.8 💡	7.9	ð 15.4	,≫20.7	24 .7	QB.7
	Mean	n.d.	n.d.	n.d.	1.2	5.4	7.6	[™] 15.1 (21.9	D `24.0	24.0
	А	n.d.	n.d.	n.d.	n.d.	1.0	3,20	6.8	5.6	3.4	1.5
abiuret	В	n.d.	n.d.	n.d.	.∭ď.	~0.7	~3,0	5.9	\$ }	2 A	1.1
	Mean	n.d.	n.d.	n.d.	<u>n.d.</u> ∝	@ Ĩ.1	≪_3.2	~6.3	\$.5	_ Ø /9	1.3
	А	1.0	2.1	1.5	1.7 🐔	1.0	🍹 1.3 🏑 (P1.4	Ø1.4	1.0	n.d.
aADMP	В	1.2	1.3	1.05	1.4%	1.2	n.d. 🏷	0.6	n.d.	0.8	n.d.
	Mean	1.1	1.7	<u></u> ^1,3″	1,5	t ,}≶∕	6 (.7)	10	0.7	0.9	n.d.
	А	n.d.	n.d.	n.d.	On.d.	@ u .d.	n.d.	<u>≈</u> %8	n.d.	n.d.	n.d.
Unknown 1	В	n.d.	n.d.	™n.d.	n.d. '	🏷 0.7 🦼	🖉 n.d. 🚕	n.d.	n.d.	n.d.	n.d.
	Mean	n.d.	n.d.) ⁵	n.d. 🗡	n.d	0.4	n.d🏹	0.4 @	🄊 n.d.	n.d.	n.d.
	А	2.0	168	2	_ K⊅°	2.0°	1:6,	1.00	1.1	1.3	0.7
Impurity	В	1.4	1.6	×1.7	[™] ¶⁄.4	<u>9</u> .1	2.1	~1,7	1.0	0.6	1.1
	Mean	1.7 %	× 1.7 🔉	Q1.9 _	1.6	2.1	ð 1 .9	1.4	1.0	0.9	0.9
Unidentified	А	0.1	0.1	0.3	0.9%	0.1	₹1.5 €	0.5	0.4	0.3	0.8
radioactivity	В	I.V		0.9_	2.4	Q.2Q	0,4	0.2	0.6	0.4	0.1
Tudiouetivity	Mean	@0 .6	(9 %6	<u>0.6 مج</u>	1.6	0.2	<u>k</u> 0/	0.4	0.5	0.3	0.4
Total	A 🧟	\$101.6 ₍	\$ 00.3 A	96.2	995 .7	\$ 9.5	% 1.8	65.5	55.9	40.6	34.3
Extractable	B 🔊	100.5	100.8	* 97.2	93.7	» 86.9 ¢	₩77.5	66.9	53.4	39.9	33.8
Residues	Mean	101.0°	100.6	96,7	84,7	88:2	79.7	66.2	54.7	40.3	34.1
Carbon	ð	n.a.	₹0.1	Ø.3	Q.9	33	6.3	14.2	25.0	n.a.	35.4
Dioxide	B	on.a.	<i>∞</i> ®0.1	S Ø.3	_\$¥.0	~37.1	6.6	15.5	22.7	33.3	37.9
Dioxide	Mean 🖄	🗸 n.a. 🖉	< 0.1 Հ	J 0.3 4	∛1.0 (», 3.2	6.5	14.8	23.9	33.3	36.6
24		n¢a.	<00	< 0.1	< 0,1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
VOC 🔊	~B	10.a.	<@1	_< 0 01	<61	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Mean	, n.a.	≈ 0.1	0.1	(∕< 0.1	< 0.1	< 0.1	n.d.	< 0.1	< 0.1	< 0.1
Non-	A A	0.2	0.7	2.2	₫3.6	7.2	10.8	20.6	19.9	21.4	24.2
Extractable	6 B 🔊	0.2	0.6	2.1	3.6	7.1	12.2	15.3	20.2	22.8	24.1
Residues	Mean	<i>(</i> 0.2	0	2,2	3.6	7.1	11.5	18.0	20.1	22.1	24.2
Tatal	Å	401.7	100.9	28.7	100.2	100.0	99.0	100.3	100.8	95.2 ¹	93.9
Doctor	ζВ	100.6 ·	01.5	¢\$9.5	98.3	97.1	96.3	97.7	96.3	96.0	95.8
Kecovery	Mean	101,2	101,2	99.1	99.2	99.2	97.6	99.0	98.6	95.6	94.9



Table CA 7.1.1.1-4:	Degradation of amidosulfuron in soil L2 under aerobic conditions (values
	expressed as % AR)

Compound	Replicate		DAT								
	No.	0	1	4	7	14	21	40	61	91	118
	А	96.3	90.8	82.5	36.9	14.2	7.6	3.9	1.4	1.2	0.7
amidosulfuron	В	95.1	90.1	80.4	39.0	11.2	4.9	2.6	<i>©</i> Ø.7	0.5	n.d.
	Mean	95.7	90.4	81.5	38.0	12.7	6.3	3.3	U 1.0	0.9	0.4
adesmethyl-	А	n.d.	n.d.	1.4	4.7	10.2	11.3	9.5	8.3	6.7 🎝	4.9
chloropyrimid	В	n.d.	n.d.	2.2	5.7	11.6	11.9	29	<u>8</u> @_`	6. © ″	6.52
ine	Mean	n.d.	n.d.	1.8	5.2	10.9	11.6	<u>_</u> 0%2	8/3	₄ 6.5	5,1
	А	n.d.	3.0	5.0	18.9	10.4	。6.7	1.3 %	1.3	0.6	Sn.d.
adesmethyl	В	n.d.	2.9	5.7	18.3	13.@	4.8	1.5	° 0.9 €)″0.6 ٍ ≪	∫ n.d.
	Mean	n.d.	3.0	5.3	18.6	12,0	5.Q*	1.4	1.1	0.6 \vee	n.d.
	Α	n.d.	n.d.	n.d.	5.4	ල්.7	s,2¥.0	¢2¥.6	~26.3	25.0	26,8
aguanidine	В	n.d.	n.d.	1.8	7.0	©18.0 🖋	22.4	26.9	S 2 8.2	26.1	Q7.2
	Mean	n.d.	n.d.	0.9	6.2	17.3	21.7	<u>° 25.7 (</u>	<u>م 27.2 را</u>	Ų26.6 ′	\$27.0
	Α	n.d.	n.d.	n.d.	10	1.5	n.d.	n.d.	n.d.♥	n.d	n.d.
abiuret	В	n.d.	n.d.	n.d.	<u>.</u> @.8	\sim 1.2	sn.đ.	n.d.	11. G2	0.00	n.d.
	Mean	n.d.	n.d.	n.d.	0.9	@1.4	≰ n.d.	An.d.	M.d.	Ø/3	n.d.
	A	3.5	2.9	2.0	8.2	» 1.9 (1.2 k	P 1.4	On.d.	n.d.	n.d.
aADMP	В	2.8	3.0	265	4. <i>3</i>	2.20	0.7**	n.d	0.5	0.7	n.d.
	Mean	3.2	3.0	2,3	6.2	2 21∀	9	00	0.3	0.3	n.d.
	A	n.d.	n.d.	n.d.	©ľ.6	@a.d.	n.d.	s m.d.	n.d.	n.d.	n.d.
Unknown 1	В	n.d.	n.d.	∫≫n.d.	1.4	∀n.d. 🔬	©0.6 ~	b ^{n.d.}	n.d.	n.d.	n.d.
	Mean	n.d.	n.c	n.d.	1.5	n.d	0.3	" n.d. 🖉	/ n.d.	n.d.	n.d.
- ·	A	1.6	1.8	27			1.4.2	2.10	1.7	0.8	1.5
Impurity	В	1.3	<u>ا ا م</u>		×2%.0	₽9			1.1	1.1	1.5
	Mean	1.4 %	× 1.5	<u>1.9</u>	1.6	1.6	Q ^{4.9}	1.9	1.4	1.0	1.5
Unidentified	A	0.3	0.3		3.1%	2.6	^v 0.7 (€	0.7	0.4	0.2	1.1
radioactivity	В			0.	1.5%	0.42	1.5	0.2	0.1	0.6	0.5
	Mean	@9 .2	W .2	<u>0.5</u>	2.3	1.5	KU	0.4	0.3	0.4	0.8
Total	A a	101.8	9 8.8 4	93.7	081.1	Ø8.8	\$0.3	43.4	39.4	36.7	35.0
Extractable	B ~	99.2	97.4	° 94.6	79.9 @	0 60.0	¥48.7	42.0	39.7	36.6	35.6
Residues	Mean	100.5	98:1	94,1	80.5	<u>59.</u>	49.5	42.7	39.6	36.6	35.3
Carbon	Ø	n.a.	A.H	9,9	6.8	209	28.3	36.8	39.4	41.3	42.8
Dioxide	B	O ^{n.a.}	0 0.1		~J.3	201°.7	29.1	35.4	39.3	41.3	43.1
	Mean	🛚 n.a. 📉	0.1	⊎° 1.0 ″	∛7.1 🥳	22.3	28.7	36.1	39.3	41.3	42.9
ja se		n¢a.	<00	< 0.1	< 0,15	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
VOC ()	ૣૼૡૺૺૢ૾ૺૻ	Da.	<@#1	୍ଟ ହୋ	< 6,1	0.3	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Mean	n.a.	_<0.1	~ 0.1	K 0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Non-	A K	° 0.3 _{≪C}	¢ 1.3 🦼	3.6) ″7.2	12.4	18.4	15.3	15.7	15.0	17.5
Extractable	B	0.3	1.3	4.6	7.2	11.0	16.7	17.3	16.6	14.1	16.1
Residues	Mean	<i>_</i> 0.3	13	4.1	7.2	11.7	17.5	16.3	16.1	14.6	16.8
Total	<u>A</u>	502.1	£00.2	° 28 .3	95.1	94.1	96.9	95.6	94.5	93.0	95.3
Recovery	ωВ	99.5	98.8	K\$100.3	94.4	93.0	94.4	94.7	95.6	92.0	94.8
	Meanू∅	100,8	99,5	₽ 99.3	94.7	93.6	95.7	95.1	95.0	92.5	95.1

n.d.: not detected n.a.: not analysed DAT: dather treatment

Table CA 7.1.1.1- 5:	Degradation of amidosulfuron in soil M under aerobic conditions (values
	expressed as % AR)

Compound	Replicate					DA	4T				
	No.	0	1	4	7	14	21	40	61	91	118
	А	97.2	90.8	87.2	78.1	67.8	50.6	31.9	20.1	9.8	7.4
amidosulfuron	В	95.1	90.0	89.3	80.6	65.2	55.4	35.2	Ø8.6	10.7	7.7
	Mean	96.2	90.4	88.2	79.4	66.5	53.0	33.6 °	19.3	10.3	7.5
adesmethyl-	А	n.d.	n.d.	0.4	0.8	4.5	6.5	10,5	11.4	12.0	10.3
chloropyrimid	В	n.d.	n.d.	n.d.	1.2	4.0	5.6	1,000	1300	10\\$	10.2
ine	Mean	n.d.	n.d.	0.2	1.0	4.3	6.1	0 7.2	12.1	41.4	10.2
	А	n.d.	0.6	1.9	3.5	3.0	。3.2 🥡	[©] 3.6 ⊳,	3.9	2.0	<u>\$</u> 2.3
adesmethyl	В	n.d.	1.0	2.1	3.1	3.90	3.9	3.2	″ 2.8 C	້ 2.5 🖔	<i>J</i> ັ 1.7
	Mean	n.d.	0.8	2.0	3.3	3.4	3.5	3.4√	3,3	2,3	2.0
	А	n.d.	n.d.	0.7	2.1	5.6	s 8.3	¢16⁄.4	27.3	23,9	21,6
aguanidine	В	n.d.	n.d.	0.8	2.4	Ø4.8 👷	7.9	A4.5	,⊜∦7.7	Q1.6	\$Q1.7
	Mean	n.d.	n.d.	0.8	2.3	5.2	8.1	15.4	17.5	D [°] 22.7 <i>"</i>	32.7
	А	n.d.	n.d.	n.d.	1.0	n.O	2,40	2.8	1.6	1.2	1.1
abiuret	В	n.d.	n.d.	n.d.	.∭ď.	1.4	2,6	1.5	2)+	10	0.8
	Mean	n.d.	n.d.	n.d.	ð.5 ∝	○Ŭ. 7	× 2.0	~2.2	_Qř.8	A .1	1.0
	А	2.3	3.0	2.2	2.4 🐔	ي 3.8 🖉	🍹 9.0 ₆ (P ⁻ 7.4	08.6	8.6	9.7
aADMP	В	2.7	3.0	205	1.6	4.1	5.7 🏷	6.7	10.8	10.7	10.1
	Mean	2.5	3.0	2A	2,0	3.9%	7 .4	70	9.7	9.7	9.9
	А	n.d.	n.d.	n.d.	Ø.9	_@¥.5	Q.4	<u>,</u> ¥\$∕0	<u>, 1</u>	1.0	1.0
Unknown 1	В	n.d.	n.d.	™n.d.	1.1 4	🏏 1.4 🦼	©1.5 _≈	ð ⁷ 2.4	A.9	0.9	0.7
	Mean	n.d.	n.d	n.d.>>	1.0	1.4	1.9~	[♥] 2.7 @	ž 1.5	1.0	0.8
	А	1.9	1¢7	N/	⊾‱	1. 1.	1:0,7	Q.90	1.6	1.5	1.2
Impurity	В	2.0	2.4	×1.6	[™] ¶%.1	¥.5	J.M.S	~ <u>1</u> ,0	0.9	1.2	1.2
	Mean	1.9 %	ັ້ 2.0 🔉	\bigcirc 1.6	1.4	1.5	1.2	1.0	1.3	1.3	1.2
Unidentified	А	0.3	0.1	0.9	0.6%	0.7	₹LOQ	0.9	1.1	0.7	1.1
radioactivity	В	< EQQ	00	0.	0. 9 %	2.42	2,3	0.5	1.0	< LOQ	1.7
Indiodetivity	Mean	Ø.1	\$ %.3	0.8ھ	0.7	1.5	1.2	0.7	1.1	0.3	1.4
Total	A 🔬	ST01.7 🖉	9 6.2 🛛	<i>9</i> 4.8	91 .1	8 8.2	~% 3.4	77.3	66.7	60.7	55.8
Extractable	B 🔊	99. 8	97.0	[∞] 96.4	92.1	» 88.7 ¢	∦ 85.3	75.0	68.7	59.4	55.8
Residues	Mean	100.8 °	96:6/	95,6	91.6	88:5	84.4	76.2	67.7	60.1	55.8
Carbon	ð	n.a.	⊴0.1	Ø,Y	Q.3%	Q9	1.6	4.4	7.1	10.6	12.3
Dioxide	B .	Ôn.a.	÷0.1	QO .1	D .3	~D:0	1.8	4.0	n.a.	n.a.	12.2
DIOXIde	Mean 🔊	r̃n.a.≪	ୖ୕< 0.1୍ଛ	₽°0.1 ′	Q0.3	0.9	1.7	4.2	7.1	10.6	12.3
		nca.	< 0	< 0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
VOC VOC	ð	n.a.	<@1	୍ଟ୍ୟୁଆ	$< 6 1^{\nu}$	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
	Mean	n.a.	_ <0.1	0.1	(∕≤ 0.1	< 0.1	0.1	< 0.1	< 0.1	< 0.1	< 0.1
Non-	A A	0.5	1.7	4.8	€6.7	9.7	14.2	18.2	23.4	24.9	28.8
Extractable	Б В 🎊	0.5	1.7	4.8	6.0	10.1	13.7	19.1	23.3	26.3	29.6
Residues	Mean	@0.5	13	4.8	6.4	9.9	13.9	18.6	23.4	25.6	29.2
Tetal ⁰	A	402.1	88.0	° 29 .7	98.1	98.9	99.2	99.9	97.2	96.2	96.9
lotai	βB	100.4	98.7	≪ ¥01.3	98.4	99.7	100.9	98.2	99.2 ¹	96.3 ¹	97.6
Recovery	Mean	101,3	98,3	100.5	98.3	99.3	100.1	99.0	98.2	96.3	97.2

n.d.: nov detected n.a.: not analysed $\mathcal{D}AT$: date treatment ¹ including ¹⁴ \mathcal{O}_2 value of replicate (A)

B. MATERIĂL BALANCE

Mean material balances were 98.6% AR (range of 94.2 to 103.2% AR) for soil V, 98.6% AR (range of 94.9 to 101.2% AR) for soil L1, 95.8% AR (range of 92.5 to 100.8% AR) for soil L2 and 99.1% AR (range of 96.3 to 101.5% AR) for soil M.

C. EXTRACTABLE AND NON-EXTRACTABLE RESIDUES

Extractable residues decreased from DAT-0 to DAT-118 from 102.8 to 42.3% AR in soil V, from 101.0 to 34.1% AR in soil L1, from 100.5 to 35.3% AR in soil L2 and from 100.8 to 55.8% AR in soil M.

Non-extractable residues decreased from DAT-0 to DAT-118 from 0.3 to 26.0% AR in soil V, from 0.2 to 24.2% AR in soil L1, from 0.3 to 16.8% AR in soil L2 and from 0.5 to 29.2% AR in soil M.

D. VOLATILES

The maximum amount of carbon dioxide was 25.9, 36.6, 42.9 and 12.3% AR at study end (DAFA18) in soil V, L1, L2 and M, respectively. Formation of volatile organic compounds was insignificant as demonstrated by values of $\leq 0.2\%$ AR at all sampling intervals for all soils.

E. DEGRADATION OF PARENT COMPOUND

The amount of amidosulfuron in the soil extracts decreased from DAT-0 to DAT-1.19 from 98.9 to 4.5% AR in soil V, from 97.6 to 1.5% AR in soil L1, from 95.7 to 94% AR in soil L2 and from 96.2 to 7.5% AR in soil M.

Three major transformation products reaching wells of more than 10% AR and two more metabolites reaching more than 5% AR but less than 10% AR were identified and quantified in this study:

Metabolite amidosulfuron-guanidine (BCS-CO41839) was the prostinent degradate. It increased to levels of up to 27.0% AR. In all soft this component had reached a plateau level at the end of the study.

Metabolite amidosulfuron-desmethyl (ALF F101630) transiently reached up to 18.6% AR. In all soils it reached its maximum levels within the Dirst three weeks of the study and afterwards clearly decreased.

Depending on soil, metabolite and dosul furon-desinethyl-chloropy imidine (BCS-CO41838) reached its highest levels (maximally 12.2% AR) between DAT-21 and DAT-61. Subsequently its concentrations decreased towards the end of the study

Metabolite amidosulfuron XDMP (AE F092944) increased in soil M until study end to max. values of 9.9% AR. In contrast, in the other soils it was detected only transiently.

The minor metabolite amidesulfuror biuret (BCS-CQ51287) was detected transiently with up to 6.3% AR in soil L1 and up to 4.9% AR in soil V. In the other two soils it reached only very minor amounts.

Depending on soil, one or two very monor components designated Unknown 1 (max. 2.7% AR) and Unknown 2 max. 10% ARS were transiently detected. They were quantified throughout the study but were not structurally identified.

Amide sulfuror ADHP (AE F) 4206 was used in the present study as reference substance to compare with the detected components. It did not co-elute with one of the degradates of amidosulfuron in this study.

In addition to these metabolites an impurity, already present in the application solution, was detected in all soils. Throughout the whole study its concentrations stayed more or less unchanged between 0.9% AR and 2.1% AR and did not co-elute with another component observed in the study.

The total of unidentified residues amounted to a maximum of 3.8% AR and no single component exceeded 2.7% AR at any sampling interval in any soil.

 $\widehat{\bigcirc}$

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

The degradation of amidosulfuron followed single first order (SFO) kinetics in soils L1 and L2 and / first order multi compartment (FOMC) kinetics in soils V and M based on lowest chi² error values and visual assessments of fits. The DT₅₀ value of amidosulfuron under aerobic conditions was 23.1, 22.1, 5.7 and 24.5 days in soil V, L1, L2 and M, respectively.

F. Comparison of Identified Metabolites in the Present and the Study ; 1989; M-122934-01-1 (KCA 7.1.1.1/01): Partial Revision of Assignment of Structures to Metabolites

The structure assigned to the major chromatographic peak originally designated component A' had to be revised. No degradate of the chemical structure originally proposed for component 'A' was detected. Since no reference material for AE F128870 was available (chemical winthesis of proposed structure failed) its chromatographic behaviour could not be investigated within the two HPLC methods. Instead, in the present study the major peak with a chromatographic behaviour similar to component 'A' of previous study by 1989; MA22934-Q-1 (KCA 7.1 (1/01)) as isolated and the structure of the substance unambiguously elucidated as being amidosulforon-guoridine (BCS-CO41839), which could be synthesized to serve as a reference? Moreover, a structure reassignment of component 'A' in the earlier studies now to amidosulfuron-guaniding is clearly supported by the close similarity in kinetic behaviour of component 'A' is the study by ; 1**289**; M-122934-01-1 (KCA 7.1.1.1/01) and of amidosulfuron-guanidine in the present study. The former assignment of component 'A' to the structure of AE F1288 therefore has to be regarded as erromeous and was indirectly disproven within this study.

Also the structure assigned to the major chromatographic peak originally designated component 'E' had to be revised. No peak with a recention time of AE 1569309 was detected throughout the whole study. As clearly shown in the present study using both HPLC methods, AE 1569309 reference material did not co-elute with anyof the components observed in this study. The former assignment of component 'E' to the structure of AE 1569309 therefore was disproven within this study¹. Therefore, the peak with a chromatographic behaviour similar to component 'E was isolated and the structure elucidated as being amidosulfuron desmethyl-chloropyrimitine (BCS-CO41838) using LC-MS/MS including accurate mass determination. Additionally, the identity of a.-desmethyl-chloropyrimidine was confirmed in the soft extracts by HPLC-co-chromatography with synthesized authentic reference item (radio-labelled).

The structure assigned to the major chromatographic peak originally designated component 'B' was clearly confirmed. Metabolite amidosulfuron-desmethyl (AE F101630) was identified by HPLC co-chromatography in two independent methods and by HPLC-MS/MS after isolation from extracts. Moreover, the structural confirmation of component B' in the earlier studies is clearly supported by the similar kinetig behaviour of component B' in the study by ; 1989; M-122934-01-1 (KCA 7.1.1.1/01) and of amicosulfuron-despecthyl in the present study (i.e. in both studies this major metabolite increased very quickly in soil L2 and then decreased slower).

Original aim of the study was to revestigate, if a component with a similar chromatographic behaviour as component 'D' observed in the previous study by ; 1989; M-122934-01-1; (KCA

¹ The structure of AE₄1569309, would have well fitted into the earlier soil pathway, as logical precursor metabolite to AE F128870. However, that precarsor proposal was wrong (see before). Proposed structure AE 1569309 was observed as a metabolite in the ration well identified by NMR and FAB-MS with molecular ion visible there. Further, plant metabolite M3 had previously been proposed to be AE 1569309 based on HPLC/MS in a preliminary test. Experimentally linking soil metabolite E to plant metabolite M3 via chromatogram comparison indicated similar relative retention factors. However, no spike & co-elution experiment had been performed due to the time elapsed between the studies, and no direct reference material comparison was to be run for metabolite E, since AE 1569309 could not be synthesized. Later, a minimal quantity of authentic AE F1569309 could be made via biosynthesis using bacteria and soil fungi. The authentic AE F1569309 indicated similar relative retention factors compared to that seen earlier from soil extract component 'E', but not any spike & co-elution testing was possible, due to time elapsed between the studies. In conclusion, the earlier structure assignment was very plausible, but never unambiguously confirmed by any experiment.

7.1.1.1/01) would be observed again using comparable soils and study conditions. In the study M-122934-01-1 component 'D' eluted between components B and E, very close to component 'E'. At later stages it was poorly separated from 'E' and was observed as a peak shoulder of component 'E'. In the study M-122934-01-1 component 'D' accumulated to maximum values of 8.8% AR with highest values between day 20 and day 70.

When applying an HPLC method identical with the optimized method of **Mathematical**; 1989; M-122934-01-1; (KCA 7.1.1.1/01), the sequence of metabolites in the chromatograms of the present study was the same as in the Till study. Thus in the present study such a peak would have been expected in the chromatographic region between metabolites amidosulfuron-desmethyl and amidosulfuron-desmethylchloropyrimidine, directly before amidosulfuron-desmethyl-chloropyrimidine. Throughout the whole study repeat, no candidate peak with similarities to component 'D' was visible in the chromatograms of all four soils.

Since in the study M-122934-01-1 (KCA 7.1.1.1/01) component 'D' co-eluted with component 'E' at the later stages, it was checked if this could have been the case in the present study, too. Therefore, the isolated radioactive peak for desmethyl-chloropy midine was investigated for purity using three different HPLC methods: In each case only a single pure component was observed.

III. CONCLUSIONS

Amidosulfuron was rapidly to well degraded and well mineralized in soik under acrobic conditions in the laboratory in the dark. The calculated best fit DT_{50} values were between 5 2 and 24.5 days in the tested soils.

Formation of carbon dioxide was significant (up to 42.9% AR) at study end indicating the potential for a complete mineralization of aminosulfuron and its degradation products.

L,

Using soils and conditions, comparable to the study 1989; M-122934-01-1; (KCA 7.1.1.1/01) the absence of two formerly proposed metabolites were demonstrated by state of the art analytical methodology and five degradation products overe identified with the following maximum occurrences: amidosulfuron-desmethyl-chloropyrimidule with 12.1% AR, amidosulfuron-desmethyl with 18.6% AR, amidosulfuron-guandine with 32.7% AR, amidosulfuron-biuret with 6.3% AR and amidosulfuron-ADMP with 9.9% AR.

Formation of non-extractable tesidues (NER) was up to 29.2% AR at study end, which is an indication for biotic degradation of am dosulfuron.

The structure of the metabolite designated component 'A', with the formally proposed structure of AE F128870 was chapped to the structure of BCS-CO41839 (amidosulfuron-guanidine).

The structure of the metabolite designated component 'E', with the formally proposed structure of AE 1569309 was changed to the structure of amidosulfuron-desmethyl-chloropyrimidine (BCS-CO41838).

A minor metabolity formerly designated as component 'D' (study M-122934-01-1, KCA 7.1.1.1/01) was not detected in the present study.

In a supplement to the aerobic soil degradation study by (2010; M-366012-01-1 (KCA 7.1.1.1/09) a clarification of the non-detect of any compound which could be assigned to the former component "C" is given.

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Report:	KCA 7.1.1.1/10; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Title:	Amidosulfuron - Supplement to the study MEF-09/687 - [pyrimidyl-2-14C]AE
	F075032 (Amidosulfuron): Aerobic soil metabolism/degradation
Report No.:	MEF-11/032
Document No.:	M-400350-01-1
Guideline(s):	not specified
Guideline deviation(s):	not specified
GLP/GEP:	no star star

In the study M-122934-01-1 (KCA 7.1.1.1/01) component 'C' eluted between components 'B'and 'E', very close to component 'B'. The peaks of 'B' and 'C' were sufficiently separated, although not on the baseline, and 'C' was observed on the peak tailing of B'. In the study by Til component 'C' rapidly accumulated to maximum values of 7.7% AR with highest values between day 3 and day 14/21.

M

When applying an HPLC method identical with the optimized method of Till the sequence of metabolites in the chromatograms of study ; 2010; M-366012-01, 1 (KCA 7.1.15709) was ; 1989; M-122934-01-1, (KČX 7.1.1.1/01), Thus, in the present the same as in the study study such a peak would have been expected in the chromatographic region between the tabolites a.desmethyl and a.-desmethyl-chloropyrimidine directly behind a.-desmethyl. Throughout the study repeat, a very minor candidate peak with a retention time similar to component 'C' was visible in the chromatograms of one of four soils. However, the overall behaviour of this peak, occurrence in different soils, maximum abundance, time course of formation and decline, was clearly different from that of component 'C' in the study of Oll (KCA 7.1.10/01).

Since in the study M-122934-012 (KCA 7.1.1.101) component 'C' envied in the peak tailing of component 'B', it was checked if 'C' could have been hidden behind a.-desmethyl. The isolated radioactive peak for a.-desmethyl way investigated for purity using three different HPLC methods: alkaline using boric acid buffer, acidified using H₂SO₄ and HPLC method applied for LC-MS analysis, acidified using formic acid. In each case only a single pure component was observed.

Although not explicitly stated in the study report, the methods applied in the study M-366012-01-1 (KCA 7.1.1.1/09) were also able to detect component "(S) and, if present at significant levels, to elucidate its structure. However, no merabolite with a behaviour similar to that described for component "C" in the study M-

366012-01-1 KCA 7 J.1.1/0 Was abserved >

Two further studies on metabolism of amidosulfuron in two extreme soils (loam with 0.5% OC, clay with 34% (02), dated 1991 could fot be traced in the baseline dossier for undocumented reason. For completeness, they are therefore machine on supplemental dossier level and are summarized in analogy the procedures for new studies (KCA 7.1.1.1/11 and KCA 7.1.1.1/12). These studies do not provide any additional pathway information.

KČA 7.1.1.1711; 1991; M-130546-01-1
Kinetics and metabolism in sandy clay loam SCL(E) under aerobic conditions at an
application rate of 0.06 mg kg-1 Hoe 075032-14C
A46507
M-130546-01-1
yes

Executive Summary

The route and rate of degradation of $[2-^{14}C]$ -amidosulfuron was studied in one soil under aerobic conditions in the laboratory in the dark at 20 ± 2 °C and 40% of the maximum water holding capacity for 100 days:

Soil	Source	Texture (USDA)	рӉ҈Ѻ	OM [%]
E (SCL)	Brenes, Spain	loam	5.8	0.9

A study application rate of 0.06 mg/kg soil dry weight was applied based on a field application rate of 0.045 kg/ha.

The mean material balance was 97.6% AR. The maximum amount of carbon dioxide was 12.7% AR at study end.

Extractable residues decreased from DAT-0 to DAT-100 from 97.7 to 66 AR. Non-expractable residues (NER) increased from DAT-0 to DAT-100 from not detectable amounts to 16.6% AR.

Ô

The amount of amidosulfuron in the soil extract decreased from DAF0 to DAF100 from 97.7 to 46.2% AR.

Besides the formation of carbon dioxide, one degradation product AE F101630, was identified with a maximum occurrence of 7.0% AR at study end (DAT-100). One unidentified metabolite amounted to a maximum of 13.1% AR at study end and was identified as BCS-CO40839 in a later study (KCA 7.1.1.1 /09).

First order kinetics were observed for the aeroble degradation of amidesulfuron with a DT₅₀ value of 95 days.

I. MATERIALS AND METHODS

- A. MATERIALS
- 1. Test Item

[pyrimidyl 2, ⁴C]amidosulfaron Sample ID: HOE 075032 00 ZE99 0003 Specific Activity: 2.60 MBq/mg Radiochemical Purity ×98% Chemical Purity: not reported

A

2. Fest Soil

The study was carried out using one soil (see Table CA 7.1.1.1-1). The test soils were used in fresh condition and sieved to a particle size ≤ 2 mm.

Parameter		Re	esults / Unit	ts
Soil Design	ation		E (SCL)	
Geographic	Location			4
City			Brenes	
Country			Spain 💊	Ş
Textural Cl	ass (USDA)		loam 🔊	ř,
Sand	$[50 \ \mu m - 2 \ mm]$		37.8%	Ĩ
Silt	[2 µm – 50 µm]	~~°	3840%	\sim
Clay	[< 2 µm]	Ű	24.2%	Y Y
pН		å Ö	°7.4 ∢	, V
Organic Ma	atter	U L	⁷ 0.9%	Ż
Cation Excl	hange Capacity [meq/106)g		16.0	
Water Hold	ling Capacity		م ² 7.3% م	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
USDA: Unit	ed States Department of Agric	mure 🔬	, <u> </u>	Š

Table CA 7.1.1.1- 6:Physico-chemical properties of test soil

B. STUDY DESIGN

1. Experimental Conditions

The test system for degradation in solution aerobic conditions consisted of 250 mL Erlenmeyer flasks, fitted with trap attachments (permeable for exygen) containing sorta line for absorption of $^{14}CO_2$ and glass wool coated in paraffin for adsorption of volatile organic compounds.

For preparation of the test systems, 50° dry worght equivalents of the preved soils were weighed into each test vessel and the soil moisture was adjusted to 40% of the maximum water holding capacity (MWHC). The test vessels were then equilibrated at 20 °C in the dark.

The study application rate (SAR) was approximately 0.66 mg per kg soil dry weight. The test item was applied dropwise on the soil surface of the respective test systems in 300 μ L acetone. Soil moisture was adjusted to 40% MWHC for the individual test vessels.

The test systems were incubated in the dark for 100 days at 20 ± 2 °C. Soil moisture was adjusted every seven days if necessary

2. Sampling

Nine sampling intervals were distributed over the entire incubation period of 100 days. Duplicate samples were processed and analysed 0, 3, 5 14, 21, 35, 49, 70 and 100 days after treatment (DAT). Microbial soil biomass was determined at start and end of the study.

0

3. Analytical Procedures

Ô

Carbon dioved absorbed by soda lime was liberated with hydrochloric acid and trapped in methoxyethanol/ethanolamine (34), v/v). The radioactivity content was determined by liquid scintillation counting (LSC).

The glass wool coated with paraffin oil of the trap attachments were extracted with benzene/propan-2ol (2/1; v/v) to desorb VOC. The radioactivity content was determined by LSC.

At each sampling interval the entire soil of each test system was extracted at ambient temperature using acetonitrile/water 4/1 (ν/ν). After centrifugation, the remaining soil was re-extracted until less than 2% of the applied radioactivity was found in the extract. The radioactivity content of the soil extracts was determined by LSC.

The soil extracts were concentrated and analysed by reversed phase HPLC/radiodetection. The limit of quantitation (LOQ) for HPLC/radiodetection analysis of the soil extracts was at least 1% AR as shown by the smallest quantifiable peak.

The exhaustive extracted soils were dried and non-extractable residues were determined by combustion/LSC.

Test item and main degradation products were identified by HPLC co-chromatography with reference items.

The degradation kinetics of amidosulfuron was determined assuming first order kinetics.

II. RESULT AND DISCUSSION

Results indicated that the anticipated standardized conditions were maintained over the duration of the laboratory study. The results showed that the selected soil was viable.

A. DATA

 Table CA 7.1.1.1-7:
 Degradation of amid@sulfuron in soil Funder acrobic conditions (values expressed as % AR)

		d	0. ^v . (>	× .	4, 4	∿O″	AC "		
Compound	Replicate	,O	× . Ô	Ŭ, Ĉ		DAŤ	Y R	Q″		
	No.	0	3	, Z	14	20	35	49	70	100
amidosulfuron	Mean	97.7	\$6.3	95.1	<i>2</i> 0.2	86.2	80.2	68.3	62.7	46.2
adesmethyl	Mean	n.d.	n.d.	n.d.	ي 1.0 گ	2.6	4.3	5.3	5.1	7.0
aguanidine 1	Mean	n:ek:	p.d.	n.d.	n.d.)	n.d.	n.d.	5.3	9.0	13.1
Unidentified	X	nt.d.	Ma.d.	<u>()</u> .ď.	ød.	nxd.	n.d.	n.d.	n.d.	n.d.
radioactivity	B ∧	n.d.	n.d.	n.d.	Sn.d.	"m.d.	n.d.	n.d.	n.d.	n.d.
Tauloactivity	Mean	n.d. 🖓	n.d 🖉	n.d.	n.d.న	, n.d.	n.d.	n.d.	n.d.	n.d.
Total Extractable		97381	9638	95 \$ 9	91,30	89.71	83.19	78.44	76.59	65.87
	B	97.51	96.26	94090	9ħ.00	87.97	85.74	79.38	77.01	66.92
Kesidues Ø	Mean "	97.7	96.3	~95.1	@91.2	88.8	84.5	78.9	76.8	66.4
	🖉 A 🐇 .	n.d.	n.d.🦳	0.22	0.70	1.88	4.46	6.53	9.60	13.13
Carbon Divoxide	BOY	n.	n.dØ	0.1%	0.73	1.62	3.04	6.20	10.38	12.25
	Mean	n.d.	n.d.	@.2	0.7	1.8	3.8	6.4	10.0	12.7
	A a	Nn.d.	"(n.d.	(Dn .d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
VOCô	🖉 B 🐇	🏹 n.d. 🤇	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	Mean	n.d	n.d. 🖓	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Neg Estre stable	A	n.d.	3:40	3.58	7.34	6.32	10.85	11.60	10.89	15.87
Non-Extractable	B	Ĝø.d.	.≪₩.d.	n.d.	6.48	8.02	9.21	11.98	12.19	17.30
Residues	»Mean	n.d.🔊	© 1.6	1.8	6.9	7.2	10.0	11.8	11.6	16.6
		97.8m	99.48	99.19	99.41	97.91	98.50	96.57	97.08	94.87
Total Recovery	B	97.51	96.26	95.07	98.21	97.55	97.99	97.56	99.58	96.47
A A	Mean	97.7	97.9	97.1	98.8	97.7	98.2	97.1	98.3	95.6

n.d.: not detected AT: day after treament

¹ identified in a later study (KCA 7.1.1.1 /09)

B. MATERIAL BALANCE

The mean material balance was 97.6% AR (range of 95.6 to 98.8% AR).

C. EXTRACTABLE AND NON-EXTRACTABLE RESIDUES

Extractable residues decreased from DAT-0 to DAT-100 from 97.7 to 66.4% AR.

Non-extractable residues decreased from DAT-0 to DAT-100 from not detectable amounts to 16.6% AR.

D. VOLATILES

The maximum amount of carbon dioxide was 12.7% AR at study end (DAT-100). Formation of volatile organic compounds was not detected at all sampling intervals.

E. DEGRADATION OF PARENT COMPOUND

The amount of amidosulfuron in the soil extract decreased from DAT-0 to DAT 100 from 97 to 46.2% AR.

One degradation product, AE F101630, was identified with a maximum occurrence of 7.0% AR at study end (DAT-100). One unidentified metabolite amounted to a maximum of 03.1% AR at study end and was identified as amidosulfuron-guanidine (BCSCO41839) in a later study.

III. CONCLUSIONS

Amidosulfuron was moderately degraded in soil under acrobic conditions in the park in the laboratory. The calculated half-life was 95 days in the tested soil. The major degradation products amidosulfuron-desmethyl (AE F101630) and amidosulfuron-guanidine (BCSCO41839) were formed.

Report:	KCA 7.1.1.1/12, 1990, M-13085-01 C
Title:	Kinetics and metabolism in sitt loam SU under aerobic conditions at an application
	rate of 0.06 mg kg Hoe 075032-146
Report No.:	A46547 8 0 0 V
Document No.:	M-130585-01-0 × ×
Guideline(s):	
Guideline deviation(s):	
GLP/GEP:	Aves & Q

Executive Summary

The route and rate of degradation of [2, C]-approximation was studied in one soil under aerobic conditions in the laboratory in the dark at 20 ± 2 °C and 40 - 60% of the maximum water holding capacity (40% MWHO from study star), at DAT-13 adjusted to 60% MWHC) for 100 days:

°~	л ^у л		\sim .			
Soil/		Source		Texture (USDA)	pН	OM [%]
Š	۵۶ Sp	akding, Great	Britain	clay	6.4	20.0
0, 3	00		28			

A study application rate of 0.06 mg/kg soil dry weight was applied based on a field application rate of 0.045 kg/ha.

The mean material balance vas 98.59 AR. The maximum amount of carbon dioxide was 6.1% AR at study end.

Extractable residues decreased from DAT-0 to DAT-100 from 94.4 to 55.8% AR. Non-extractable residues (NER) increased from DAT-0 to DAT-100 from 3.4 to 34.9% AR.

The amount of amidosulfuron in the soil extract decreased from DAT-0 to DAT-100 from 94.4 to 19.6% AR.

Besides the formation of carbon dioxide, one degradation product, amidosulfuron-desmethyl (AE F101630), was identified with a maximum occurrence of 20.4% AR at DAT-49, slightly

decreasing towards study end. One unidentified metabolite amounted to a maximum of 12.5% AR at study end and was identified as amidosulfuron-guanidine (BCS-CO41839) in a later study (KCA 7.1.1.1/09).

First order kinetics were observed for the aerobic degradation of amidosulfuron with a DT_{50} value of 45 days.

I. **MATERIALS AND METHODS** A. **MATERIALS** 1. **Test Item** [pyrimidyl-2-¹⁴C]amidosulfuron HOE 075032 00 ZE99 000 Code No.: Specific Activity: 2.60 MBq/mg > 98% Radiochemical Purity: Chemical Purity: not reported 2. **Test Soil** Table CA Th The study was carried out using one soil (see condition and sieved to a particle size ≤ 2 mm Physico-chemical properties of test soft Table CA 7.1.1.1-8: **Parameter**[®] Results / Units Ô'n sť. Soil Designation Geographic relation City palding Country Great Britain Pextural Class clay Sand 8.4% 80 uma© mm ŜĩĦ [2 µm)² 50 um 36.4% 55.2% Clav [⊲́́́Ω um 7.4 hΗ Organic Matter 20.0% Cation Exchange Capacity [meg/100 g] 73.6 81.6% Water Holding Capacity Department of Agriculture DAOUnited States

B. STUDY DESIGN

1. Experimental Conditions

The test system for degradation in soil under aerobic conditions consisted of 250 mL Erlenmeyer flasks, fitted with trap attachments (permeable for oxygen) containing soda lime for absorption of ${}^{14}\text{CO}_2$ and glass wood coated in paraffin for adsorption of volatile organic compounds.

For preparation of the test systems, 50 g dry weight equivalents of the sieved soils were weighed into each test vessel and the soil moisture was adjusted to 40% of the maximum water holding capacity (MWHC). The test vessels were then equilibrated at 20 $^{\circ}$ C in the dark.

The study application rate (SAR) was approximately 0.06 mg per kg soil dry weight. The test item was applied dropwise onto the soil surface of the respective test systems in 300 μ L acetone. Soil moisture was adjusted to 40% MWHC for the individual test vessels. At DAT-13 the soil moisture was adjusted to 60% MWHC.

The test systems were incubated in the dark for 100 days at 20 ± 2 °C. Soil moisture was adjusted every seven days if necessary.

2. Sampling

Nine sampling intervals were distributed over the entire incubation period of 100 days. Duplicate samples were processed and analysed 0, 3, 7, 14, 21, 35, 49, 50 and 100 days after treatment (DAT). Microbial soil biomass was determined at start and end of the study.

3. Analytical Procedures

Carbon dioxide absorbed by soda lime was liberated with hydrochloric acid and trapped in methoxyethanol/ethanolamine (3/1; v/v). The radioactivity content was determined by liquid scintillation counting (LSC).

The glass wool coated with paraffin oil of the trap attachments were extracted with betweene/propan-2ol (2/1; v/v) to desorb VOC. The radioactivity content was determined by LS.

At each sampling interval the entire soft of each test system was extracted at ambient temperature using acetonitrile/water 4/1 (ν/ν). After centrifugation, the remaining soil was re-extracted until less than 2% of the applied radioactivity was found in the extract. The radioactivity content of the soil extracts was determined by LSC.

The soil extracts were concentrated and analysed by reversed phase HPC/radiodetection. The limit of quantitation (LOQ) for HPCC/radiodetection analysis of the soil extracts was at least 1.9% AR as shown by the smallest quantifiable peak.

The exhaustive extracted soils were dried and non-extractable residues were determined by combustion/LSC.

Test item and main degradation products were identified by HPLC co-chromatography with reference items.

The degradation kinetics of amidosulfuror was determined assuming first order kinetics.

II. RESULT AND DISCUSSION

Results indicated that the anticipated standardized conditions were maintained over the duration of the laboratory study. The regults showed that the selected soil was viable.

- ... results showed the

A. DATA

Table CA 7.1.1.1- 9:	Degradation of amidosulfuron in soil E under aerobic conditions (values expressed
	as % AR)

Compound	Replicate		DAT							
	No.	0	3	7	14	21	35	4 9	70	100
amidosulfuron	Mean	94.4	86.6	86.6	83.6	69.2	55.3	₽ 46.0	°35.0 "	19.6
adesmethyl	Mean	n.d.	1.9	5.0	7.5	13.7	19.3	20.4	19.5	18,1
aguanidine ¹	Mean	n.d.	n.d.	n.d.	n.d.	_o n.d.	3.8	. 8	10.4	JZ.5
Unidentified radioactivity	Mean	n.d.	n.d.	n.d.	n.d	n.d	n.d	n.d.	n.d.	5.7
Total Extractable Residues	A B	93.81 94.95	87.78 89.15	91.68 91.58	88,24 Ø4.01	82,30 83.24	78.65 78.36	72,76 Dr.62	64655 65:32	54.66 \$7.00
		94.4	88.5	91.0	~ 91.1 "(0.65	172		5 12	2 ×33.8
Carbon Diovida	A P	nd	n.d.	11.64.	0.23°	0.04	1.75	3.23	5.12	5.54 677
Carbon Dioxide	Mean	n.d.	n.d.	n.d.	0.2	0407	1.80	3,2	5.20 5.2	6.1
	А	n.d.	n.d 🔊	n.d.	⁹ n.d.	0 n.d. (k	n.d.	n.d.	Sn.d.	n.d.
VOC	В	n.d.	n.dÔ)	n.d.	n.do	n.d.	n.d.	🕈 n.d. 🖉	n.d.	n.d.
	Mean	n.d.	p.d.	n.d.	n.€D [≫]	n.d.	n,d	n.d.	n.d.	n.d.
Non-Extractable	А	3.47	7.68	8.24	1 4.27	13:56	19,13	28,34	27.97	34.49
Residues	В	3.42	P, 7.83 🏾	7.45	1.62 s	∉3.18 ٍ	@ 7.70	Q2.83	28.06	35.26
Residues	Mean	3.4	° 7.8⊘	7.8 Ø	12.9	13.4	18.4 ×	23.1	28.0	34.9
	A	97.28	95.46	99.92	102,74	96,7*	99:51	99.33	97.64	94.49
Total Recovery	В	Ø 8.37	96.98	99.03	105.86	97,06	97.86	97.71	98.58	99.03
	Mean	≫97.8 _{&} ≉	96.3	K 99.4	Q04.2	-Q6.9	\$98.7	98.5	98.1	96.8

n.d.: not detected , DAT: day after treatment

¹ identified in a later study (KCA \$2.1.1 /09)

B. MATERIAL BALANCE

The mean material balance was 98.5% AR (range of 96.3 to 104.2% AR).

C. EXTRACTABLE AND NON-EXTRACTABLE RESIDUES

Extractable residues decreased from DO T-0 to DAT-100 from 94.4 to 55.8% AR.

Non-extractable residues decreased from DAT-0 to DAT-100 from 3.4 to 34.9% AR.

D. VOLATILES

The maximum amount of carbon digeride wave. 1% AR at study end (DAT-100). Formation of volatile organic compounds was not detected at all sampling intervals.

E. TOEGRADATION OF PARENT COMPOUND

The amount of amidosulfaton in the soil extract decreased from DAT-0 to DAT-100 from 94.4 to 19.6% AR.

One degradation product, amidosulfuron-desmethyl (AE F101630), was identified with a maximum occurrence of 20.4% ÅR at DAT-49 and slightly decreasing towards study end (DAT-100). One unidentified metabolite amounted to a maximum of 12.5% AR at study end and was identified as amidosulfuron-guanidine (BCS-CO41839) in a later study.

III. CONCLUSIONS

Amidosulfuron was well degraded in soil under aerobic conditions in the dark in the laboratory. The calculated half-life was 45 days in the tested soil. The major degradation products amidosulfuron-desmethyl and amidosulfuron-guanidine were formed.

A brief overview summary of metabolite abundances across above studies is p Table CA 7.1.1.1-10.

Table CA 7.1.1.1-10	Abundance ranges for degradation	products of	amidosulfuron in	aerobic soil [% of
	applied]. Maximum values are mar	ked bold / 🛈	nderlined. 🏾 🖉 🕜	

Study		K	CA		КСА	KCA	KKA	Ô	🥉 К	CA		KCA	KCA
Reference		7.1.1	.1 /01		7.1.1.1 /02	7.1.1 /04	7.1.0.1 /05	Ø	7.1.1	9 207	Ô	7.1.1.1 /11	7.1.1.1 /12
Soil designation and type	SLV sandy loam	S 2.1 sand	LS 2.2 loamy sand	SL 2 silt loam	SCL sandy s clay loan	Birkenheide sandy loan	LS 2,29 loamy sand	V sandy Itram	LÍ Sand	L2 sand	M loam	loam	SL clay
Temperature °C	20	20	20	20	20	Å20		20	270	20	20	20	20
Adesmethyl	15.6	16.5	<u>49.6</u>	7.0	5.2	8.4 🏑	40 X	5.0	∦8.9	18.0	3.5	7.0	20.4
Aguanidine	24.2	7.9	15.0	258	16.6	<u>38:6</u>	28	26,1	24.0	27.2	22.7	13.1	12.5
Adesmethyl- chloropyrimidine	8.6	14.3 ¹	9.1	10/4	n [°] zd	×10.8	O ^{n.d.}	6.8	6.¢	11.6	12.2	n.d.	n.d.
Abiuret	n.d.	n.d.	n.d.	n.d.	Ch.d.	n.d.	n.d	6.1 ²	<u>6.3</u>	1.4	2.2	n.d.	n.d.
AADMP	n.d.	n.d.	n.d.	n.¢	n.d. C	n.d	n.d.	20)	1.7	6.2 ²	<u>9.9</u>	n.d.	n.d.
CO ₂	8.8	2.9	10.7	1 O 3	46.6	20.4	3.6	25.9	36.6	42.9	12.3	12.7	6.1
NER	31.9	32.	<u>45.5</u>	28.7	٢٩.2	\$26.8	36.3	26.0	24.2	17.5	29.2	16.6	34.9

n.d. = not detected

¹ metabolites "D" and "E" rot resolved

² single value

Applying the trigger values specified in Regulation 1107/2009, it is concluded that the following components should be considered relevant for risk assessment: Amidosulfuron (AE F075032), amidosulfuron desmethyl (AE F101630), amidosulfuron-desmethyl-chloropyrimidine (BCS-CO41838), amidosulfuron-guanidine (BCS-CO41839), amidosulfuron-biuret (BCS-CQ51287), and amidosulfuron-ADMP (AP F092944).

CA 7.1.1.2 Anaerobic degradation

Studies subpurted and evaluated for the first inclusion of amidosulfuron on Annex I:

The degradation behaviour of antidosulfuron in soil under anaerobic conditions in the dark in the laboratory was southed in one soil using radiolabelled test item, and was considered acceptable during the original EU review for Annex I inclusion of amidosulfuron (EFSA scientific report 2007, 116, 1-86). The following south is included in the baseline dossier. No additional studies are submitted in the context of application for approval renewal.

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Report:	KCA 7.1.1.2/01; ; 1992; M-137874-01-1	
Title:	Hoe 075032-14C Anaerobic soil Metabolism	
Report No.:	A48777	
Document No.:	M-137874-01-1	
Guideline(s):	USEPA (=EPA): § 162-2	
Guideline deviation(s):	not specified	Ra
GLP/GEP:	yes	

EFSA peer review conclusion (2007): Data on anaerobic degradation in soil (Jaboratory 20%) indicated that amidosulfuron was more persistent than under aerobic conditions and formed the metabolite AE F094206 at up to 10.9%AR, that was not observed in significant amounts in the available aerobic experiments. Under anaerobic conditions muteralisation of the pyrioiding ting-t-C-radiolabel to carbon dioxide was negligible.

The List of EU Endpoints (rev. 3, December 2010) states the following information:

Half-life of amidosulfuron > 300 days Metabolites:

Amidosulfuron-ADHP (AE F094206) Amidosulfuron-desmethyl (AE F091630) 14.5 % 60 days after flooding)

No changes to these information are proposed in the context of approval renewal.

CA 7.1.1.3 Soil photolysis

Son photolysis

Studies submitted and evaluated for the first inclusion of amidosulfuron on Annex I: The degradation behaviour of amidosulfuron on soil surface under photolytic conditions in the laboratory was studied in two soil using radiolabelled test item, and was considered acceptable during the original EU review for Annex I inclusion of amidosulfuron (EFSA scientific report 2007, 116, 1-86).

The following studies are mcluded in the baseline dossier. No additional studies are submitted in the context of application for approval renewal.

Report: 🚫 🚫	KCAO [*] .1.1.3/ ⁽⁰⁾ ; ; 1989; M-123337-01-1
Title:	Hoe 075032-14C Playodegredation on Soil
Report No.:	A 0582 A O
Document No.:)M-123\$3/7-01-1@"
Guideline(s); Y	
Guideline devlation	
GLP/GE	yes O W
S'a.	
Report a	KCA (7)1.1.3/0(2) (100 ; 2003; M-230615-01-1
Title:	Am Cosulfuçõr (AE F075032): Soil photolysis
Report No.:	CJ 983
Document No.:	M-230645-01-1
Guideline(s):	SETAC: 1; 2; USEPA (=EPA): FIFRA/530/09-90-078
Guideline deviation(not specified
GLP/GEP:	yes

EFSA peer review conclusion (2007): photolysis would not be expected to contribute significantly to the degradation of amidosulfuron under field conditions.

Ø 1

The List of EU Endpoints (rev. 3, December 2010) states the following information:

Photolytic degradation on soil surface can be considered of minor importance for the elimination of amidosulfuron.

No changes to these information are proposed in the context of approval renewal

CA 7.1.2 Rate of degradation in soil

CA 7.1.2.1 Laboratory studies

CA 7.1.2.1.1 Aerobic degradation of the active substance

Amidosulfuron was found well degraded in soil under aerobic conditions in the laboratory. To implement new experimental data on parent and metabolites, and new guidance for kinetic evaluation of experimental data, an update of the overall pathway kinetic evaluation was made (KCA 7.4.2.1.1/18 and KCA 7.1.2.1.2/12). An overview of the DT_{50}/DT_{90} and formation fractions of amidosulfuron and its major degradation products under aerobic conditions in the Taboratory is provided in Table CA 7.1.2.1.1-1 and Table CA 7.1.2.1.1-2 below for details reference is made to the individual study summaries.

Table CA 7.1.2.1.1- 1:	Overview of	soil degradation	non-pormalised	and wormalised	DT 50/90	values for	,
		\mathcal{Q}	″ <i>"</i> {"	~0 ~(.*			
	amidosulfuro	on and its metabol	ites based on lab	oratory studies.			

Compound	🛛 📎 🗘 abo	oratory Aerobic (Conditions
	DT 59	→ DT ₉₀	DT ₅₀
	j [days]	🔨 [days]	20 °C pF2/10kPa
	<u> </u>		[days]
amidosulfuron	18.0 ×	£ [*] 59.6	14.4
adesmethyl (AE F10163		41.6	10.8
adesmethyl-chloropyrimidine (BCS-CO41838)	, 79,0	223	59.8
aguanidine (BCS-COA1839)	Ø90 Ö	> 1000	399
abiuret (BCS-CQ5 🖓 87)	×30.7 ×	102	26.0
aADMP (AE F092944)	22.9	75.7	19.3

Table CA 7.1.2.1.1 2 Compilation of formation fractions for the formation of metabolites in aerobic soil

	J W	0 *	\checkmark			
N S		Formati	on fraction			
	Andiadosulfuron	Amidosuffiction → Aridosuffiction → AADMP & Q	Amidosulfuron → Intermediate compartment	Intermediate → A desmethyl- chloropyrimidine	Intermediate → A Guanidine	Intermediate \rightarrow A Biuret
Minimum	0.151	0.095	0.489	0.215	0.387	0.104
Maximum	0.674	0.147	0.702	0.314	0.731	0.286
Arithmetic mean 🔊	0.291	0.121	0.564	0.268	0.539	0.193

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



Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron



This experimental study was provided as part of the confirmatory data submission, and is found summarised and evaluated in the "Addendum to Monograph prepared in the context of post Annex I procedure (new Annex II data)", Dec. 2010, rev. 1 Feb. 2011. Upon request by the RMS the study is re-submitted for approval renewal as formally "new information", and summary and discussion is available in the present document MCA above, please refer to point KCA 7.1.1.1/09.
Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Report: Title:	KCA 7.1.2.1.1/12; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
	F075032 (Amidosulfuron): Aerobic soil metabolism/degradation
Report No.:	MEF-11/032
Document No.:	M-400350-01-1
Guideline(s):	not specified
Guideline deviation(s):	not specified
GLP/GEP:	no

This supplemental discussion to the data of study KCA 7.1.1.1/09 west generated as part of the confirmatory data submission, and is found summarised and evaluated in the "Addendum to Monograph prepared in the context of post Annex I procedure new Amex II data", Dec. 2010, rev. 1 Feb. 2011. Upon request by the RMS the study is re-submitted for approval renewal as formally "new information", and summary and discussion is available in the present document MCA under point KCA 7.1.1.1/10.

Report:	KCA 7.1.2.1.1/13; 2010; M-360784-03-1
Title:	Kinetic evaluation of laboratory aerobic soil degradation
	of amidosulfuron and its metabolites on four soils
Report No.:	MEF-09/696
Document No.:	M-360784-03-1
Guideline(s):	not applicable χ^{γ} χ^{γ} χ^{γ} χ^{γ} χ^{γ} χ^{γ}
Guideline deviation(s):	not applicable
GLP/GEP:	no Q' Q' L' L' L' L' L'

This modelling report was provided as part of the confirmator data submission, and is found summarised and evaluated in the Adder dum to Monograph prepared in the context of post Annex I procedure (new Annex II data", Dec. 2010, rev. Feb. 2011.

In context of the present opplication for approval renewal, this evaluation is superseded by a new evaluation KCA 7.1.2.1 18 which was made to implement additional data and to update for latest guidance document recommendations. Therefore, no summary and discussion is included here.

Report: Title: Krietic exfluation of laboratory aerobic soil degradation of amidosulfuron and its

Report No.: Guideline(s): Guideline deviation(s): GLP/GEP: Metabolites different soils MEF 09/712 M-360772-014 M-360772-014 Met applicable Met applic

This modelling roort was provided as part of the confirmatory data submission, and is found summarised and evaluated in the Addendum to Monograph prepared in the context of post Annex I procedure (new Annex) I data Dec. 2010, rev. 1 Feb. 2011.

In context of the present application for approval renewal, this evaluation is superseded by a new evaluation KCAS. 1.2.1. 1.2.1. It has that was made to implement additional data and to update for latest guidance document recommendations. Therefore, no summary and discussion is included here.

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Report:	KCA 7.1.2.1.1/15; ; 2010; M-387660-01-1
Title:	Amendment to the Kinetic evaluation of laboratory aerobic soil degradation of
	amidosulfuron and its metabolites
Report No.:	MEF-10/540
Document No.:	M-387660-01-1
Guideline(s):	not applicable
Guideline deviation(s):	not applicable
GLP/GEP:	no

This modelling report was provided as part of the confirmatory data submission, and is found summarised and evaluated in the "Addendum to Monograph prepared of the context of post Aprex I procedure (new Annex II data", Dec. 2010, rev. 1 Feb. 2011.

In context of the present application for approval renewal, this evaluation is superseded by a new evaluation KCA 7.1.2.1.1/18 that was made to implement additional data and to update for latest guidance document recommendations. Therefore, no summary and discussion is included here.

New studies (non EU-evaluated) submitted in context of Abnex Lapproval renewa

Report:	KCA 7.1.2.1.1/16; 57 (1990; M-13@346-01)
Title:	Kinetics and metabolism in sandy clay loom SCL(E) under aerobic conditions at an
	application rate of 0.06 mg kg 1 Hoe 075032-14C
Report No.:	A46507
Document No .:	M-130546-01-10 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
Guideline(s):	
Guideline deviation(s):	
GLP/GEP:	yes S S

Experimental study, summarised and discussed before under point KCA 7.1.1.1/11 of this document. Data of this study has been considered in the overall pathway kinetic evaluation KCA 7.1.2.1.1/18.

Assuming first order limetics the DT_{50} value of amidosulfuror and erobic conditions was 95 days and the corresponding DT_{90} was 314 days.

	>/ ⊗/ h		// % //		
	DT		Rate constant k	Regression factor r	
Soil 👋 🕅	[days]	© [days]♡	°⊈days ⁻ r]		
E (SCL)	<i></i> €95 ≪	314	⁷ -0.0073	-0.994	
	L'A	, S	K O		
\$(Q V		*****		
- A		L S	. Õ¥		
Report: 🔬	KC	7.1.2⊱Q.1/17	; 🕺 ; 1991; M	-130585-01-1	
Title:	- Kir	netics and meta	🏘 lism in silt loam S	L under aerobic condition	ns at an application
The second secon	🕖 🖉 Örate	e of 0,06 mg kg	g-1 Hoe 075032-14C		
Report No.: A	′ ~ ~ A4	6547 ~			
Document No.:	<u> </u>	130585-01-1			
Guideline(s):	_~~~ -O				
Guideline deviat	ion(s):	10%			
GLP/GEP:	yes	ł			
	(Charles)				

Degradation kinetics of any dosultin on in soil E under aerobic conditions

Experimental study, summarised and discussed before under point KCA 7.1.1.1/12 of this document.

Assuming first order kinetics the DT_{50} value of amidosulfuron under aerobic conditions was 45 days and the corresponding DT_{90} was 150 days.

Degradation kinetics of amidosulfuron in soil SL under aerobic conditions

Soil	DT ₅₀ [days]	DT90 [days]	Rate constant k [days ⁻¹]	Regression factor r
SL	45	150	-0.0153	-0-996

According to the OECD 307 guidance, soils used in degradation studies should be covering a range of relevant agricultural soils (as an example sandy loam, silty loam, loam or loamy sand are mentioned). For the organic matter, OECD 307 recommends to use soils with an 0° content between 0.5 and 2.5%. As both the taxonomic class (clay soil) and properties (20% organic matter, equivalent to 34% organic carbon) of the test soil used in this study considerably deviate from these recommended by the guidance, the data from this study was excluded from the overall pathway kinetic evaluation KCA 7.1.2.1.1/18 to derive kinetic information for modelling purposes.

Data of this study has been considered in the overall pathway whetic evaluation KCA 7, 1.2.1. 18

Report:	KCA 7.1.2.1.1/18; Q016; Q553089-01-1
Title:	Amidosulfuron (AMS) and metabolites Kinetic evaluation of degradation in soil
	under aerobic laboratory conditions 🧳 🖉 🖉
Report No.:	EnSa-16-0100
Document No.:	M-553089-01-10 4 4 4 7 10 10 10 10 10 10 10 10 10 10 10 10 10
Guideline(s):	none i a si no a c
Guideline deviation(s):	none N N N
GLP/GEP:	no x x x x x x
Executive Summany	

Executive Summary

A kinetic analysis of soil fesidue data from the perobic soil degradation studies M-122934-01-1, M-130544-01-1, M-202744-01-1, M-138644-01-1, M-138645-01-2 (Baseline Dossier, KCA 7.1.1.1/01, KCA 7.1.1.1/02, KCA 7.1.1.1/04, KCA 7.1.2.1.1/03 and KCA 7.1.2.1.2/04), M-366012-01-1 and M-130546-01-1, (Supplemental Dossier, KCA 7.1.1.1/09 and KCA 7.1.1.1/11) was performed with the software KinGU(2.1 according to FOCUS kinetics (2014) to derive half-lives for amidosulfuron and its degradation products amidosulfuron-desmethyl. (AE F101630), amidosulfuron-desmethyl-chloropyrinneline (BCS-CQ51287) and amidosulfuron-ADMP (AE F092944), which are suitable for environmental risk assessments (trigger endpoints) and modelling.

Only the results for amidoculfuron are described here. The results for the degradation products are reported in section A 7.1(2.1.2) (KOA 7.1(2.1.2)/1.2/12) of this document.

Single First order was the most appropriate kinetic model to describe the degradation process in all studied soils

The DT_{50} values (trigger endpoints) for amidosulfuron range from 2.26 to 97.6 days, with a geometric mean of 18.0 days. The normalised (20 °C, pF2) modelling endpoints range from 2.26 to 68.0 days with a geometric mean of 14.4 days.

I. METHODS

Soil residue data from the aerobic soil degradation studies (1989; M-122934-01-1, 1991; M-130544-01-1, 2001; M-202744-01-1, 1993; M-138644-01-1, 1993; M-138645-01-1 (Baseline Dossier, KCA 7.1.1.1/01, KCA 7.1.1.1/02, KCA

7.1.1.1/04, KCA 7.1.2.1.1/03 and KCA 7.1.2.1.2/04), **2010**; 2010; M-366012-01-1 and **2010**; 1991; M-130546-01-1, (Supplemental Dossier, KCA 7.1.1.1/09 and KCA 7.1.1.1/11) were used. In these studies, the degradation of amidosulfuron was studied in various soils covering different soil types under aerobic conditions in the dark in the laboratory for up to 120 days at 20 °C, and test concentrations of 45 to 68 g a.s./ha.

The kinetic analysis was performed according to FOCUS kinetics (2006, 2014) using the software KinGUI 2.1 with four different kinetic models: single first order, first order multi compartment, hockey-stick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each campling interval. Time zero values of parent/applied substances were set to sum of all measured residues/material balance. Consequently, time zero values of respective metabolites were set to zero. Free fitting the initial amount of the parent and fixing the initial amount to 0 for metabolites was used.

The selection of the most appropriate kinetic model was based on a detailed statistical analysis including visual assessment, χ^2 statistics, randomness of residuals, and t-test significance following the FOCUS guidance (2006, 2014).

The modelling DT₅₀ values were corrected to p2 and an ambient temperature of 20°C

Ô

Single first order (SFO) was the most appropriate kinetic model for the degradation of amidosulfuron in all soils. Table CA 7.1.2.1.1-3 summarises the results of the kinetic analysis.

RÉSUI

Table CA 7.1.2.1.1- 3:	Kinetic parameters for the degradation of anidosulfuron in soils under aerobic
	conditions for the gas and model the nurness according to FOCUS
	conductions for togger and modeling purpose accepting to FOCUS

			\bigcirc	- i	/ 0. ~	3 0 V			
Study	Soil type	H	Kinetic	IOT 50	Der 90	DT 50 20 °C	e-error	t-test	Visual
	(name)	~~~~~~ ,		Jaays	Buays	ØF2/10kPa For Idays]	[%0]		Assessment -
		4				[uujs]			
KCA 7.1.1.1/01	Sandy loam	5.5	SFO	21:0	69.9	19.1	6.16	< 0.001	+
KCA 7.1.2.1.1/01	Loamy Sand	5.9 ³	SFO ~	31.0	©103	21.7	4.77	< 0.001	+
M-122934-01-1	Loamy Sand	5.0 ³	SFO	2,26	7.50	2.26	2.51	< 0.001	+
	Silt loan (SL	376 3	STO 2	21.8	72.5	17.0	7.69	< 0.001	+
KCA 7.1.1.102	Qay loam	7.4 4	SFQ O	19.3	64.1	13.8	6.76	< 0.001	+
KCA 7.1.2.1.1/02	SCL FY	Ô							
KCA 771.1.1/11	Loand (SCL	§7.4 ⁴	SFO	97.6	324	68.0	1.73	< 0.001	+
KCA 7.1.2.1.1416 M-130546-01-1	S ^{™E)}		4						
KCA 7.1.2.1.1/03	Sandy Qam	5.8 ³	SFO	24.5	81.5	20.2	3.29	< 0.001	+
M-138644-01-1 ≫	(SKVII)	0							
KCA 7.1.2.1.2/04	Leam (LEA	7.2 ³	SFO	16.6	55.3	12.7	2.95	< 0.001	+
M-138645-01-1	Silt loam (LEA II)	6.2 ³	SFO	19.4	64.3	12.6	10.3	< 0.001	+
KCA 7.1.1.1/04	Sandy loam	6.0 ³	SFO	9.52	31.6	7.10	6.96	< 0.001	+
KCA 7.1.2.1.1/05 M-202744-01-1	(LS)								

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

KCA 7.1.1.1/09	Sandy loam	5.8 ³	SFO	24.1	80.1	20.3	2.58	< 0.001	+
	(V)								
KCA 7.1.2.1.1/11	Sand (L1)	6.1 3	SFO	22.1	73.3	22.1	2.60	< 0.001	+
M-366012-01-1	Sand (L2)	5.6 ³	SFO	5.70	18.9	5.70	15.6	< 0.001	+
	Silt loam (Leland)	5.7 ³	SFO	26.4	87.8	19.1	3.00	<0.001	+
Geometric mean	(Leidild)			18.0	59.6	14.4	L.	۰ ۰	2

¹ SFO: single first order

² visual assessment: + = good

³ Measured in CaCl₂

⁴ Medium for the measurement of soil pH not stated

III. CONCLUSIO

The DT₅₀ values (trigger) for amidosulfuron range from 2.26 to 97% days, with a geometric mean of 18.0 days. The normalised (20°C, pF2) modelling endpoints range from 2.26 to 68.0 days with a geometric mean of 14.4 days.

Note: for a statistical evaluation on pH dependence of soil half the please refer to KCA 7.1.2.1.2 /03; there is no significant correlation.

CA 7.1.2.1.2 Aerobic degradation of metabolites, breakdown and reaction products

An overall summary of the laboratory degradation rates of amides alfuron including its degradation products relevant for assessment in soil was aheady provided in section CA 7.1.2.1.1, the same experimental and modelling studies apply for the present chapter. An updated overall kinetic evaluation covering both parent and metabolite was presented under point KCA 7.1.2.1.1.

Studies submitted and evaluated for the first inclusion of amidosulfuron on Annex I: Studies submitted and evaluated in the course of the post-Annex I procedure for amidosulfuron: New studies submitted for Annex I approval renewal:

same as listed for point A 7.1.2.1.1 above.

One additional experimental study under data point CA 7.1.2.1.2 is provided in the context of application for approval renewal, to Derive soil half-live information for component Amidosulfuron-ADHP (AB-F094206) as a required by Commission Regulation (EU) 283/2013 for degradates exceeding groundwater togger concentration in lysimeter leachate. In this experiment, radiolabelled Amidosulfuron ADHP was dosed directly to the test soils.

Report:	KCA 7.1.2.1.2/11; ; 2016; M-551583-01-1
Title:	2-Amino-4,6-dihydroxy-[2-14C]pyrimidine - Aerobic degradation in four soils
Report No.:	S14-00506
Document No.:	M-551583-01-1
Guideline(s):	OECD Test Guideline No. 307
	Commission Regulation (EU) No 283/2013 in accordance with Regulation
	(EC) No 1107/2009
	US EPA OCSPP Test Guideline No. 835.4100 / 835.4200 0
Guideline deviation(s):	none
GLP/GEP:	yes a v

Executive Summary

The rate of degradation of [pyrimidine-2-¹⁴C]amidosulfuron (AE F094206) was studied in four soils under aerobic conditions in the dark in the laboratory for 60 days at 20 ± 2 C and $55 \pm 5\%$ of the maximum water holding capacity.

			,7
Soil	Søwrce 🔪 🔬 Texture	pH	OC
			[%]
Laacher Hof AXX (AX)	Monheim am Rhein, Germany dooamy and	\$5.4	1.8
Dollendorf II (DD)	Blankenhein Germany Y Clay Joam	₽ 7.3	5.2
Hoefchen am Hohenseh 4a (HaH)	Barscheid, Germany 🔬 Sill loam	6.0	2.4
Laacher Hof Wurmwiese (WW)	Monheim and Rhein, Germany Sandy loam	5.1	2.1
1			

 $^1\,\text{pH}$ value was derived from aqueous 0.01 M GaCl2 suspension

A nominal study application rate of 35.56 µg test item/50 gooil dry veight was applied.

Mean material balances were in the range from 90.6 to 102.2% AR (for soil AX), 91.5 to 104.6% AR (for soil DD), 90.5 to 101.2% AR (for soil Hall) and 92.7 to 103.4% AR (for soil WW).

The maximum amount of carbon dioxide was 210° , 18.9° 22.9 and 23.3% AR at study end (DAT-60) in soil AX, DD, HaH and WW, respectively. Formation of volatile organic compounds (VOC) was insignificant as demonstrated by values of < 0.1% APC < LOD at all sampling intervals for all soils.

Extractable residues decreased from DAT 0 to DAT-60 from 99.1 to 22.6% AR in soil AX, from 91.9 to 7.5% AR in soil DD from 96.6 to 157% AR in soil PlaH and from 96.7 to 19.4% AR in soil WW. The amount of the test item in the son extracts decreased from 98.8, 90.9, 92.4 and 93.6% of applied amount at study start (DAT-0) to 12.8, 6.2 ¥0.6 and 14.1% of applied amount at study end (DAT-60) in soils AX, DD haH and WW respectively.

Non-extractable residues (NER) increased from DAT-0 to DAT-60 from 3.1 to 50.0% in soil AX, from 8.5 to 78.2% AR in soil DDO from 4.1 to 61.7% AR in soil HaH and from 3.0 to 60.7% AR in soil WW

The experimental data could be beso described by a first order multi compartment (FOMC) kinetic model for soil AX DD and HaH and by double first order in parallel (DFOP) for soil WW. The DT_{50} values of amidood furon ODHP under aerobic conditions were 0.13, 0.01, 0.06 and 0.06 days in soil AX, DD, HaH and WW, respectively. It is concluded that amidosulfuron-ADHP has no potential for accumulation in the soil environment.

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

I. **MATERIALS AND METHODS**

A. **MATERIALS**

1. **Test Item**

[pyrimidine-2-¹⁴C]amidosulfuron-ADHP Code: 2015-002025 Specific Activity: 4.684 MBq/mg Radiochemical Purity: 98.78% Chemical Purity: 96.63%

2. **Test Soil**

2. Test Soil The study was carried out using four different soils (see Table CA 7.1.2).2-1) The sould were taken from agricultural use areas representing different geographica origin and different soil properties as required by the guidelines. No plant protection products were used for the previous 5 years The soils were sampled freshly from the fields (upper horizon of 0 to 20 cm) and sieved to a particle size of ≤ 2 mm. Soil collection and handling were in accordance to ISO-10381-6

S.

Physico-chemical properties of test soils Table CA 7.1.2.1.2-1:

			<u>ki (u</u>	
Parameter A		Results	Units 💭	
Soil Designation	Láacher Hof	Dollendorf	Hoefonen Am	Laacher Hof
C C			_s Hohenseh 4a	Wurmwiese
Geographic Location	JÎÎ 🦘		× Y	
City 🥎 🔊	Monheim 🔍	Blankenheim	Burscheid	Monheim
State 500	North Rhine-	North Rhine+	North Rhine-	North Rhine-
	Westphalia	Westphaha	Westphalia	Westphalia
Country	Germany	Germany	Germany	Germany
GPS Coordinates	N 51° 04.645	N 050 22.785'	N 51° 04.013'	N 51° 04.857'
	E 006° 53 53°	E 006° 42.790'	E 007° 06.305'	E 006° 55.251'
Textural Class (USDA)	Doamy sand	Clay loam	Silt loam	Sandy loam
Sand $[50 \mu\text{m}_{\odot}2 \text{mm}] \bigcirc^{2}$	25%	[∼] 33%	25%	55%
Silt [2 µm y 50 µm]	62% Ø	38%	62%	32%
Clay [<2, im]	J 13%	29%	13%	13%
pH (soil/0.01 M CaCy 1/2)	¥ 54	7.3	6.0	5.1
pH (soil/water 1/1)	<u>(</u>).7	7.4	6.3	5.4
pH (saturated paste)	. 5.7	7.4	6.3	5.4
pH (soil/1 NKC1 1/1)	5.2	7.0	5.7	4.8
Organic Carbon	¥ 1.8%	5.2%	2.4%	2.1%
Organic Watter ¹	3.1%	9.0%	4.1%	3.6%
Cation Exchange Capacity [meq. 190 g]	7.9	20.7	11.1	10.0
Water Holding Capacity				
maximum [g H ₂ Q ad 100 g soil DW]	49.82	77.62	58.49	58.03
at 0.1 bar (pF 20)	15.0%	34.7%	35.3%	23.0%
Bulk Density (disturbed) [g/cm ³]	1.19	1.15	1.02	1.25

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Parameter	Results / Units								
Soil Designation	Laacher Hof AXX	Dollendorf II	Hoefchen Am Hohenseh 4a	Laacher Hof Wurmwiese					
Microbial Biomass [mg microbial carbon per kg soil DW] ²									
Start (BIO-) ³	214.3/251.8	379.2/328.6	304.00349.7	211.0/192.5					
Middle (BIO- / BIO+)	176.3/146.8	362.2/365.1	227. #311.6	134.2/134.8					
End (BIO- / BIO+)	108.5/112.0	327.0/243.1	194.9/146.5	97 3/95.5					

DW: dry weight

USDA: United States Department of Agriculture

¹ % organic matter = % organic carbon x 1.724

 ¹ % organic matter = % organic carbon x 1.724
 ² BIO- samples were left untreated, BIO+ samples were applied with solvent of application solution NH3)).

B. **STUDY DESIGN**

1. **Experimental Conditions**

The static test system for degradation in soil under aerobic conditions consisted of Erlemeyer glass flasks (e.g. 300 mL). Each flask was fitted with a trap artachment (permeable for oxygen) containing soda lime for absorption of carbon dioxide and a PU plug for adsorption of carbon carbon dioxide and a PU plug for adsorption of carbon dioxide and a PU plug for adsorption dioxide adsorpt compounds (VOC).

For preparation of the test systems, 50 gdry weight equivalents of the seved soils were weighed into each test vessel. Soil moisture was adjusted to 55, 5% of the maximum water holding capacity (MWHC) for the individual test systems by addition of de onized water. The test vessels were then fitted with trap attachments and equilibrated to study conditions.

The nominal study application rate (SAR) was 35.56 µg per 50 g sol dry weight. The test item was applied dropwise onto the soil surface of the respective test systems in 155 μ L H₂O (+1% NH₃). After application, the test vessels (except DAT a samples) were fitted with trap attachments.

The test systems were incubated in the tark for 60 days at 21.3 °C and a soil moisture of $55 \pm 5\%\%$ MWHC in a climatic chamber.

2. Sampling

Eight sampling intervals were distributed over the entire incubation period of 60 days. Duplicate samples were processed and analysed 0, 0,04, 0,16, 1, 3, 7, 14 and 60 days after treatment (DAT). Microbial soil biomass was determined at start, middle and end of the study.

Analytical Procedures 3.

Carbon dioxide absorbed by sode lime was liberated with hydrochloric acid and trapped in a scintillation cockbail selective for binding of carbon dioxide using an air-tight assembly. The radioactivity content was determined by fiquid scintillation counting (LSC).

The PU form plugs of the trap attachments were extracted with acetone to desorb VOC. The radioactivity content was determined by LSC.

At each sampling interval the entire soil of each test system was extracted two times at ambient temperature using @ mechanical shaker and H₂O (+1% NH₃) followed by an extraction using a microwave and H₂O (+1% NH₃) at 70 °C followed by an ambient extraction with acetone. After each extraction step, extract and soil were separated by centrifugation and decantation. The volume of each extract was determined and the first and second ambient extract and the microwave soil extract were combined and the volume of this total extract was determined. The radioactivity content of these extracts was determined by LSC.

The exhaustive extracted soils were air-dried, homogenized and non-extractable residues were determined by combustion/LSC.

For quantification, an off-line HPLC fraction collection followed by counting of collected fractions in LUMA plates was used.

The degradation kinetics of amidosulfuron was determined according to FOCLS kinetics (2006) using the software KinGUI 2 with three different kinetic models: single first order, first order multi compartment and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial total recovery at DAT-6 was included in the parameter optimization procedure, but for optimal goodness of fit the value was allowed to be estimated by the model. The best-fit kinetic model was selected on the basis of the chi² scaled-error criterion and on the basis of a visual assessment of the goodness of the fits. DT and DT₉₀ values were calculated from the resulting kinetic parameters.

II. RESULT AND DISCUSSION

Results indicated that the anticipated standardized conditions were maintained over the duration of the laboratory study. The results showed that the spected will was viable.

A. DATA

Table CA 7.1.2.1.2- 2: Degradation of amidosulfuron-ADHP (AF F094206) in soif XX under aerobic conditions (values expressed as AR)

Compound	Replicate	, Ô	- Co	- Y	D	й 🥎	,¥		
_	No.	Ĩ≫0	ام 0.04	0.16 🖉	1 🔍	3	7	14	60
	A 🔬	, 98.8 C	° 53,0 [©]	51 4	227	38.7	24.0	29.7	n.a.
aADHP	В	n.a.	66.0	52.7	°21.8	×40.3	27.7	26.3	13.5
	Mean	<u>98</u> 8	\$9.5	~ 52.0	21.7 /	39.5	25.8	28.0	13.5
Sum of	A	<i>"</i> Ø₽.Š	T 1.1	O`4.9 🔊	14.3	5.2	9.3	6.6	n.a.
Unid./Diff.	ČВ	🖓 n.a. 🦼	7.0 🔬 🧋	4.9	1200	4.9	7.3	7.1	8.7
Residues	🔊 🕅 Mean 🔒	1.5	9.0	40	13:1	5.1	8.1	6.8	4.2
Total Extractable	O'A _N	100.4	6 X 1	56.3	\$6.0	43.9	33.2	36.3	23.0
Pasiduas 1	₿©″	90.1	\$2.9	ð ⁵ 8.2	[∞] 33.7	45.2	34.9	33.5	22.1
Kesiddes , 🦃	Mean	99.1	≈°°68.5	[≫] 57.2⊘	34.8	44.5	34.1	34.9	22.6
	A K	n.a 🔘	0.1	0	4.7	8.3	13.0	12.9	23.2
Carbon Dioxide ²	∾Q̃B O	n.a.O	Q.Ø	0.6	5.7	8.5	11.2	16.6	19.1
	🎽 Mean	na.	0.0	‰∕0.5	5.2	8.4	12.1	14.7	21.2
	Â	~Qn.a.	<i>∲</i> 0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC ²	, ©₿ ´	🗸 n.a. 🖉	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Mean	n.a	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non Extractable	A O'	20~	29%.2	34.0	60.1	45.6	55.6	41.6	50.1
Perioduce 2	B	9.3	18.2	39.3	54.8	40.3	55.6	40.5	50.0
Nesidues	Mean	(, 3.1 A	23.7	36.7	57.4	42.9	55.6	41.0	50.0
	ÅÅ _ℓ	103.40	93.3	90.8	100.7	97.8	101.9	90.8	96.2
Total Recovery ¹	B	104.0	91.2	98.0	94.2	93.9	101.7	90.5	91.2
	Mean	102.2	92.2	94.4	97.5	95.8	101.8	90.6	93.7

n.a.: not analysed, WAT: day after treatment

¹ Difference to Material Batance values due to rounding errors as well as clean up and chromatographic losses.

² Values taken from Material Balance.

Compound	Replicate				DA	Т			
_	No.	0	0.04	0.16	1	3	7	14	60
	А	90.9	27.5	23.8	10.4	10.6	6.3	6.3	6.5
aADHP	В	n.a.	39.1	23.8	13.1	13.3	5.0	5.5	5.8
	Mean	90.9	33.3	23.8	11.8	12.0	. 9.6	5.9	6.2
Sum of	А	1.2	3.9	6.6	7.9	5.6 <	×4.4 ~	°1.1 L	2.8
Unid./Diff.	В	n.a.	4.6	7.5	3.0	2.3	y″ 3.7 🖉	° 2.40″	0.00
Residues	Mean	1.2	4.3	7.1	5.4	3.907	4,0	1,8	1,4
Total Extractable	А	92.1	31.4	30.4	18.3.	16.2	°10.7	£7.8	S 9.3
Residues ¹	В	91.8	43.7	31.4	100	15.6	∕∽9.6	© [∞] 7.9 ູ %	J 5.8
	Mean	91.9	37.6	30.9	√ ¶7.2	A15.9 🖉	🕅 10.2 🕺	7.7, 🏷	7.5
	А	n.a.	0.0	0.3	هي 3.4 هي	0.3 °	21,50	2009	22,2
Carbon Dioxide ²	В	n.a.	0.0	0.0 0.0	j 3.9 j	6.7	13.3	121.8	\$\$.5
	Mean	n.a.	0.0	0.2	3.6	6.5	P].4	<u>,</u> 97.9	\$18.9
	А	n.a.	0.0	Q.D	s 9.0	× 0.0	0.0	0.0	0.0
VOC ²	В	n.a.	0.0	Q.0 /	v 0.0 v	0.0	× 0.0°	0.00	0.0
	Mean	n.a.	0.0 🧹	j 0.0 🔍)້ 0.0 🔬	0.0	0.0	0.0	0.0
Non Extractable	А	8.1	65.5	64,4	70-0	\$ 0,1	65.3	ð 1.2	76.2
Pasiduas ²	В	8.9	50.D	64.5⁄	20.5	75.2	81.4	66.7	80.3
Residues	Mean	8.5	58.0	\$4.3	Ø 10. 7	&77 . 7_	U 73.3	69.0	78.2
	A	100.1	<u>\$</u> 97.0	094.8	91.7	102,6	97	99.6	107.6
Total Recovery ¹	В	100.7 d	94.1 🔊	, 95.9 🏷	91.4	.970	1.04.4	89.4	101.6
	Mean	100. 4 💭	[∞] 95.6	95Ø	<u>94,5</u>	100.1	₽00.9	94.5	104.6

Table CA 7.1.2.1.2- 3: Degradation of amidosulfuron-ADHP (AE F094206) in soil DD under aerobic conditions (values expressed as % AR)

n.a.: not analysed, DAT: day after treatment ¹ Difference to Material Balance values due to rounding errors as well as clean us and chromatographic losses. ² Values taken from Material Balance.

S

T.L. C. 71212 4	D. A.			AF FORMAR		1.*.
1 able CA /.1.2.1.2-4:	Degradation	of amidosult	uron-ADHP	(AVE FU94200) in soll HaH under	' aerobic
	conditions (alues extriness	ed 🌬 % AR)	, A		
	conditions (A					

Compound	Replicate	K,	-¥	<u>Ś</u>	D A	Т			
_	No.	0	0.04	0.10	×,	3	7	14	60
		92.4	50.9	\$5.2	A5.4	30.0	11.3	10.5	11.1
aADHP	BOY	Maa.	\$2.0	A 1.5	≫15.3	27.4	11.7	14.1	10.1
	Mêan	9 2.4	<u>~</u> 52.5 ′	₿ 33.4 @,	15.3	28.7	11.5	12.3	10.6
Sum of	, 🛼 🖌 🌾	3.4	8.7	9:00	6.2	4.8	4.1	5.8	4.5
Unid./Biff.	B O	n.a 🏷	8.8	132	6.1	4.6	4.1	3.8	5.8
Residues 炎	🔊 Mean 🏾	3.4	87	(/ 11.4	6.2	4.7	4.1	4.8	5.1
Total Extractable	Â	\$5.8	61.6	44.8	21.6	34.8	15.4	16.3	15.6
Posiduos	ÂB ·	ý7.4 (60.8	44.6	21.4	31.9	15.8	17.8	15.9
Kesiduęs 🥪	Mean	Š 96.6	61,2	44.7	21.5	33.4	15.6	17.1	15.7
Ŭ,	A X	n a	Q.9	0.2	4.4	6.4	18.5	20.5	22.2
Carbon Dioxide	B	n.	× Ø.0	0.1	5.1	6.8	16.7	19.0	23.5
	Mean	, n.a. 🔈	@ 0.0	0.1	4.7	6.6	17.6	19.8	22.9
	A A	🎽 n.a. 🔿	0.0	0.0	0.0	0.0	0.0	0.0	0.0
VOC	[∞] B ⊲⊘	n.a.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Mean	n .a .	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Non-Extract	Â	A.1	37.3	46.7	64.5	55.9	62.7	65.3	61.9
Pasiduas ²	∆B	4.0	34.3	45.2	64.0	54.8	63.3	63.3	61.5
Residues	Mean	4.1	35.8	46.0	64.2	55.4	63.0	64.3	61.7
	Ο A	99.9	98.9	91.8	90.4	97.2	96.6	102.2	99.7
Total Recovery ¹	В	101.4	95.1	89.9	90.5	93.5	95.8	100.1	101.0
	Mean	100.6	97.0	90.8	90.5	95.3	96.2	101.2	100.3

n.a.: not analysed, DAT: day after treatment

¹ Difference to Material Balance values due to rounding errors as well as clean up and chromatographic losses.

² Values taken from Material Balance.

Compound	Replicate				DA	T			
_	No.	0	0.04	0.16	1	3	7	14	60
	А	93.6	58.2	26.6	11.1	34.9	17.0	20.4	14.3
aADHP	В	n.a.	52.0	37.2	10.9	39.3	1803	23.1	13.9
	Mean	93.6	55.1	31.9	11.0	37.1	J.7	21.8	14.1
Sum of	А	3.4	10.1	30.4	10.7	7.6 <	≫8.1 ≈	°10.9 🗶	, 4.1
Unid./Diff.	В	n.a.	8.7	22.0	16.1	9.6 🖍	y″ 7.3 🖉	`7.7©″	6,62
Residues	Mean	3.4	9.4	26.2	13.4	8.607	7,1	9.3	5,3
Total Extractable	А	97.0	68.2	57.0	21.8°	42.6	~25.1	31.4	₹8.3
Residues ¹	В	96.5	60.7	59.2	200	48.9	~25.6	©30.8 ٍ ×	20.4
	Mean	96.7	64.5	58.1	24.4	45.7	🏷 25.4 📈	J 31.1 🔊	19.4
	А	n.a.	0.0	0.1	م 2.8 گر	P 7.5	16.70	158	22,4
Carbon Dioxide ²	В	n.a.	0.0	0.2 @	3.7	8.	10.2	10.0	24 .3
	Mean	n.a.	0.0	0.1	3@	7.8	4 3.4	<u> </u>	23.3
	А	n.a.	0.0	Q.D	s_ 9.0	× 0.0	0.0	0.0	0.0
VOC ²	В	n.a.	0.0	Q.0 /	v 0.0 v	0.0	× 0.0	0.00	0.0
	Mean	n.a.	0.0 🦼	j 0.0 <)້ 0.0 🔬	0.0	0.0	0.0	0.0
Non Extractable	А	3.2	24.8	32,4	69.9	46,9	50.8	649.9	61.1
Pasiduas ²	В	2.8	37.8	36.5	63.3	35.8	61.9	6 48.0	60.4
Residues	Mean	3.0	3123	\$ 4.5	Ø 6 6.1	% 41.4	56.4 ₂	48.9	60.7
	A	100.2	<u>\$</u> 93.1	©89.5 _	94.5	° 97:Q	92.05	97.1	101.8
Total Recovery ¹	В	99.3 d	ģ 98.5 _॒ ∩	, 96.0 🌂	93.0	.920	90.7	94.8	105.1
	Mean	99.8 ,C	° 95.8℃	92Ø	93,8	9 ¥.8	\$95.2	95.9	103.4

Table CA 7.1.2.1.2- 5: Degradation of amidosulfuron-ADHP (AE F094206) in soil WW under aerobic conditions (values expressed as % AR)

n.a.: not analysed, DAT: day after treatment

n.a.: not analysed, DAT: day after treatment

² Values taken from Material Balance.

B. MATERIAL BALANCE

Mean material balances were in a gange from 90 b to 102,2% AR for soil AX), 91.5 to 104.6% AR (for soil DD), 90.5 to 100.2% AF (for soil HaH) and 92% to 103(4% AR (for soil WW). L 1

EXTRACTABLE AND NON-EXTRACTABLE RESIDUES С.

 \bigcirc

Extractable residues decreased from DAT to DAT-60 from 99.1 to 22.6% AR in soil AX, from 91.9 to 7.5% AR in soil DD, from 96.6 to 15,7% AR in soil HaH and from 96.7 to 19.4% AR in soil WW.

Non-extractable restoues (NOR) increased from DAT to DAT-60 from 3.1 to 50.0% AR in soil AX, from 8.5 to 78.2% AR in soil DD from #1 to 6%,7% AR in soil HaH and from 3.0 to 60.7% AR in soil WW.

D. VODATILES

The maximum appoint of carbon dioxide was 21.2, 18.9, 22.9 and 23.3% AR at study end (DAT-60) in soil AX, DD, HaH and WW, respectively. Formation of volatile organic compounds (VOC) was insignificant & demonstrated by values of < 0.1% AR (< LOD) AR at all sampling intervals for all soils.

DEGRADATION OF PARENT COMPOUND E.

The amount of amidose furnition ADHP in the soil extracts decreased from DAT-0 to DAT-60 from 98.8 to 13.5% of applied amount in soil AX, from 90.9 to 6.2% of applied amount in soil DD, from 92.4 to 10.6% of applied amount in soil HaH and from 93.6 to 14.1% of applied amount in soil WW.

Because this is a rate study, no degradation products were identified.

The degradation of amidosulfuron-ADHP (AE F094206) followed first order in multi compartment (FOMC) kinetics in soils AX, DD and HaH and double first order in parallel (DFOP) kinetics in soil

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

WW, based on lowest chi2 error values and visual assessments of fits. Table CA 7.1.2.1.2- 6 summarizes the best-fit results of the DT₅₀ and DT₉₀ calculations.

Table CA 7.1.2.1.2- 6: Best-fit degradation kinetics of amidosulfuron-ADHP (AE F094206) in soils under aerobic conditions for trigger evaluation according to FOCUS

				a	
	Best-Fit	DT50	DT90	Chi ² Error	。 Visual
Soil	Kinetic Model ¹	[days]	[days])%]	Assessment ²
Laacher Hof AXX	FOMC	0.13	> 1000	₹₽3.42 ×	
Dollendorf II	FOMC	0.01	4.1	J 5.07 V	$A + \Sigma$
Hoefchen am Hohenseh 4a	FOMC	0.06	≈4 6.6	13.52	
Laacher Hof Wurmwiese	DFOP	0.06	Ø 111 R	18,4 0 x	(<i>`</i> **

¹ FOMC: first order multi compartment, DFOP: double first order in paralle ² visual assessment: + = good, o = moderate

III. CONCI

Amidosulfuron-ADHP (AE F094206) was degraded in soll under aerobic conditions in the dark in the laboratory with calculated best-fit half-lives ≤ ∞ days in the te souls

Report: Title:

KCA 7.1.2.1.2/# 2016: M-553089-0 Amidosulfuron (AMS) and metabolites Kinetice valuation of degradation in soil under aerobic laboratory contigions EnSa-16-0100

	under aerobic laboratory conceptions
Report No.:	EnSa-16-0900
Document No.:	M-553089-01-12 0 4 4 5
Guideline(s):	none of the second
Guideline deviation(s):	nope
GLP/GEP:	
	Ĵi de la de
Executive Summary	
A kinetic analysis of so	il desidue data from the acrobic soil degradation studies
122934-01-1,	1991; M-130574-01-1, 2001; M-202744-01-1, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5,
1993; M-138644-01-D	; 1993; M-138645-01-1 (Baseline Dossier, KCA 7.1.1.1/01,
KCA 7.1.1.1/02, KCA	7.1. P.1/04, KCA 7. 2.1.1/03 and KCA 7.1.2.1.2/04), 2010; M-
366012-01-1 and	; 1991@M-130646-01 1/2 (Supplemental Dossier, KCA 7.1.1.1/09 and KCA
7.1.1.1/11) was perform	bed with the software KinGUI 2.1 according to FOCUS kinetics (2014) to
derive half-lives for	amidosulfuror and the degradation products amidosulfuron-desmethyl
(AE F1016 30), and	osulturon-desmethyl chloropyrimidine (BCS-CO41838), amidosulfuron-
guanidine (BCS-CO4)	1839), amidosulfuron-biuret (BCS-CO51287) and amidosulfuron-ADMP
(AE F092944), which	Gre suitable for environmental risk assessments (trigger endpoints) and
modelling. Only the res	ults for the degradation products adesmethyl, adesmethyl-chloropyrimidine,
aguanidine/abiuret a	nd ADMP are described here. The results for the amidosulfuron are reported
in section CA 7.121.1	(KCA 7.1.2.1.1/18) of this document.
÷.	

Single first order was the most appropriate kinetic model to describe the degradation process in all studied soils.

The DT₅₀ values (trigger) range from 7.22 to 23.8 days (geomean: 12.5 days) for a.-desmethyl, from 45.2 to 168 days (geomean: 70.2 days) for a.-desmethyl-chloropyrimidine, from 334 to 697 days (geomean: 490 days) for a.-guanidine, from 20.4 to 68.0 days (geomean: 30.7 days) for a.-biuret and from 4.75 to 166 days (geomean: 22.8 days) for a.-ADMP. The normalised (20°C, pF2) modelling endpoints range from 5.18 to 21.7 days (geomean: 10.8 days) for a.-desmethyl, from 38.1 to 125 days

(geomean: 59.8 days) for a.-desmethyl-chloropyrimidine, from 334 to 520 days (geomean: 399 days) for a.-guanidine, from 14.8 to 57.4 days (geomean: 26.0 days) for a.-biuret and from 4.75 to 120 days (geomean: 19.3 days) for a.-ADMP.

I. **METHODS**

Soil residue data from the aerobic soil degradation studies 1989: M-122934-01-1. ; 1991; M-130544-01-1, ; 2001; M-202744-01-1, 1993. M-138644-01-1, M-138645-01-1 (Baseline Dossier, KCA 7.1.1.1/01, KCA 7.1.1.1/02) KCA 7.1.1.1/04, KCA 7.1.2.1.1/03 and KCA 7.1.2.1.2/04), ; 2010; M-366012-01 and : 1994⊉M-130546-01-1, (Supplemental Dossier, KCA 7.1.1.1/09 and KCA 7.1.1.1/11) were wied. In these studies, the degradation of amidosulfuron was studied in various soils coxering different's fil types under aerobic conditions in the dark in the laboratory for up to 120 days at 20 °C, and test concentrations of 45 to 68 g a.s./ha.

The kinetic analysis was performed according to FOCUS kinetics (2006, 2014) using the software KinGUI 2.1 with four different kinetic models: Single first order, first order wilti compartment, hockey-stick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. Time zero values of parent/applied substances were set to sum of all measured residues/material balance. Consequently, time zero values of respective metabolites were set to zero. Free fitting the initial amount of the parent and fixing the initial amount to 0 for metabolites was used

The selection of the most appropriate kinetic model was based on a detailed statistical analysis including visual assessment, χ^2 statistics, randomness of residuals, and t-test significance following the FOCUS guidance (2006, 2014).

The modelling DT₅₀ values were corrected to pF2 and an ambient temperature of 20 °C.

Single first order (SFO) was the most appropriate kinetic model for the degradation of all degradation 77.2.1.25 to Table CA 7.1.2.1.2- 11 summarise the results of the products in all soils. Table C kinetic analysis

the most appropriate kinet. the constraint of the the theter of the the

Table CA 7.1.2.1.2-7: Kinetic parameters for the degradation of amidosulfuron-desmethyl (AE F101630) in soils under aerobic conditions for trigger and modelling purpose according to **FOCUS and formation fractions**

Study	Soil type (name)	рН	Kinetic Model ¹	DT50 [days]	DT90 [days]	f.f.	DT50 20 °C pF2/10kPa [days]	St. (χ ²)
KCA 7.1.1.1/01	Sandy loam (SL V)	5.5 ²	SFO	23.8	79.0	Į.	21.7 O	18.00
KCA 7.1.2.1.1/01 M-122934-01-1	Loamy Sand (LS 2.2)	5.0 ²	SFO	14.4	47.9 ∘ پ	Ø.674		9.6 3
KCA 7.1.1.1/02 KCA 7.1.2.1.1/02 M-130544-01-1	Clay loam (SCL F)	7.4 ³	SFO	7.22 5	24.0 S	0.185	15918 °	23.3
KCA 7.1.1.1/04 KCA 7.1.2.1.1/05 M-202744-01-1	Sandy loam (LS)	6.0 ²	SFO *	چ 10.2 مې	933.9	خ 0.213 ک ے ا	7.65 0	\$5.4
KCA 7.1.1.1/09	Sandy loam (V)	5.8 ²	SFO	235	37.1	0.252	7.89	13.7
KCA 7.1.2.1.1/11	Sand (L1)	6.1 ²	SFO .	S 15.4	Ĵ 51.1€	Q0.268 ⁴	0 15 4	13.5
M-366012-01-1	Sand (L2)	5.6 ²	🏟 SFO 🌂	9.2Q	30.6	- 40	9021	8.37
	Silt loam (Leland)	5.7¢	SFO	18.1	69 .0	6 CJ/51	© 13.1	19.7
Geometric mean	(?	S &	12.5	J 41.6 [≈]		10.8	
Arithmetic mean	Ő		y v	Ő	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	0,291		

¹ SFO: single first order

 $^2\,$ Measured in CaCl_2 $\,$

3 Medium for the measurement of soil pH notstated

4 decline fit

Ğ Z Table CA 7.1.2.1.2-8: Kinetic parameters for the degradation of amidosulfuron-ADMP (AE F092944) in soils under according to FOCUS and formation fractions

Ó

\$

1			•				
Study	Sould type (name) of pH	√ 1 ≪Kinetic≈ 3 ØVlodel≪	DT50 [days]	DT90 [days]	f.f.	DT50 20 °C pF2/10kPa [days]	St. (χ ²)
KCA 7.1.1.1/09	Sandy loam (N) 5(8	SEO	15.0	49.8	0.095	12.7	39.8
KCA 7.1.2.1.1/M	Sand (L2) 5.6	SFO	4.75	15.8	_ 3	4.75	18.9
M-366012-00-1	Silt loam Leland 5.7	SFO	166	551	0.147	120	15.3
Geometric mean			22.8	75.7		19.3	
Arithmetic mean					0.121		
¹ Measured m CaCl							
² SFO: single first <i>e</i>	nçaler Ö						
³ decline fit							

Table CA 7.1.2.1.2-9: Kinetic parameters for the degradation of amidosulfuron-desmethylchloropyrimidine (BCS-CO41838) in soils under aerobic conditions for trigger and modelling purpose according to FOCUS and formation fractions

Study	Soil type (name)	рН	Kinetic Model ¹	DT50 [days]	DT90 [days]	f.f.	DT50 20 °C PF2/10kPa [days]	St. (χ ²)
KCA 7.1.1.1/04 KCA 7.1.2.1.1/05 M-202744-01-1	Sandy loam (LS)	6.0 ³	SFO	168	557	0.2 2 3		6.34 2
KCA 7.1.1.1/09	Sandy loam (V)	5.8 ³	SFO	45.2 渗	°150 ∍	€0.27 <u>6</u> °^	38.4	\$.29
KCA 7.1.2.1.1/11	Sand (L1)	6.1 ³	SFO	49, <i>5</i> 0	165	0.215	×49.5 ¥	10.7
M-366012-01-1	Sand (L2)	5.6 ³	SFO	561	~18°	Q .314	56.1	12.6
	Silt loam (Leland)	5.7 ³	SFO -	5 79.8	265	Ø.311 É	578	3.15
Geometric mean			Å	70 <u>,</u> 2	223	L L	59.8	
Arithmetic mean			, Q		- N	0.268	Q Ø	,
¹ SFO: single first o	rder				, , , , , , , , , , , , , , , , , , ,		<u>o și</u>	

² visual assessment: + = good

³ Measured in CaCl₂

⁴ Medium for the measurement of soil pH not stated

Table CA 7.1.2.1.2- 10: Kinetic parameters for the degradation of amidosulfuron guanidine (BCS-CO41839) in soils under aerobic conditions for trigger and modelling purpose according to FOCES and formation fractions

Study	Soil type (name) (Kinetič Model ²	DT ₅₀ DT ₅₀ [days]	DT ₅₆ [davs]) f.f.	DT50 20 °C pF2/10kPa [days]	St. (χ ²)
KCA 7.1.1.1/04	Sapay loam (LS)	6.0 ^{°3}	SFO	\$697	×1000 ³	0.731	520	4.00
KCA 7.1.2.1.1/05	۵°. (õ 2	r d				
M-202744-01-1	à a á							
KCA 7.1.1.1/09	Sand (L1)	6.1	SPO	33 4	>1000 3	0.499	334	3.51
KCA 7.1.2.1.1/1	Silt toam (Leland)	©73	SFO	Ø506	>1000 3	0.387	366	5.42
M-366012-04-1		Ķ (r L	8				
Geometric mean			Ž (L),	490	>1000 ³		399	
Arithmetic mean		Å,	0°			0.539		

Measured in CaCl₂ SFO: single first order worst case default O ¹ Measured in CaCl₂ 2

3

Table CA 7.1.2.1.2-11:	Kinetic parameters for the degradation of amidosulfuron-biuret (BCS-CQ51287)
	in soils under aerobic conditions for trigger and modelling purpose according to
	FOCUS and formation fractions

Study	Soil type (name)	pH ¹	Kinetic Model ²	DT ₅₀ [days]	DT90 [days]	f.f.	DT ₅₀ 20 °C GF2/10kPa [days]	St. (χ ²)
KCA 7.1.1.1/09	Sandy loam (V)	5.8 ³	SFO	68.0	226	0,187	₹₹7.4	¥ 15.7
KCA 7.1.2.1.1/11	Sand (L1)	6.1 ³	SFO	20.8	69.0	0.286	لم 20.8	17.9
M-366012-01-1	Silt loam (Leland)	5.7 ³	SFO	20.4 🔊	<u></u> ∘ 67.8 ∡	0.104	14.8	Å <u>2</u> .8
Geometric mean				30,7	102		26.0	Y
Arithmetic mean				Ô	\$~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	(0.192	\sim	
 Measured in CaCl SFO: single first or 	² rder		Č		, , , , , , , , , , , , , , , , , , ,			

III. CONCLUSIONS 🔬

The DT₅₀ values (trigger) range from 7.22 to 3.8 days (geomean: 12.5 days) for a desmethyl, from 45.2 to 168 days (geomean: 70.2 days) for a days (geomean: 20.4 do 68.0 days (geomean: 30.7 days) for a biuret and from 4.75 to 166 days (geomean: 22.8 days) for a ADMP. The normalised G0°C, pF2) modelling endpoints range from 5.18 to 21.7 days (geomean: 10.8 days) for a desmethyl chloropyrinidine, from 33.1 to 125 days (geomean: 59.8 days) for a desmethyl-chloropyrinidine, from 33.1 to 125 days (geomean: 59.8 days) for a days (geomean: 26.0 days) for a days (geomean: 399 days) for a days (geomean: 19.3 days) for a days (geomean: 26.0 days) for a days (geomean: 19.3 days) for a days (geomean: 26.0 days) for a days (geomean: 19.3 days) for a days (geomean: 26.0 days) for a days (geomean: 19.3 days) for a days (geomean: 26.0 days) for a days (geomean: 19.3 days) for a days (geomean: 26.0 days) for a days (geomean: 19.3 days) for a days (geomean: 26.0 days) for a days (geomean: 19.3 days) for a days (geomean: 26.0 days) for a days (geomean: 19.3 days) for a days (geomean: 26.0 days) for a days (geomean: 19.3 days) for a days (geomean: 26.0 days) for a days (geomean: 19.3 days) for a days (geomean: 26.0 days) for a days (geomean: 26.

 Report:
 KCA 7.1.2.1.2/j3;
 2016; 0 × 555189-01-1

 Title:
 Evaluation of pH-dependency of soil degradation and adsorption data of Applosultion (ANS) and its metabolities - Statement

 Report No.:
 M-555189-01-1

Document No S M-555(89-01-0 Guideline(s): O none Guideline deviation(s): none GLP/GEP: O G

Since amidos alfuror is known to be an ionicable compound, a statistical data evaluation was made to check for possible pH-dependence of soil degradation half-life, for the parent substance and all soil metabolites. The assessment was based on Kendall's rank correlation test. The results of the statistical test were expressed as Kendah tau value showing strength of a correlation, ranging between 0 and 1, and the p-value defining level of significance, with a default limit value of 0.05.

The results of the statistical evaluation are presented in the following tables.

Table

Document MCA: Section	7 Fate and	l behaviour ir	the environment
Amidosulfuron			

	Soil	pH	DT50
	5011	(CaCl ₂)	[days]
SL V		5.5	19.1
S 2.1		5.9	© 2 1.7
LS 2.2		5.0	ر 2.3
SL 2		5.6	× 17:0°
SCL F		7.4	
SCL E		7.4	68.0 A
SL V II		∂ \$.8	مَ [™] 20.2 [™]
LEA I		Ű 7.2 C	× , ~ 125 , ~
LEA II		6.D ^v	§ \$2.6
LS		Ø ×6.0	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
V		5.8	
L1		× × 6,1Å	× 22.1
L2		5.6	L Q.7 0
Leland	~	Å N (9.7	0 [°] 0 [°] 19.1 5
Kendall's tau	Ĉ		~ 0.326°
p-value			0,1,23
The p-value is hig between the DT50	ner than an a p riori and soil pH does n	i chosen level of significa	nce. A correlation
7.1.2.1.2- 13: Stat	istical evaluation for	pH dependency of DU ₅₀ :	amidøsulfuron-desmethy
	× Soil	O [×] v pH	DT50
		- 🗇 👡 (CaCly)	[days]

Table CA 7.1.2.1.2-12: Statistical evaluation for pH dependency of DT₅₀: amidosulfuron

		9		
4		× *	(CaCl ₂)	[days]
SL V	Ŭ Q Q	Å a.	5.5	21.7
LS 2.2		O Ø	5,0	14.4
SCL F		, ₀ °	~ ¹ .4	5.2
LS 🐎	N A O		× 6.0	7.6
V _(a) (a)		N° N	5.8	7.9
L1 × K		× O	6.1	15.4
L2			5.6	9.2
Leland		[©]	5.7	13.1
Kendall stau		Ő		-0.5
p-valage		- ,		0.108





Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Table CA 7.1.2.1.2-14: Statistical evaluation for pH dependency of DT₅₀: amidosulfuron-desmethylchloropyrimidine

	nH	DT50
Soil	(CaCl ₂)	[days]
	6.0	م 125
	5.8	38.1
	6.1	√√ 4955° "(
	5.6	56A O
	5.7	^O [™]
1	s° 4	
is higher than an a priori chos	en lever of significanc	e&A correlation
DT50 and soil pH does not exi	st. 🖉 🔬	
Statistical evaluation for pH d	ependency of DT3. ar	nidosulfuron guanidine
		A AT50
Soil		
		<u> </u>
Ś Ś		
, <u>, , , , , , , , , , , , , , , , , , </u>		
	K^a O^a A	<u> </u>
is higher than an a priori chos	en level of significanc	e. A correlation
DT50 and soil platoes notexi	st. J [*]	
DT50 and soil ph does not exi Statistical evaluation for pH f	ependency of RT ar	nidosulfuron-biuret
DT50 and soil pH does not exi Statistical evaluation for pH d	ependency of RT38: ar	nidosulfuron-biuret
DT50 and soil pH does not exi Statistical evaluation for pH d	pendency of RT ₃ : ar	nidosulfuron-biuret DT50 [days]
DT50 and soil pH does not exi	p pendency of D_{13}^{+} : ar p p D_{13}^{+} : ar p D_{13}^{+} : ar	nidosulfuron-biuret DT50 [days] 57.4
DT50 and soil pH does not exi	pendency of RT ₃ : ar pendency of RT ₃ : ar (CaCl ₂) 5.8 6.1	nidosulfuron-biuret DT50 [days] 57.4 20.8
DT50 and soil pla does not exi Statistical evaluation for pH a	st. $\sqrt{2}$ pendency of $D_{1,3}^{+}$: ar $\sqrt{2}$ $D_{1,3}^{+}$: ar	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8
DT50 and soil pla does not exi	st. pendency of D1 3: ar	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333
DT50 and soil ph does not exi	ependency of DT a: ar physical article articl	midosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333 1
DT50 and soil pH does not exi Statistical evaluation for pH d Soil 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	st. pendency of DT 3: ar (pH) (CaCl ₂) 5.8 6.1 5.7 en level of significance	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333 1 e. A correlation
DT50 and soil pH does not exi Statistical caluation for pH d Soil f Soil	st. pendency of D1 a: ar provide the state of significance st.	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333 1 e. A correlation
DT50 and soil ph does not exi Statistical evaluation for pH d Soil Soil Soil Soil Soil Soil Soil Soil	ependency of DT at an pendency of DT at	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333 1 e. A correlation
DT50 and soil pH does not exi Statistical caluation for pH d Soil 5 Soil	en level of significance	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333 1 e. A correlation
DT50 and soil pH does not exi Statistical caluation for pH d Soil of Soil bigher than an opriori chos DT50 and soil pH does not exi	ependency of DT a: ar (CaCl ₂) 5.8 6.1 5.7 en level of significance st.	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333 1 e. A correlation
DT50 and soil pH does not exi Statistical evaluation for pH d Soil Soil Soil Soil Soil Soil Soil Soil	ependency of DT a: ar ph CaCl ₂) 5.8 6.1 5.7 en level of significance st.	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333 1 e. A correlation
DT50 and soil pH does not exi Statistical evaluation for pH d Soil 5 Soil 5 Soi	ependency of RT ar ph (CaCl ₂) 5.8 6.1 5.7 en level of significanc st.	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333 1 e. A correlation
DT50 and soil pH does not exi Statistical evaluation for pH d Soil of Soil brigher data an a priori chos DT50 and soil pH does not exi	en level of significancest.	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333 1 e. A correlation
DT50 and soil pH does not exi Statistical evaluation for pH d Soil 5 Soil 5 Soi	ependency of DT a: ar pendency of DT a: ar (CaCl ₂) 5.8 6.1 5.7 en level of significance st.	nidosulfuron-biuret DT50 [days] 57.4 20.8 14.8 0.333 1 e. A correlation
	is higher than an a priori chos DT50 and soil pH does not exi Statistical evaluation for pH d Soil Soil	is higher than an a priori chosen level of significance Soil So

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

	pН	DT50
5011	(CaCl ₂)	[days]
V	5.8	12.7
L2	5.6	4.8
Leland	5.7	Q 120.0
Collombey	7.6	3.4 .
Speyer 2.2	6.0	
Les Evouettes	7.3	
Namosneim	8.0	
Favia Spaver 2.2	5.5 ×	γ $\frac{1}{3}$ $\frac{1}{6}$
Vercelli	× 61 × 4	
Pappelacker		
Uffholz		\$11.2 \$ \$
Otzberg	0 2,7.4 0	a 4.40 D
Kendall's tau		-0,338
p-value	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Qr126 0
The p-value is higher than an a priorichosen between the DT50 and soil pH does for exist.	level of significance. A	correlation 5
e CA 7.1.2.1.2-18: Statistical evaluation for the dep	A DT soi amido	Staturon-ADHP
Soft		^o D150
Laacher Hot AXXa 🔬 🖉 🤇 🖇		668.0
Dollendorf II	7.3	14.0
Hoefchen am Høftenseh		1.2
Laacher Hof Warmwiese	<u> </u>	80.8
Kendall's ta	2 2	0
p-value		1
The p-value is higher than an a priori chosen	level of significance. A	correlation
between the DT50 and soil pH does not exist.	~~	

Overall Conclusion: The statistical evaluation of the degradation data of amidosulfuron and its metabolites demonstrated that for none of the evaluated substances a significant correlation of DT₅₀ to the soil pH exists.

CA 7.12.1.3 Anaerobic degradation of the active substance

Ő

The degradation rate of analysulfuron in soil under anaerobic conditions in the dark in the laboratory was EU reviewed for Annex I inclusion, and was considered acceptable during the original EU review of amidosulfuron (EFSA scientific report 2007, 116, 1-86). The following study is included in the baseline dossier. No additional studies are submitted in the context of application for approval renewal. Ş

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

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

Report: Title:	KCA 7.1.2.1.3/01; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Report No.:	A48777
Document No.:	M-137874-01-1
Guideline(s):	USEPA (=EPA): § 162-2
Guideline deviation(s):	
GLP/GEP:	ves X a. A ta
GLI, GLI	
Report:	KCA 7.1.2.1.3/02; 2003; 2003; M-232780-01-1, K
Title:	Statement of Bayer CropScience, Metablism and Environmental Kate on objections
	from the Austrian UBA regarding the submission of the Jossier for amides alfuron
	(AE F075032)
Report No ·	C042514
Document No.:	M-232780-01-1
Guideline(s):	
Guideline deviation(s):	
GLP/GEP·	
A	Sand to hard days and a subart for a start of the second start of
Amidosulturon was I	ound to break down slowly, under an aerospic conquisions with a half-life of

> 300 days in the tested soil.

CA 7.1.2.1.4 Anaerobic degradation of metabolites, breakdown and reaction products

No studies are submitted within this supplemental dossier for the amidosulfuron Annex I Renewal.

Anaerobic conditions in soil will not prevail for extended time periods and on a full field plot scale under the intended use conditions of amidesulfuror. Considering the slow breakdown of amidosulfuron under an erobic conditions, metabolites will not be formed to significant extent, and will be degraded when the soil turns back to rerobic conditions. Specific studies on anaerobic degradation of relevant metabolites, degradation and reaction products in soil are therefore not required.

CA 7.1.2.2 Field studies

CA 7.1.2.2.1 Soil dissipation studies

Even though formative not triggered under Commission Regulation (EU) No 283/2013 in accordance with Regulation (EC) No 1107/2009, a field soil dissipation study has been conducted for amidosultaron on winter wheat at three European sites. The study was performed with application rates of 0.03 (F0.06 kg a.s./ha in spring. The study was EU evaluated and accepted during the Annex I inclusion of amidosulturon (EFSA scientific report 2007, 116, 1-86).



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

Report:	KCA 7.1.2.2.1/01;	1999; M-185640-01-1
Title:	Amidosulfuron water dispersibl	le granula 750 g/kg (Code: AE F075032 00 WG75
	A109) Investigation of the dissi	pation of AE F075032 00 WG75 A109 in soil under
	field conditions	Č
Report No.:	C003109	. Ő
Document No.:	M-185640-01-1	
Guideline(s):		
Guideline deviation(s):		S V , V
GLP/GEP:	yes	

From the data available calculations of DT₅₀ and DT₉₀ values were not possible. Amidos the function is very rapidly degraded in soil under field conditions. No significant downward movement occurs. Ō

The EU list of endpoints states:

"DT50f: From the data available calculation new possible. Pending on the soil type and the application rate residues declined below the $LOQ \ll 0.002$ mg/kgy after 1-3 months after application in the 0-20 cm soil layer. < 0.002 mg/kg in deeper soil layers. DTAT: From the data available calculation not possible." A C C

No changes are proposed to these conclusions.

CA 7.1.2.2.2 Soil accumulation studies

As concluded from the various laborated and field degradation experiments, there is no potential for an accumulation of residues of amid sulfuron and its major metabolites in soil. Field accumulation studies have not been performed and are not required for amintosulfuron. Ô

Adsorption and desorption in soil CA 7.1.3

Adsorption and desorption CA 7.1.3.1

The mobility in soil of amidosulfuron and its metabolities relevant for assessment was studied by batch equilibrium tests of a variety of different soils. An overview of the data is presented in Table CA 7.1.3.1 Delow. **K**

	\bigcirc^{v}				
Component / Soil	°⊅pH [CaCl2]	OC [%]	K _F [mL/g]	Koc [mL/g]	1/n
Amide Sulfuron 6	¥				
Silt loam (S, S)	5.6 ^{a)}	0.72	0.60 ^{b)}	81.9	1.01
Sandy loam (SL VA	6.1 ^{a)}	1.05	0.06 ^{b)}	5.7	0.97
Loamy sand (LS 2)	5.0 ^{a)}	2.92	0.57 ^{b)}	17.9	1.10
Sandy loam (Birkenheide)	6.02	0.94	0.1860	19.8	0.9499
Clay loam (Minneso	5.80	3.15	2.3656	75.1	0.9080
Silt loam (Sarotti)	7.38	1.30	0.1915	14.7	0.9209
Clay (Canada)	7.6 ^{a)}	1.81	0.61	33.70	0.82
Sandy loam(Laacher Hof AXXa)	6.1	1.6	0.202	12.6	0.9321
Loam (Dollendorf II)	7.3	4.6	0.329	7.2	0.8892
Silt loam (Hoefchen am Hohenseh)	6.3	1.9	0.174	9.2	0.9154
Sandy loam (Laacher Hof Wurmwiese)	5.1	1.8	0.404	22.5	0.9432

Table CA 7.1.30-1: Soldadsorption data & amidosulfuron and its metabolites relevant for assessment

Component / Soil	pH [CaCl2]	OC [%]	K _F [mL/g]	Koc [mL/g]	1/n
Loam (Hanscheider Hof)	5.6	2.8	0.407	14.5	0.9111
Arithmetic mean					0.94
Geometric mean			0.34	18.6	
Adesmethyl (AE F101630)				<u> </u>	
Sandy loam (Birkenheide)	6.02^{a}	0.94	0.1265	\$13.4 °	Q .967
Clay loam (Minnesota)	5.80^{a}	3.15	1.0423	33.6	A.891 6
Silt loam (Sarotti)	7.38 ^{a)}	1.30	0.1512	7 14	« 0.943 Q
Arithmetic mean			~ ~ <i>(</i>)	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	0,934
Geometric mean		(0.27	~17.3 [°]	
Adesmethyl-chloropyrimidine (BCS-CC	041838)	×.	, <u> </u>	× . 0	K.
Loamy sand (Laacher Hof AXXa)	5.9	2.1	1 568	270	× 0.91&7
Loam (Hoefchen am Hohenseh 4a)	6.6	26	0 614	$\tilde{0}$	0.9800
Silt loam (Hanscheiderhof)	6.0	a 2.5 s	0789	31.6	a 9108
Clay loam (Dollendorf II)	7.0	$Q^{\ast}_{5} 0 $	2673	210	0 9144
Loam (Leland)	5.7 🔬 🛛	0°C	0.287	A.7.8	0.9330
Arithmetic mean		- Q			0.92
Geometric mean		<u>s</u>	Q 0,61	<u> </u>	
Aguanidine (BCS-CO41839)	S (Ď, Č	S .	j "O	
Loamy sand (Laacher Hof AXXa)	5.9	2.1⊮	× 0.240 ×	A.4	0.8723
Loam (Hoefchen am Hohenseh 4a)	× 66	Ø.6	© 0.337	©13.0	0.9119
Silt loam (Hanscheiderhof)	610	م 2.5 ⁽) 0,289 v	11.6	0.9054
Clay loam (Dollendorf II)	7.0	5.0	649 ~	/ 13.0	0.8797
Loam (Leland)	్రా 5.7 న్యా	9.6	©.232	38.7	0.9460
Arithmetic mean		°~~ .	Q . 4		0.90
Geometric spean	<u> </u>	× : ×	<u> </u>	15.4	
Abiuret (BCS-CQ51287)) ^v	N Y		
Loamy sand (Laacher Hør AXXa)	5.9	21	0.012 °C	0.6	1.0526
Loam (Hoefchen am Hohenseh 4a)	606	Q2.6	O ^{e)}	0	N/A ^{c)}
Silt loam (Hanscheiderhof)	A .0	چ 2.5 چ	y 0 e)	0	N/A ^{c)}
Clay loam (Dollengorf II)	Š 7.0 Č	5.0	0.009	0.4	0.8851
Loam (Leland)	ັ້57ຼື		0 ^{e)}	0	N/A
Arithmetic mean		L.	0.00	0.2	0.99
Geometric mean		,	N/A	N/A	N/A
AADMP (AE F092 944)	κ C)*			
Sand (S 2.1)	5.00	1.17	2.47	211	0.69
Loamy sand (LS 2.2) & (5000	2.91	2.59	89	0.86
Loamy sand (SL 2, \mathfrak{O}^{\vee} \mathfrak{O}^{\vee}	¥ .70	1.32	8.25	625	0.65
Sandy loan (SL V)	6.10	1.04	4.11	395	0.78
Silty chay (Kan@da)	7.70	1.80	16.50	917	0.62
Arithmetic mean					0.72
Geometric mean			5.14	335.5	
EFSA consolidated endpoints					
Con <u>st</u> dering further data					
A A A A A A A A A A					0.76 ^{d)}
<i>©</i> Geometric mean:				275.8 ^{d)}	

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Component / Soil	pH [CaCl2]	OC [%]	K _F [mL/g]	Koc [mL/g]	1/n
AADHP (AE F094206)					
Sandy loam (AX)	6.3	1.8	5.0	276.7	0.8827
Loam (DD)	7.3	1.7	11.1	654.4	0.9982
Silt loam (HaH)	6.1	5.0	6.0	120.6	0.9042
Loam (WW)	5.1	1.9	5.8	<i>3</i> 04.4 °	0,8915
Arithmetic	mean				0.92 Ø
Geometric	mean		6.63	5 285,5	«

^{a)} Medium of pH measurement not stated

b) original K_F values are based on molar concentrations. These values were recalculated by notifier (Kle© 2001) and accepted by RMS (LoEP rev.4, December 2010).

c) no adsorption of the test item was detected for soils Hoefchen Am Hohenseh 4a, Dollendorf II and Leland, therefore the adsorption constant could not be calculated and was set to 0 mL/2

d) EFSA pooled data including various (non-Bayer) sources to generate a consolidated endpoint

The data for all components was subjected to a statistical evaluation of possible pH-dependence of Koc; there is no significant correlation for any component. (please refer to KCA 7.1.2.13/03).

s.c

CA 7.1.3.1.1 Adsorption and desorption of the active substance

The adsorption and desorption behaviour of amidosulfuron of soil was studied via batch equilibrium experiments. The information was EU reviewed for Annex 4 inclusion, and was considered acceptable during the original EU review of amidosulfuron (EESA scientific report 2007, 116, 1-86). The following studies are included in the maseline dossier. Two additional studies are submitted in the context of application for approval renewal.

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

Report:	≫ [©] KCA ₹.1.3.	1 ₄ ¢01;	; 9 990; MA27	597-01-1
Title:	Нах 07503	Adsorption/Des	soption in the Sy	stem Soil/Water
Report No.:	2 °A74733Q	, Š		
Document No	_%M-127597-	01-10	″	
Guideline(s):			station of the second s	
Guideline deviation	~~~~		7,0	
GLP/GEP:			Y	
		<u>n</u>	<i>y</i>	
_~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Ô.	S S		
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~				

The List of DU Endpoints (rev. 3, December 2010) states the following information:

AmidosQuuron	à L	$\sim$				
Soil X	S ^a pl	<b>O</b> %	KF	Koc	n	
Silt loam (У 2) 🔥		× V.72	0.60 ²	81.94	1.01	
Sand (S 2.1) ¹	♦ 65.0	1.17	0.03	2.56	1.74	
Sandy loam (S	6.1 0	¥ 1.05	0.06	5.71	0.97	
Loamy sand (LS 2.2	2) (1) 5.0	2.92	$0.57^{-2}$	17.87	1.10	

¹ not considered for valuation

² original K_F values are based on molar concentrations. These values were recalculated by notifier (Kley, 2001) and accepted by RMS (LoEP rev.4, December 2010).

#### Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Report:	KCA 7.1.3.1.1/02;		2001; M-2	02742-01-	1	
Title:	Adsorption/desorption	n of amidos	ulfuron (A	E F075032	) in three dif	ferent soils
Report No.:	C012456				,	
Document No.:	M-202742-01-1					
Guideline(s):	<b>OECD: 106</b>					
Guideline deviation(s):					<i>R</i> a	
GLP/GEP:	yes				, O	
The List of EU Endpoint Amidosulfuron	s (rev. 3, December 2	010) states	the follo	wing in	mation	
Soil	pH (CaCl ₂ )	OC %	1	Kock	1/n	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Sandy loam (Birkenheide)	6.02	0.94	Q.1860	19.	0,5499	
Clay loam (Minnesota)	5.80	3.15	2.365	7 <b>50°</b>	Ø9080	
Silt loam (Sarotti)	7.38	1.30 0	0.1995	$a^{14.7}$	0.920%	Ĩ
		S		A .	$\sqrt[n]{}$	<u></u>

Anne Anne approval renewal: New studies (non EU-evaluated) submitted in context

Two additional studies for amidosulfuron are submitted in the context of approval renewal. The first study, dated 1991, testing amidosulfuron adsorption of soils of extreme properties and/or overseas provenience and two clay minerals, could not be traced in the baseline dossier for undocumented reason. For completeness, it is therefore included here on supplemental dossier level and summarized in analogy to the procedures for new studies (KCA 7.1.3.1.1 /03), Only one of the tested matrices is considered representative for agricultural soil, and yielded an adsorption coefficient within the range of other agricultural soils. A second study testing adsorption of an idosulfuron on 5 representive agricultural soils was newly conducted to enlarge the overall dataset (KCA 7.1.3.1.1 /04).

#### **Report:**

Title:

KCA 7.13.1.1/03; : 1991; M-130695-01-1 Adsorption/desorption in the system soil/water and soil-mineral/water Hoe 075032 substance, pure Code floe 075032 00 ZB98 0001

Ò

st n

Report No.:	、 ●	A466	80 6	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Document No.: 🔩	Q.	₩/13	069 <b>3</b> A	) 1-1 💉
Guideline(s):	1 v	<u>v</u>	Q.,	0
Guideline deviation	n(s);^~	° (	S .	8
GLP/GEP:		yes	, ,	,
~//	4	$\approx$		) A
Executive Sum	narv (	7.	4	<i>a</i> i

#### Executive Suppmary

The adsorption and desorption behaviour of amidosulfuron was studied in four soils and two soil minerals in batch equilibrium experiments in the dark at 20 °C and under abiotic conditions. Å

son a	Source	Texture (USDA)	pН	OC [%]
England	N Liechst UK Ltd. GB	silty clay	7.0	16.17
Canada 🔍	🔬 🧹 Hoeghst Canada	clay	7.6	1.81
Arizona A	Orniversity of Arizona, Maricopa Agricultural	loamy fine sand	8.0	0.16
	Center, Research Farm			
Arizona B	University of Arizona, Maricopa Agricultural	sandy loam	7.95	0.26
	Center, Research Farm			
Kaolin	Riedel de Haen, Seelze, F.R.G.	soil mineral	3.7	-
Montmorillonit	Fluka Chemie AG, Neu-Ulm, F.R.G.	soil mineral	2.0	_

The adsorption phase of study was carried out using air-dried soils sterilised in an autoclave with a soil-to-solution ratio of 1/2.4 for soil England and 1/2 for all other soils and soil minerals.

Amidosulfuron was applied at nominal concentrations of 0.4, 1.0, 2.0 and 4.0 mg/L in aqueous  $CaCl_2$ solution for all soils, except for soil England where three concentrations were used only (1.0, 2.0 and 4.0 mg/L). The desorption phase was performed for the highest concentration only by supplying preadsorbed soil samples with fresh aqueous 0.01 M CaCl₂ solution for two desorption cycles. Adsorption and desorption cycles took place for 24 hours equilibration time each.

The mass balances accounted to 102.1, 108.2, 96.4 and 86.5% for soil Arizona A, Arizona B, Canada and England, respectively. For soil minerals Kaolin and Montmorillonit the mass balances accounted for 72.2 and 56.7%, respectively. The low values for mass balance are not due to degradation as verified by HPLC analysis but can be ascribed to insufficient extragion efficiency of water and acetonitrile for the soil minerals Kaolin and Montmorillonit, respectively.

The calculated Freundlich coefficients derived from isotherms  $\mathbb{O}K_{\rm F}$  were 3.61 and 0.64 for soils England and Canada, respectively, and 1.04 for soil miteral Kaohn. Due to the lack of adsorption of the test item to soils Arizona A and Arizona B and due to 100% adsorption to the soil mineral Montmorillonit within two hours it was not possible to determine isotherms. The corresponding Koc values were 33.70 and 22.26 for soils Canada and Regland respectively, and 0 for Soils Ar Bona A and Arizona B. Due to the very high organic carbon content in the peat soil England this soil is not considered in risk assessment as it is not presenting a typical agricultural soil. Furthermore, soils Arizona A and Arizona B were not considered in risk assessment due to their very low organic carbon content of < 0.3%.

Considering natural soils only, the adsorption behaviour of and dosulfuron can be correlated with the cation exchange capacity (coefficient of correlation  $x^2 =$ 0.88) and the organic carbon content (r² = 0.97).

#### I. MATERIALS AND

#### MATERIALS A.

1. **Test Item** unlabelled amidosalfuron Certificate No.: Code No.: Hoe 09294 00 Chemical Portity 98.5%

#### 2. **Test Soils**

Ø Two soils originating from USA, one soil originating from Canada and England each and two soil minerals were used for the test. The soils representing different geographical origins and soil properties ( Table CA 7. \$ 3.1.1

Parameter			Results / Uni	ts					
Soil Designation	England	Canada	Arizona A	Arizona B	Kaolin	Montmorillonit			
					Å				
Source	Hoechst UK	Hoechst	University of	University of	Riedel de	Fluka Chemie			
	Ltd. GB	Canada	Arizona,	Arizona,	Haeb, Seelze, .	AG, Neu-Ulm,			
			Maricopa	Maricopa	F.R.G	€%R.G. ⊘			
			Agricultural	Agricultural	67 1				
			Center,	Center,					
			Research Farm	Research Faring	- A O				
Pesticide use		Not	reported		$\sim N/A \ll$	°≈N/A			
Collection		Not	reported		NAN NAN	N/A °			
procedures									
Sampling depth		Not reported Not reported Not reported Not reported Not							
Storage		Not reported N/AO							
conditions									
Storage length		Not	reported		Ň A Ĉ	N/A			
Soil Preparation		Air-dried an	nd sieved (2 mm)		ON/A O	N/A			
Textural Class	silty clay	clay 🧹	loamy	Sandy to am	soil mineral	soil mineral			
(USDA)		<u>A</u>	sand 🗸		¥ _2				
Sand	6.30%	3.30%	<b>\$\$</b> .41%	64.39%	Ø.70%	7.34%			
Silt	46.93%	35.96%	مَحْ 2.84%	OI6.14%	<u> </u>	85.94%			
Clay	46.77%	_6 <b>&amp;</b> \$0%	8.75%	19.47%	49.55%	6.72%			
pН	7.0	7.6	\$.0	7.95	3.7	2.0			
Organic Carbon	16.17%	X 1.81X	0.16%	Ø.26% ~	-	-			
Organic Matter	27.81	3.4	0.28	× 0.45	-	-			
Cation Exchange	86.10	AR40 ~	339	U 10:58	3.89	38.60			
Capacity		Ϋ́, Ϋ́							
[meq/100 g]	õ	. 👋							

$\mathbf{T}$	Table	CA	7.1.3	1.1-	1:	Physico-c	hemical	pro	perties	of	test soils
--------------	-------	----	-------	------	----	-----------	---------	-----	---------	----	------------

N/A not applicable Department of Agriculture USDA: United States

#### B. STUÐÝ DESDĞN

#### 1. Experimental Conditions

The test system for adsorption desorption in batch equilibrium experiments consisted of centrifugation tubes (volume, 100 mb) and screw caps. Air dued soil samples were sieved down to 2 mm particle size and are subsequently sterilised in an autoclave under steam pressure by heating for 30 min at 130 °C. \$1

In an accorption kinetic test, the equilibration time was determined testing five different incubation times ranging from 4 to 72 hours for each soil except for soil England, for which four different incubation wines ranging from 4 to 144 hours were tested.

 $\bigcirc$ The adsorption desorption test was carried out in duplicate using air-dried soil with unlabelled amidosulfuron in the dark at 20 °C. Amidosulfuron was applied at nominal concentrations of 0.4, 1.0, 2.0 and 4.0 mg/L for all soils, except for soil England where three concentrations were used only (1.0, 2.0 and 4.0 mg/L). The equilibration time was 24 hours for soils Arizona A, Arizona B, Canada and soil mineral Kaolin, 2 hours for soil mineral Montmorillonit and 96 hours for soil England. The equilibration solution used was 0.01 M aqueous CaCl₂ solution with a soil to solution ratio of 1:2 for all soils and soil minerals except for soil England for which a soil to solution ratio of 1:2.4 was used. The two desorption steps were carried out under the same conditions for the highest test concentrations only.

#### 2. Analytical Procedures

After equilibration the soil was separated from the CaCl₂ solution by centrifugation. After adsorption, the removed supernatant was replaced by fresh aqueous 0.01 M CaCl₂ solution and equilibrated again (first desorption). The desorption step was repeated one more time and the remaining soil was extracted three times with acetonitrile in order to establish a mass balance. The concentration of the test item in the aqueous phases and in the soil extracts was determined by HPLC. Prior to HPLC analysis the aqueous phases were extracted with dichloromethane and concentrated.

The analytical method was validated according to linearity, selectivity accuracy and precision. The linear range for the parent compound was determined as 0.4 to 100.0 mg/L. Preliminely results taken from a formerly performed adsorption/desorption study revealed that the test compound only exhibits weak adsorption properties. Thus, for this study it seemed vero unlikely that anidosulfuron was adsorbed to soil constituents in a way that less than 5% of the originally applied concentration  $(1/10 c_0)$  remained in the aqueous phase. Therefore, it appeared not crucial if the case of the low concentration series  $(1/10 c_0)$  that the general tequirement to detect, even 1% of the lowest concentration tested is not fulfilled. It could be demonstrated for all soils that no interference between the test substance amidosulfuron and constituents of the test system occurred on applying the analytical methods used. For determination of the accuracy, recover tates were determined in blank CaCl₂-solutions, which have been stirred for 16 h, with the respective soil and spiked with a stock solution containing amidosulfuron dissolved in aceionitril friethylamine.

#### 3. Calculations

The concentration of amidosulfuron in the aqueous solution was quoted in mg/L or mol/L, respectively. Assuming that the density of aqueous  $eaCl_2$  solution (0.01 mol/L) is 1 mg/mL concentrations may be calculated in the dimensions mg/kg or mol/kg, respectively. Thus, KD-values calculated in this way (on the basis rag/L) are identical to those KD-values based on concentration values in mg/kg.

The amount of test item adsorbed to the soil was calculated by subtracting the equilibrium concentration in the solution from the initial concentration (applied concentration). By establishing the mass balances and the stability of the test item with PPLC it was verified that, besides the adsorption to the soils, no other significant processes had contributed to the decline of test item measured in the supernatant.

The overall mass balance was calculated as sum of amidosulfuron in the removed supernatants resulting from the adsorption and desorption steps and amount of amidosulfuron in the soil extracts after the final desorption steps.

C

Adsorption and desorption isotherns were calculated of the adsorption data according to the Freundlich equation.

## II. RESULTS AND DISCUSSION

### A. MATERIAL BALANCE

A material balance was not established in this study.

### B. DEGRADATION OF PARENT COMPOUND

The mass balances of the adsorption/desorption test accounted to 102.1, 108.2, 96.4 and 86.5% for soil Arizona A, Arizona B, Canada and England, respectively. For soil minerals Kaolin and Montmorillonit the material balances accounted for 72.2 and 56.7%, respectively. The low values for mass balance are not due to degradation as verified by HPLC analysis but can be ascribed to insufficient extraction efficiency of water and acetonitrile for the soil minerals Kaolin and Montmorillonit, respectively.

#### C. **FINDINGS**

At the end of the adsorption phase, 16.5-23.5%, 51.0-59.8%, 32.6-34.7% and 99.8-100% were adsorbed in soil Canada, England, Kaolin and Montmorillonit, respectively. For soils Arizona A and Arizona B minor adsorption was detected for the two lowest test concentrations (range between 2.8 and 3.5%, see Table CA 7.1.3.1.1-2). The adsorption coefficients  $K_F$  of amido@lfuron derived from the adsorption isotherms for soils Canada and England were 0.61 and 3.61 mL/g, respectively, and 1.04 for soil mineral Kaolin. No adsorption of the test item was detected for soils Arizona A and Arizona B, whereas the soil mineral Montmorillonit adsorbs amides alfuron, to nearly 10%. Therefore, the calculation according to the Freundlich equation coold not be performed. The adsorption constants K_{OC(ads)} (normalised to organic carbon content) were 33.70 and 22.26 pf g for soils Canada and England, respectively, and 0 for soils A@zona A and Arizona B. The Freundlich exponents 1/n were in the range of 0.76 to 0.99 (mean: 0.86) see Table CA 1.3.1 3.1

M At the end of the first desorption phase (performed for the highest test concentration only) 48.2%, 39.5% and 0.2% of the initially adsorbed amount were desorbed in soil canada, England and soil mineral Montmorillonit, respectively. No desorption was observed in soil Arizona , Arizona B and in soil mineral Kaolin (see Table CA 7.1.3.1.1-2) At the end of the second desorption phase (performed for the highest test concentration only), 96,9%, 46,2%, 24.8% and 0.2% of the invially adsorbed

Ì



#### Table CA 7.1.3.1.1-2:

Adsorption isotherms: Concentration of amidosulfuron in aqueous and soil phase at the end of the adsorption period and percentage of adsorbed and desorbed amidosulfuron in soils (mean values)

Concentration of a.s.	Solut	ion	Soil ¹	Adsorbed	1 st Desorption	2 nd Desorption
[mg/L]	[mg/L]	[µmol/L]	[µmol/kg]	[%]	[%]	[%] ²
		Arizo	ona A		<u> </u>	
4.084	4.1940	11.35	-0.60	-2.7 ³	× - 4	×4
1.973	2.0195	5.47	-0.25	-2.4 ³	₿ n.d _k	n.d. Ø
1.093	1.0600	2.87	0.18	3.0 🦉	n.@	An.d
0.395	0.3825	1.04	0.06 췭	»° 3.2 🗇	n.d.	א אע¢.
		Arizo	ona B 🧷 🖉	Ĺ,		
4.084	4.1558	11.25	-0.29	<u></u> ~₽8 ³	-40	~ - ⁴
1.973	2.0155	5.46	-023	2.2 ³ n	r [×] n ðr	n.d
1.093	1.0543	2.85	0.21	3.5 ·	PA.	n de
0.395	0.3838	1.04	گ¢ 0.06	2.8	"n.d.	and.
		Can	anda 🚿	_^^		
4.084	3.363	9.10 🗶	3.91	a 17.7 o	× 482	<b>N</b> 96.9
1.973	1.648	4.46	Q1.76 @	16.5%	n.d.	n.d.
1.093	0.837	2.27	1.39	23.4	n.d.	n.d.
0.395	0.302	<b>9</b> .82 C	0.50	Q\$.5	≪ n.d <u>.</u> @	n.d.
		Eng	land 🖖 💡		× _~	
4.084	2.002	)* 5.4 <b>5</b> *	3.53	» 51.0 ×	<b>B9</b> .5	46.2
1.973	0.926	<u>2</u> :5/Ĭ	&`6.80 <u>,</u> O`	53	_sn.d.	n.d.
1.093	0.439	<u>ب</u> ۲.19	¥ 4.25	<b>59</b> .8 (	n.d.	n.d.
	~	N Ka	olin 🧔 📃	<u>Q`</u>		
4.084	2677	P* 7.25	×7.62 ©	34.5	-1.7 ³	24.8
1.973	Q.330	3.60	<u> </u>	32.6	n.d.	n.d.
1.093	0.720	<u>9</u> .95	2.02	~34:1	n.d.	n.d.
0.395	<u>)</u> 0.258	<u>\$0.70</u>	0574	<i>⊈</i> ∕⁄34.7	n.d.	n.d.
Montmorillonit						
4.084	0.0075	<u>69</u> 2	<u>(</u> \$22.07	99.8	0.2	0.2
1.973	0.0000°°	<b>\$</b> 9.00	F 10.68	100.0	n.d.	n.d.
1.093	> 0.0000	[~] 0.00 √	<b>5</b> 292	100.0	n.d.	n.d.
0.325	050000	<u>) 0.00</u>	<b>2</b> .14	100.0	n.d.	n.d.

n.d.: not determined ¹ The amount of test item adsorbed to the soil was calculated by subtracting the equilibrium concentration in the solution from the initiated concentration (applied concentration).

2

Low concentrations officest compound measured in the aqueous phase (near the limit of quantification) are affected with uncertainly and therefore easily result in negative values for adsorption/desorption during calculation Desorption not measurable due to negligible adsorption 3 4



Adsorption								
Soil	Koc [mL/g]							
Arizona A	loamy fine sand	8.0	0.00	n.d.	n.dQ	0.00		
Arizona B	sandy loam	7.95	0.00	n.d.	s fixd.	° 0.00		
Canada	clay	7.6	0.61	0.82	\$0.975¢	33.70		
England silty clay 7.0 3.61								
Kaolin	"n.d.							
Montmorillonit soil mineral 2.0 n.d. and n.d.								
Mean (arithmetic) 1.00 0 0.86 0 09878 0 599								
n.d.: not determinable K _{oc} : Adsorption/desorption coefficient per organic carbon/Us x 100/koorganic arbon)								

Table CA 7.1.3.1.1- 3:	Adsorption constants of amidosulfuron in soils and soil n	ninerals
------------------------	-----------------------------------------------------------	----------

#### III. **CONCLUSIONS**

The adsorption coefficients K_F of amide sulfuron for soils Canada and England calculated based on the Freundlich isotherms were 0.61 an 03.61 mL/g, respectively, and 0.04 for soil mineral Kaolin. No adsorption of the test item was detected for soils Atizona A and Arizona B, whereas the soil mineral Montmorillonit adsorbs amidost Furon to nearly 100% Therefore the calculation according to the Freundlich equation could not be performed. The adsorption constants ROC(ads) (normalised to organic carbon content) were 33.70 and 22.20 mL/g for soils Canada and England, respectively, and 0 for soils Arizona A and Arizona B. Due toohe very high organic carbon content in the peat soil England this soil is not considered in risk assessment as it is not presenting a typical agricultural soil. In addition soils Arizona A and Auzona B are also not considere Din risk assessment due to their organic carbon contents below the minimum OECD 406 guideline recommended value of 0.3%.

Ô Considering natural soils only, the adsorption behaviour of amidosulfuron can be correlated with the cation exchange capacity (coefficient of correlation c = 0.88) and the organic carbon content ( $r^2 =$ 0.97).

Report: XC&7.1.3.1 04; , , , , , , , , , , , , , , , , , , ,
Fitle: [py@midyl_2014C]amidosulfuron: Adsorption / desorption on five soils
Report Not $\mathbb{Q}$ EpSa-15-0867
Document No.: $\mathcal{O}_{\mathcal{V}}$ $\mathcal{O}_{\mathcal{V}}$ $\mathcal{O}_{\mathcal{V}}$ $\mathcal{O}_{\mathcal{V}}$
Guideline(s): Commission Regulation (EU) No 283/2013 in
accordance with Regulation (EC) No 1107/2009; US EPA OCSPP Test Guideline
No. 835.1230
Guideline deviation(s): none 🖤
GLP/GEP:

#### **Executive Summary**

The adsorption and desorption behaviour of amidosulfuron were studied in five soils in batch equilibrium experiments in the dark at  $20 \pm 2$  °C.

## Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Soil	Source	Texture (USDA)	рН ¹	OC [%]
Laacher Hof AXXa (AX)	Monheim, Germany	sandy loam	6.1	1.6
Dollendorf II (DD)	Blankenheim, Germany loam		7.3	4.6
Hoefchen am Hohenseh (HH)	Burscheid, Germany	silt loam	6.3	1.9
Laacher Hof Wurmwiese (WW)	Monheim, Germany	sandy loam	5.1	1.8
Hanscheider Hof (HN)	Burscheid, Germany	loam	ĝ 5.6	2.8

¹ pH measured in CaCl₂

The adsorption phase of the study was carried out using air-dried soils, equilibrated in aqueous 0.0. M CaCl₂ solution with a soil-to-solution ratios of 1/1 (soils DD, HH, WW and HN) and  $1:0^{4}$  (soil AX).

[Pyrimidyl-2-¹⁴C]amidosulfuron was applied in aqueous 0.02 M CaCl₂ solution at test concentrations of 0.85, 0.30, 0.10, 0.03 and 0.01 mg/L. The desorption phase was performed by supplying pre-adsorbed soil samples with fresh aqueous 0.01 M CaCl₂ solution. Adsorption and desorption took place for 24 hours equilibration time each.

The test item was sufficiently stable throughout the study for all soils. Mean parental mass balances were 97.9, 93.6, 95.8, 96.0 and 91.0% AR for soil AX, DD, HH, WW and HX, respectively. Mean material balances were 98.9% AR for soil AX, (range from 96.6 to 101.4%, AR), 99.0% AR for soil DD (range from 95.1 to 103.4% AR), 102.1% AR for soil HIP (range from 99.0 to 105.2% AR), 99.8% AR for soil WW (range from 97.4 to 102.4% AR) and 100.7% AR for soil HN (range from 95.1 to 105.2% AR). No adsorption to the surface of the test tubes was observed.

In the definitive adsorption test 22.5 - 30.1% AR,  $22.3 \odot 35.3\%$  AR, 19.4 - 20.0% AR, 28.1 - 35.6% AR and 28.6 - 39.1% AR were adsorbed in soil AX, DD, HP, WW and HN, respectively.

The sorption parameters were calculated using Freehollich isotherms. The calculated adsorption constants  $K_{F (ads)}$  of the Freehollich notherms ranged from 0.174 to 0.407 mL/g (mean: 0.303 mL/g) and the adsorption constants  $K_{F (ads)}$  (normalised to organic carbon content) ranged from 7.2 to 22.5 mL/g (mean: 13.2 mL/g) for the tested soils. The Freundlich exponents 1/n ranged from 0.8892 to 0.9432 (mean: 0.9182). The desorption  $K_{F(des)}$  (mean: 0.965 mL/g) and the normalized  $K_{Foc(des)}$  (mean: 80.4 mL/g) values were significantly higher (approx. 7 times higher) than those obtained for adsorption, indicating that amidosa furon once adsorbed to soil is not readily desorbed.

There is no significant correlation between plt and adsorption for the investigated soils.

°~

## I. MATERIALS AND METHODS

### A. MATERIA

1. Test Iten [pyrimdyl-2-¹⁴C]amid@sulfuron Sample ID: Specific Activity: Radiochemical Purity: Chemical Purity: 98.1%

### 2. Test Soils

Five soils were used (see Table CA 7.1.3.1.1- 4). The soils were taken from agricultural use areas representing different geographical origins and soil properties. The soils were sieved to a particle size of  $\leq 2$  mm.

Table CA 7.1.3.1.1- 4:	Physico-chemical properties of test soils	
------------------------	-------------------------------------------	--

Soil Designation       AX       DD       HH       WW       HN         (Laacherhof AXXa)       (Dollendorf II)       (Hoefchen am Hohenseh 4a)       (Laacher Hof Wurnwiese)       (Hanscheider Hof)         Geographic Location:       Monheim       Blankenheim       Burscheid       Wurnwiese)       Barscheid         State       North Rhine- Westphalia       Burscheid       North Rhine- Westphalia       Burscheid       North Rhine- Westphalia       Westphalia       Sorth Rifered Westphalia       North Rifered Westphalia       North Rhine- Westphalia       North Rhine- Westphalia       North Rhine- Westphalia       North Rhine- Westphalia       North Rhine- Westphalia	Parameter	Results / Units						
(Laacherhof AXXa)       (Dollendorf II)       (Hoefchen am Hohenseh 4a)       (Laacher Hof Wurnwiese)       (Hanscheider Hof)         Geographic Location:       Monheim       Blankenheim       Burscheid       Northeneim       Burscheid       Northeneim       Burscheid       North Rhine- Westphalia       North R	Soil Designation	AX	DD	НН	WW	HN		
AXXa)       Hohenseh 4a)       Wurnwiese)       Hof         Geographic Location:       Monheim       Blankenheim       Burscheid       Wonheim °       Barscheid         State       North Rhine- Westphalia       Westphalia       Germany, Germany, Germany, Eeticate use history       None used for the previous       North State       North Philes       North State       North Philes       North State		(Laacherhof	(Dollendorf II)	(Hoefchen am	(Laacher Hof	(Hanscheider		
Geographic Location:       Monheim       Blankenheim       Burscheid       Wonhein °       Barscheid         State       North Rhine-Westphalia       Ocermany       Germany       Germany       Westphalia       Westphalia       Ocermany       Gerdany       Gerdany         GPS Coordinates       N 51° 04.6'       N 50° 22.8'       E 006° 53.5'       E 006° 62.3'       E 006° 65.3'		AXXa)		Hohenseh 4a)	Wurmwiese)	Hof)		
City       Monheim       Blankenheim       Burscheid       Monheim °       Burscheid         State       North Rhine- Westphalia       Westphalia       Germany       Germ	Geographic Location:				, OŠ			
State       North Rhine- Westphalia       North	City	Monheim	Blankenheim	Burscheid	∘ Monheim °	Burscheid		
CountryWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyWestphalia GermanyPosticide use historyNone used for the previous five yeasNone used for the previous five yeasNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone VoltaNone<	State	North Rhine-	North Rhine-	North Rhine-	North Rhune-	North Rhine-		
CountryGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermanyGermany<		Westphalia	Westphalia	Westphalia	🖓 Westphalia 🚊	Westphalia		
GPS CoordinatesN 51° 04.6' E 006° 53.5'N 50° 22.8' E 006° 42.8'N 51° 04.0' E 007°66.3'N 51° 04.4' E 006° 55.3'N 51° 04.5' E 006° 55.3'Pesticide use historyNone used for the previous five year $\circ$ Collection proceduresSample taken with shorel and placed in plastic baseSampling depth $0 - 20$ cmStorage conditionsStored after sieving an 2ir-drying at approx. 4 ° prior to zse.Soil PreparationAll affect and sieved $0$ mm)Textural Class (USDA)sandy loamSand $77\%$ Silt $15\%$ Clay $8\%$ PH CaCl2 $6.4$ PH water $6.4$ Cation Exchange Capacity $8\%$ Cation Exchange Capacity $4\%$ Cation Exchange Capacity $4\%$ Cation Exchange Capacity $4\%$ Cation Exchange Capacity $4\%$ <td>Country</td> <td>Germany</td> <td>Germany</td> <td>Germany</td> <td>Germany 🏑</td> <td>Germany</td>	Country	Germany	Germany	Germany	Germany 🏑	Germany		
E 006° 53.5'E 006° 42.8'E 007°06.3'E 006° 53.3'E 007°08.43'Pesticide use historyNone used for the previous five year $\circ$ Collection proceduresSample taken with shovel and placed in plastic backSampling depth $-20 \text{ cm}$ Storage conditionsStored after sieving and air-drying at approx. 4 ° prior toyse.Soil PreparationAir affrid and sieved $O$ mm) $O$ Textural Class (USDA)sandy loamSand $77\%$ Silt $15\%$ Silt $15\%$ Organic Carbon $1.6\%$ Organic Carbon $1.6\%$ $Organic Matter 1$ $2.8\%$ Cation Exchange Capacity $87$ $Q$ $21.3$ $114$ $10.7$ $10.8$ $100$ g] $10.4\%$ $1^{14}$ organic matter = % organic carbon x 1.724 $QPS:$ global positioning systemUSDA: United States Department of Agriculture	GPS Coordinates	N 51° 04.6'	N 50° 22.8'	Ø 51°04.0'	N 51° 04.9	№51°04.5'		
Pesticide use history       None used for the previou five year       o         Collection procedures       Sample taken with shorel and placed in fastic base         Sampling depth       -20 cm         Storage conditions       Stored after sieving and air-drying at approx. 4 ° prior topse.         Soil Preparation       Air dried and viewed Q mm)         Textural Class (USDA)       sandy loam         Sand       77%         Silt       15%         Organic Carbon       1.6%         Organic Carbon       1.6%         Organic Carbon       1.6%         Organic Matter 1       2.8%         Value       2.1.3         1% organic matter = % organic carbox x 1.724         GPS: global positioning system         USDA: United States Department of Agriculture		E 006° 53.5'	E 006° 42.8' 🖇	UE 007%06.3'	&E ^{006°} 55.3'	<b>€0</b> 07°08.43'		
Collection procedures       Sample taken with shored and placed in plastic base         Sampling depth       -20 gm         Storage conditions       Stored after sieving and air-drying at approx. 4 ° prior toose.         Soil Preparation       Air affied and sieved Q mm) °         Textural Class (USDA)       sandy loam         Sand       77%         Silt       15%         Provide       23%         Silt       15%         Silt       15%         Silt       15%         Provide       30%         Air affied and sieved Q mm) °         Textural Class (USDA)       sandy loam         Sand       77%         Silt       15%         Provide       30%         Sand       77%         Silt       15%         Silt       15%         Silt       15%         Silt       15%         Ph CaCl2       6.4         PH water       6.4         Organic Carbon       1.6%         Organic Matter 1       2.8%         Silt       1.6%         Silt       10.7         Image: Silt       10.7         Silt       1.0% <td>Pesticide use history</td> <td></td> <td>None used</td> <td>or the previous</td> <td>five years</td> <td>y do</td>	Pesticide use history		None used	or the previous	five years	y do		
Sampling depth       O - 20 cm         Storage conditions       Stored after sieving and air-drying at approx. 4 ° prior topse.         Soil Preparation       Air offied and sieved O mm)         Textural Class (USDA)       sandy loam         Sand       77%         Silt       15%         Silt       15%         Organic Carbon       6.4         Organic Carbon       1.6%         Organic Matter 1       2.8%         Cation Exchange Capacity       6.4         1% organic matter = % organic carbon x 1.724         GPS: global positioning system         USDA: United States Department of Agriculture	Collection procedures	Sai	mple taken with	showel and place	ed in pastic bags	, j		
Storage conditions       Stored after sieving and Air-drying at approx. 4 ° prior to ase.         Soil Preparation       Air offied and sieved Q mm)         Textural Class (USDA)       sandy loam         Sand       77%         Silt       15%         Glay       8%         PH CaCl2       64         PH water       6.4         Organic Carbon       1.6%         Organic Matter 1       2.8%         2.8%       7.9%         Y       3.3%         Y       2.8%         Y       1.6%         Y       1.6%         Y       1.6%         Y       9%         Y       9%         Y       6.3         Y       5.1         S.8       5.3         Organic Carbon       1.6%         Y       3.3%         Y       2.8%         Y       3.3%         Y       10.7	Sampling depth		Å.	0 - 20 cm	4 x	Å.		
Soil PreparationAir Fried and sieved $Q$ mm)Textural Class (USDA)sandy loamloamsilt loamand y loamSand77%34%23%55%42%Silt15%37%6%30%45%Clay8%26%46%34%13%pH CaCl2647%6.35.15.6pH water6.47.4655.35.8Organic Carbon1.6%4.6%9%1.8%2.8%Organic Matter 12.8%7.9%3.3%3.1%4.8%Cation Exchange Capacity8721.31110.710.8Imeq/100 g]9%1.8%2.8%4.8%4.8%USDA: United States Department of Agriculture4.6%4.6%4.6%4.6%	Storage conditions	Stored after sieving and air-drying at approx. 4 °C prior to ise.						
Textural Class (USDA)sandy loamloamsilt loamsandy loamloamSand $77\%$ $34\%$ $23\%$ $55\%$ $42\%$ Silt $15\%$ $77\%$ $60\%$ $30\%$ $45\%$ Clay $8\%$ $26\%$ $46\%$ $74\%$ $13\%$ pH CaCl2 $6.4$ $7.4$ $6.5$ $5.1$ $5.6$ pH water $6.4$ $7.4$ $6.5$ $5.3$ $5.8$ Organic Carbon $1.6\%$ $7.9\%$ $3.3\%$ $3.1\%$ $4.8\%$ Cation Exchange Capacity $87$ $21.3$ $11.4$ $10.7$ $10.8$ Imeq/100 g] $1\%$ $7.24$ $6.5$ $7.9\%$ $7.9\%$ USDA: United States Department of Agriculture $5.7$ $7.9\%$ $7.9\%$ $7.9\%$	Soil Preparation		Air-ori	ed and sieved Q	mm) 🕅 🔬	1		
Sand $77\%$ $34\%$ $23\%$ $55\%$ $42\%$ Silt $15\%$ $37\%$ $60\%$ $30\%$ $45\%$ Clay $8\%$ $26\%$ $46\%$ $34\%$ $13\%$ pH CaCl ₂ $64$ $7.4$ $65$ $5.1$ $5.6$ pH water $6.4$ $7.4$ $65$ $5.3$ $5.8$ Organic Carbon $1.6\%$ $44.6\%$ $9\%$ $1.8\%$ $2.8\%$ Organic Matter ¹ $2.8\%$ $7.9\%$ $3.3\%$ $3.1\%$ $4.8\%$ Cation Exchange Capacity $87$ $21.3$ $11.4$ $10.7$ $10.8$ [meq/100 g] $1.6\%$ $4.6\%$ $5.5\%$ $5.8$ $5.8$ USDA: United States Department of Agriculture $5.7$ $5.8$ $5.8$ $5.8$ $5.8$	Textural Class (USDA)	sandy loam	6 loam l	Silt loam	sandy loan	loam		
Silt       15% $37\%$ $30\%$ $45\%$ Clay $8\%$ $26\%$ $16\%$ $30\%$ $45\%$ pH CaCl ₂ $6.4$ $7.4$ $6.3$ $5.1$ $5.6$ pH water $6.4$ $7.4$ $6.5$ $5.3$ $5.8$ Organic Carbon $1.6\%$ $44.6\%$ $9\%$ $1.8\%$ $2.8\%$ Organic Matter ¹ $2.8\%$ $7.9\%$ $3.3\%$ $3.1\%$ $4.8\%$ Cation Exchange Capacity $47$ $21.3$ $11.4$ $10.7$ $10.8$ [meq/100 g] $1\%$ $4.9\%$ $5.5$ $5.6$ $5.8$ USDA: United States Department of Agriculture $5.3$ $5.8$ $5.8$ $5.8$ $5.8$	Sand	77%	3\$%	23 × 23 ×	© 55%	42%		
Clay       8%       26%       16%       4%       13%         pH CaCl2       6.4       7.4       6.3       5.1       5.6         pH water       6.4       7.4       6.5       5.3       5.8         Organic Carbon       1.6%       7.9%       3.3%       3.1%       4.8%         Organic Matter 1       2.8%       7.9%       3.3%       3.1%       4.8%         Cation Exchange Capacity       87       21.3       11.4       10.7       10.8         [meq/100 g]       1%       9%       1.724       10.7       10.8         USDA: United States Department of Agriculture       5%       5%       5%       5%	Silt	15%	37% (	<b>6</b>	30%	45%		
pH CaCl2 $6.\Psi$ $7.4$ $6.5$ $5.1$ $5.6$ pH water $6.4$ $7.4$ $6.5$ $5.3$ $5.8$ Organic Carbon $1.6\%$ $2.8\%$ $7.9\%$ $9.\%$ $1.8\%$ $2.8\%$ Organic Matter 1 $2.8\%$ $7.9\%$ $3.3\%$ $3.1\%$ $4.8\%$ Cation Exchange Capacity $87$ $21.3$ $11.4$ $10.7$ $10.8$ Image/100 g] $1\%$ $1.724$ $65$ $5.3$ $5.6$ USDA: United States Department of Agriculture $5\%$ $5.3$ $5.6$ $5.3$ $5.8$	Clay	8%	£ 26% í	<u></u> ~16% ~~ ♥	<u></u> Å4%	13%		
pH water     0.4     7.4     65     5.3     5.8       Organic Carbon     1.6%     4.6%     1.8%     2.8%       Organic Matter 1     2.8%     7.9%     3.3%     3.1%     4.8%       Cation Exchange Capacity     87     21.3     11.4     10.7     10.8       Imeq/100 g]     1% organic matter = % organic carbonx 1.724     7.9%     7.9%     7.9%     7.9%       USDA: United States Department of Agriculture     7.9%     7.9%     7.9%     7.9%     7.9%     7.9%	pH CaCl ₂	6.¥ Š	7:9	0° 6.3	S.1	5.6		
Organic Carbon       1.6%       4.6%       1.8%       2.8%         Organic Matter 1       2.8%       7.9%       3.3%       3.1%       4.8%         Cation Exchange Capacity       8       21.3       11.4       10.7       10.8         [meq/100 g]       1% organic matter = % organic carbox x 1.724       10.7       10.8         GPS: global positioning system       4.8%       4.8%       4.8%	pH water	<u>\$</u> 6.4	7.4	65 1	5.3	5.8		
Organic Matter 1       2.8%       7.9%       3.3%       3.1%       4.8%         Cation Exchange Capacity       87       21.3       11.4       10.7       10.8         [meq/100 g]       9       9       9       9       9       9       9       10.7       10.8         '' % organic matter = % organic carbody 1.724       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9       9	Organic Carbon	⁹ 1.6%	4.6%	°K9% &	1.8%	2.8%		
Cation Exchange Capacity 87 21.3 7 11.4 10.7 10.8 [meq/100 g] ¹ % organic matter = % organic carbox 1.724 GPS: global positioning system USDA: United States Department of Agriculture	Organic Matter ¹	× 2.8%	7.9%	© 3.3% ~	3.1%	4.8%		
[meq/100 g] ¹ % organic matter = % organic carbox 1.724 GPS: global positioning system USDA: United States Department of Agriculture	Cation Exchange Capacity		21.3	× 11.4×	10.7	10.8		
¹ % organic matter = % organic carbod x 1.724 GPS: global positioning system USDA: United States Department of Agriculture	[meq/100 g]	1 <i>6</i> y kan an a	L Ó ^Y "Ø					
GPS: global positioning system USDA: United States Department of Agriculture	¹ % organic matter = % organic ca	arbox x 1.724		a star				
USDA: United States Department of Agriculture	GPS: global positioning sostem			ð				
	USDA: United States Department	of Agriculture		4 A				
			Q	J				
B. STUDY DESIGN V O	B. STUDY DESIGN	ů × Č						
		õ. õ .	on si					

## B.

#### **Experimental Conditions** 1.

The test system for adsorption and desorption in batch equilibrium experiments consisted of Teflon[®] centrifuge tubes (volume 42,mL) closed with screw caps. The experiments were performed in duplicate. O

In preliminary tests, the adsorption of the test item to the test system surface, the optimal soil-tosolution ratio, the appropriate adsorption and desorption equilibration times and the stability of the test item were determined. (I)  $\bigcirc$ 

The adsorption phase was carried out using air-dried soils equilibrated in aqueous 0.01 M CaCl₂ solution for 1 day with soil-to-solution ratios of 1/1 for soils DD, HH, WW and HN and 1/0.7 for soil AX. The test item was applied at concentrations of 0.85, 0.30, 0.10, 0.03 and 0.01 mg/L in aqueous 0.01 M CaCl₂ solution. The desorption phase was performed by supplying pre-adsorbed soil samples with fresh aqueous 0.01 M CaCl₂ solution. Adsorption and desorption took place for 24 hours equilibration time each.

The test systems were shaken by a mechanical overhead shaker in the dark at 20.1 °C in a walk-in climatic chamber.

W

## Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

### 2. Analytical Procedures

The suspensions were centrifuged (10 min., 5000 x g) and the radioactivity contents in the supernatants were analysed by liquid scintillation counting (LSC).

In the preliminary parental mass balance test, the soil was additionally extracted five times using acetonitrile/water and methanol/water mixtures. The aqueous supernatant and the combined soil extracts were analysed by HPLC/radiodetection to determine the stability of the test item and to establish the parental mass balance. The limit of detection (LOD) and limit of quantitation (LOQ) for HPLC/radiodetection analysis were 0.5 and 1.7% AR, respectively.

The partition of the test item in the adsorption and desorption batch equilibrium experiment was determined based on the radioactivity content in the superfectant only due to the stability of the test item demonstrated by the parental mass balance. After desorption, the soft was to ophilized, homogenized and the radioactivity content determined by combistion SC to establish the material balance.

### 3. Calculations

The overall material balance (MB) was calculated as support radioactivity of the removed supernatants resulting from adsorption and desorption and the residues in the soil determined by combustion (including the remaining solution after the last centrifugation step).

The calculation of the parental mass basic for the adsorption was basic on the amount of test item recovered in the aqueous  $CaCl_2$  solution and extracted from the soil and surface of the test vessel with an organic solvent.

The amount of test item adsorber to soil was calculated by subfracting the equilibrium concentration in the solution from the initial concentration applied concentration. By establishing the material balances and the stability of the test item with HPLC/radiodetection, it was verified that, besides the adsorption to soils, no other significant processes had contributed to the decline of test item measured in the supernatant

Adsorption and desorption isotherms were calculated by linear regression analysis of the adsorption or desorption data according to the Freundlich equation. Based on the Freundlich  $K_F$ -values, the respective Freundlich  $K_F$ -values were derived by normalisation for the soil organic carbon content.

## II. RESULTS AND DECUSSION

### A. MATERIAL BOLANCE AND RESULTS OF PRELIMINARY TESTS

 $\bigcirc$ 

In preliminary tests it was shown, that the test item was stable in CaCl₂ solution and did not show significant absorption to the unner surfaces of the test vessels.

Mean material balances were 98.9, 99.00102.1, 99.8 and 100.7% of applied radioactivity [% AR] for soil AX, DD, 47H, WW and 47N, respectively. The complete material balances found for all soils and concentrations demonstrated that there was no significant loss of radioactivity dissipated from the test systems or during sample processing.

### B. DEGRĂDATION OF PARENT COMPOUND

Amidosulfuron was sufficient stable throughout the study. The mean parental mass balances were 97.9, 93.6, 95.8, 96.0 and 91.0% AR after 48 hours for soil AX, DD, HH, WW and HN, respectively.

### C. FINDINGS

At the end of the adsorption phase, 22.5-30.1% AR, 22.3 -35.3% AR, 13.4-20.0% AR, 28.1-35.6% AR and 28.6-39.1% AR were adsorbed in soil AX, DD, HH, WW and HN, respectively (see Table CA 7.1.3.1.1- 5). The calculated adsorption coefficients  $K_{F(ads)}$  of the Freundlich adsorption

isotherms ranged from 0.174 to 0.407 mL/g (mean: 0.303 mL/g) and the adsorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 7.2 to 22.5 mL/g (mean: 13.2 mL/g). The Freundlich exponents 1/n were in the range of 0.8892 to 0.9432 (mean: 0.9182), indicating that the concentration of amidosulfuron affected the adsorption behaviour in the examined concentration range (see Table CA 7.1.3.1.1-7).

At the end of the desorption phase, 26.1-36.0%, 12.6-25.1%, 27.5-39.5%, 33.5-39.5% and 29.0-40.1% of the initially adsorbed amount were desorbed in soil AX, DD, HH, WW and HN, respectively (see Table CA 7.1.3.1.1- 6). The desorption  $K_{F(des)}$  (mean: 1.965 mL/g) and the normalised  $K_{OC(des)}$  (mean: 80.4 mL/g) values were higher (approx. 7 times higher) than those obtained for the adsorption phase (see Table CA 7.1.3.1.1- 7).

Table CA 7.1.3.1.1- 5:	Definitive test: Concentration of pyrim@yl-2-14 amido@lfuron in a	iqueous
	and soil phase at the end of the adsorption period (mean $\pm$ s.d.).	Ś

<b>Concentration of a.s.</b>	Soil ^A	Solution a	Percentage Percentage					
[mg/L]	[mg/kg]	Q [mg/L]	Adsorbed [%@R]					
Laacherhof AXXQAX)								
0.010	0.002	0.007	30.1 ±007					
0.030	0.005	0.02	<u>26.4</u> <u>21.7</u>					
0.101	0.019	0 <b>07</b> 3	$2709 \pm 1.0$					
0.283	0.050	A.207	6.8 ± 1.3					
0.846	0.120	الم 0.656 م	$22.5 \pm 0.1$					
	<u> </u>	endokt (DD) O 🏷						
0.010	Ø.004 🔊	× 0.006	35.3 ± 1.9					
0.030	×0.010,5×	(j. 020 Q [*]	32.8 ± 0.4					
0.101		0.069	31.3 ± 3.0					
0.283	0,0%	0.185 🏹	$34.0 \pm 0.9$					
0.846	Q189 O	↓ 0 <u>6</u> 57 ↓	$22.3 \pm 2.6$					
Hoefenen am Hohensen (Hall)								
0.010	× 0.00 ×	0.008	$18.8 \pm 0.5$					
0.030	0.006	0.024	$20.0 \pm 0.5$					
0.101	A 1020 S	¢۶ 0÷081	$19.8 \pm 0.8$					
0.283	₹\$0.050 ×	^Q _∅ 9.232	$17.8 \pm 1.9$					
0.846	(k) 0.1 kg ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~ <b>0.733</b>	$13.4 \pm 1.4$					
	O Laacher Wof	Wurmwiese (WW)						
0.010	د <u>م</u> 004 ک ^۲	ky 0.006	$35.6 \pm 1.1$					
0.030	× × 0.009	© 0.020	$31.7 \pm 0.5$					
0.10	0.02	0.068	$32.5 \pm 1.6$					
0283	(1) $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$	0.190	$32.9 \pm 0.6$					
₄ 0.846 ©	0 238 5	0.608	$28.1 \pm 0.7$					
A Anscheider Hof (HN)								
	0.004	0.006	$39.1 \pm 1.9$					
Q2030	~ 0,40,11	0.019	$35.8 \pm 0.1$					
0.101	<b>0</b> .035	0.067	$34.1 \pm 0.2$					
0.283		0.186	$34.2 \pm 0.1$					
0.846	0.242	0.604	$28.6 \pm 0.5$					

^A The amount of test item adsorbed to the soil was calculated by subtracting the equilibrium concentration in the solution from the initial concentration (applied concentration).

## Table CA 7.1.3.1.1- 6:Definitive test: Concentration of [pyrimidyl- $2^{-14}$ C]amidosulfuron in aqueous<br/>and soil phase at the end of the desorption period (mean ± s.d.)

Concentration of a.s.	Soil ^A	Solution	Percentage						
[mg/L]	[mg/kg]	[mg/L]	Desorbed [%IA RA]						
Laacherhof AXXa (AX)									
0.010	0.001	0.001	$34.5 \pm 2.5$						
0.030	0.004	0.002	29.0 1.4						
0.101	0.012	0.010	36.9°± 10.7°						
0.283	0.037	0.020							
0.846	0.094	0.050 °	26.1 ± 23						
	Dolle	endorf (DD), 🖉 🛛 🔊							
0.010	0.003	0,000 0	$12.9^{\circ} \pm 0.4^{\circ}$						
0.030	0.007	Ø:002 ×	25.1 ± 1.07 &						
0.101	0.027	0.005							
0.283	0.079	L 0.01 V	17.5 ± 11.3						
0.846	0.164	Q 0.025 x	$1206 \pm 3.1$						
Hoefchen am Hohensen (Hality and Ality									
0.010	0.001	0.001	27.5 ±004						
0.030	0.004	0.00	<u></u> 38.9 ⊈ 5.8						
0.101	0.013	0,007	$3302 \pm 1.4$						
0.283	0.035	√Q:016 ℃	× .8 ± 5.7						
0.846	0.076	0.044	$39.5 \pm 9.6$						
	Laacher Hof	Wukmwiese (WW) 🛇	<u>, 0</u>						
0.010	<b>B</b> 002	× 0.001	$33.5 \pm 0.5$						
0.030	\$~y0.006	(, <i>(</i> <b>0</b> ).004 (Q) [*]	<u>♦</u> 37.5 ± 1.8						
0.101		0.013	$38.5 \pm 1.0$						
0.283	0,057	0.036	$39.0 \pm 1.0$						
0.846		<i>√</i> 0,094 <i>√</i>	$39.5 \pm 1.1$						
Hanscheider Hof (HN)									
0.010	0.008	0.001	$29.0 \pm 3.1$						
0.030	0.097	0.00	$30.4 \pm 2.3$						
0.101	6 ³ 69023	& 0.4 <b>01</b> ² 2	$33.5 \pm 0.9$						
0.283	× \$0.067	<i>Q</i> .030 <b></b>	$30.6 \pm 1.9$						
0.846	(v. 0.145) ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	≪°>0.097	$40.1 \pm 2.6$						

A The amount of test free adsorbed to the soil was calculated by subtracting the equilibrium concentration in the solution from the initial concentration after the sorption step.



## Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

					Adso	orption			Deso	rption	
Soil	Soil type	рН ¹	OC [%]	K _{F(ads)} [mL/g]	1/n	R ²	K _{FOC(ads)} [mL/g]	K _{F(des)} [mL/g]	1/n	R ²	KFOC(des) [mL/g]
AX	sandy loam	6.1	1.6	0.202	0.9321	0.9965	12.6	2.115	1.0647	0.9689	132.2
DD	loam	7.3	4.6	0.329	0.8892	0.9851	7.2	3.790	0.9299	0.8469	82.4
нн	silt loam	6.3	1.9	0.174	0.9154	0.9905	9.2	1.269	9170×	0.9598	66.8
WW	sandy loam	5.1	1.8	0.404	0.9432	0.9973	22.5	∘ 1.307	0.2465	0.9982	72.6
HN	loam	5.6	2.8	0.407	0.9111	0.9981	14.5	1346	0.9057	0.9901	<b>48.1</b>
	<b>Mean (arithmetic)</b> 0.303 0.9182 0.9935 <b>13.2</b> 1.965 0.9528 0.9528 804							86.4			

Table CA 7.1.3.1.1-7:	Adsorption and desorption	constants of [pyrimidyl-2-	¹⁴ C]amidosulfuron in soils
-----------------------	---------------------------	----------------------------	----------------------------------------

¹ pH: Value given as determined with 0.01 M calcium chloride solution

 $K_F$ : Freundlich coefficient for adsorption (ads) or desorption (des)

1/n : Slope of the Freundlich adsorption/desorption isotherms

 $K_{oc}$ : Adsorption/desorption coefficient per organic carbon  $K \ge 100$  organic arbon) (

R²: Regression coefficient of Freundlich equation

#### III. CONCLUSIONS

The adsorption coefficient  $K_{Foc(ads)}$  (arithmetic mean) of anidosulfuron was 13.2 mL/g. The Freundlich exponent n (arithmetic mean) was 09182. The desorption constants  $K_{F(des)}$  anidosulfuron were about 7 times higher than the respective adsorption constants, indicating a strengthened binding of amidosulfuron once adsorbed to soils representing conditions relevant for the environment.

There was no significant correlation between pH and adsorption for the investigated soils.

# CA 7.1.3.1.2 Adsorption and desorption of metabolites, breakdown and reaction

The adsorption and desorption behaviour of major degradation product amidosulfuron-desmethyl (AE F101630) was EO reviewed for Annex Unclusion, and considered acceptable during the original EU review of amidosulfuron (EFSA scientific report 2007, 116, 1-86).

In consequence of the pow metabolic pathway information obtained from study KCA 7.1.1.1/09 in the post-Annex % procedure, new data was generated to describe soil adsorption of metabolites amidosulfuron-desmethyl-chloropyrimidine (BCS-CO41838), amidosulfuron-guanidine (BCS-CO41839), amidosulfuron-biuret (BCS-CQ51287), and amidosulfuron-ADMP (AE F092944). These studies were provided as part of the confirmatory data submission, and are found summarised and evaluated in the "Addendum to Monograph prepared in the context of post Annex I procedure (new Annex II data)", Dec. 2010, rev. A Feb. 2011. Upon request by the RMS these documents are resubmitted for approval renewal as formally "new information", and summary and discussion is provided again for below.

One additional experimental study on metabolite amidosulfuron-ADHP (AE F094206) is provided in the context of application for approval renewal, as is required by Commission Regulation (EU) 283/2013 for degradates exceeding groundwater trigger concentration in lysimeter leachate.
## Amidosulfuron-desmethyl:

### Studies submitted and evaluated for the first inclusion of amidosulfuron on Annex I:

<b>Report:</b> Title: Report No.: Document No.: Guideline(s):	KCA 7.1.3.1.2/01; ; 2001; M-202740-01-1 Adsorption / desorption of AE F101630 on three different soil C012455 M-202740-01-1 OECD: 106; SETAC: Proc.Ass.Env.Fate, Part 1.4. ; USEA (=EQ): OPIOS					
Guideline deviation(s):						
GLP/GEP:	yes					
The List of EU Endpoints (rev. 3, December 2010) states the following information						
Soil	pH (CaCl2) OC K K A KFOC / 1/n					
Sandy loam (Birkenheid	le) 6.02 0.9% 9.1265 9 13.4 0.472					
Clay loam (Minnesota) Silt loam (Sarotti)	5.80 $315$ $1.042$ $36$ $63914$ $7.38$ $1.30$ $0.102$ $3.6$ $0.9425$					
New studies (non EU-evaluated) submitted in context of Apprex I approvation was						
One additional study on soil adsorption of metabolite amidosulfuron desmethyl is submitted in the context of approval renewal. The study, dated 1992 testing adsorption of the component on 5 soils						

Cone additional study on soil adsorption of metabolite amidosulturon desmeary is submitted in the context of approval renewal. The study, dated 1992/testing adsorption of the component on 5 soils, could not be traced in the baseline dossier for undocumented reason. For completeness, it is therefore included here on supplemental dossier level and summarized and discussed in analogy to the procedures for new studies (KCA 7.1.3,  $12^{\circ}$  /02). The study is considered invalid due to methodological issues and therefore for new studies.

# Report: 5KCA 74.3.1.2/02; 54.2 (1992; M-138281-01-1 Title: Adsorption/desorption/behavioon the softem soil/water of Hoe 101630, a

metabolite of the sufforyl uner Amidosulfuron Code: Hoe 075032

### Report No.: Document No.: Guideline(s): Guideline deciation(s): GLP/GEP: yes

# Executive Summary

The adsorption behaviour of amidosulfuron desmethyl (AE F101630) was studied in five soils in batch equilibrium experiments in the dark at room temperature. Desorption steps were not performed as the kinetic measurements showed very low sorption of the test substance.

Soil 🖉 歳	SQurce	Texture (USDA)	рН ¹	OC [%]
Arizona S	Arizona, USA	loamy fine sand	8.0	0.16
Regina clay	O Canada	silty clay	7.7	1.80
LS 2.2°	LUFA Speyer, Germany	loamy fine sand	5.5	2.96
SL 2.3	^v LUFA Speyer, Germany	sandy loam	4.7	1.32
SLN 0	Neustadt, Germany	loamy fine sand	7.05	0.89

¹ pH measured in CaCl₂

The adsorption phase was carried out using sterilized soils in aqueous  $0.01 \text{ M CaCl}_2$  solution with a soil-to-solution ratio of 1/5. Amidosulfuron-desmethyl was applied at nominal concentration of 5.1, 0.94, 0.19 and 0.038 mg/L. Adsorption took place for 24 hours in the dark at room temperature.

The test item was sufficient stable throughout the study. The parental mass balance for all soils was > 90% (range of 91 to 99%). The overall mass balances were determined by HPLC/UV analysis of the adsorption supernatant and soil extracts.

In the definitive adsorption test 0 - 14.8%, 3.9 - 39.3%, 4.9 - 62.2%, 0 - 60.6% and 0 - 33.3% of the applied test item were adsorbed in soils Arizona S, Regina clay, LS 2.2, SL 2.3 and SLN, respectively.

The calculated adsorption coefficients  $K_{F(ads)}$  of the Freundlich isotherms for the test soils Arizona, S, Regina clay, LS 2.2, SL 2.3 and SLN were 0.08, 0.42, 0.72, 0.83 and 0.51 m//g. The calculated adsorption coefficients normalized to the organic carbon content Koc(Ms) were 51.1, 28.5, 24.4, 62.9 and 57.1 for soils Arizona S, Regina clay, LS 2.2, SL 2.3 and SLN, respectively.

The corresponding The Freundlich exponents 1/n were 0.48, 0.59, 0.60, 0.45 and 0.51 (ncean: 0.51)° for soils Arizona S, Regina clay, LS 2.2, SL 2.3 and SLS, respectively. The power correlations were not related to sorption processes but to unavoidable uncertainties in the analytical values when testing very t star used in the total of the star total of th low sorbed substances (no or little difference between concentrations at start and after desorption). Therefore, results of this study are not considered reliable and were not used in risk assessment.

### **MATERIALS AND METHO** I.

### **MATERIALS** A.

### 1. **Test Item**

AE F101630 (unlabelled) Product code: Purity:

### 2. **Test Soils**

Three soils originating from Gormany and one each from the USA and Canada were used for the test. The soils were taken from areas representing different geographical origins and soil properties (see Table CA 7.1.3.1.2

Z@97 00016

Parameter 🖏 🔊 💍		BY W	<b>Results / Units</b>		
Soil Designation	Arizona S	Regina clay	LS 2.2	SL 2.3	SLN
Origin States	Arizona	Canada	LUFA Speyer,	LUFA Speyer,	Neustadt,
		Ş	Germany	Germany	Germany
Pesticide us nistory S		J	not reported		
Collection procedures			not reported		
Sampling depth			not reported		
Storage conditions	), ,?;		not reported		
Storage length	Ĩ.		not reported		
Soil Preparation	🔊 soil	s supplied by th	e sponsor and u	sed without siev	ing
Textural Class (USDA)	loamy fine	silty clay	loamy fine	sandy loam	loamy fine
Ĩ	sand		sand		sand
Sand	85.56%	2.11%	84.27%	61.65%	78.98%
Silt	5.69%	41.42%	14.87%	29.45%	12.79%
Clay	8.75%	56.47%	0.86%	8.9%	8.23%
pH (CaCl ₂ )	8.0	7.7	5.5	4.7	7.05
Organic Carbon	0.16%	1.80%	2.96%	1.32%	0.89%
Organic Matter ¹	0.28%	3.10%	5.08%	2.27%	1.53%

Table CA 7.1.3:1,2-1: Physico-chemical properties of test soils

Hốe/

97.29

### Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Parameter	rameter Results / Units				
Soil Designation	Arizona S	Regina clay	LS 2.2	SL 2.3	SLN
Cation Exchange Capacity [meq/100 g]	3.39	39.54	8.27	4.68	5.54
Max. water holding capacity	34.01%	66.51%	43.85%	29.82%	31.96%

¹ % organic matter = % organic carbon x 1.724

USDA: United States Department of Agriculture

#### B. **STUDY DESIGN**

#### 1. **Experimental Conditions**

The test system for adsorption in batch equilibrium experiments consisted of lume 80 mL) and ground glass stoppers.

In preliminary tests, the appropriate adsorption equilibration interaction and the stabil item in presence of soil were determined (parental mass backhce)~

In the definitive test, the adsorption phase was carried out in applicate using Serilized soils (autoclaved at 120 °C for approx. 30 min.) and 0.01 M CaCD solution with soil-to solution ratio of 1:5 for all soils. Unlabelled amidosulfurone desmethyl was applied at concentrations of 5.1, 0.94, 0.19, place for 2 hours equilibration and 0.038 mg/L in 0.01 M triethylamine solution. Adsorption @ok time.

The test systems were shaken by a mechanical shaker in the dark at poom temperature.

#### 2. **Analytical Procedures**

The suspensions were centrifuged and the supernatants were analysed by HPLC/UV.

In the preliminary parental mass balance test (adsorption test), the soil samples taken after 24 h were extracted twice with 40 and 20 mL 0.01 M phosphoric acid/methanol (9:1; v/v) for 1.5 h. The samples were centrifuged after each extraction step and the supervatants removed. The supernatants were analysed by HPLC/UV to preck the stability of the jest item and to establish the mass balance.

### Calcutations 3.

Amounts of test item are expressed as test item concentration or as percentage of the applied amount of test item.

The amount of test we adsorbed the soil was calculated by subtracting the equilibrium concentration in the solution from the initial concentration (applied concentration). By establishing the material balances and the stability of the test item with HPLC it was verified that, besides the adsorption to the soils no other significant processes had contributed to the decline of test item measured in the supervisitant.

The overall mass balance was calculated as sum of the test item concentration in the removed supernatants resulting from the adsorption step and the extraction.

Adsorption isotherms were calculated by linear regression analysis of the adsorption data according to the Freundlich equation. Based on the Freundlich K_F-values, the respective Freundlich K_{F,OC}-values were derived by normalisation for the soil organic carbon content.

# II. RESULTS AND DISCUSSION

## A. RESULTS OF PRELIMINARY TESTS

In the preliminary adsorption kinetics test it was shown, that equilibration conditions were attained after 20 h for every soil (in agreement with the sponsor samples were shaken for 24 hours in the definite test). The mass balance of amidosulfuron-desmethyl, determined in the preliminary adsorption test was > 90% for all soils. Thus, the stability in presence of soil was adequate to determine the distribution by HPLC/UV in the definitive test.

## **B. DEGRADATION OF PARENT COMPOUND**

AE F101630 was sufficient stable under the study conditions. The parental mass balances of the preliminary adsorption test were 99.35, 96.13, 91.59, 93.9 and 96.84% AR after 24 hours for soil Arizona S, Regina clay, LS 2.2, SL 2.3 and SLN, respectively.

## C. FINDINGS

In the definitive adsorption test 0 - 14.8%, 3.9 - 393%, 4.9% 62.2%, 0 - 60.6% and 0 - 33% of the applied test item amount were adsorbed in soils Arizona S, Régina clay, L 2.2 SL 2 % and SLN, respectively (see Table CA 7.1.3.1.2- 2). The calculated adsorption coefficients  $K_{F(ads)}$  of the Freundlich isotherms for the test soils Arizona S, Regina clay, LS 3%, SL 2.3 and SDN were 0.08, 0.42, 0.72, 0.83 and 0.51 mL/g. The calculated adsorption coefficients normalized to the organic carbon content  $K_{OC(ads)}$  were 51.1, 23.5, 24.4, 62.9 and 57.7 for soils Arizona S, Regina clay, LS 2.2, SL 2.3 and SLN, respectively.

The corresponding Freundlich exponents 140 were 0.48, 0.59, 0.66, 0.45 and 0.51 (mean: 0.51) for soils Arizona S, Regina clay, LS 2-2, SL 2-3 and SLN, respectively (see Table CA 7.1.3.1.2-3).. The poor correlations were not related to portion processes but to unavoidable uncertainties in the analytical values when testing very low sorbed substances (no or little difference between concentrations at start and after adsorption).

# Table CA 7.1.3.1.2- 2: Adsorption text: Concentration of antidosulfuron-desmethyl in aqueous and soil phase at the end of the autorption period

Concentration of t.i.	Soil 🖉 🕺	Solution	Percentage				
[mg/L]	<u> </u>	$\square$ [mg/L]	Adsorbed A				
AS A A A A A A A A A A A A A A A A A A							
0.05	O 0025 ~ 0°	0.028	14.827				
0.2	ر @0.011 کُ	0.192	1.115				
1 🔊 🦃		0.906	0.935				
5, 2, 6	-0,495	5.137	-0.409				
	Regin	ia clay					
1 0.05 A	0.066	0.020	39.272				
0.2 V	0.0440	0.182	4.501				
		0.750	17.150				
S.	~C>	4.841	3.866				
A.	LS	2.2					
0.05	Ø 0.104	0.013	62.243				
0.2	0.048	0.184	4.922				
1	1.207	0.696	24.933				
5	2.371	4.643	9.250				
SL 2.3							
0.05	0.101	0.013	60.579				
0.2	-0.006	0.195	-0.589				
1	1.099	0.718	23.272				
5	1.271	4.865	4.960				

### Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Concentration of t.i. [mg/L]	Soil [mg/kg]	Solution [mg/L]	Percentage Adsorbed ^A				
	SLN						
0.05	0.056	0.022	33.300				
0.2	-0.028	0.200	-2.850				
1	0.956	0.746	20.809				
5	0.692	4.982	2.700				

Α The amount of test item adsorbed to the soil was calculated by subtracting the equilibrium concentration in the solution from the initial concentration (applied concentration). 

				, K	Ô ^y .	K O	Ľ,
					dsorption	× 2	
Soil	Soil type	рН	OC [%]	Kikulds)	∑ 1/n ⊿ 1/n		
Arizona S	loamy fine sand	8.0	0.16	0.08	0,48	0.63	<b>§1.14</b>
Regina clay	silty clay	7.7	1.80	26 ⁴²	0.59	0.83	23.52
LS 2.2	loamy fine sand	5.5	2:96	0.72	0.60	0.79	24.35
SL 2.3	sandy loam	4.7	J1.32	0.8\$	\$.45 °	0,96	62.91
SLN	loamy fine sand	7.05	0,89	× 9.51	0.54	0.90	57.06
		Nean (	(arithmetic)	× 0.51	\$\$,53 ^	0.82	43.80

Table CA 7.1.3.1.2-3: Adsorption constants of AE F101639 in soits

pH: Value given as determined with 0.01 M catorum chloride solution

KF: Freundlich coefficient for adsorption (ad

1/n : Slope of the Freundlich adsorption/desorption/isotherms

Koc: Adsorption/desorption coefficient por organic earbon (K) 100/% Organic carbon)

r: correlation coefficient

#### III. **CONCLUSIONS**

The adsorption coefficient K_{OC(0}, (arithmetic mean) of amidosulfuron-desmethyl (AE F101630) was 43.8 mL/g. The Freundlich exponent 1/m (arithmetic mean) was 0.53. ۵a

Ŵ

Discussion: The evaluation of the sorption tests with different concentrations of the test substance showed poor correlations of the logarithmic concentrations in soil and solution for all soils (coefficients of correlation ranging from 0.63 to 0.96), which were linked to analytical issues encountered in this non-radiolabe experiment. Presumably for the same reason, Freundlich coefficients were notably out of the usual range (0.48 to 0.60), and not in-line with those observed in study KCA 7.1.3 (J.2 /01. Therefore, results of this study are not considered reliable and were not used in risk assessment.



## Amidosulfuron-desmethyl-chloropyrimidine:

Studies submitted and evaluated in the course of the post-Annex I procedure for amidosulfuron

Report:	KCA 7.1.3.1.2/03; ;	; 2010;	M-365227-01	-1	
Title:	[Pyrimidine-2-14C]amidosulfuron-des	methyl-chlo	ropyrimidin	BCS-CO	78570):
	Adsorption to soils		Ű		
Report No.:	MEF-09/733			<ul> <li>°</li> </ul>	L
Document No .:	M-365227-01-1		a de la companya de l	Ø	Ó ^v ĝ
Guideline(s):	OECD 106; EU 95/36/EC amending	91/414/EEC	C; UŠČEPA Ø	PPTS 835	5.1230
Guideline deviation(s):	none	~ 0		A A	
GLP/GEP:	yes	ð		Ŏ ^Ÿ	Ŵ

### **Executive Summary**

The adsorption behaviour of BCS-CO78570 (sodium salt of amidosulfuron-despectivelychloropyrimidine, BCS-CO41838) was studied in five soils of batch equilibrium experiments in the dark at  $20 \pm 1$  °C.

	^^^			// 1
Soil	Source	Texture (USDA)	[≫] pH ¹√	OC [%]
Laacher Hof AXXa (A)	Monheipa German	🖉 loamy sand 嶡	5,0	2.1
Hoefchen am Hohenseh Plot 4a (O)	Burscheid, Germany	🛇 "loam 🖉	6.6	2.6
Hanscheiderhof Plot 611(H)	Burscheid, Gomany	spit loam	6.0	2.5
Dollendorf Plot II (D)	Blamenheim, Germany	🔬 clay loam 🔍	7.0	5.0
Leland (L)	, O Leland, USA 🗞	loàn 🖉	5.7	0.6
nII maggurad in CaCl		$0^{\circ}$		

¹ pH measured in CaCl₂

The adsorption phase of the study was carried out using pre-equilibrated air-dried soils in 0.01 M aqueous CaCl₂ solution with tatios of soil to solution of 1:1 for soils A and O, 3:4 for soil H and 1:2 for soil D. BCS-CO78570 (socium salt of a.-desmethyl-chloropyrimidine) was applied at concentrations of nominal 1.0, 0.3, 0.1, 0.93, and 0.01 mg/L in supernatant. Adsorption took place in the dark at  $20 \pm 1$  °C for 72 hours.

The test item was stable throughout the study. The mass balance of the parent compound determined for all soils at the highest concentration was > 90%. The overall mass balances (parent and CO₂) were determined by 4 SC of the supernatants after adsorption and combustion/LSC of the remaining soils. The overall material balance for all concentrations was in the range of 90.4 - 94.5% (mean: 92.4%) of the applied radioactivity (AR). In the adsorption test 35.4 - 46.5%, 37.2 - 46.2%, 36.6 - 48.0%, 33.9 - 44.5%, and 20.4 - 27.8% A& were adsorbed to soils A, O, H, D, and L, respectively.

The adsorption parameters were calculated using the Freundlich adsorption isotherm. The calculated adsorption constants  $K_{F(ads)}$  of the Freundlich isotherms for the five test soils ranged from 0.287 mL/g to 1.073 mL/g (mean: 0.666 mL/g) and the adsorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 2.446 mL/g (mean: 30 mL/g). The Freundlich exponents 1/n were in the range of 0.9468 to 0.9330, indicating that the concentration of the test item affected the adsorption behaviour in the examined concentration range.



# Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

# I. MATERIALS AND METHODS

# A. MATERIALS

## 1. Test Item

[pyrimidine-2-14C]BCS-CO78570 (sodium salt of a.-desmethyl-chloropyrimidine, BCS-CO41838)Sample ID:KATH 6339Specific Activity:5.21 MBq/mgRadiochemical Purity:> 98%Chemical Purity:99%

# 2. Test Soils

Four soils originating from Germany and one soils originating from the USA were used for the test. The soils were taken from agricultural use areas representing different reographical origins and soil properties (see Table CA 7.1.3.1.2-4).

# Table CA 7.1.3.1.2-4: Physico-chemical properties of test soils

Parameter		~~~~	Results / Units	«O [·] <i>'0</i>	<u> </u>
Soil Designation	Α	Q Ø	HO	Ť Ď	О́ L
	(Laacherhof	(Hoefchen am	(Hanscheiderhof)	(Dollendorf Plot	(Leland)
	AXXa)	Hohenseh Plot	Plot 611)	Sy II) ⊘	
~		Q 4a)	^v _V		
Geographic				× . 0	
Location:			ý <u></u> , Ô, , , O		T 1 1
City	Monheim 🖉	Burscheid	Burscheid	Blankenheim	Leland
State	North Rhine	North Rhine≯	North Rhines	Sorth Rhine-	Mississippi
	Westphalia	Westphalia	°∼⁄Westphania	Westphalia	
Country	Germany	Germany	Germany	Germany	USA
GPS Coordinates	N 54 04.64	/N 5404.0110	N 50 04.482 ∛	N 50°22.899'	N 33° 20.168'
	E 996° 53.547'	E 007° 06.327'	E 007° 06 361'	E 06°43.001'	W 90° 53.082
Pesticide use history	Õ,	Norre used for the	e previous five years		N/A
Collection		Sample taken	with shower and plac	ed in plastic bags	•
procedures 👸		<u>Š</u>			
Sampling depth	L'u		20 cm		0-15 cm
Storage conditions 🚕	o O in cli	mate champer at	6 (at receiving fa	cility)	Refrigerator at
2			7		4 °C in USA,
			9		Climate chamber
, Ô,		Q'			at 6 °C at test
			1 . 1 . 1	1 (1 2	facility
Storage length	Pless than 3 mor	ing after steving	approximately 13	less than 3	approximately 14
A O	0		montins	sieving	montins
Soil Deparation	9 4	A ii	r dried and sieved (?	mm)	
Tenternal Clades				11111)	1
(USDA)	loamy sand	loam	silt loam	clay loam	Ioam
(USDA)	Q50/ @	330/	27%	35%	30%
Sallu V	A 90/	3370	2770 520/	3370	5970
	8% 70/	44%	33%	28%	30%
Clay	° 7%	23%	20%	37%	11%
pH CaCl ₂	5.9	6.6	6.0	7.0	5.7
pH water	6.2	6.9	6.1	7.2	6.0
Organic Carbon	2.1%	2.6%	2.5%	5.0%	0.6%
Organic Matter ¹	3.6%	4.5%	4.3%	8.6%	1.0%

Parameter		Results / Units					
Soil Designation	A (Laacherhof AXXa)	O (Hoefchen am Hohenseh Plot 4a)	H (Hanscheiderhof Plot 611)	D (Dollendorf Plot II)	L (Leland)		
Cation Exchange Capacity [meq/100 g]	11.5	14.2	9.2	25.2 0	9.5		

 1 % organic matter = % organic carbon x 1.724

GPS: global positioning system

USDA: United States Department of Agriculture

# **B.** STUDY DESIGN

# 1. Experimental Conditions

The test system for adsorption in batch equilibrium experiments consisted of Feflon® centrifuge tubes (volume 42 mL) and screw caps.

ç ç

In preliminary tests, the stability of the test item in  $CeCl_2$  solution, the adsorption of the test item to the test system surface, the optimal soil-to-solution ratio, the appropriate adsorption equilibration time and the stability of the test item in presence of soil were determined (parental mass balance test).

In the definitive test, the adsorption phase of the study was carried out in duplicate using preequilibrated air-dried soil with [pyrifoldine-2] C]BC S-CO78 70 applied at forminal concentrations of 1, 0.3, 0.1, 0.03, and 0.01 mg/L in the dark at 20  $\pm 1$  °C for 72 hours. The equilibration solution used was 0.01 M aqueous CaCl₂ solution with a soil to solution ratio of 1:1 for soils A and O (20 g soil and 20 g solution), 3:4 for soil H (15 g soil and 20 g solution) and 1:2 for soil D (10 g soil and 20 g solution).

The samples were incubiled at constant temperature in the dark and continuously agitated using an overhead shaker.

# 2. Analytical Proceedines

The suspensions were centrifuged (approx. 15 mm., 10000 x g) and the radioactivity contents in the supernatants were determined. For the calculation of the mass balance, the remaining soil was air dried, combusted, and analysed by LSC.

In the preliminary parental mass balance test, the soil samples taken after 24 and 72 h were extracted fivefold with each 16 mL ACN/MilleQ-water (4/1; v/v), by shaking for 30 min. After each extraction step the samples were combined and measured (volume LSC). After concentration (1:10) an aliquot (50 µL) of combined ambient extracts were analysed by HPLC to check the stability of the test item and to establish the parental mass balance.

# 3. Calculations

Amounts of test item are expressed as percentage of the applied radioactivity, or as test item concentration after conversion by the specific radioactivity.

The amount of test item adsorbed to soil was calculated by subtracting the equilibrium concentration in the solution from the initial concentration (applied concentration). By establishing the material balances and the stability of the test item by HPLC it was verified that, besides adsorption to soils, no other significant processes had contributed to the decline of test item measured in the supernatant. The overall material balance was calculated as sum of RA of the removed supernatants resulting from the

adsorption step, and the residues in the soil layer determined by combustion (including the remaining solution after the last centrifugation step).

Adsorption and desorption isotherms were calculated by linear regression analysis of the adsorption data according to the Freundlich equation. Based on the Freundlich K_F-values, the respective Freundlich K_{F,OC}-values were derived by normalisation for the soil organic carbon content.

#### II. **RESULTS AND DISCUSSION**

### MATERIAL BALANCE AND RESULTS OF PRELIMINARY TESTS A.

In preliminary tests it was shown, that the test item did not show significant adsorption to the inner surfaces of the test vessels. No breakdown of the test item in pure GaCl2-solutions was determined in HPLC-analysis. The complete material balances found for all soid and concentrations demonstrated that there was no significant loss of radioactivity dissipated from the test systems or during sample processing. The parental mass balance of BCS-CO78570 was 790% for all soft. Thus the stability in presence of soil was adequate to determine the distribution by LSC in the definitive test.

#### **DEGRADATION OF PARENT COMPOUND** B.

for soils , O, H, D and The parental mass balance after 72 h were 93.0. 90.4.91. L, respectively.

#### C. FINDINGS

At the end of the adsorption phase 35.4 46.5% 37.2 - 46.2%, 36.6 - 480%, 33.9 - 44.5% and 20.4 - 27.8% were adsorbed based on the measured (pyrimidine-2-14G)BCS-CO78570 concentration in soil A, O, H, D and L, respectively (see Table CA 7/1.3.1.2-5). Based on the measured [pyrimidine-2-¹⁴C]BCS-CO78570 concentration, the calculated adsorption coefficients K_{F(ads)} of the Freundlich adsorption isotherms ranged from 0287 to 0.073 mL/g (mean: 0.566 mL/g) and the adsorption constants K_{OC(ads)} (normalised to organic carbon content) ranged from 21 to 48 mL/g (mean: 30 mL/g). The Freundlich exponents 4/n were in the range of 0.9108 to 0.9330 (mean: 0.9204), indicating that the concentration of BCS-CQ/8570 drd not affect the adsorption behaviour in the examined concentration range (see Table CA 7.13.1.2-6)

The second secon

### Table CA 7.1.3.1.2- 5: Definitive test: Concentration of [pyrimidine-2-14C]BCS-CO78570 in aqueous and soil phase at the end of the adsorption period (mean $\pm$ s.d.)

Concentration of t.i.	Soil	Solution	Percentage			
[mg/L]	[mg/kg]	[mg/L]	Adsorbed ^A			
	Laacherho	f AXXa (A)	<u>Š</u>			
0.010	0.005	0.006	$46.5 \pm 0.95$			
0.031	0.014	0.017	y 44.7 ± 0.54			
0.09	0.038	0.055	41.2 ± 1.06			
0.29	0.127	0.167	@ 43.1 ↓ 1.11 ↓			
0.91	0.320	0,585	$354 \pm 1.22$			
	Hoefchen am	Hohenseh (O)	Y S Y			
0.010	0.005	^س ني 0.006 ⁰	46.2 + .16			
0.031	0.014		ي 45.1€ 0.57			
0.09	0.040	<b>900</b> 54	$43.7 \pm 0.26$			
0.29	0.128	K N.166 K K	$43.6 \pm 0.22$			
0.91	0.337	§	♥37.2 ± 9.16			
	Hanscheid	derhol (H)	À L			
0.010	0.007	Q Q005 🖌 (	$48.0 \pm 0.11$			
0.031	0.019	C. 69.016 Q	$46.2 \pm 0.05$			
0.09	0.053		42.7 ± 0.62			
0.29	0.17	~~ 0,4 65 ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	43.9 ± 0.38			
0.91	0,492	<u>©</u> \$74 ~	$36.6 \pm 0.50$			
	Dolleng	lorf (D) 💍 💍	1			
0.010	م 20.009	0.000	$44.5 \pm 0.84$			
0.031	0.027	× 0.015 6	$43.8\pm0.44$			
0.09	× 0,675 <	`∻ງັ ູ ∅0056 ູ √ີ່	$39.9 \pm 0.15$			
0.29	\$ \$ 245 m	×0.171	$41.6 \pm 0.37$			
0.91	0.61 <b>5</b>	© 0.5 <b>9</b> 8⁄ [®]	$33.9 \pm 0.91$			
Leland (L						
0.010	0,0003	Q 0.007	$27.8 \pm 0.97$			
0.031		<u>کٌ گُوُں</u> 0.023	$26.3 \pm 0.28$			
0.09 👸 🗞		0.069	$26.0 \pm 1.38$			
0.29		0.213	$27.6 \pm 0.18$			
0(2)	<b>0 85</b>	0.721	$20.4 \pm 1.04$			



Table CA 7.1.3.1.2- 6:	Adsorption constants of [pyrimidine-2-14C]BCS-CO78570 in soils
------------------------	----------------------------------------------------------------

		Adsorption					
Soil	Soil type	рН	K _{F(ads)} [mL/g]	1/n	R ²	KoC(ads) [mL/g]	
Α	loamy sand	5.9	0.568	0.9137	0.9973	© 27	
0	loam	6.6	0.614	0.9300	0.9984		
н	silt loam	6.0	0.789	0.9108	0.989	32	ZE.
D	clay loam	7.0	1.073	0.914	0.9973		$\sim$
L	loam	5.7	0.287	0 0 330	0.9948	→ 48 Å	R
Μ	ean (arithmetic	)	0.666	00.9204	@9972 @		
pH: Value give K _F : Freundlich 1/n : Slope of tl K _{oc} : Adsorption R ² : Regression	n as determined w coefficient for ads he Freundlich adso n/desorption coeffi coefficient of Free	ith 0.01 M ca sorption (ads) prption/desorp icient per org undlich equat	tion isotherms anic carbon (K z	x 100% organic c	arbon)		

C

#### **CONCLUSIONS** III.

The adsorption constant K_{OC(ads)} (arithmetic mean) of BCS-5078579 (sodium salt of a.-desmethylchloropyrimidine, BCS-CO41838) was 30 mL/g. The Freundlich exponent 1/n (arithmetic mean) was 0.9204.

# Amidosulfuron-guanidine

the course of the pest Studies submitted and evaluated in Annex I procedure for amidosulfuron

; 2010; M-363960-02-1 **Report:** 7.1/2/h 1.2/04 Guanidine14C] anidosulfuron-guandine (BCS-CO80263): Adsorption to soils Title: Report No .: 09/732 L. Document No.: M-363960-02 95/36/EC amending 91/414/EEC; US EPA OPPTS 835.1230 Guideline(s): OFECD 10 E/EU Guideline deviation(s hðne **GLP/GEP:** 

# **Executive Summary**

The adsorption behavoour of BCS-CO80263 (sodium salt of amidosulfuron-guanidine. BCS-CO41839) was studied in five soils in batch equilibrium experiments in the dark at  $20 \pm 1$  °C.

Soit	Source	Texture (USDA)	рН ¹	OC [%]
Laacher Hof AXXa (A)	Monheim, Germany	loamy sand	5.9	2.1
Hoefchen am Hohenset Plot 4a (O)	Burscheid, Germany	loam	6.6	2.6
Hanscheiderhof Plot	Burscheid, Germany	silt loam	6.0	2.5
Dollendorf Plot II (D)	Blankenheim, Germany	clay loam	7.0	5.0
Leland (L)	Leland, USA	loam	5.7	0.6

¹ pH measured in CaCl₂

The adsorption phase of the study was carried out using pre-equilibrated air-dried soils in 0.01 M aqueous CaCl₂ solution with ratios of soil to solution of 1:1 for soil A, O, H, and L and of 1:2 for soil

D. BCS-CO80263 (sodium salt of BCS-CO41839) was applied at concentrations of nominal 1.0, 0.3, 0.1, 0.03, and 0.01 mg/L in supernatant. Adsorption took place in the dark at  $20 \pm 1$  °C for 72 hours.

The test item was stable throughout the study. The mass balance of the parent compound determined for all soils at the highest concentration was > 90%. The overall mass balances (parent and CO₂) were determined by LSC of the supernatants after adsorption and combustion/LSC of the remaining soils. The overall material balance for all concentrations was in the range of 92.0 - 96.5% (mean: 93.5%) of the applied radioactivity (AR). In the adsorption test 20.6 - 31.1%,  $260^{\circ}$  - 34.0%,  $23.2 \times 31.8\%$ , 25.6 - 36.7%, and 18.8 - 23.4% AR were adsorbed to soils A, O, H, D, and P, respectively.

southe ranges (norma pollich expone test item affected (1830) (00700 test item affected (1830) (00700 test item affected (1830) (00700 test item affected (1970) (00700 test item affected (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (1970) (197 The adsorption parameters were calculated using the Freundlich adsorption isotherm. The calculated adsorption constants K_{F(ads)} of the Freundlich isotherms for the five test soils ranged from 0/2/32 mL/g to 0.649 mL/g (mean: 0.349 mL/g) and the adsorption constant K_{FQG}(Ms) (normalised to organic carbon content) ranged from 11 to 39 mL/g (mean: 18 @L/g). The Frequedlich exponents 1/n were in the range of 0.8723 to 0.9460, indicating that the concentration of the test item affected the adsorption behaviour in the examined concentration range.

#### I. **MATERIALS AND METHODS**

#### A. MATERIALS

#### 1. **Test Item**

[guanidine-14C]BCS-CO80263 (sodi m salt & BC Sample ID: KATH©330 Specific Activity: 3.66 MBq/ **Radiochemical Purity:** Chemical Purity:

### 2. **Test Soils**

Four soils originating from Germany and one soils originating from the USA were used for the test. The soils were taken from agricultural use areas representing different geographical origins and soil properties (see Table CA 7 312

Parameter 🖧 💊	ô ô'	à và	Results / Units		
Soil Designation			H	D	L
L.Y	(Laacherhof)	(Hoetchen am)	(Hanscheiderhof	(Dollendorf Plot	(Leland)
Ô	`AXXa%^	Hobenseh Plot	Plot 611)	II)	
	Q 4	<b>4a</b> ) ⁵ √			
Geographic 👓 👸	Ý Ô [¥] .(	Ĵ, ×			
Location:	<u> </u>				
City S	Monheim	Burscheid	Burscheid	Blankenheim	Leland
State A	North Rome-	Sorth Rhine-	North Rhine-	North Rhine-	Mississippi
	Westbhalia	Westphalia	Westphalia	Westphalia	11
Country	Germany	Germany	Germany	Germany	USA
GPS Coordinates	N 51° 04.6497	N 51° 04.011'	N 51° 04.482'	N 50°22.899'	N 33° 20.168'
	<b>5</b> 006° 53.517'	E 007° 06.327'	E 007° 06.361'	E 06°43.001'	W 90° 53.082
Pesticide use history	), v	None used for the	previous five years	5	N/A
Collection	Sample taken with shovel and placed in plastic bags				
procedures			_	_	
Sampling depth		0-2	20 cm		0-15 cm

### Table CA 7.1.3. Physico-chemical properties of test soils

Parameter			<b>Results</b> / Units		
Soil Designation	Α	0	Н	D	L
	(Laacherhof	(Hoefchen am	(Hanscheiderhof	(Dollendorf Plot	(Leland)
	AXXa)	Hohenseh Plot	Plot 611)	II)	
		4a)			
Storage conditions	in cli	mate chamber at	6 °C (at receiving fa	cility) 👸	Refrigerator at
				a a	4 °C in USA,
					Climate chamber
					at 6 °Cat test
Q ₁ 1 (1	1 (1 2	4 0	1 . 1 . 1		facility 14
Storage length	less than 3 mor	iths after sleving	approximately, 13	less than 5	approximately 14
			montins	months aner	
Soil Propagation		۸	r dried find size		
		All			
Textural Class	loamy sand	loam	silt loam	"Oclay loann	loam a
(USDA)	o <b>T</b> O (	<b>2 2 3</b> <i>4</i>		¢ "V	Ŭ Û
Sand	85%	33%		» 3,5% _~	20%
Silt	8%	44%	× ~ × ×	28% کې	© 50%
Clay	7%	23%	ي 20% گ	© 37%℃	A 11%
pH CaCl ₂	5.9	6,60	~~ 6 <u>0</u>	TO TO	<b>6</b> 5.7
pH water	6.2	¢.9	Ø.1 🖉	/ ~ <i>1.2</i>	6.0
Organic Carbon	2.1%	26%	~2.5% O	5.0%	0.6%
Organic Matter ¹	3.6%	<b>6</b> %4.5%	4.3%	× 8.6%	1.0%
Cation Exchange	11.5	0 142	KJ 20 ³ A	2012	9.5
Capacity	Ô		y U _a o		
[meq/100 g]					

¹ % organic matter = % organic carbon x 1.72GPS: global positioning system

USDA: United States Department of Agriculture

# B. STUDY DESIGN

# B. STUDI DESEAN

1. Experimental Conditions in Statch equilibrium experiments consisted of Teflon® centrifuge tubes (volume 42 mb) and screw caps.

In preliminary tests, the stability of the test item in  $CaCl_2$  solution, the adsorption of the test item to the test system surface, the optimal soil to-solution ratio, the appropriate adsorption equilibration time and the stability of the test item in presence of soil were determined (parental mass balance test).

In the definitive test, the adsorption phase of the study was carried out in duplicate using preequilibrated air-dried soil with [guanidine-¹⁴C]BCS-CO80263 applied at nominal concentrations of 1, 0.3, 0, 0.03, and 0.01 ang/L in the dark at  $20 \pm 1$  °C for 72 hours. The equilibration solution used was 0.01 M aqueous CaCl₂ solution with a soil to solution ratio of 1:1 for soils A, O, H and L (20 g soil and 20 g solution) and a solution ratio of 1:2 for soil D (10 g soil and 20 g solution).

The samples were incubated at constant temperature in the dark and continuously agitated using an overhead shaker.

# 2. Analytical Procedures

The suspensions were centrifuged (approx. 10 min.,  $10000 \times g$ ) and the radioactivity contents in the supernatants were analysed by liquid scintillation counting (LSC). The pH values of the supernatants were determined. For the calculation of the mass balance, the remaining soil was air dried, combusted, and analysed by LSC.

In the preliminary parental mass balance test, the soil samples taken after 24 and 96 h were extracted fivefold with each 16 mL ACN/Milli-Q-water (4/1; v/v), by shaking for 30 min. After each extraction step the samples were centrifuged and supernatants decanted. Extracts from ambient extraction steps were combined and measured (volume, LSC). After concentration (1:10) an aliquot (50 µL) of combined ambient extracts were analysed by HPLC to check the stability of the test item and to establish the parental mass balance.

# 3. Calculations

Amounts of test item are expressed as percentage of the applied radioactivity, or as test item concentration after conversion by the specific radioactivity.  $\sim^{\circ}$ 

The amount of test item adsorbed to soil was calculated by subtracting the equilibrium concentration in the solution from the initial concentration (applied concentration). By establishing the material balances and the stability of the test item by HPLC it was verified that, besides adsorption to soils, no other significant processes had contributed to the decline of test item measured in the supernatant. The overall material balance was calculated as sum of RA of the removed supernatants resulting from the adsorption step, and the residues in the soil layer determined by combustion (including the remaining solution after the last centrifugation step).

Adsorption and desorption isotherms were calculated by mean regression analyses of the adsorption data according to the Freundlich equation. Based on the Freundlich  $K_{F,OC}$ -values, the respective Freundlich  $K_{F,OC}$ -values were derived by normalisation for the soil organic carbon content.

# II. RESULTS AND DISCUSSION

# A. MATERIAL BALANCE AND RESULTS OF PRELIMINARY TESTS

In preliminary tests it was bown, that the test item did not show significant adsorption to the inner surfaces of the test vessels. No breakdown of the fest item in pure CaCl₂-solutions was determined in HPLC-analysis. The complete material balances found for all soils and concentrations demonstrated that there was no significant loss of radioactivity discipated from the test systems or during sample processing. The parental mass balance of BCS-CO80263 was > 90% for all soils. Thus, the stability in presence of soil was adequate to determine the discribution by LSC in the definitive test.

# B. DECRADATION OF PARENT COMPOUND

The parental mass balances after 48th were 92.0, 92.5, 93.9, 92.6 and 96.5% for soils A, O, H, D and L, respectively.

# C. FINDINGS

At the end of the adsorption phase, 29.6-31, 9%, 26.0-34.0%, 23.2-31.8%, 25.6-36.7% and 18.8-23.4% were adsorbed based on the measured [guanidine-¹⁴C]BCS-CO80263 concentration in soil A, O, H, D and L, respectively (see Table CA 7.1, 3.02-8). Based on the measured [guanidine-¹⁴C]BCS-CO80263 concentration the calculated adsorption coefficients  $K_{F(ads)}$  of the Freundlich adsorption isotherms ranged from 0.232 to 0.649 mL/g (mean: 0.349 mL/g) and the adsorption constants  $K_{OC(ads)}$  (normalised to organic carbon content) ranged from 11 to 39 mL/g (mean: 18 mL/g). The Freundlich exponents 1/n were in the range of 0.8723 to 0.9460 (mean: 0.9031), indicating that the concentration of BCS-CO80263 did not affect the adsorption behaviour in the examined concentration range (see Table CA 7.1.3.1.2.9).

### Table CA 7.1.3.1.2-8: Definitive test: Concentration of [guanidine-14C]BCS-CO80263 in aqueous and soil phase at the end of the adsorption period (mean $\pm$ s.d.)

Concentration of t.i.	Soil	Solution	Percentage				
[mg/L]	[mg/kg]	[mg/L]	Adsorbed ^A				
Soil Laacherhof AXXa (A)							
0.010	0.003	0.007	$31_{0}1 \pm 1.33$				
0.031	0.009	0.022	29.4 ± 0.69				
0.12	0.028	0.091	≪ 23.3 ± 0.47				
0.36	0.075	Q.287	≥ 20,8 ± 0.48 5				
1.22	0.251	9.967	$29.6 \pm 0.05$				
	Soil Hoefchen a	m Hohensch (O)					
0.010	0.004	0.00	<u></u> 34.0, 50.26 √				
0.031	0.010	<b>0</b> 0021	$339 \pm 0.23$				
0.12	0.035	√y ° _{&gt;y} 0.084	29.3 ± 0 9				
0.36	0.096	0.266	26.6 # 1.06				
1.22	0.316		[™] 26.0 ± 0.38				
	Soil Hanscheiderhof (H)						
0.010	0.003	<i>لا ي</i> 0.007 م	$31.8 \pm 1.63$				
0.031	0.009		$28.8 \pm 0.40$				
0.12	0.037	& \$1,986 °~	27.8 ± 4.24				
0.36	0:084 🔊 、	<u>کْ 278 میں میں 278 میں میں 278 میں میں میں میں میں میں میں میں میں میں</u>	$23.1 \pm 0.62$				
1.22	۵.283 ۵	0.935	$23.2 \pm 0.64$				
	Soil Dolle	nderf (D)					
0.010	A 1008	× .007 ×	$36.7 \pm 1.07$				
0.031	Ø <u>Ø</u> 0.022 🖒 🦂	0.020	$35.5 \pm 0.21$				
0.12	°0.072° 0	0.083	$30.2 \pm 0.32$				
0.36	0.490	0° 267	$26.2 \pm 0.27$				
1.22	£.623 °	Ç Q0.907	$25.6 \pm 0.40$				
Soil Letand (L)							
0.010		0.008	$23.4 \pm 0.18$				
0.63	0 [°] 0907 0 [°]	≪∛ 0.024	$22.6 \pm 0.32$				
0.12	0.024	0.095	$20.1 \pm 0.19$				
0.36 2	َ مَرْبَّةُ 0.06 <b>%</b> O	0.294	$18.8 \pm 1.59$				
1.22?	0,242	0.976	$19.9 \pm 1.11$				



Table CA 7.1.3.1.2- 9:	Adsorption constants of [guanidine- ¹⁴ C]BCS-CO80263 in soils
------------------------	--------------------------------------------------------------------------

				Adsorption	1	
Soil	Soil type	рН	KF(ads) [mL/g]	1/n	R ²	KoC(ads) [mL/g]
Α	loamy sand	5.9	0.240	0.8723	0.9981	© 11
0	loam	6.6	0.337	0.9119	0.9994	
Н	silt loam	6.0	0.289	0.9054	0.9974	
D	clay loam	7.0	0.649	0.8797	0,9990	130
L	loam	5.7	0.232	0.9460	°∼y0.99855	39
Me	an (arithmetic	2)	0.349	<b>0.9031</b>	0.9984	
H: Value given F: Freundlich c n : Slope of th oc: Adsorption ² : Regression c	as determined w coefficient for ad e Freundlich ads (desorption coefficient of Fre	vith 0.01 M ca sorption (ads) orption/desorp icient per org undlich equat	ilcium chloride otion isotherms anic carbon (K ion	x 100% organic	carbon)	
I CON	CLUSIONS		$\hat{Q}$	~~~ ~ ~	y or	<u>C</u>

#### III. **CONCLUSIONS**

The adsorption constant  $K_{Foc(ads)}$  (arithmetic mean) of BCS-6080265 (sodium salt of amidosulfuronguanidine. BCS-CO41839) was 18 mL/g. The Freundlich exponent (arithmetic mean) was 0.9031.

# Amidosulfuron-biuret:

Studies submitted and evaluated in the course of the post-Annex procedure for amidosulfuron

**Report:** 2010: 12365734-01-1 W05

Title: erminal garbamov-14C BCS-CQ56642 (amidosulfuron-biuret): Adsorption on five őils

10/070 Report No.: M-365734-01-1 Document No. **CECD 10@US EP& OPPTS 835.1230; EU 95/36/EC amending 91/414/EEC;** Guideline(s): Canadian PMRADACO Number 8.2.4.2; Japanese MAFF New Test Guideline Guideline deviation(s)

none GLP/GEP: 🎘 yes 🖗

(M)

# Executive Summary

Ø The adsorption behaviour of anidosulfaron-biuret (BCS-CQ56642) was studied in five soils in batch equilibrium experiments in the dark at  $19.1 \pm 0.1$  °C. A

Soil	Source	Texture (USDA)	рН ¹	OC [%]
Laacher Hof AXXa (AX)	Monheim, Germany	loamy sand	5.9	2.1
Hoefchen am Hohensen Plot 4a (HH)	Burscheid, Germany	loam	6.6	2.6
Dollendorf Plot II (HN)	Blankenheim, Germany	clay loam	7.0	5.0
Hanscheiderhof Plot 611(DD)	Burscheid, Germany	silt loam	6.0	2.5
Leland (LL)	Leland, USA	loam	5.7	0.6

¹ pH measured in CaCl₂

The adsorption phase of the study was carried out using air-dried soils pre-equilibrated in aqueous 0.01 M CaCl₂ solution with a soil-to-solution ratio of 1/1. Amidosulfuron-biuret was applied at nominal concentrations of 1.0, 0.3, 0.1, 0.03 and 0.01 mg/L in aqueous 0.01 M CaCl₂ solution (applied as sodium salt BCS-CO56642). No desorption step was performed due to a very low/no adsorption of amidosulfuron-biuret on the test soils. Adsorption took place for 72 hours in the dark at  $19.1 \pm 0.1$  °C.

The test item was sufficient stable throughout the study. The parental mass balance for all soils was in the range of 93.9 to 96.2% (mean: 94.9%) of the applied radioactivity. The overall mass balances for all concentrations and soils were in the range of 91.8 to 100.6% (mean: 97,2%).

In the definitive adsorption test 0.4 - 1.7% and 0.9 - 1.8% of the applied radioactivity were adsorbed in soils Laacher Hof AXXa and Hanscheiderhof, respectively. Novadsorption of the test item was detected for soils Hoefchen Am Hohenseh 4a, Dollendorf A and LeDand. @ 1 Ari

The adsorption parameters were calculated using the Freundlich adsorption isotherm. The calculated La. item w. adsorption e. i were 1.0526 a ively. In for the investigated soils. adsorption constants KF(ads) of the Freundlich isotherms for the test soils Laacher Hof AXXa and Hanscheiderhof were 0.012 and 0.009 mL/g. No adsorption of the test, item was detected for soils Hoefchen Am Hohenseh 4a, Dollendorf II and Leland. Therefore the adsorption constants were set to 0 mL/g (mean overall: 0.004 mL/g). The Freuddlich exponents 1/n were 1,0526 and 0.8851 (mean: 0.9689) for soils Laacher Hof AXXa and Hanscheiderhof, respectively.

There is no significant correlation between pH and adsorption for the

### MATERIALS AND METHO I.

### A. **MATERIALS**

### **Test Item** 1.

[terminal carbamoyl-14 Sample ID: ATH 6416 Specific Activity: 5.14 MB@/mg Radiochemical Puri Chemical Purity

### 2. Test Soils

Four soils originating from German and one soils originating from the USA were used for the test. The soils were taken from agricultural use areas representing different geographical origins and soil properties (see Kable CA 7.1.3, 12-10)

Parameter, O			<b>Results</b> / Units		
Soil Designation		<b>ЭНН</b>	DD	HN	LL
, Ş	Laacherhof	<ul> <li>Hoefchen am</li> </ul>	(Dollendorf II)	(Hanscheiderhof)	(Leland)
× 1	AXXa) 🖉	Hohenseh 4a)			
Geographic 🔊					
Location: 🛛 🌾	1				
City	Monheim	Burscheid	Blankenheim	Burscheid	Leland
State	North Rhine-	North Rhine-	North Rhine-	North Rhine-	Mississippi
	Westphalia	Westphalia	Westphalia	Westphalia	
Country	Germany	Germany	Germany	Germany	USA
GPS Coordinates	N 51° 04.6'	N 51° 04.0'	N 50°22.9'	N 51° 04.5'	N 33° 20.2'
	E 006° 53.5'	E 007° 06.3'	E 006°43.0'	E 007° 06.4'	W 090° 53.1
Pesticide use history		None u	sed for the previous	s five years	

# Table CA 7 3.1.2- 10. Physico-chemical properties of test soils

Parameter			<b>Results / Units</b>	1	
Soil Designation	AX	HH	DD	HN	LL
	(Laacherhof	(Hoefchen am	(Dollendorf II)	(Hanscheiderhof)	(Leland)
	AXXa)	Hohenseh 4a)			
Collection		Sample taken	with shovel and pla	ced in plastic bags	
procedures				<u> </u>	
Sampling depth			0 - 20  cm		0
Storage conditions		Ambient, a	fter sieving storage	in refrigerator	
Storage length	less than 10 mor	nths after sieving		less than 21 mont	hs after sieving
Soil Preparation		Aiı	r-dried and sieved (		
Textural Class	loamy sand	loam	clay loan	silt loayn	ି (ତଥ୍ୟଯ
(USDA)			× ő		
Sand	85%	33%	<b>65</b> %	\$27%	۵٫39% ،
Silt	8%	44%	× 28% ×	@ 53% ~	50%
Clay	7%	23%	○ 37%	Q 20%	
pH CaCl ₂	5.9	6.6		6:0 🏷	<b>3</b> .7
pH water	6.2	6.9	× ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	\$\cong 6.1 \cong \	6.0
Organic Carbon	2.1%	2.6%	5.0%	× 2.5%	0.6%
Organic Matter ¹	3.6%	4.5%	8.69	4.396	<b>°</b> 1.0%
Cation Exchange	11.5	14,2	× 25 ^{,2} .	\$ <u>9</u> .2 @	9.5
Capacity			Υ, O'		
[meq/100 g]			à ĉ	<u>i</u> y _i y	
1 % organic matter = %	organic carbon x 1	704 🔊	N ^a O ^v	S . O	
GPS: global positioning system					
USDA: United States Department of Asycculture					
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		× ø		
B. STUDY DE	ESIGN	La		N.	
		つ゛ (グ 〆		1	

STUDY DESIGN B.

Experimental Conditions 1.

The test system for adcorption in batch equilibrium experimence consisted of centrifuge tubes (volume 42 mL) and Teflon® screw caps.

Ç, In preliminary tests, the stability of the test item of CaCl2 solution, the adsorption of the test item to the test system surface, the optimal soil-to-solution ratio, the appropriate adsorption equilibration time and the stability of the test item in presence cosoil were determined (parental mass balance test).

4 In the definitive test, the adsorption phase of the study was carried out in duplicate using preequilibrated, ar-dried soil with terminal carbamoyl-14C]BCS-CQ56642 (sodium salt of amidosulfupor-biurety applied at normal concentrations of 1, 0.3, 0.1, 0.03, and 0.01 mg/L in the dark at 19.1 ± 0.1 °C from 72 hours. The equilibration solution used was 0.01 M aqueous CaCl₂ solution with a soil to solution ratio of 1:1 for all soils

The samples were incubated at constant temperature in the dark and continuously agitated using an overhead shaker.

2. Analytical Procedures

The suspensions were centrifuged (approx. 10 min., 1140 x g) and the radioactivity contents in the supernatants were analysed by liquid scintillation counting (LSC). In order to establish the material balance, the remaining soil was extracted twice with 10 mL acetone each at ambient temperature by shaking for 30 min. The samples were centrifuged and the supernatants decanted and combined. The radioactivity in the supernatants was determined by LSC and the remaining soil was air dried, combusted, and analysed by LSC.

In the preliminary parental mass balance test, the soil samples taken after 72 h were extracted three times with 16 mL acetonitrile/water 4/1 (v/v) at ambient temperature by shaking for 30 minutes each except for the samples of soil Dollendorf II, which were extracted five times with the same conditions. The samples were centrifuged after each extraction step and the supernatants decanted. The supernatants were combined and analysed by LSC. Aliquots of the supernatant and organic extract were concentrated and analysed by HPLC to check the stability of the test item and to establish the parental mass balance.

3. Calculations

Amounts of test item are expressed as percentage of the applied radioactivity, or as test item concentration after conversion by the specific radioactivity. \sim°

The amount of test item adsorbed to the soil was calculated by subtracting the equilibrium concentration in the solution from the initial concentration (applied concentration). By establishing the material balances and the stability of the test item with HPLC it was very identical that, bestdes the adsorption to the soils, no other significant processes had contributed to the decline of test item measured in the supernatant.

The overall material balance was calculated as sum of radioactivity of the removed supernatants resulting from the adsorption step and the esidues in the soil layer determined by combustion (including the remaining solution after the last centrifugation step).

Adsorption and desorption isotherms were calculated by linear degression analysis of the adsorption data according to the Freundlich equation Based on the Freundlich K values, the respective Freundlich $K_{F,OC}$ -values were derived by normalisation for the soil of game carbon content.

II. RESULTS AND DISCUSSION

A. MATERIAL BALANCE AND RESULTS OF PRELIMINARY TESTS

C

In preliminary tests it was shown that the test item did not show significant adsorption to the inner surfaces of the test vessels. No breakdown of the test item in pure CaCl₂-solutions was determined in HPLC-analysis. The complete material balances found for all soils and concentrations demonstrated that there was no significant loss of fadioachivity dissipated from the test systems or during sample processing. The parental mass balance of amidosulfuron-biuret was > 90% for all soils. Thus, the stability in presence of soil was adequate to determine the distribution by LSC in the definitive test.

B. DEGRADATION OF PARENT COMPOUND

Amidosulfuron-bivet was sufficient stable throughout the study. The mean parental mass balances were 95.9, 93.9, 94.0, 94.3 and 96.2% AR after 72 hours for soil AX, HH, DD, HN and LL, respectively.

C. FINDINGS

In the definitive adsorption test 0.4 - 1.7% and 0.9 - 1.8% of the applied radioactivity were adsorbed in soft AX and HN, respectively. No adsorption of the test item was detected for soils HH, Dollendorf and LL (see Table CA 7.1671.2-14). The calculated adsorption constants $K_{F(ads)}$ of the Freundlich isotherms for the test soil AX and HN were 0.012 and 0.009 mL/g. No adsorption of the test item was detected for soils HH, DD and LL. Therefore the adsorption constants were set to 0 mL/g (mean overall: 0.004 mL/g). The Freundlich exponents 1/n were 1.0526 and 0.8851 (mean: 0.9689) for soils AX and HN, respectively (see Table CA 7.1.3.1.2- 12).

Table CA 7.1.3.1.2- 11:Definitive test: Concentration of [terminal carbamoyl- 14 C]BCS-CQ56642 in
aqueous and soil phase at the end of the adsorption period (mean ± s.d.)

Concentration of t.i.	Soil	Solution	Percentage				
[mg/L]	[mg/kg]	[mg/L]	Adsorbed ^A				
Laacherhof AXXa (AX)							
0.010	0.000	0.010	0.7 ± 0.7				
0.029	0.000	0.029	9.4 ± 0.6				
0.10	0.001	0.096	1.3 ± 0.4				
0.29	0.002	0.287	0.6 0.2 🚫				
0.97	0.016	9 ,952 🔧	$\gamma = 1 \gamma \pm 0.4 \gamma^{2}$				
	Hoefchen am I	Hohenseh 🕅 🖉 🌾					
0.010	0.000		@ -1.2 ≠ 0.7				
0.029	0.000	0.029					
0.10	0.000	070997	0.9 ± 0.6				
0.29	-0.001	£ 9.290 Å	-0.3 ± 0.05				
0.97	0.97 0.001 0.968 0.968 0.1 ± 0.2						
Dollendorf (QD)							
0.010	0.000	<u> </u>	-0.5 ± 0.5				
0.029	0.000	» (Q.029)	0.9 ± 0.2				
0.10	-0.001	۲ <u>0.098</u> ۲	<i>Q</i> -1.3 ± 0.2				
0.29	-0.004	~~ 0.2 @	-1.4 ± 0.7				
0.97	-0.678	€\$ 9 86 €	-1.9 ± 0.4				
	🔍 Hanscheid	exbor (HNO) 🕺 🚿 🔍	Ŭ				
0.010	©0.000	$\gamma 0.01 $	1.8 ± 0.6				
0.029	لي	© 0.0Q9 ⁴	1.5 ± 0.4				
0.10		<u> </u>	1.3 ± 0.4				
0.29	£ 0.003	\$\$\$.286 \$	0.9 ± 0.4				
0.97	Q0.013_C	0.955	1.4 ± 0.8				
Leland (LL)							
0.010	0.000		-0.9 ± 0.2				
0.029	× (9.000	\$.029	-0.9 ± 0.2				
0.10	0.000 ×	× مَ [*] 0.098	-0.4 ± 0.2				
0.29	<u>~</u> ~0.00 <u>2</u> ~~~	0.291	-0.7 ± 0.1				
0.90	<u>%</u> 0.000 ~	~ <u>0.968</u>	0.0 ± 0.3				

^A The amount of test them adsorbed to the soil was calculated by subtracting the equilibrium concentration in the solution from the initial concentration (applied concentration).



Table CA 7.1.3.1.2- 12:	Adsorption constants of [terminal carbamoyl-14C]BCS-CQ56642 in soils
-------------------------	--

			Adsorption					
Soil	Soil type	рН	K _{F(ads)} [mL/g]	1/n	R ²	KoC(ads) [mL/g]		
AX	loamy sand	5.9	0.012	1.0526	0.9268	025		
НН	loam	6.6	0 1	N/A	N/A		4	
DD	clay loam	7.0	0 1	N/A	N/A			
HN	silt loam	6.0	0.009	0.9074	∂ .9074√	~% .4		
LL	loam	5.7	0 1	N/A 🛫	NA			
Mea	an (arithmetic)		0.004	0.968	<u></u> 9171 @			

pH: Value given as determined with 0.01 M calcium chloride solution

K_F: Freundlich coefficient for adsorption (ads)

1/n: Slope of the Freundlich adsorption/desorption isotherms

Koc: Adsorption/desorption coefficient per organic carbon (x 100%) organic arbon) (

R²: Regression coefficient of Freundlich equation

¹ No adsorption of the test item was detected for soils III, DD and LL, therefore the adsorption constant could not be calculated and was set to 0 mL/g

III. CONCLUSIONS

The adsorption constants $K_{F(ads)}$ of abidosulturon-biuret for Soils AX and HS calculated based on the Freundlich isotherms were 0.012 and 0.009 mL/g, respectively. No adsorption of the test item was detected for soils HH, DD and L. Therefore the calculation according to the Freundlich equation could not be performed and the adsorption constants $K_{F(ads)}$ were set to 0 mL/g (mean overall: 0.004 mL/g). The respective $K_{OC(ads)}$ values for all soils were in the range of 0 to 0.6 mL/g (mean: 0.2 mL/g).

There was no significant correlation between pH and adsorption for the investigated soils.

Amidosulfuron-ADMP.

Studies submitted and evaluated in the course of the post-Annex I procedure for amidosulfuron

Report No.: A48997 Document No.: M-136973 Guideline (s): GECD 106 Guideline deviation(s): --GLP/GEP: yes

Executive Summary

The adsorption and desorption behaviour of $[^{14}C]AE$ F092944 (amidosulfuron-ADMP, AE F092944) was studied in eight soils in batch equilibrium experiments in the dark at 20 °C.

Soil	Source	Texture (USDA)	pH 1	OC [%]
S 2.1	Landwirtschaftliche Untersuchungs- und	sand	5.00	1.17
	Forschungsanstalt Speyer, FRG			
LS 2.2	Landwirtschaftliche Untersuchungs- und	loamy sand	5.00	2.91
	Forschungsanstalt Speyer, FRG			
SL 2.3	Landwirtschaftliche Untersuchungs- und	loamy sand	ال 4.70	1.32
	Forschungsanstalt Speyer, FRG	e C	, s	
Arizona A	University of Arizona, Maricopa Agricultural Center,	loamy sand	\$ 00	0.16
	Research Farm, USA		Ø	O' ĝ
Arizona B	University of Arizona, Maricopa Agricultural	sandy loann	≫7.95 _. ∢	0,20
	Center, Research Farm, USA			, S
SL V	Hoechst AG, Frankfurt/Main, FRG	sandy loam	6.90	<u>∘</u> ¶.04
SL 2	Hoechst Roussel Agri-Vet Company, Mississipi	svit loana	\$.60 ¥	ر» 0.72
	Research Farm, USA		N° Q	
Kanada	Hoechst Canada	🔊 silty 🛛 ay 🖉	D 7.70 V	1.80
¹ determine	d in 0.01 M CaCl ₂ solution) ₍	<u> </u>

The adsorption phase of study was carried out using air dried soils with a soil-to-solution ratio of 1/5 for all soils. Amidosulfuron-ADMP (AE F092944) was applied at concentrations of 4.6, 2.4, 1.3 and 0.6 mg/L in aqueous 0.01 M CaCl₂ solution. The desorption phase was performed for the highest concentration only by supplying pre-adsorbed soil samples with fresh aqueous 0.01 M CaCl₂ solution for two desorption cycles. Adsorption and desorption cycles took place for 24 hours equilibration time each.

Amidosulfuron-ADMP (AE F092944) was sufficient stable throughout the study. The material balances were 97.7, 94.2, 93.9, 96.3, 91 9 94.4, 96.6 and 94.7% of applied radioactivity [% AR] for soil S 2.1, LS 2.2, S 2.3, SL V, SL 2, Afizona & Arizona B and Kanado respectively. Ø

The calculated adsorption \mathcal{O} efficients K_{F(\mathcal{O})} of the Freundlich adsorption isotherms ranged from 1.05 to 81.30 mL/g (mean: 14,6 mL/g) and the adsorption constants $N_{OC(ads)}$ (normalised to organic carbon content) ranged from 89 to 11289 mL/g (mean: 1861 mL/g). The Freundlich exponents n were in the range of 0.52 to 0.80 (mean: 0.67) indicating that the concentration of AE F092944 affected the adsorption behaviour in the examined concentration range.

MATERI

1. Test Item [pyrimidine-2] £ F092944 Hoe 🕅 2944 👀 ZB99 0001 Code No.: Batch No.: 21054 Specific Activity: 1084 MBg Radiochemical Purity °99% Chemical Purit 2. Test Solls

Four soils originating from Germany, two soils originating from the USA and one soil originating from Canada were dised for the test. The soils representing different geographical origins and soil properties (see Table CA 7.1.3.1.2-13). Air dried soil samples were sieved down to 2 mm particle size prior to use.

Parame	eter					Results / Un	nits		
Soil Des	signation	S 2.1	LS 2.2	SL 2.3	Arizona A	Arizona B	SL V	SL 2	Kanada
Source		Landy	wirtschat	ftliche	University	of Arizona,	Hoechst AG,	Hoechst	Hoechst
		Unter	suchung	s- und	Maricopa	Agricultural	Frankfurt/Mai@3	Roussel	Canada
		Forse	chungsaı	nstalt	Center,	Research	FRG	Agri-Vet	
		Sp	beyer, FF	RG	Fa	arm		Company	
							ð,	Mississi@"	Q
								Research	
D	1 • .					N		Farm, SA	, Sř
Pesticid	e use history	Not reported					у ,		
Collecti	on procedures					Not reporte		r si	
Samplin	ng depth					Not report	ed 🖉 🔊		Ś
Storage	conditions				Å	Not reporte	ed O		Ş
Storage	length				A A	Not reporte	s la		<i>1</i> 7
Soil Pre	paration				Aur-dri	ed and sieve	xd (2 mm)	ŷ <i>(</i>)	
Textura	l Class (USDA)	sand	loamy	loamy	Loamy _	S sand	sandy loam?	silt	silty
			sand	sand 👸	⊳″ sand∕Q	loada	× ~		clay
Sand	$[50 \ \mu m - 2 \ mm]$	84.30%	84.60%	66.42%	88.41%	6 4 39% ₃	56.80%	15.30%	2.22%
Silt	[2 µm – 50 µm]	11.20%	9.70%	24,68%	2®4%	@6.14%	31:60%	0 66.60%	41.31%
Clay	[< 2 µm]	3.50%	5.70%	890%	8.75%	19.47%	مِنْ 60% مِنْ	18.10%	56.47%
pН		5.00	5.00	4.70	° 8.00 €	7,93	6.10	5.60	7.70
Organic	Carbon	1.17 2,91 1,22 ⁷ 0,46 0.26 0 1.04 0.72					1.80		
Organic	Matter	2.01	2.01 5.01 1.27 0.28 0.45 1.79 1.23 3.7					3.10	
Cation I	Exchange	3.95	10.59	4.68	° ^{3.39} √	10.78	<u>6.60</u>	16.10	39.54
Capacit	y [meq/100 g]	×.	0		s °	, Ŷ			

Table CA 7.1.3.1.2- 13:	Physico-chemical properties of test soils
	i nysieo enemiear properties of test sons

USDA: United States Department of

B. STUDY DESDG

1. Experimental Conditions

The test system for adsorption/desorption in batch equilibrium experiments consisted of centrifugation tubes (volume 100 mt) and screw caps. 1

In preliminary tests, the appropriate adsorption equilibration time and the stability of the test item were determined. Ø)

The adsorption phase was carried of in duplicate using air-dried soil with soil-to-solution ratios of 1/5 for all soils. A@F092944 was applied at nominal concentrations of 4.635, 2.393, 1.311 and 0.581 mg/L in aqueous 0.01 M(CaCl₂ solution. The desorption phase was performed by supplying preadsorbed soil samples with flesh stephized aqueous 0.01 M CaCl2 solution to samples of the highest test concentration only. Adsorption and desorption took place for 24 hours equilibration time each.

were transferred on a gyro wheel shaker and equilibrated in the dark at 20 °C. The test systems

Analytical Procedures 2.

After equilibration the soil was separated from the CaCl₂ solution by centrifugation. After adsorption, the removed supernatant was replaced by fresh aqueous 0.01 M CaCl₂ solution and equilibrated again (first desorption). The desorption step was repeated one more time (second desorption). The remaining soil was air dried and the radioactivity content was determined by combustion/LSC to establish a mass

balance. The concentration of the test item in the aqueous phases was determined by LSC due to the stability of the test item demonstrated in the adsorption kinetic test.

3. Calculations

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

II. RESULTS AND DISCUSSION

A. MATERIAL BALANCE

7% of applied radiosetivity

Material balances were 97.7, 94.2, 93.9, 96.3, 91.9, 94.4, 96.6 and 94.7% of applied radioactivity [% AR] for soil S 2.1, LS 2.2, S 2.3, SL V, SL 2, Arizona A Arizona B and Kanada, respectively, for the highest test concentration. The complete material balances found for all soil@demonstrated that there was no significant loss of radioactivity dissipated from the test systems or the processing.

B. DEGRADATION OF PARENT COMP

AE F092944 was sufficient stable as shown within the apporption kinetic test.

C. FINDINGS

At the end of the adsorption phase, 15.5-27.1% AR, 25.1-1.8% AR, 37.6-58.6% AR, 4.3-10.9% AR, 10.4-19.7, 29.0-39.2, 91.3-97.9 and 55.5-77.7% AR were adsorbed in sold S 2.1 LS 2.2, S 2.3, SL V, SL 2, Arizona A, Arizona B and Kanada, respectively (see Fable CA/1.13, 2^{2} -14). The calculated adsorption coefficients $K_{F(ads)}$ of the Freundlich adsorption isotherms ranged from 1.05 to 81.30 mL/g (mean: 14.76 mL/g) and the adsorption constants $K_{OC(ads)}$ (normalised to organic carbon content) ranged from 89 to 11289 mL/g (mean: 1861 mL/g). The Freundlich exponents n were in the range of 0.52 to 0.86 (mean: 0.67), indicating that the concentration of AE F092944 affected the adsorption behaviour in the examined concentration range (see Table CA/7.1.3.4.2-15).

At the end of the first desorption phase (performed for the highest test concentration only), 41.5%, 36.0%, 32.7%, n.d.% 32.6%, 37.68%, 6.3% and 86.6% of the initially adsorbed amount were desorbed in soil S 20, LS 22, S 2.3 SL V, St 2, Arizona A, Arizona B and Kanada, respectively (see Table CA 7.1.3.1.2-14). At the end of the second desorption phase (performed for the highest test concentration only), 30.5%, 40.7%, 28.7%, 28.4%, 37.8%, 33.6%, 6.9% and 24.5% of the initially adsorbed amount were desorbed in soil S 2.1, LS 2.2, S 2.3, SL V, St 2, Arizona A, Arizona B and Kanada, respectively (see Table CA 7.1.3.1.2-14). At the end of the second desorption phase (performed for the highest test concentration only), 30.5%, 40.7%, 28.7%, 28.4%, 37.8%, 33.6%, 6.9% and 24.5% of the initially adsorbed amount were desorbed in soil S 2.1, LS 2.2, S 2.3, SL V, SL 2, Arizona A, Arizona B and Kanada, respectively (see Table CA 7.1.3.1.2-14).



Table CA 7.1.3.1.2-14:

Adsorption isotherms: Concentration of amidosulfuron-ADMP in aqueous and soil phase at the end of the adsorption period and percentage of adsorbed and desorbed AE F092944 in soils (mean values)

Concentration of	Cal	-4	S.a.I	Adsorbed	1 st	2 nd
t.i.	501	ition	5011		Desorption	Desorption
[mg/L]	[mg/L]	[µmol/L]	[µmol/kg]	[%]	© [°] [%] ¹	[%] ¹
			S 2.1			Å »
4.635	3.9185	25.25	23.09	15.5	_ ¥1.5	30.5
2.393	1.9560	12.60	14.08	18.0	🕜 n.d. 🕰	n d
1.311	1.0430	6.72	8.64 📎	° 20/4 ~	7 n.d. 7	, m.d.
0.581	0.4235	2.73	5.07 🦉	27.1 ×	nkd.	°∼yn.d.
		-	LS 2.2	×, 0, v		
4.635	3.4715	22.37	37.49	25	ي 36.0 🔊	4007
2.393	1.7340	11.17	21.23	27.5	n.d	nrd.
1.311	0.9510	6.13	LT1.60	£27.5	n.d.	©n.d.
0.581	0.3965	2.56	Q* 5.94	× 31.8	@.d.	🖉 n.d.
		4	SL 2.3 💭			Ĵ
4.635	2.8905	18.63 💭	56.21 Q	\$4,6	32.70	28.7
2.393	1.3570	8.74	33.38	43.3	n.d.	n.d.
1.311	0.6510	4.20	21.27 ×	50.3	@1.d.	n.d.
0.581	0.2405	155	10.97	© 58,6¥	2 n.d.	n.d.
		O ^V A	rizona 🔬			
4.635	4.4335	O28.57	_ ≪6.49 _0 ^v	~Q4.3 _ U	-40.3 ²	28.4
2.393	2.2725	õ 14.64	≫ <u>3.88</u> ∪	5.0	n.d.	n.d.
1.311	1.2160 🗞	7.84	3.005	Q* 7.2 *	n.d.	n.d.
0.581	0.5175	0.33 0	×2:05	109	n.d.	n.d.
	Â,		rizona B 🥎			
4.635	4.1.15	Q″ 26.13	15.58	10.4	32.6	37.8
2.393	2,1390	13.78	8.28	10.6 🖉	n.d.	n.d.
1.311	G.1075	£7.14 🔬		15.5	n.d.	n.d.
0.581	0.4665	3.01	\$.69	19.7	n.d.	n.d.
	Ő ^y	T L	<u>sov</u> ~			-
4.635	3 2895	2,1,20	S 43∂5	29.0	37.6	33.6
2.393	f.598 0 €		25,62	33.2	n.d.	n.d.
1.311	Q̃0.7993	© 5.15 ©	¥6.48	39.0	n.d.	n.d.
0.581	0,2535	2.2 8 , ⁷	× 7.33	39.2	n.d.	n.d.
<u>لي ۲</u>	<u> </u>		SL 2			
4.635	0.4025	2.59	136.37	91.3	6.3	6.9
2.39	0.11 95	\$ 0.77 O	73.25	95.0	n.d.	n.d.
1.311	0.0465	$\sim 0.30^{\circ}$	40.74	96.5	n.d.	n.d.
6581	0.0120	0708	18.33	97.9	n.d.	n.d.
V Q		<u> </u>	Kanada			
4.635	2.0700	مَحْ 13.40	82.36	55.1	26.6	24.5
2.393 🚄	, 0.8945	<i>➡</i> 5.76	48.28	62.6	n.d.	n.d.
1.311	0.3850 🍙	2.48	29.84	70.6	n.d.	n.d.
0.581	A.1295	0.83	14.55	77.7	n.d.	n.d.

n.d.: not determined %

² Low concentrations of test compound measured in the aqueous phase (near the limit of detection) must be considered as uncertain and therefore easily result in negative values for adsorption during calculation

				Adsorption		
Soil	Soil type	рН	K _F	n	r ²	Кос
S 2.1	sand	5.00	2.47	0.69	0.9965	211
LS 2.2	loamy sand	5.00	2.59	0.86	0.9974	° &9
SL 2.3	loamy sand	4.70	8.25	0.65	0.9996	6 25
Arizona A	loamy sand	8.00	1.05	0.52	\$9780 °	£ 663
Arizona B	sandy loam	7.95	1.82	0.68	0.9716	5 6%
SL V	sandy loam	6.10	4.11	Ø.78 ×	y 099902	395 °
SL 2	silt loam	5.60	81.30	0.580	0.9985	
Kanada	silty clay	7.70	16.50	~0.62 ~0 ×	0.9993	©17
Mear	n (arithmetic)		ACA:76	Q 0.67	& 0.99 <u>1</u> 4	5 1861

Table CA 7.1.3.1.2-15: Adsorption constants of amidosulfuron-ADMP in soils and soil min

K_F: Freundlich coefficient for adsorption (ads)

»" "A

b: Freundlich coefficient

 K_{oc} : Adsorption/desorption coefficient per organic varbon (K x 100/% organic varbon), r^2 : correlation coefficient

III. CONCLUSIONS

The adsorption coefficient K $\partial \partial$ (arithmetic mean) $\partial \partial$ amide amide and a MDMP (AE F092944) was 1861 mL/g. The Freundlich exponent (Carithmetic mean) was 0.67.

The results are included in the summary of the adsorption and desorption behaviours of amidosulfuron and its major degradation products in soil given in section CA 74, 3.1.

Note: Amidosulfuron-ADMP (AF F092944) is a serminal metabolite shared with a number of further pyrimidinyl class sulfonylurea herbicide active substances. In recent AIR reviews for other Bayer active substances forming this degradate (foramsulfuron, mesosulfuron-methyl), EFSA has repeatedly requested to pool data available from various (non-Bayer) sources to generate a consolidated endpoint on soil adsorption. Even though Bayer as well as some member states have expressed practical concerns over such procedure, the new list of EU endpoints for substance foramsulfuron has been issued including a such consolidated data secon component AE F092944.

Expecting similar request by EFSA as well in the context of the present AIR review, it is for pragmatic reason, proposed to use the identical dataset as well for metabolite Amidosulfuron-ADMP (AE F092944):

Screenshot of consolidated endpoints for AE F092944 as presented in EFSA conclusion on Foramsulfuron.

Metabolite 2 AE F092944 a.k.	a IN-J290, a	.k.a. IN-J)290, a.k.a	a. ADMP,	a.k.a. CP	017477		
Soil Type	OC %	Soil pH ^{a)}	K _d (mL/g)	K _{doc} (mL/g)	K _F (mL/g)	K _{Foc} (mL/g)	1/n	
Loamy sand	1.17	5.0ª			2.47	211	0.69	
Loamy sand	2.91	5.0 ª			2.59	89	0.86	
Sandy loam	1.32	4.7 ª			8.25	625	A.65	
Sandy loam	1.04	6.1 ª			A.I1	395	0.78	
Silt loam	0.72	5.6ª			0,81.3	11289	0.5	
Silty clay	1.80	7.7ª	2	° A	v 16,5°	917	0.62	
Speyer 2.2, loamy sand ^c	2.1	6.4 ^b	()		1:22	58,1	° 0.85	
Pavia, loamy sand ^c	0.5	5.2 ^b	K)	<u> </u>	226	Ø 5 2	∞0.81	
Drummer, silt loam ^c	3.1	5.5 ^b	O	°∼y	A5.3	1460	0.71 °	
Nambsheim, sandy loam ^c	0.7	7.8 ^b	*	K.	0.859	1230	0.29	
Vercelli, silt loam ^c	1.2	5.8 ^b	<u>6</u> 0.	0° 1	2.38	199	8/82	
Spever 2.2. loamy sand ^d	2.29	7.0		Å	1.17	\$50.9	0.84	
Collombey, Joamy sand ^d	1.17	7.76			×0.71	60.4	0.82	
Sisseln, sandy loam ^d	1.557	286		õ,	0 0.83	52.8	0.92	
Vetroz silt loam ^d	4 05	30	Q. (V K	1 78	4200	0.91	
Drummer silt loam ^e	1.78	× 6.9 ^b €		, <i>S</i> 1	11054	648.3	0.72	
Sarny sandy loam ^e	0.58	8.0		, C	. 402	\$21.0	0.68	
Spinks loamy sande	1 10	6.8 ^b	- S		2 59	> 225.2	0.00	
Sable silty clay loam ^e	1.10	a g b	la d		$\sqrt{2.39}$	1611 5	0.75	
Geometric mean (if not nH den	endent)*		<u>;</u>	ř. S	, <u>JZ.69</u>	275.8	0.50	
(n - 10)		j 🔊	Ũ	°0,		275.0		
Arithmetic mean (if not nH den	alident)	ď.	Ĉ		. *		0.76	
nH dependence. Vec or No.	емиенц	Ő¥ .		correlati	Ś		0.70	
(a) Magurad in CaCh			NU Clear	CUITEIago	øri			
(b): Measured in H ₂ O	Å 6	s .	.4	Å				
(c): Aikens, P.J.; 2001 (accepted in th	RARs for thep	yrsulfu@n-n	nethyl@pensu	ulfuror and	azimsulfuror	n; refer to the	e EFSA	
conclusion on the peer deview of	the active subs	tance flupyrs	sulf@n-met	hyl, EFSA (2	2014a))			
(d): Voeikel, W. 1995 (accepted in the substance nicosulfuen EESA (20)	BRAR TOC DICOSU	uitoxon; retei	O C C	eonclusion	on the peer	r review of th	ie active	
(e): Nadeau, R.G., SicDu, R.S., (1996)	(accepted in the	RARs for s	difosulfuror a	and halosulf	uron; refer t	to the EFSA o	onclusion on	
the peer review of the active sulf	osanaron, EFSA	(2014b)	S.					
* Only relevant after implementation of	Koje published I	EFSA guidan	ce.					
	~ Õ		Ś					
Amidosulfuron-ADDP: O	õ,	°° ×	U'					
Ĩ, I,		Y K						
New studies (non EU-exaluated	Csubmitted	in context	t of Annez	x I appro	val renew	al:		
j O V K	ĵ _e ŭ	\sim		**				
Report: 🔊 🖉 KC&71	3 1 207.	· 2()16 [.] M-54	7183-02-1				
Fitle: O 2-Appino	-4 Qdihydrô	v-[2-14C	lovrimidin	e: Adsorn	tion/desor	ption on fo	ur soils	
Report No. 0 \$14-055	9°		10,111,011	•••••••••••		p 11011 011 10		
Document No.: AM-54718	33-02-1							
Guideline(s)	est Guideline	No. 106						
Commiss	Commission Regulation (FII) No 283/2013 in accordance with Regulation							
(EC) No	1107/2009					8		
US EPA	OCSPP Test	Guideline	No. 835 1	230				
Fuideline deviation(s):	G COLI 1000	Saraonno						
LP/GEP: ves								

Executive Summary

The adsorption behaviour of amidosulfuron-ADHP (AE F094206) was studied in four soils in batch equilibrium experiments in the dark at 22.6 °C.

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Soil	Source	Texture (USDA)	рН ¹	OC [%]
Laacher Hof AXXa (AX)	Monheim, Germany	sandy loam	6.3	2.0
Dollendorf II (DD)	Blankenheim, Germany	loam	7.3	5.1
Hoefchen am Hohenseh 4a (HaH)	Burscheid, Germany	silt loam	6.1	2.1
Laacher Hof Wurmwiese (WW)	Monheim, Germany	loam	5.1	2.0
1			Ro	

¹ pH measured in CaCl₂

The adsorption phase of the study was carried out using air-dried, sterilized soils (γ -irradiation), equilibrated in aqueous 0.01 M CaCl₂ solution with a soil-to-solution ratio of 1:20, 0.5 g soil / 10 mL solution).

2-Amino-4,6-dihydroxy-[2-14C]pyrimidine (amidosulfuron_XDHP) was applied in aqueons 0.01 M CaCl₂ solution at nominal test concentrations of 0.35, 0,175, 0,005, 0.0175 and 0.0035, me/mL. The equilibration time for adsorption was 1 h.

The test item was sufficient stable throughout the study for all soils. Mean parental mass balances of the definitive test at a nominal concentration of 0.25 µg/mL were 93.6, 90.3, 93, Oand 93, 6% AR for soil AX, DD, HaH and WW, respectively. Mean material mass balances of the definitive test at a nominal concentration of 0.35 µg/mL were 98, 92.2, 97.8 and 98.8% AR for soil AXODD, HaH and WW, respectively. No adsorption to the surface of the test tubes was observed.

The sorption parameters were calculated using Freuhalich isotherms? The calculated adsorption constants K_{F (ads)} of the Freundlich isotherms ranged from 5.0 to 11. LorL/g (mean: 7.0 mL/g) and the adsorption constants Koc(ads) (normalised to organic carbo Ocontents ranged from 218 to 289 mL/g (mean: 261 mL/g) for the tested soils. The Freundrich exponents I/n ranged from 0.8827 to 0.9982 (mean: 0.9192).

There is no significant correlation between pH and adsorption for the investigated soils. According to .royň ng all te: the mobility index of Briggs, the top item solw mobile in all tested soils.

I.

A.

1. Test Item 2-@Č]pyrimidine 2-amino-4,6²dihydrox Code: CC-6676 Specific Activi 4.**68**4 MBô⊮ma Radiochemical Puri \$98% Chemical Purity

2. Æest Soils

Four soils originating from Germany were used for the test. The soils were taken from agricultural use areas representing different geographical origins and soil properties (see Table CA 7.1.3.1.2-16). The soils were sieved to a particle size of ≤ 2 mm and sterilized by gamma radiation for the adsorption batch equilibrium experiments.

Table CA 7.1.3.1.2-16:	Physico-chemical properties of test soils
	i nysieo enemicai properties of test sons

Parameter		Results	/ Units				
Soil Designation	AX	DD	HaH	WW			
	(Laacherhof	(Dollendorf II)	(Hoefchen am	(Laacher Hof			
	AXXa)		Hohenseh 4a)	Wurmwiese)			
Geographic Location:			Ű				
City	Monheim	Blankenheim	Burscheid	Monheim			
State	North Rhine-	North Rhine-	North Raune-	WNorth Phine-			
	Westphalia	Westphalia	Westphalia	Westphalia			
Country	Germany	Germany 🔊	Germany 🏹	Germany			
GPS Coordinates	N 51° 04.6'	N 51° 04.6	N 51°04 0	√ × 50° 22,9'			
	E 006° 55.5'	E 006° 53.57	£ 007°¢6,3'	© E 006 43.0'			
Pesticide use history		None used for the r	nevious five years	, _C			
Collection procedures	Sample	taken with shove	and placed in plasti	c bago 🏾 🌾			
Sampling depth		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
Storage conditions	Ambient, aft	er sieving, air-dryi	ng and stepilization	prior to ase			
Soil Preparation	A	Air-cored and	ieved (Dnm) O				
Textural Class (USDA)	sandy loam 💍	16am	sift loam	no loam			
Sand	72%	چ 29%	× 19%	Ø 50%			
Silt	19%	44%	0 ⁷ 66% (32%			
Clay	9%	ž 27% Š	\$\$\$% Ô	18%			
pH CaCl ₂	6.3 °~	<u></u> √√7.3 O [*]	~~ 6.1 C	5.1			
pH water	<u></u> \$ 6.5	7.4	6:4	5.4			
Organic Carbon	2.0%	~ 5,1% [^]	∛ 2,1%	2.0%			
Organic Matter ¹	× 3.4%	×8,8% Ø	3.6%	3.4%			
Cation Exchange Capacity	9.0	21.5 ×	11.3	10.4			
[meq/100 g]			\sim				
¹ % organic matter = % organic	c carbon x 1.724		Y				
GPS: global positioning system							
USDA: United State Department of Agriculture							
STUDY DESIGN							
Experimental Con	Experimental Conditions						

B.

Experimental Conditions 1.

The test system for adsorption in Gatch equilibrium experiments consisted of sterile plastic centrifuge tubes (volume 50 mL) and PTFF sealed screw caps. The CaCl₂ solution was sterilized by autoclaving before the start of each test. The experiments were performed in duplicate.

In preliminary tests, the stability of the test item in CaCl₂ solution, the adsorption of the test item to the test system surface. The optimal soil-bo-solution ratio, the appropriate adsorption equilibration time and the stability of the test item in presence of soil were determined (parental mass balance test).

In the definitive test, the adsorption phase of the study was carried out using pre-equilibrated, air-dried and sterilized soil with 2-Amino-4,6-dihydroxy-[2-14C]pyrimidine applied at nominal concentrations of 0.35, 0.175, 0.035, 0.0175, and 0.0035 mg/L in the dark at 22.6 °C for 1 hour. The equilibration solution used was 661 M aqueous CaCl₂ solution with a soil to solution ratio of 1:20 for all soils.

The samples were incubated at constant temperature in the dark and continuously agitated using an overhead shaker.

2. Analytical Procedures

The suspensions were centrifuged (2 min., 4000 rpm) and the radioactivity contents in the supernatants were analysed by liquid scintillation counting (LSC). In order to establish the material balance, the remaining soil was extracted at ambient conditions using 10 mL pure water +1% NH₃, followed by 3 further extraction steps at 50 °C in a water bath and 5 mL of pure water +1% NH₃, each. Selected combined extracts were analysed by HPLC and fractionated on luma plates (&)seconds interval) to determine the stability of the test item in the solution. The exhaustively extracted soils were air dried, homogenized and residues were determined by combustion/LSC. The parental mass balance (PMB) was determined in all soils of the definitive test using a soil-to-solution rate of 1/29, corresponding to 0.5 g soil dry weight equivalents and a total volume of 10 mL aqueous 0.61 M Cacl2 solution.

3. Calculations

The overall material balance (MB) was calculated as sum of radioactivity of the refaved supernatants resulting from adsorption and the residues in the soft determined by combustion (including the remaining solution after the last centrifugation step).

The calculation of the parental mass balance for the adsorption was based on the amount of test item recovered in the aqueous $CaCl_2$ solution and extracted from the soil and surface of the test vessel with an organic solvent.

The amount of test item adsorbed to soil was calculated by subtracting the equilibrium concentration in the solution from the initial concentration (applied concentration) By establishing the material balances and the stability of the test form with HPLC/radiodetection it was verified that, besides the adsorption to soils, no other significant processes had contributed to the decline of test item measured in the supernatant

Adsorption isotherms were calculated by linear regression analysis of the adsorption data according to the Freundlich equation. Based on the Freundlich K_{F} -values, the respective Freundlich $K_{F,OC}$ -values were derived by normalisation for the soil organic carbon content.

II. RESULTS AND DISCUSSION

A. MATERIAL BADANCE AND RESULTS OF PRELIMINARY TESTS

In preliminary tests it was shown, that the test new was stable in CaCl₂ solution and did not show significant actorption to the inner surfaces of the test vessels.

Mean material balances were 98.2, 92.2, 77.8 and 98.8% of applied radioactivity [% AR] for soil AX, DD, HaH and WW, respectively. The complete material balances found for all soils and concentrations demonstrated that there was no significant loss of radioactivity dissipated from the test systems or during sample processing.

B. DEGRADATION OF PARENT COMPOUND

Amidesulfuror ADHP was sufficient stable throughout the study. The mean parental mass balances were 93.6, 99.3, 93.8 and 93.6% AP after 1 hour for soil AX, DD, HaH and WW, respectively.

C. FINDINGS

In the definitive adsorption test 23.4 - 36.0% AR, 33.3 - 40.1% AR, 24.4 - 36.0% AR and 23.8 - 34.5% AR were adsorbed in soils AX, DD, HaH and WW, respectively (see Table CA 7.1.3.1.2- 17). The calculated adsorption constants $K_{F(ads)}$ of the Freundlich isotherms ranged from 5.0 to 11.1 mL/g (mean: 7.0 mL/g) and the adsorption constants $K_{OC(ads)}$ (normalised to organic carbon content) ranged from 218 to 289 mL/g (mean: 261 mL/g). The Freundlich exponents 1/n were in the range of 0.8827 to 0.9982 (mean: 0.9192), indicating that the concentration of amidosulfuron-ADHP affected the adsorption behaviour in the examined concentration range (see Table CA 7.1.3.1.2- 18).

Table CA 7.1.3.1.2- 17:Definitive test: Concentration of 2-Amino-4,6-dihydroxy-[2-14C]pyrimidine
(amidosulfuron-ADHP) in aqueous and soil phase at the end of the adsorption
period (mean)

Concentration of t.i.	Soil	Solution	Percentage			
[mg/L]	[mg/kg]	[mg/L]	🖉 Adsorbed ^A			
	Laacherhof	AXXa (AX)	L ° í			
0.363	1.711	0.277	23.6			
0.181	0.848	0.139	23.4			
0.037	0.213	0.026	. °° 2 ³ ,2			
0.018	0.092	(∂:) 914	25.3			
0.004	0.026	Ø.002 (S)	√ մ6.0,∿γ			
Dollendorf (DD)						
0.363	2.420	<u></u>				
0.181	1.450	0009				
0.037	0.253	چ <u>%</u> 0.024 ج	34.5			
0.018	0.131		Ø 35 Ø			
0.004	0.026 🔬		26.1			
Hoefchen am Hohonseh (Hall)						
0.363	1.977 📎	s \$264	27.2 ¹⁰			
0.181	0.884	× 0.137 × ×	ي 24.4			
0.037	0.24	~ 0.0 %	33.0			
0.018	0.03	کر <u>کر کر ک</u>	28.3			
0.004	0.026 ×	سي [×] 0.002 [×] (36.0			
🖉 Laacher Hof Wurmwiese (WWI)						
0.363	× 1.859 ~	Q 0.2Q	25.6			
0.181			23.8			
0.037	0,236	× 0.025 ×	32.2			
0.018	Q0.126		34.5			
0.004	0.024 [%]	© 0.0QZ	33.4			

A The amount of test item adsorbed to the soil was calculated by Obtracting the equilibrium concentration in the solution from the initial concentration (applied concentration).

 Table CA 7.1.3,1.2 18:
 Adsorption
 Sconstants
 of
 2-Amino-4,6-dihydroxy-[2-14C]pyrimidine

 Adsorption
 Sconstants
 of
 2-Amino-4,6-dihydroxy-[2-14C]pyrimidine

 Adsorption
 Sconstants
 of
 2-Amino-4,6-dihydroxy-[2-14C]pyrimidine

			- Ô	Ads	orption		
Soil	Soil type	ΩpH ¹ ≈	©OC (§ [%]	KF(ads) [mL/g]	1/n	R ²	KFOC(ads) [mL/g]
AX	sandy loam	6.&	20	5.0	0.8827	0.9943	249
DD	loam	7.3	© 5.1 ×	J 11.1	0.9982	0.9965	218
Hat	sil@toam	§ 6.1	2	6.0	0.9042	0.9941	287
WW	loam		£2.0	5.8	0.8915	0.9952	289
	Mean (ari	hmetic)	ď	7.0	0.9192	0.9950	261

¹ pH: Value given as determined with 0.01 M calcium chloride solution

 $\hat{K_F}$: Freundlich coefficient for adsorption (ads)

1/n : Slope of the Freundlich adsorption/desorption isotherms

Koc: Adsorption coefficient per organic carbon (K x 100/% organic carbon)

R²: Regression coefficient of Freundlich equation

III. CONCLUSIONS

The adsorption coefficient K_{OC} (arithmetic mean) of amidosulfuron-ADHP (AE F094206) was 261 mL/g. The Freundlich exponent 1/n (arithmetic mean) was 0.9192.

The results are included in the summary of the adsorption and desorption behaviours of amidosulfuron and its major degradation products in soil given in section CA 7.1.3.1.

Report:	KCA 7.1.3.1.2/08;	; 2016; M-555189-01-1 🗳 🥎 🕺
Title:	Evaluation of pH-dependency of	of soil degradation and adsorption data of \bigcirc
	Amidosulfuron (AMS) and its r	metabolites - Statement
Report No.:	M-555189-01-1	
Document No.:	M-555189-01-1	
Guideline(s):	none	
Guideline deviation(s):	none	
GLP/GEP:	no	

Since amidosulfuron is known to be an ionisable compound, a statistical data evaluation was made to check for possible pH-dependency of soil adsorption, for the parent substance and all soil metabolites. The assessment was based on Kendall's rank correlation test. The results of the statistical test were expressed as Kendall-tau value showing strength of a correlation, ranging between 0 and 1, and the p-value defining level of significance, with a default limit value of 0.05.

O

The results of the statistical evaluation are presented in the following tables.

Table CA 7.1.3.1.2-19: Statistical evaluation for pH dependency of KpQ amidos furn

	QÎ	V.
Soil S O v	CaCl ₂)	Koc [mL/g]
SL 2	5.6	82
SLV	Ø 6.4	6
LS 2.2	5	18
Birkenheide	6.02	20
Minnesota S & S	5.8	75
Sarotti 🖓 🔧 🖑 🖉	7.38	15
Kanada N (7.6	34
Laarher Hutt AXXa 🗸 🏷 🗸 🗸	6.1	13
Dollendorft [®]	7.3	7
Hoefeten am Hohenseh 🖉 🖉 🔍	6.3	9
Wurnwiese	5.1	22
Hanscheiderhof & S	5.6	15
Kendallo tau		-0.246
p-value		0.301
The p-values high @ than and priori chosen leve	el of significance. A	correlation

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Table CA 7.1.3.1.2-20: Statistical evaluation for pH dependency of Koc: amidosulfuron-desmethyl

	nН	Koc
Soil	(CaCl ₂)	[mL/g]
Birkenheide	6.02	13
Minnesota	5.8	۵33
Sarotti	7.38	٢ 12
Kendall's tau		°∼ -0.333° ≉
p-value		J. V. O
The p-value is higher than an a priori chosen lev between the Koc and soil pH does not exist	el of significance	A correlation
	× ~	
CA 7.1.3.1.2-21: Statistical evaluation for pH depend chloropyrimidine	ebey of Koc: am	ittosulfurón-desmettayl-
Soil	[©] pH [©]	Koc
	\mathcal{A} \mathcal{A}	
Hoefchen am Hohenseh		$D^{\nu} = D^{\nu} \frac{2}{24} \frac{1}{62}$
Hanscheiderhof		
Dollendorf		
Leland	ý Č	48
Kendall's tau		-0.8
p-value	<u> </u>	<u> </u>
The p-value is higher than an a priori chosen lev between the Koc and soil pH thes not exist	el of significance	e. A correlation
		<u></u>
CA 7.1.3.1.2-22: Statistical coaluation for pH depend	ency of Koc am	idosulfuron-guanidine
	2 PH	Koc
	CaCl ₂)	[mL/g]
Laacher Hof AXXa	5.9 ×	11
Hoefchen am Hohenseh	6.6	13
Hanselfeiderhof &	6	12
Dottendorf O' O' O'	7	13
Leland V L C V	5.7	39
KendadU's tau 🗢 🔨 🖉		0.200
p-value		0.806
The p-value is higher than an a priori chosen lev	el of significance	e. A correlation
« between the Koc and soit of does not exist		

Table

2016-05-31

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

$1 a 0 0 C \Lambda 7.1.2.2.2.5$. Statistical evaluation for pri dependency of Koc. annuosultaton-orace	Table CA 7.1.3.1.2-23:	Statistical evaluation for pH dependency of Koc: amidosulfuron-	-biuret
---	------------------------	---	---------

	Soil		pH	Koc
	~ • • • •		(CaCl ₂)	[mL/g]
Laacher Hof AX	Xa		6.2	0.6
Hoefchen am Ho	henseh		6.9	0 رش
Hanscheiderhof			6.1	O
Dollendorf			7.2	∞ 0. 4 °
Leland			6	<u>v</u> <u>v</u> c
Kendall's tau				0^{7} 0^{7}
p-value			ð° í	
The p-value is h	igher than an a prio	ori chosen level	ofsignifican	ce. A correlation
between the Ko	e and soil pH does n	ot exist	$\sim 0'$	
		Ű	Ś	
7.1.3.1.2-24: St	tatistical evaluation f	or pH dependen	cyof Koc: a	nidosul#uron-AlDMP
			<u>~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~</u>	
	Soil		γ pH γ	
\$21				0° $0^{\text{mL/g}}$
1822	۰ <u>م</u>	6 [~] 4		
LS 2.2 SL 2.3	Ś			×1 (2)5
SL 2.5	A			× × × × × × × × × × × × × × × × × × ×
	Ő¥		₹ <u>9</u> .1 ×	
SL 2 Variada	Õ 🤋	y . W		× 017
Kanada	o ×	, ~	0 1.10	× 91/
Speyer 2.2		Q. Z	.Q.4	× 58
Pavia	K Ö		5:2	O) 452
Drummer	S L		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	1461
Nambsheim		' Å e		123
Vercelli		. 8	6 8	196
Speyer 2.2	"		~~7	51
Collombe		D' A	S 7.7	61
Sisseln	0" <i>0</i> " \$		J 7.8	53
Vetroz			7.3	42
Dranomer S	× ~		6.9	646
Sarpy Sarpy		×u · · · · · ·	8	331
Kendalks tau 🕺		<u> </u>		-0.243
p-value 0				0.161
	100			





Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Table CA 7.1.3.1.2-25:	Statistical evaluation for	pH dependency of	Koc: amidosulfuron-ADHP

Soil	pH (CaCl ₂)	Koc [mL/g]
Laacher Hof AXXa	6.3	218
Dollendorf II	7.3	<u>ک</u> 286
Hoefchen am Hohenseh	6.1	ر 290 ک
Laacher Hof Wurmwiese	5.1	≥ <u>~</u> 2H&° √
Kendall's tau		D' Q O
p-value		Ø.089 A
The p-value is higher than an a priori chosen	level of significanc	é. A correlation
between the DT50 and soil pH does not exist.	Ű A	

Overall Conclusion: The statistical evaluation of the scription data of anidosuffuron and its metabolites demonstrated that for none of the evaluated substances a significant correlation of Koc to the soil pH exists.

CA 7.1.3.2 Aged sorption

Studies are not required under Compussion Regulation (EL) No 283/2012 in accordance with Regulation (EC) No 1107/2009.

CA 7.1.4 Mobility in soil

A study for the determination of the plant uptake factor was performed for amidosulfuron and is submitted within this supplementations for approval renewal of amidosulfuron.

 Report:
 KCA 7.1.4/01
 2006; M-545930-01-1

 Title:
 Determination of the plant uptake factor of amidosulfuron in wheat plants

 Report No.:
 ErSa-15-0008

 Document No.:
 M-54593001-1

 Guideline(s):
 US EPA OCSPP not applicable

 GLP/GEP:
 yes

The plant uptake factor (PUK) of an adosulfuron was determined in wheat plants for 6 days in a greenhouse ctimatic chamber under controlled temperature (approx. 20 °C/18 °C (day/night)), light (day/night cycle of 6 h/8 b) and honidity (approx. 50%) conditions.

0

Approx 86 - 102 mL of the test solution was taken up by the plants. 5.78 ml of the test solutions was lost due to exporation, which was determined in four control replicates, respectively. The mean initial concentrations (day 0) in the test solutions amounted to $173.4 \,\mu\text{g/L}$ for [pyrimidyl-2-¹⁴C]amidosulfuron. Towards the end of the experiment an increase of the initial concentration of [pyrimidyl-2-¹⁴C]amidosulfuron up to 211.03 $\mu\text{g/L}$ was observed. Root washing desorbed with a mean 2.2 μ g of the test compound. The radioactive recovery for [pyrimidyl-2-¹⁴C]amidosulfuron amounted to 98.3%. The separate analysis of roots and shoots exhibited, that in average 36.8% of the radioactive test item was taken up by the plant and was freely translocated from roots into the shoot.

The PUF for amidosulfuron amounted to 0.31 ± 0.06 in wheat plants.

I. MATERIALS AND METHODS

A. MATERIALS

1. Test Item

[pyrimidyl-2-14C]Amidosul	furon
Sample ID:	KML 10106
Specific Activity:	3.75 MBq/mg
Radiochemical purity:	\geq 96%
Chemical Purity:	$\geq 96\%$

2. Test Crop

Wheat plants (variety: Thasos) were pre-grown in perlite under greenhouse condutions. At growth stage BBCH 12-13, the perlite was removed from the root system by washing with a gentle water shower. The roots were carefully cleaned and 2 plants were transferred to each 0.35 C brown glass bottles containing approx. 310 mL nutrient solution. After a pre-conditioning phase of 3 days (BBCH 14) the initial fresh biomass of the whole plants was determined by weighting.

3. Test Solution

The intended test concentration of the test item was $100 \ \mu g/L$. The stock solution was prepared by dissolving the test item in 3 x 1 mL acetoniurle/water (8/2) and 2 x 1 mL water. The application was done by adding of aliquots of the stock solution of the buffered nutrient solution (50% Hoagland's nutrient solution containing MES-buffer to stabilize the target pH value of 6.5) of the single tests.

B. STUDY DESIGN

1. Experimental Conditions

The test items were separately investigated in five single tests. For each test, a single plant was incubated with approx. 310 mL test solution in a 0.35 L brown glass bottle. To investigate the evapotranspiration, the uptake of nutrient solution by the plants and the biomass development throughout the course of each experiment of three control tests without test compound were prepared. Four replicates served a stability and evaporation control systems.

During the test period the plants were fixed with elastomer foam and the flasks were sealed with plastic foam to avoid tosses to evaporation. To establish aerobic conditions throughout the experiments, each flask was aeraed by an appropriate stream of air.

During the experimental phase, the plants were cultivated in a greenhouse with controlled (approx. 20 °C/18 °C (day/night)) dight (day/night) cycle of 16 h/8 h) and humidity (approx. 50%) conditions.

2. Analytical Procedures

The following parameters were determined at the start of the incubation, at the interim samplings and at the end of the experiment: i) the mass of test substance, ii) the volume of test solution in the test vessels iii) the pH of the test solution and, iv) the dissolved oxygen level in the test solution. Samples were taken or day 0, day 2, day 4, and day 8 after incubation with test item. The mass of the test compound in the test solution was calculated from the specific radioactivity and the amount of radioactivity (mean value of the three aliquots) in the test solution. At the end of the experiment, the roots were gently shaken in approx. 200 mL acetonitrile/water (4/1 v/v) for 5 minutes to wash off any compound associated to the root surface. The root wash solution was quantified separately by LSC. The plant tissue was patted dry and the fresh weight biomass of the plants was determined by weighing. The remaining plants were divided into shoots and roots. The radioactivity in roots and shoots was determined separately by combusting and subsequent measurement by LSC. The identity of the test compound in the stock solution was confirmed by HPLC analysis of an aliquot of the stock solution and at the end of the experiment in the control test solution
II. RESULTS AND DISCUSSION

A. DEGRADATION OF PARENT COMPOUNDS

HPLC-analysis of the control test solution demonstrated that the test item was stable during the whole test period of 6 days.

B. FINDINGS

The experiment with [pyrimidyl-2-¹⁴C]amidosulfuron exhibited for the total experimental time period a water loss for one plant ranging from approx. 86 up to 102 mL. The control samples without plants revealed a mean loss of 5.78 mL by evaporation. During the incubation period 00 mL of test solution were removed for LSC measurements from each control and test vessels

The mean initial concentration in test solutions with [pyTmidylQ-¹⁴ClAmidosulfuron amounted to 173.40 μ g/L. Overall, the concentration of the test compared in the test solutions with plants increased at the end of the testing (211.03 μ g/L). Supported by the interse decrease of the mass of the test item from 51.58 μ g down to 46.85 μ g.

On average the root washing released 2.20 µg of the test compound from the roots. Recovery of total applied radioactivity was found in mean as 98.3%. The separate analysis of roots and shoots exhibited, that 36.8% of radioactivity taken up is freely ranslocated from roots into shoots.

The plant uptake factor (PUF) for [pyrimidyl-2- 14 C]amidosulfuron was calculated by considering the results from five single tests.

(1)

The plant uptake factor was calculated from the amount of test item in the test solution and the volume of test solution at DAT-0 and DAT-8. The PUC for amidosulturon was determined as 0.31 ± 0.06 (mean value).

		y. U	ta da		
Replicate		χ m _{r×2-0} C D (μg) χ	(mL)	m _{sol} [μg]	PUF
Ja83PT8	201.59	51.98	210.83	46.11	0.37
Ja83PT9	293.09	51.23	224.03	46.44	0.37
Ja83PTAQ	290,25	51,02 2	211.49	45.83	0.34
Ja83PT11	290.21	\$2.59	219.09	49.02	0.25
Ja83PT12	294.90	51.0°	228.27	48.14	0.23
	Ô, Ň	Å Å		Mean	0.31

 Table CA 7.1.4-1:
 Calculation of the Plant Uptake Factor

 V_{DAT-0} , m_{DA} m_{DA} v_{O} v_{O} <t

The good plant health indicated by intense biomass increase and water consumption throughout the testing period demonstrated a reliable and robust test system for the PUF determination of the test item. This was supported by a stable pH of the test solutions and continuous aerobic conditions during the experimental period. Deviations between the values of individual test replicates were low and the overall radioactive recovery was excellent (> 98%).

III. CONCLUSIONS

Amidosulfuron was considerably translocated into the shoots of wheat plants which confirmed by a significant PUF. The plant uptake of amidosulfuron in wheat plants was determined as 0.31 (mean value) at DAT-8.

CA 7.1.4.1 Column leaching studies

CA 7.1.4.1.1 Column leaching of the active substance

The leaching behaviour of amidosulfuron in soil in the laboratory was evaluated during the Annex I inclusion using formulated amidosulfuron and one radiolabel position, [pyrioidyl-2-¹⁴C], and was accepted by the European Commission (EFSA scientific report 2007, 116, 1-86).

Studies submitted and evaluated for the first inclusion of amidosulfuron of Annex 4

Report:	KCA 7.1.4.1.1/01; ; 1999 M-1296 f1-01-1 , O
Title:	Hoe 075032-14C Seepage Behaviour According to BBA-Quideline IV, 4-2
Report No :	A45488
Document No :	M 129611.01.1
Guideline(s):	BBA: $IV, 4-2$
Guideline deviation(s):	
GLP/GEP:	ves Q' ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~
D (
Report:	KCA /.1.4.1.1/02; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Title:	Leaching behaviour of Want protection Qents
Report No.:	C001517
Document No.:	M-129547-01-2
Guideline(s).	BBA Part IV 40, *
Guideline deviation(a):	
Guidenne deviation(s).	
GLP/GEP:	
The studies were rates	s acceptable in the previous DAR, no EQ agreed endpoint was derived from
these tests	
mose iesis.	

CA 7.1.4.1.2 Colume leaching of metabolites, beakdown and reaction products

No soil column leaching studies with metabolites of amidosulfuron have been performed. Studies are not required under Commission Regulation (EU) to 283/2013 in accordance with Regulation (EC) No 1107/2009.

CA 7.1.4.2 Lysimeter studies

Studies subnitited and evaluated for the first inclusion of amidosulfuron on Annex I:

The leaching behaviour of amidosulfuron and its degradation products was studied in a lysimeter experiment following post-emergence application in spring to winter wheat. The study report has been amended with a number of explanative/supportive documents, issued during the first review process. Amidosulfuron has shown no relevant leaching potential in the lysimeter study. Under practical conditions amidosulfuron will not enter the ground water at annual concentrations at or above 0.1 μ g/L. The information was EU reviewed for Annex I inclusion, and was considered acceptable during the original EQ review of amidosulfuron (EFSA scientific report 2007, 116, 1-86).

Bayer – Crop Science Division

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Report:	KCA 7.1.4.2/01; ; ; ; ; ; 1994; M-133154-02-1
l itle:	Degradation and leaching of 14C-Amidosulfuron in two sand lysimeters under
D (NI	outdoor conditions
Report No.:	A52314
Document No.:	M-133154-02-1
Guideline(s):	BBA: , Part IV, 4-3
Guideline deviation(s):	O
GLP/GEP:	yes
Report:	KCA 7.1.4.2/02; ; 2003; M-232780-060 🖉
Title:	Statement of Bayer CropScience, Metabolism and Er@ronmer@al Fatered quest of s
	from the Austrian UBA regarding the subassion of the dossier for a dosulfy on
	(AE F075032)
Report No.:	C042514
Document No.:	M-232780-01-1
Guideline(s):	
Guideline deviation(s):	
GLP/GEP:	no A A A A
Report:	KCA 7.1.4.2/03:
Title:	Statement (3) of Bayer ApopScieQe, MetGolism and Environmenta Qate on
	questions from the RMS Austria regarding the submission of the dossier for
	amidosulfuron (AEA075032)
Report No.:	C042516
Document No.:	M-232785-01-10 5 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Guideline(s):	
Guideline deviation(s):	
GLP/GEP:	
olli, olli v	
Report:	KCA 1 4 2/00 2004 91-234969-01-1
Title:	Adorndum to report Hoe02 of SLFA Newstadt Degradation and leaching of 14C-
	and dosulfary in the sand dosimeter under Oxdoor conditions Investigation of the
	Sidues un the leachates Code: AE 9075032
Report No ·	C043660
Document No ·	M-234960-04-1
Guideline(s):	
Guideline deviation(s)	
GLP/GEP:	
Overall for the ly	eter experiment the FSA (report (2007) concluded: "Amidoculfuron and the
metabolite $\Delta F.F.10163$	Owas present in leachate leaving the 1 3m soil monolith at annual average

The experiment in the EFSA report (2007) concluded. Amidosulturon and the metabolite AE F101630 was present in leachate leaving the 1.3m soil monolith at annual average concentrations $\sim 0.1 \mu gL$ (the parametric drinking water limit, these concentrations were 0.002-0.021 µg/L for amidosulfuron and not detected for AE F101630). Two metabolites AE F128870 and AE F094206 were present in individual leachate samples at up to 0.25 and 0.53 µg/L respectively with these highest concentrations occurring in the second year of the experiment. It might be expected that these $\sqrt{2}$ metabolites could be present in leachate leaving the upper soil column at annual average concentrations >0.1 µg/L as a consequence of the requested use on cereals particularly if applications are made to cereal crops grown in consecutive years (which was not the case in this experiment)."

In consequence of the soil metabolite structure corrections made during the post-Annex I procedure triggered by the results of study KCA 7.1.1.1/09, and the chromatography comparison to metabolite "A" shown in document KCA 7.1.4.2/04 (M-234960-01-1), the lysimeter leachate component previously assigned the structure of AE F128870 requires correction to new structure Amidosulfuron-guanidine.

Thus, it is proposed to correct the List of Endpoints entry for the lysimeter study results as follows:

Amidosulfuron: Detected only at the first and second sampling dates (0.025 μ g/L each) in the 1st

year (lysimeter X) and at the first three sampling dates (0.14 μ g/l, 0.06 μ g/L and 0.025 μ g/L) in lysimeter IX (LOD: 0.01 µg/L). 14 CO₂: 0.01 – 0.11 µg/L during 1st year and up to 0.02 µg/L during 2nd and 3nd year. Amidosulfuron-desmethyl (AE F101630): not detected Amidosulfuron-guanidine (BCS-CO41839): up to $0.53 \,\mu g/L$ Amidfosulfuron-ADHP (AE F094206): up to $0.25 \,\mu g/L$ (identification in selected samples only) Overall loss of radioactivity: 80 % New studies (non EU-evaluated) submitted in context of Annex I approved ren For formal completeness, two public literature documents reporting on non-standard Hysimeter experiments for amidosulfuron are briefly summarised here. This data is considered supportive information, and confirms the observations of rapid breakdown in soil and absence of relevant leaching potential of amidosulfuron made in study K 7.1.4 2/01. ; 1992; M-132470-01-2) the degradation and movement of In a doctoral dissertation (amidosulfuron was studied in lysimeter experiments. Soils and crop reported in the dissertation differ from those used in the study submitted in the paseline possier (KCA 7.1.4.2/04). N ; 1992; M-192470-04 2 KCA 7.1.4.2/05; **Report:** Lysimeter trials to determine the degradation and movement of the herbicide Title: amidosulfuron more arises with a special view to carry-oper behaviour and with reference to glasshouse bioassays Report No.: A56570 Document No .: M-13247@ Guideline(s): **Guideline deviation(s): GLP/GEP:** no \bigcirc The data generated in the above activity formed the basis for the following public literature article authored by the same@esearcher: ; 1992; M-138148-01-2 **Report:** KEA 7.1.4.2/06; Title: Degradation and hytotoxicity of the new herbicidal active ingredient amidosulfuron under outdoor conditions Report No.: M-138148-01-2 Document No. Mr-13814860/1 Guideline(s): Guideline deviation(s) GLP/GEP: 🚿 The degradation and movement of [pypimidyl-2-14C]amidosulfuron were studied in lysimeter trials using two soils at three pH values, a sandy loamy silt (pH 7 and pH 8, adjusted with Ca(OH)₂) and a loamy sand (pH 6.1) for 28 points. The test item was applied post-emergence at an application rate of 45 g/ha, corresponding to 36 mg/k/simeter, to two year old vines.

Results showed that soil type and pH had no effect on the persistence, degradation pattern and vertical movement of amidosulfuron. Microbial degradation of the active ingredient was rapid with an average half-life of 14.3 ± 1 days. Abiotic hydrolysis in relation to pH was of no - or of only subordinate - importance for degradation. Amidosulfuron was not transported to soil layers deeper than 10 cm. At the end of the study active ingredient was extracted only from samples taken from the 0 - 5 and 5 - 10 cm layers.

Amidosulfuron

CA 7.1.4.3 **Field leaching studies**

Field leaching studies were not performed and are not required. A comprehensive set of laboratory data on degradation and adsorption of parent active substance and major metabolites to soil allow for an assessment of the mobility of all significant residues under various environmental conditions by the use of computer simulations as given, for example, by the FOCUS scenario approach. Such transfer calculation is more flexible and allows for adaptation to site or country specific climate and soil conditions, such overcoming the limitations of a field leaching experiment.

CA 7.2 Fate and behaviour in water and sediment <u>Abiotic hydrolysis:</u> Amidosulfuron is stable in sterile buffer solutions from near neutral to alkaline pH values (DT₅₀ = 237 d at pH 6, 25 °C, and > 365 d at pH 7 and 9, 25 °C), but degrades capidly in an acidic environment (DT₅₀ = 1.3 d at pH 3, 25 °C, 3.87 d at pH 4, 25 °C, and 30.56 to 33.9 d at pH 5, 25 °C). The hydrolytic pathway involves cleavage of the sulfony brea linkage of form amidosulfuron-ADMP (AE F092944) and an SN bond cleavage with a bydrolysis to form amidosulfuron-sulfamic acid (BCS-AW41401, acidic environment).

Aqueous photolysis: Amidosulfuron is not photodegraded to significant extent at wavelengths > 290 nm in sterile buffer solution (DT = 2370 days onder environmental conditions). Direct photolysis will therefore not contribute notably to elimination from the aquatic onvironment, and will not lead to the generation of relevant degradates

<u>Water/sediment:</u> Amidosulfuron was found wincrobially degraded in four tested aerobic sediment/water systems. The proposed route of degradation is similar to the initial route of degradation in aerobic soil: O-demethylation at the pyrimidine ring forming amidosulfuron-desmethyl (AE F101630), cleavage of the pyrunidine ring of a.-desmethyl to result in amidosulfuron-biuret (BCS-CQ51287) and amid@usulfuron-guanidine (BCS-CO41839) Further degradation of a.-biuret at the sulfonyl group leads to the cormation of (guanidinearbony) sulfamic acid (BCS-BI49539). The maximum abundances in the total system were 18.8% for a.-desmethyl, 9.9% for a.-biuret, 21.1% for a.-guanidine and 6.6% for (guanidicarbon sulfare acid All further degradates remained below 5% AR until sampling das 180. Fermina bioconversion ed into the formation of non-extractable residues, and ¹⁴C@arbon dioxid@ Q,

The studies were kineticall evaluated according FOCUS (2006), an overview of this information provided in the table below:

cvaluated according 1 .cow: .c





Figure 7.2-2: Abiotic hydrolysis of amidosulfuron



CA 72.1 Route and rate of degradation in aquatic systems (chemical and photochemical degradation)

CA 7.2.1.1 Hydrolytic degradation

The hydrolytic route and rate of degradation of amidosulfuron in buffers under sterile conditions in the dark in the laboratory were evaluated and considered acceptable during the original EU review of amidosulfuron (EFSA scientific report 2007, 116, 1-86). The following studies are included in the baseline dossier.

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

Report: Title:	KCA 7.2.1.1/01; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;		
Report No.:	A47707		
Document No.:	M-136307-01-1		
Guideline(s):			
Guideline deviation(s):			
GLP/GEP:	yes Sy L , U		
Reported endpoints bas	sed on this test, accepted in previous Eloreview:		
pH 5 : DT _{co} 33.9 d (25	$^{\circ}\mathrm{C})$		
$nH 7 and 9 \cdot stable at 2$			
$\underline{p11 / and } $. Stable at 2			
Report.	KCA 7.2 1 1/02		
Title:	Hoe 075032 Determination of Abiotic Hydroly's as a Function of H (Hoe 075032		
11010.	$00 \text{ ZB98 } 0001)$ \swarrow		
Report No.:	A48869		
Document No.:	M-137962-01-1		
Guideline(s):	BBA: Leaflet No. 54, Part I: SEPA (EPA); & 161-1		
Guideline deviation(s):			
GLP/GEP:	yes of a start of the		
Reported endpoints bas	sed on this test, accepted in previous (U review:		
I I			
<u>pH 3 :</u> DT ₅₀ 1.34 d (25 °	$^{\circ}C)$ $\overset{\prime}{\scriptstyle$		
<u>pH 4 :</u> DT ₅₀ 3.87 d (25 °	$^{\circ}$ C) \sim		
<u>pH 5 :</u> DT ₅₀ 30.56 d (25 °C ^V Q [*]			
pH 6 : DT (237.1 d (25 x))			
Overall EFSA (2000)	concluded		

"Amidosulfuron was essentially stable under steppe hydrolysis conditions at 25°C at pH 7 and 9. At pH 5 a single first order DT_{50} of 34 days was calculated. The metabolite AEF092944 was the major identified breakdown product formed a pH 5 \sim

Besides Amidosulfuron-ADMP (2) E F092944), a second degradate was also reported in the above tests to be formed under acidic condition (pH 5 and less), designated "Hoe X" by the study authors. The component was tontatively assigned the epenical structure of amidosulfuron-sulfamic acid (BCS-AW41401) or report KCA (2.1.1 6). In their E-Fate evaluation, the former RMS commented "it is very unlikely that aquatic habitats with such low pH values are situated close to agricultural areas. Therefore, RMS is of the opinion that further work on the identification of the second hydrolysis metabolite and additional hydrolysis/photolysis studies with the two metabolites are not required."

A further report on structure identification of this component is available in the baseline dosser, in the previous DAR field under point (B.2.1.15., now included here below for clarity:

Bayer – Crop Science Division

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Report:	KCA 7.2.1.1/03; 1993; M-132772-01-1
Title:	Structure elucidation of a hydrolysis degradate of the sulfonyl urea Amidosulfuron
	(Hoe 075032)
Report No.:	A51873
Document No.:	M-132772-01-1
Guideline(s):	USEPA (=EPA): § 161-1
Guideline deviation(s):	
GLP/GEP:	no

Moreover, in the context of approval renewal, confirmation of the chemical structure BCS-AW41201 assigned to hydrolysis degradate "Hoe X" is meanwhile available as well from the firstings reported in a new study KCA 6.5.1/01 (M-505652-01-1), summarised to document MCA Section 6. Herein, the hydrolytic degradation of amidosulfuron at acidic pH conditions has been investigated in citrate buffered drinking water. Amidosulfuron was exposed to three sets of conditions each of them being representative for typical food processing operations: 96 °C for 20 min (pH 4.0), 100 °C for 60 min (pH 5.0) and 120 °C for 20 min (pH 6.0). In these experiments the identical two hydrolytic degradates amidosulfuron-ADMP (AE F092944) and amidosulfuron-sulfamic acid. (BCS-AW41401) were observed as were previously reported in the ambient temperature hydrolysis tests. In the new study KCA 6.5.1/01, an unambiguous structure elucidation of degradate amidosulfuron-sulfamic acid (BCS-AW41401) is provided, involving HPLC/MS experiments with accurate mass determination, and the demonstration of chromatography co-elution with authentic synthesized reference material of BCS-AW41401. A comparison of mass spectra contained in both new and old reports clearly confirms the conclusions previously drawn in KCA 72.1.1/02 and KCA 7.2.4.1/03.

CA 7.2.1.2 Direct photochemical degradation

The photolytic route and rate of degradation of apridosultairon in buffer in the laboratory was evaluated during the Anne Finclusion, and were considered acceptable during the original EU review of amidosulfuron (EFSA scientific report 2007, 146, 1-862

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



Two public literature studies on aquatic photodegradation of amidosulfuron are submitted in the context of application for approval renewal. Even though these studies are considered not of relevance for regulatory risk assessments, they are summarised to enable a disucssion of their findings.

Report:	KCA 7.2.1.2/02; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Title:	Chromatography and High-Resolution Mass Spectrometry for the Characterization of the Degradation Products of the Photodegradation of Amidosulfuron: An Analytical Approach
Report No.: Document No.: Guideline(s): Guideline deviation(s): GLP/GEP:	M-488813-01-1 M-488813-01-1 not applicable not applicable no
Executive Summary	

The photolytic route and rate of degradation of amidosulfuron were studied in ultrapure water under exposure to simulated sunlight (280 - 400 nm) in the laboratory for 20 h at 30 °C, at a total radiation of 820 W/m².

Two main degradation products of amidosulfuron 10% (UHPEC area) were observed They were identified as amidosulfuron-ADMP (AE F092944, AMD3) and amidosulfuron-sulfamic acid (BCS-AW41401, AMD4).

A number of minor degradates were also formed overall it was observed that the pyrimidine ring existing in the amidosulfuron structure was retained during amidosulfuron degradation.

The determined half-life of amidosulfuron was 6.3 ht

MATERIALS AND METRODS

A. MATERIALS

1. Test Item Amidosulfuron Sample ID: Chemical Purity: Test Concentration: $271 \times 10^{5} M (\equiv 10 mg/c)$

2. Test Water Ultra-pure water was used

- B. STUDY DESIGN
- 1. Experimental Conditions

A cylindrical Pyrex glass vessel of 250 mL volume was used horizontally as a batch reactor. Solar irradiation was simulated by using a Suntest apparatus (Heraeus, Hanau, Germany) equipped with a xenon lamp (UV B from 280-320 nm, 2.71 W/m² and UV-A from 320-400 nm), 58.0 W/m²). The total radiation in the wavelength range between 300 and 830 nm was 820 W/m². The exposure area was about 500 cm². UV radiation was limited at 280 nm using a filter restricting transmission of light below this value. An emission spectrum of the test equipment in comparison to natural sunlight is shown here below, reproduced from figure 1 of the publication.



The test systems were irradiated for 20

2. Sampling

Samples were analysed after 20 h of irradiation.

3. Analytical Proceduces

Degradation products of anidosutturon were analysed and identified by UHPLC-UV, UHPLC-MS and FT-ICR-MS.

NIL SRESULTS AND DIS€ USSION

On the basis of the retrosorthetic analysis, the most identified degradation products were mainly due to the losses of methylsulfamic acid (CH₃NO₅S), sulfocarbamic acid (CH₃NO₅S), carbamic acid (CH₃NO₂), (rethylsuffonyl) suffamic $(C_2H_7NO_5S_2)$, Nmethylmethanesulfonamide (C₂H₇NO₂S), and settionic acid (H₂SD₄) molecules. Accordingly, O- and S-demethylation as well as hydroxylation processes were also observed.

Two degradation products of amidesulfuron > 10% (UHPLC area) were observed. They were identified as amidosoffuron ADMP (AMD3) and amidosulfuron-sulfamic acid (AMD4).

A n It was observed that the pyrimidine ringrexisting in the amidosulfuron structure was retained during amidos I furor degradation.

The determined half-life of amidosulfuron was 6.3 h.

Ø

III. CONCLUSIONS

In the photodegradation experiments, two predominant degradation products of amidosulfuron > 10%(UHPLC area) were observed and identified as amidosulfuron-ADMP (AE F092944, AMD3) and amidosulfuron-sulfamic acid (BCS-AW41401, AMD4). Furthermore, a large number of minor components were reported.

It was observed that the pyrimidine ring existing in the amidosulfuron structure was retained during amidosulfuron degradation.

The determined half-life of amidosulfuron was 6.3 h.

Notifier's comment and discussion:

The very rapid degradation of amidosulfuron reported in this test is in clear contradiction to the photolytic stability observed in the notfier's study KCA 7.2.1.2/01. An analysis for possible backgrounds to and relevance of this different finding was made and revealed the following main points:

- In a first major difference to the notifier's study, the experiment (
 - ; 2013; M-988812-91-1, KOA 7.2, 7.2/02) was conducted in non-buffered ultrapure water, whilst the portfier's study was conducted in pH 7 neutral buffer solution. Ultrapure water will not provide a defined and stable pH condition, since upon exposure to air the absorption of atmospheric carbon dioxide will result in a notable acidification². Moreover, the test item antidosulfuron itself is an acoust substance (pKa = 3.58, cf. MCA section 2.8), ionisation of which will lead into phi decrease when dissolved in pure water in the absence of a buffering system. Amidosulfuron is known to be hydrolytically labile under slightly acidic pH conditions (see KCA \$2.1.1/01 and \$CA 7.2.9.1/02), resulting in the formation of the same degradates amidos furon ADMP and amidosulfuron-sulfamic acid that were observed as predominant products in the photolysis publication. Furthermore, the high temperature of 300°C reported for the experiment would facilitate hydrolysis processes. Therefore, it can be assumed that the Observed predominant degradates AMD3 (amidosulfuron-ADMP, AE F092944) and AMD4 (amidosulfuron-sulfamic acid, BCS-AW41401) of study KČA 7.2. 2/02 are most probably formed via hydrolytical degradation rather than photolytical degradation Unfortunately, the experiment did not include dark control samples, and pH controls that would have revealed such effect. Moreover, it is not reported in how far the test was performed under sterile conditions.
- As a second major difference, the irradiance spectrum of the test equipment chosen by the authors of KGA 7.2.1.2/02 was different to the spectrum tested in the notifier's study KCA 7.2.1.2/01. Whilst a \$280 nm cut-of filter was used in KCA 7.2.1.2/02, irradiance started only at 290 nm in the obtifier of study as is recommended by the applicable guidance documents. The approach taken in publication KCA 7.2.1 2/02 leads to a notable difference to the solar spectrum in particulat in the Ower wavelengths range that is most relevant for photolytical processes (see Figure 1 above). For a representation of natural environmental conditions at ground level, testing guid@ines (cg. OECD 316) recquire the use of an optical filter system to cut-off wavelengths < 290 nm to approximate the depicted solar spectrum at ground level. Irradiance in KCA 7.2.1.2/02 however started in the UV-B range at 280 nm, at an intensity notably exceeding that of the solar spectrum. Considering the absorption spectrum of amidosulturon, depcited as an inlay in author's Figure 1 as well, the molecule might be photolytically excited to a certain degree at wavelengths around 280 nm (located in the tailing edge of the molecule main absorbance band), whilst there is virtually no light absorbance at > 290 nm, i.e. in the environmentally relevant region. Therefore, even if true photolytical processes might have contributed to the author's observations, these results would not be relevant for a description of amidosulfuron's behaviour under natural sunlight conditions.

² estimate pH of water exposed to CO₂ at atmospheric concentration level (ca. 400 ppm) at 30°C is pH 5.6-5.7; cf. Figure 6 in: Light T.S., Kingman E.A., Bevilacqua A.C.; The conductivity of low concentrations of CO₂ dissolved in ultrapure water from 0-100°C; Paper presented at the 209th American Chemical Society National Meeting, Anaheim, CA. April 2-6, 1995.

Report:	KCA 7.2.1.2/03; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	72-01-1
Title:	Study on the photodegradation of amidosulfuron in aqueous solution	ns by LC-MS/MS
Report No.:	M-491772-01-1	
Document No.:	M-491772-01-1	
Guideline(s):	not applicable	
Guideline deviation(s):	not applicable	
GLP/GEP:	no	°

Executive Summary

The photolytic route and rate of degradation of amidosulfuron were studied in altrapute water under exposure to simulated sunlight in the laboratory for 34 day, at $30 \pm 1^{\circ}$ C in comparison to samples incubated in the dark.

The photodegradation studies were performed using a solar box equipped with a xeron lamp set at 260 W m⁻² equipped with an outdoor UV filter. The Gradianee level and temperature were Gosen to provide irradiation and temperature comparable for those naturally occurring during submer at a latitude corresponding to Northern Italy. Dark samples were covered with aluminum foil

Triplicate samples were analysed for irradiated and dark test stems after 0, 2, 5, 5, 10, 12, 15, 18, 20, 25, 28 and 34 days of irradiation.

Degradation of amidosulfuron was evoluated by UV-vis absorbance spectra of the range of 190 to 600 nm. Degradation products of amidosulfuron were dentified by HPLC-DAD-MS/MS.

Three degradation products of antidosulturon were identified. One degradation product derived from the loss of the R1 (pyrimidine part) and R2 ($SSC_2O_2H_6$) more ties in common hydrolysis product (amidosulfuron-ADMP, AEF092944) and a degradation product derived from the loss of the NH–CH₃ and SO₂–CH₃ groups and the insertion of an O–CH₆ group.

No complete mineralisation of anidosulfuron was observed.

The determined half ife of midosulfuron was 11.5 days assuming a first order kinetic reaction.

VI. APATERIALS AND METHODS

7,5% ~ 7

A. MATER

 Test Item Amidosulfuron Sample 1D: Chemical Purity:
 Test Water

Ultra-pure water water was used

3. Test Solution

The test solution was prepared in ultrapure water with amidosulfuron at a concentration of 5 mg L^{-1} , due to the low solubility of the parent in ultrapure water.

B. **STUDY DESIGN**

1. **Experimental Conditions**

The photodegradation studies were performed using a solar box (CoFoMeGra solar box 3000e, Milan, Italy) equipped with a xenon lamp set at 260 W m⁻² equipped with an outdoor UV filter. The xenon lamp emission covers the entire solar spectrum from 290 to 800 nm. The gradiance level and temperature were chosen to provide irradiation and temperature comparable to those naturally occurring during summer at a latitude corresponding to Northern Italy average irradiance and temperature was recorded in the period from May to September by a meteorological station).

For photodegradation experiments 10 mL of the test solution were filled into quartz cells and exposed to solar box irradiation.

The photodegradation was evaluated in comparison to dark samples therefore, 10 m of the test solution were filled into quartz cells protected by an alphinium foil and incubated in the dark

The irradiated and dark test systems were incubate of 34 day

2. Sampling

Triplicate samples were analysed for irradiated and dark test 10, 12, 15, 18, 20, 25, 28 and 34 days of irradiation.

The chemical oxygen demand (COD) offues were evaluated in Triplicate 7-0 and DAT-34 on the test solution of both irradiated and dark samples. 0

Analytical Procedures 3.

C

600 nm. The concentration of amidosulfuron in irradiated samples was evaluated by the area of its chromatographic peak. Å

Degradation products of amidosulfuron were identified by PPLC-DAD-MS/MS. No sample pretreatment was applied to prevent analyte and degradation product losses.

The chemical oxygen demand values were derived according to the ISO6060:1989 guideline.

II. RESURTS AND DISCUSSION

UV-vis spectra showed a maximum absorbance at 244 nm (parent) and an additional band at 205 nm (probably a degradation product as impority) before irradiation (DAT-0). After 14 days of irradiation, a decrease of the 244 µm band and an increase of the band at 205 nm were observed. After 34 days of irradiation, both the parent band at \$44 nm and the one at 205 nm totally disappeared and two new bands characterised by a maxima at 223 and 258 nm, respectively, were observed. The results point out that degradation occurs (the band or 244 nm decreases) and degradation products were formed (increase of bands at 205 nm (DAT 14) and at 223 and 258 nm (DAT-34)).

In general, the experimental conditions were proven to play an important role on the fragmentation pattern observed

Six peaks were observed and identified using HPLC-MS/MS. Three peaks were assigned to degradation products while three were assigned to impurities of the amidosulfuron test solution. One degradation product derived from the loss of the terminal sulfonyl group and part of pyrimidine moiety and was already present at DAT-0 with increasing intensity in the chromatogram along with irradiation. A common hydrolysis product (amidosulfuron-ADMP, AEF092944) was observed after 24 h with increasing area along with irradiation. The last possible degradation product was visible

after 48 h of irradiation and the structure proposed derives from the loss of the NH–CH₃ and SO₂–CH₃ groups and the insertion of an O–CH₃ group.

COD values obtained from the amidosulfuron solutions that underwent irradiation for 34 days and were preserved in the dark for the same time confirmed that a complete mineralisation was not achieved.

The photodegradation process resulted in a first order kinetic reaction with a half-life of amidosulfuron of 276 h (11.5 days).

III. CONCLUSIONS,°

Three degradation products of amidosulfuron were identified. One degradation product derived from the loss of the terminal sulfonyl group and part of pyrimidine monety, a common hydrolysis product (amidosulfuron-ADMP, AEF092944) and a degradation product derived from the loss of the NH-CH3 and SO₂–CH₃ groups and the insertion of a methoxy group.

No complete mineralisation of amidosulfuron was bserved

The determined half-life of amidosulfuron was 1.5 days assuming a fast order kinetic baction.

Notifier's comment and discussion:

Ø The behaviour of amidosulfuron reported in this test is in contradiction to the photolytic stability observed in the notfier's study KCA 72.1.2/01 An analysis for possible backgrounds to and relevance of this different finding was made and revealed the following main points:

- Similar to the publication by Harir et al (KCA07.2.1.202), test medium for the experiments reported in KCA 7.2.1 2/03 was non-buffered ultrapure water, whilst the notifier's study KCA 7.2.1.2/01 was conducted at constant pH 7 in buffer solution. Ultrapure water will not provide a defined and stable pH Condition, since upon exposure to air it will absorb atmospheric carbon dioxide pesulting in a notable acidification³. Moreover, the test item amidosulfuron itself is an acidic substance (pka 3.58) and will therefore lead to pH decrease when dissolved in pure water in the absence of a buffering system. Amidosulfuron is known to be hydrolytically labore under slightly acide pH conditions (see KCA 7.2.1.1/01 and KCA 7.2.1.1/02), and may be expected to not be stable in such test system. Even though the authors of KCX 7.2.1 2/03 tested stability of their test item in dark controls over 15 days at 35°C and 70°C, and Daimed Degradation to occur only at the exaggerated temperature of 70°C, the analysis m^{\forall} this experiment part \tilde{Q} involved only the qualitative comparison of UV spectra, without any chromatography resolution of individual components. Therefore, such test is considered unsuited to exclude that hydrolytic processes would have contributed to the observed degradation in the photolysic investigation (which did not include any dark control samples, or pH measurements). Moreover, it is not reported in how far the test was performed curder sterile conditions. Ø
- (I) \bigcirc Furthermore, even though the authors of KCA 7.2.1.2/03 claim to have used 97.5% w/w pure test item purchased from a commercial supplier, in their photodegradation experiment they discuss three prominent/impurities of the test material being detected at variable abundances at all sampling timepoints, identified as pyrimidine-ring opened components. Based on Figure 2 of their publication (see reproduced here below), HPLC-DAD trace for day 0, it is evident that

³ pH of water exposed to CO_2 at atmospheric concentration level (ca. 400 ppm) at 30°C is estimated to be ca. 5.6-5.7; cf. Figure 6 in: Light T.S., Kingman E.A., Bevilacqua A.C.; The conductivity of low concentrations of CO₂ dissolved in ultrapure water from 0-100°C; Paper presented at the 209th American Chemical Society National Meeting, Anaheim, CA. April 2-6, 1995.

the purity of test item at test start did unlikely match the intended purity; a notable contamination / artifact formation had occurred before test initiation for unknown reason, or impurities were potentially left over from the synthesis process.



Overall, based on the above analysis, the study is considered to not provide reliable information of relevance for risk assessment.

CA 7.2.1.3 Indirect photochemical degradation

Indirect photochemical degradation of amidosulfuron was not studied, and is not a general data requirement under Regulation \$107/2009.

CA 7.2.2 Route and rate of biological degradation in aquatic systems

CA 7.2.2.1 "Ready biodegradability"

The "ready biodegradability" of amidosulfuron was evaluated during the Annex I inclusion using unlabelled amidosulfuron, and was considered acceptable during the original EU review of amidosulfuron (EFSA scientific report 2007, 116, 1-86).

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

Report:	KCA 7.2.2.1/01; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	; 1991; M-130898-01-2 fied Sturm test in accordance with
	the OECD Guideline 301 B for Testing Chemicals	of 19 September 1984
Report No.:	A54662	Ô
Document No.:	M-130898-01-2	- OF
Guideline(s):	OECD: 301 B (1984)	
Guideline deviation(s):	not specified	
GLP/GEP:	no	G, & A X

Endpoints according to the Review Report for amidosulfuron (EFSA scientific report 2007 116, 1-86):

Amidosulfuron was not ready biodegradable in a mod

CA 7.2.2.2 Aerobic mineralisation in surface water

The data point is a new data requirement under Regulation (EV) No. 1107/2009, one new experimental study is therefore submitted for approval renegat of amidosulfaron: . V N (n)

Report:	KCA 7.2.2.2/01; 2015; M\$547192-01-1
Title:	[Pyrimidyl-2-140] Amidosulfuror - Aerobis degradation in atural water
Report No.:	AS419 O γ δ O' δ O'
Document No .:	M-547193@1-1
Guideline(s):	OECD Goudeline for Testing of Chemicals, X 309
	Aerobic Mineration in Surface Water, Apr. 13, 2004
Guideline deviation(s):	none of the second s
GLP/GEP:	yest of a de A

Executive Summary

The route and rate degradation of pyrisodyl-2- C amidosulfuron were studied in natural water under aerobic conditions in the dark in the aboratory for 58 days at 20 °C.

Qð Study application rates of $4.03 \,\mu g$ ($10.07 \,\mu g/L$) and $39.48 \,\mu g$ ($98.70 \,\mu g/L$) per test system were applied for the low and the high concentration, respectively.

Mean material balances were 99.4% of applied radioactivity [% AR] (range from 98.5 to 100.5% AR) for the low congentration and 100.6% SR (range from 98.9 to 102.6% AR) for the high concentration.

The amount of carbon dioxide war 2.2 and 0.5% AR after 58 days of incubation for the low and high concentrations, respectively. Formation of volatile organic compounds was insignificant as demonstrated by values of < 0.1% AR at all sampling intervals for both concentrations. Ø

For all test systems almost no metabolism of the test item amidosulfuron was measured. The amount of amidosulfuror was in the range of 97.3 to 100.2% AR and 98.1 to 101.8% AR for the low and high concentration, respectively. The metabolite amidosulfuron-ADMP (AE F092944) was determined with maximum amounts of 2.5 and 3.5 % AR at study end (DAT-58) in low and high concentration test systems, respectively. The metabolite amidosulfuron-desmethyl (AE F101630) was determined in high concentration samples only with a maximum amount of 0.4% AR at study end (DAT-58). The same was observed in sterile controls (max. amount of 3.3% AR for a.-ADMP and 0.3% AR for a.-desmethyl at DAT-58). Two non-identified metabolites were detected in the high concentration test systems with max. 0.9% AR in total for both concentrations.

Man Cut

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

On the basis of the determined results no half-lives (DT₅₀ or DT₉₀) of amidosulfuron were calculated as the results would be many times higher than the entire incubation period.

It is concluded that abiotic processes will contribute to the degradation of amidosulfuron under typical conditions in the aquatic environment.

I. **MATERIALS AND METHODS**

A. **MATERIALS**

Test Item 1.

[pyrimidyl-2-14C]amidosulfuron		
Sample ID:	KML 9796	
Specific Activity:	3.75 MBq/mg	
Radiochemical Purity:	$\geq 98\%$	
Chemical Purity:	>98%	

2. **Test Water**

Natural water from the "Kellmetschweiher" located near the town of Schifferstadt was used. The water was sampled freshly from the pond and seved through a 1.1 miksieve prior to us

Table CA 7.2.2.2- 1:	Physico-chemical	l properties of test	water
----------------------	------------------	----------------------	-------

A.	
Parameter 🦧 "	Results / Units 🖉 👋
Water Designation	Kellmotschweither
Origin . O C	Near the town of Schifferstadt, Rhineland-Palatinate,
	Germany Q [*]
GPS Coordinates	Q49°21,'52.78''N 8719'58.94''E
Storage	Stored in a cooling chapiber between +1 °C and +10
	°C for 2 days prior to pre-equilibration.
Temperature [°C] ¹	20.2 °C
pH ¹	\$J.29 O [*] <u>\$</u> U [*]
Redox Potentia F _H [mV] ²	198-200
Oxygen Saturation [mg/L] 1	9.69° ~°
Total Organic Carbon (TOC) [mg/L	
Dissolved Organ Carbo (DOC) mg/L]	
Total Nitrogen [mg/L]	
Total Phosphorous [mg/L]	© .05
Total Ammonium mg/L]	\$0.08
Total Marate [mg/L]	< 0.5
Dissolved Othophosphate [mg]	0.08
Mcrobial activity	$DT_{50(benzoic acid)} < 24 h$
measured at sampling site	

² measured during pre-equilibration GPS: global positioning system

B. STUDY DESIGN

Experimental Conditions 1.

The static test system for degradation in surface water under aerobic conditions consisted of cylindrical 1 L glass flasks (i.d. 10 cm), corresponding to a surface area of 78.5 cm². Each test vessel was fitted with a trap attachment (permeable for oxygen) containing soda lime for absorption of carbon dioxide and layers of oil wetted quartz wool for adsorption of volatile organic compounds (VOC).

Each test system was filled with 400 mL \pm 2 mL of the test water (including the amount of the aqueous application solution). The volume of the applied water was determined by weighing. Sterile controls were sterilised by autoclaving at ca. 120 °C for at least one hour. Pre-equilibration was done for about 5 days.

Study application rates of 4.03 μ g (10.07 μ g/L) and 39.48 μ g (98.70 μ g/L) per test system were applied for the low and the high concentration, respectively. The test item was applied in 500 and 530 μ L distilled water for low concentration and high concentration test systems, respectively.

The test systems were incubated in a climatic chamber at sontrolled temperature of 20 °C under aerobic conditions. During incubation water was gently stirred with a magnetic stirret

 \bigcirc

2. Sampling

Eight sampling intervals were distributed over the entire incubation period of 58 days. Diplicate samples were processed and analysed 0, 1, 3, 7, 14, 28, 42 and 58 days after treatment (DAT) for both low and high concentration. Sterile controls were processed and analysed at DAT 04 and 0AT-58 for the high concentration, microbial activity samples 0, 3, 6, 8, 24, 48 and 72 hours after treatment.

3. Analytical Procedures

¹⁴CO₂ bound to the soda lime was liberated with FCl, trapped in appropriate scintrilator-cocktail and measured by LSC. The paraffin wetted plass wool for adsorption of voratile organic molecules was extracted with acetone. Aliquots of these extracts were submitted to LSC.

× i

At each sampling interval, pH, oxogen content and redox potential in the water were determined. Any dissolved carbon dioxide in the water phase was checked by LSC measuring again after acidification of aliquots in an ultrason bath.

All water specimens of the low concentration and high concentration test systems were directly measured by LSC, IPLC/radiodetection or TLC/radiodetection. In order to improve the chromatographic analysis from DAT3 on all water phases of the low concentration test systems variants were concentrated using a rotary evaporator. A concentration factor of 4 was employed. Degradation samples were analysed by reversed phase HPLC/radiodetection. The limits of quantitation for HPLC/radiodetection analysis of the water were < 1.8 and 0.4% AR for the low and high concentration, respectively. Results of HPLC/radiodetection analysis were confirmed by TLC/radiodetection.

Test item, amidesulfuron ADMR and amidosulfuron-desmethyl were identified by HPLC and TLC cochromatography with reference items

II. RESULTS AND DISCUSSION

Results indicated that the anticipated standardized conditions were maintained and that the water was microfally active over the duration of the laboratory study.

The pH in the water range from 7.94 to 9.02 for both low and high concentration.

Oxygen contents (range from 6.93 to 8.95 mg/L) and redox potential measurement (range from 138 to 200 mV) indicated perobic conditions in the water for both concentrations.

DATA A.

Table CA 7.2.2.2- 2: Degradation of amidosulfuron in natural pond water under aerobic conditions (low concentration, single and mean values expressed as % AR)

Compound	Rep-				DA	АT			
	licate	0	1	3	7	14	28 🖉	42	58
	А	101.3	99.8	98.7	97.9	99.6	99, d	98.2	96.9
amidosulfuron	В	99.1	98.7	98.7	99.0	99.5	99,5	78.1	\$ 97.7
	Mean	100.2	99.2	98. 7	98.5	99.5	99.3	98.1	[©] 97.3
	Α	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4
aADMP	В	0.0	0.0	0.0	0.0 🕎	° 0.0 🗳	$0,0^{\circ}$	0.0	1,8
	Mean	0.0	0.0	0.0	0.00	0,0,	9.0	×0.0	°~2.1
	Α	0.0	0.0	0.0	Q.0/	٥٥ آ	ر هر 9.0	@0.0	0.0
adesmethyl	В	0.0	0.0	0.0	Ø.0	×0.0	0.0	0.0	0.Q_°
	Mean	0.0	0.0	0.0	🖉 0.0 🧳	»َ 0.0 ^د	0.00	0,0	0.0
	Α	0.0	0.0	0.0	0.00	0,0	0 .0	<u> </u>	0.0
unknown 1	В	0.0	0.0	0.Q	~Q.0	°.Q.Ö	0.0	0.0	0.0
	Mean	0.0	0.0	√0.0 ″	0.0	×0.0	🖌 0.0 🖾	ິ 0.0	0.0
	Α	0.0	0.0	0.0	0.0	0.0%	0.0	0	0.0
unknown 2	В	0.0	0.0 👡 🖉	ڰ 0.0 ℃	🖗 0.0Q	0.0	ÓÒ	@0	0.0
	Mean	0.0	0.0	0.0	0,6	0,0	× 9.0	<i>@</i> , 0.0	0.0
Sum of	Α	0.0	0:0	0.0	LO.0	0.0	ي ∮_0.0 ∛	0.0	0.0
Unid./Diff.	В	0.0	<u>6</u> 8,0	Q0.0	0.0	0.0	0.0	0.0	0.0
Residues	Mean	0.0	0.0 📎	O 0.0 (0.0	0.0	. 00	0.0	0.0
	Α	101.3	99. & _′	99?:ty	9709	100.4	999 .1	98.2	99.3
Water	В	991	9 <u>9</u> 0	98.7	99.0	000.5	[%] 99.5	98.7	99.6
	Mean	100.2	299.4	98.9	(ັ 98.5 ຼ	100.50	99.3	98.4	99.4
Carbon Diovida	Α	"m.d.	0.0	○ 0.0 [*]	0.1	0.0	0.0	0.1	0.2
soda lime	В) n.d.	0.0%	0.0	0.1	Å.	0.0	0.0	0.1
soud mile	Mean	n.d	0.0	Ŵ	Ø .1	0.0	0.0	0.1	0.1
Carbon dioxide	ð	n.d.	0.1	<u>م</u> ر 0.3	0.0	0.8	0.0	0.0	0.0
water	_OB	n.d.	Ø ³ 0.3	چ 0.0 کړ	0.10	1.0	0.0	0.6	0.1
Water	Mean &	🖓 n.d. 🛁	0.2	0.2	0.0	0.9	0.0	0.3	0.1
Carbon dioxide	$A \otimes$	n.	0.4	Ð3	0.1	0.8	0.0	0.1	0.2
total	"By"	n.d.	0 3	0.0	<i>©</i> 0.2	1.0	0.0	0.6	0.2
	Měan	`b <i>i</i> .d.	0.2	پ [≫] 0.2 √	0.2	0.9	0.0	0.4	0.2
Volatile 🗞	¥A	n.d.	0.0°	0,0	0.0	0.0	0.0	0.0	0.0
Organic	B	n.d.	0,0	a a a a a a a a a a a a a a a a a a a	0.0	0.0	0.0	0.0	0.0
Compounds	Mean	p.d .	9,0	0.0	0.0	0.0	0.0	0.0	0.0
Total	ŎĂ	101.3	\$99.8	\$ [≫] 99.6	98.1	100.5	99.1	98.3	99.4
Recoverv	S [♥] B	≫99.1 Ô	[∞] 99.0	98.7	99.2	100.5	99.6	98.7	99.6
	Mean [©]	100. 2)	<u>99%4</u>	99.2	98.6	100.5	99.3	98.5	99.5

n.d. for detected, n.a.: for analysed, N/A: for applicable, DAT: days after treatment

Compound	Rep-						DAT				
	licate	0	1	2	7	14	20	42	59	14	58
		U	1	3	/	14	28	42	- 30 ĝ	(sterile)	(sterile)
	Α	98.6	100.4	98.6	98.8	99.7	100.1	97.5	9793	101.7	97.5
amidosulfuron	В	97.7	102.1	100.9	99.7	100.2	100.6	95.7	°~9A.6	101.8	Sy 99.1
	Mean	98.1	101.3	99.8	99.2	100.0	100.4	96.6	Ď96.0	©101.8 🤇	98.3
	А	0.0	0.0	0.0	0.0	0.0	0.0	1.8	3.0	0.0	X6
aADMP	В	0.0	0.0	0.0	0.0	0.0	0.0	Â,Ă	_4?\$∕	0.9	JA 3.0
	Mean	0.0	0.0	0.0	0.0	0.0 (0.0	⊸ 2.2	3.5	× 0.0 %	3.3
	А	0.0	0.0	0.0	0.0	0.0	0.0	× 0.0 ×	0.8	ത് 0.0 🛸	v 0.7
adesmethyl	В	0.0	0.0	0.0	0.0	Ø.Ø	0.0%	0,0 🗸	0.0	0.0	Q . 0 °
	Mean	0.0	0.0	0.0	0.0	XØ. 0	0.0	0.0	03	O	A9 .3
	А	0.9	1.3	0.0	0.0	0.0	Û0.0	@0 .0	ď.Ó	Ø.0	0.0
unknown 1	В	1.0	0.0	0.0	0.0	0,Q^	0.0	[®] 0.0	[~] 0.0	چ 0.0 🧭	[≫] 0.0
	Mean	0.9	0.6	0.0	0.0		0×0″	0.0	0.0~	₹ 0. 0 ©	0.0
	А	0.0	0.0	0.0 😞	0.0	A.O	0.0	$\langle 0,0 \rangle$	0.6	ØØ	0.0
unknown 2	В	0.0	0.0	0,00	0.0	ي 0.0∛	0.0	ð.0	@ ? .7	Ø.0	0.0
	Mean	0.0	0.0	Q.Q	0.6	0.0	[♥] 0.0☆	່ 0.0 🖉	©0.6	∂ 0.0	0.0
Sum of	А	0.9	1.3	<u>0.0</u>	0.0	Q.0	0.05	0.0	0.60	0.0	0.0
Unid./Diff.	В	1.0	0.0	₿Ó.0 _	$\bigcirc 0.0$	0.0	×0.⁄0	. 0 9	0.5	0.0	0.0
Residues	Mean	0.9	0.6	0.0 🤇	0.0 🧹	2 0.0 ₍	6¥0.0 ∝	ð.0	0.6	0.0	0.0
	Α	99.4	101.8	100,7	9848	100.	100.JC) [*] 99.5 [*]	101.7	102.0	101.8
Water	В	98.7 <	102.2	100.9	99.7	100.8	10000	98.4 >	100.2	101.9	103.4
	Mean	99.1	102.6	100.8	99.2	A90.4	100.4	98.9	101.0	101.9	102.6
Carbon Dioxide	Α	n d.	0.00	0.0	- 0.0 °	م 0.0 ا	<i>©</i> 0.0 、	Ø.0	0.0	0.0	0.0
soda lime	В	ad.	<u>a</u> a	Q:Q	0,0	0.0	0.0	0.0	0.0	0.0	0.0
soud mile	Mean	Sn.d.	ØØ.0	A .0	O	<u>0</u> Ø/	0,0%	0.0	0.0	0.0	0.0
Carbon dioxide	A 🔊	n.d. 🖗	0.1	2.2	0.0	0.3	\$0	0.1	0.0	0.2	0.0
water	RO	n.d	0.0	0.0	0.0	0.6	0.0	0.2	0.9	0.1	1.3
water	Mean	A,d.	0.]	1,0	0.0	″ 0. 4	0.0	0.2	0.5	0.2	0.7
Carbon diovide	δA 🗞	n.d. /	0.1	<u>3</u> ?2	<u>Ø</u> 0	0.3	0.0	0.1	0.0	0.3	0.0
total	Ė B _, ≪_,	n.d.	[≫] 0.0 [∞]	¢0.0 گ	0.0	Ø.6	0.0	0.3	0.9	0.1	1.4
total	Mean	n.ď.≯	0.4	1.1	🎽 0.0 🔬	¥0.4	0.0	0.2	0.5	0.2	0.7
Volatile	° A	n.d.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Organic	Β	Sn.d.	Ø.0	0.0	<u>d</u> ø	0.0	0.0	0.0	0.0	0.0	0.0
Compounds	Mean	* n.d. 🔍	ີ 0.0 🖉	³ 0.0	Ŏ. 0	0.0	0.0	0.0	0.0	0.0	0.0
Total	Ŕ	99.4	101	100.7	[≫] 98.8	100.0	100.1	99.5	101.7	102.0	101.9
Recovery	Ŝ. ₽	98.7	103.2	101.0	99.7	100.8	100.6	98.4	100.3	101.9	103.4
i i i i i i i i i i i i i i i i i i i	[^] Mean	99.1	ĈØ2.0	100.8	99.3	100.4	100.4	98.9	101.0	102.0	102.6

Table CA 7.2.2.- 3:Degradation of amidosulfuron in natural pond water under aerobic conditions
(high concentration, single and mean values expressed as % AR)

n.d.: not setected, n.a.: not analysed N/A: not applicable, DAT: days after treatment

B. MAJERIAL BALANCE

Mean material balances were 99.4% of applied radioactivity [% AR] (range from 98.5 to 100.5% AR) for the low conventration and 100.6% AR (range from 98.9 to 102.6% AR) for the high concentration. The complete material balances found at all sampling intervals demonstrated that there was no significant loss of radioactivity dissipated from the test systems or during sample processing.

C. VOLATILES

The amount of carbon dioxide was 0.2 and 0.5% AR after 58 days of incubation for the low and high concentrations, respectively. Formation of volatile organic compounds was insignificant as demonstrated by values of < 0.1% AR at all sampling intervals for both concentrations.

E.

For all test systems almost no metabolism of the test item amidosulfuron was measured. The amount of amidosulfuron was in the range of 97.3 to 100.2% AR and 98.1 to 101.8% AR for the low and high concentration, respectively. The metabolite amidosulfuron-ADMP (AE F092944) was determined with maximum amounts of 2.5 and 3.5 % AR at study end (DAT-58) in low and high concentration test systems, respectively. The metabolite amidosulfuron-desmethyl (AE F101630) was determined in high concentration samples only with a maximum amount of 0.4% AR at study end (DAT-58). The same was observed in sterile controls (max. amount of 3.3% AR for a. ADMP and 0.3% AR for a.-desmethyl at DAT-58). Two non-identified metabolites were detected in the high concentration set systems with max. 0.9% AR in total for both concentrations.

On the basis of the determined results it was not considered to be meaningful to calculate my halflives (DT₅₀ or DT₉₀) of amidosulfuron as the results would be many times higher than the entire incubation period of 58 days. Such calculations are not considered to be valid.

CONCLUSIONS III.

Almost no degradation of the test item amidosulfuron was observed in natural water under aerobic conditions in the dark in the laboratory. 0

degradation of appedosulfuron under typical It is concluded that abiotic processes will contribute to the conditions in the aquatic environment.

CA 7.2.2.3 Water/sediment stud

The route and rate of degradation of amiddsulfuror in water/sediment systems under aerobic conditions were evaluated during the Annex Anclusion using one ratiolabel position, [pyrimidyl-2-¹⁴C-], and were accepted during the original EU review of amidosulfuron (EFSA scientific report 2007, 116, 1-86).

Studies submitted and inclusion of amid ulfuron on Annex I:

2000; MĴ 99268-01-1 **Report:** 2 202

dosulfuron in the aquatic environment (water / sediment

Report No.: Document No Guideline(s): Guideline devi **GLP/GEP:**

Title:

The study is considered to be valid and provides reliable information for substance distribution and kinetic identification the experiment was unable to deliver unantiguous information about the identity of highly polar downstream degradate material that reached major abundance in some of the test systems. A zone of polar radioactivity in the primary TLC chromatographic method was not well resolved and only tentatively assigned to the reference standard amidosulfuron-ADHP@AE F094206). Since this assignment could not be confirmed in a secondary TLC method, the exact nature of this material was left open by the author (cf. e.g. Table 6d vs. 6e of original report).

Aiming to provide clarity on this point, a new additional water/sediment study was conducted in the context of application for approval renewal and is found reported under point KCA 7.2.2.3/02 below.

Bayer – Crop Science Division

New studies (non EU-evaluated) submitted in context of Annex I approval renewal:

In the new water/sediment study by Hellpointner (KCA 7.2.2.3/02) with optimized analysis, all components of major abundance could be unambiguously clarified, including polar material. In this fraction, components amidosulfuron-guanidine and amidosulfuron-bidget (both previously known as soil metabolites) were identified, and a further highly polar degradate, present at only max. 6.6% in the total system, was assigned the structure of amidosulfuron-(guanidinocarbony) sulfamic acid. For comparison, samples were also profiled via the TLC method previously used in study KCA 7.2.2.3/01. All major peak zones observed by Knoch could be linked and assigned to the degradates observed in the new study KCA 7.2.2.3/02. An updated metabolic pathway scheme of amidosulfuron in water/sediment was in consequence established as is shown in Figure 7.2.1, amended for components amidosulfuron-guanidine, amidosulfuron-buret, and amidosulfuron-(guanidinocarbony) sulfamic acid, and corrected for the the way appeared of amidosulfuron.

Report:	KCA 7.2.2.3/02; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Title:	Amidosulfuron: Aerobic aquatic metabolism
Report No.:	M-552591-01-1
Document No.:	M-552591-01-1
Guideline(s):	OECD Test Guideline No. 308, US EPA OCSPP Test Gindeline No. 835.4300 /
	835.4400
Guideline deviation(s):	none
GLP/GEP:	yes of a y a a

Executive Summary

The degradation of [pyrimidyl-2.⁴⁹C]amidosulfuron was investigated in two water/sediment systems under aerobic conditions in the dark in the laboratory for 100 days at 19.9 °C:

	~	O		\sim			
Water/Sediment	System	Š	Source	°,	Texture	pН	ТОС
System	ID			SY 0	(USQA)		[g/kg] / [mg/L]
Anglersee		Lever	kusen, Gern	nany 🖉	Sand	7.8 ² / 7.1 ³	2.5 4 / 2.7 5
Wiehltalsperre	W	Reich	ishof, Germ	any O	Sift loam	7.2 ² /5.2 ³	3.1 ⁴ / 62.6 ⁵
				é Na			

TOC: total organic carbon¹ sediment textural class

² water pH value determined immediately after sampling

³ sediment pH value decivered from access 0.00M CaCl² suspension

⁴ water TOC determined instart of Study

⁵ sediment TOC determined at start of study

sediment foc determined at start of study

The study application that was 23.4 µs lest system, corresponding to 45 µg/L. Duplicate test systems were processed and analyses (0, 3, 7, 8, 30, 4), 63, 84 and 100 days after treatment.

Overall mean material balance was 99.7% of applied radioactivity (% AR) for water/sediment system Anglessee and 8.5% & for water/sediment system Wiehltalsperre.

The following maximum amounts of carbon dioxide were detected at DAT-100 (study end): 6.2% AR in water/sediment system Anglersee and 5.6% AR in water/sediment system Wiehltalsperre. Formation of volatile organic compounds was not significant, values being < 0.1% AR at all sampling intervals in both water/sediment systems.

Residues in water decreased from DAT-0 to DAT-100 from 97.9 to 81.5% AR in system Anglersee and from 97.4 to 21.9% AR in system Wiehltalsperre.

Extractable residues in sediment increased from DAT-0 to DAT-100 from 1.5 to 9.9% AR in system Anglersee. In system Wiehltalsperre, extractable residues in sediment increased from 1.6% AR at DAT-0 to 16.5% AR DAT-7 and then decreased to 10.7% AR at DAT-100.

Extractable residues in the total system (water and sediment extracts) decreased from DAT-0 to DAT-100 from 99.3 to 91.3% AR in system Anglersee and from 99.0 to 32.5% AR in system Wiehltalsperre.

Non-extractable residues (NER) increased from DAT-0 to DAT-100 from 0.1 to 3% AR in system Anglersee. In system Wiehltalsperre, NER increased from DAT-0 to DAT-63 from 0.2 to 63.0% AR and decreased then to 59.0% AR until DAT-100.

Amidosulfuron dissipated from the water due to degradation and translocation into the sediment. The amount of amidosulfuron in the water decreased from DAT-100 from 96.2 to 62.8% AR in system Anglersee and from 95.5% AR to non-detectable amounts in system Webltalspere.

The amount of amidosulfuron in the sediment extracts increased in system Angletsee from DAT-0 to DAT-49 from 1.4 to 9.5% AR and decreased then to 8.6% AR at DAT-100. In system Wiehltalsperre, the amount of amidosulfuron in the sediment extracts increased from DAT-0 to DAD 7 from 1.5 to 13.6% AR and decreased then to non-detectable amounts at DAT-100.

The amount of amidosulfuron in the total system decreased from DAT=0 to DAT=100 from 97.6 to 71.4% AR in system Anglersee and from 96.9% AR to non-detectable amounts in system Wiehltalsperre.

Besides carbon dioxide, four major degradation products were identified during the study: amidosulfuron-(guanidinocarbonyl)sultamic and (max. water: 6.2% AR at DAT-100; max. entire system: 6.6% AR at DAT-400); anndosulfuron-guanidine (max. water: 14.8% AR at DAT-49; max. entire system: 21.1% AR at DAT-34), anidosulfuron-desmethyl (max. water: 11.4% AR at DAT-15; max. sediment: 2.6% AR at DAT-40, anidosulfuron-desmethyl (max. water: 11.4% AR at DAT-15; max. sediment: 2.6% AR at DAT-40; max. entire system, 14.0% AR at DAT-15) and amidosulfuronbiuret (max. water: 9 % AR at DAT-400; max. sediment: 0 % AR at DAT-84; max. entire system: 9.9% AR at DAT-109).

In order to set the current result on the pathway of degradation of amidosulfuron in water/sediment systems under aerobic conditions into context with two earlier water/sediment metabolism studies (KCA 7.2.2.3/01 and KCA (22.2.3/09)) and to identify previously unknown metabolites, a comparison was made by additionally analysing the degradates with the earlier used chromatographic methods. The comparison showed that the riew proposed pathway of degradation is very well represented by the separation of peaks during the Knoch study (KCA 7.2.2.3/01) and that all significant unknowns listed therein are identified, now Furthermore it was confirmed that the chromatographic method previously used in a further study by Crildemeister (KCA 7.2.2.3/03) was not suitable for the separation of amidosulfation and its metabolites.

The experimental data could be best described by a double first order in parallel (DFOP) kinetic model for dissipation from the water and a single first order (SFO) kinetic model for degradation in the total system. The DT values for the dissipation of amidosulfuron from the water were 171 and 12.7 days in system Anglersee and Wiehltalsperre, respectively. The DT_{50} values for the degradation of amidosulfuron in the total water/sediment system were 227 and 16.5 days in system Anglersee and Wiehltalsperre, respectively.

I. MATERIALS AND METHODS

A. MATERIALS

1. Test Item

[pyrimidyl-2-¹⁴C]amidosulfuron CAS No Specific activity Radiochemical purity

120923-37-7 3.75 MBq/mg 97.2% HPLC with radioactivity-detector

2. Water/sediment systems

The water/sediment systems (Table CA 7.2.2.3- 1) were sampled freshly before study start. The sediment was obtained from the upper sediment layer (upper horizon in approx, 30 cm depth) and sieved to a particle size of ≤ 2 mm. The water was filtered through a 0.063 mm mesh before preparation of the test systems.

Table CA 7.2.2.3-1: Physico-chemical properties of test@vater/sediment_systems

Parameter	Resul	ts/Unite
Water/Sediment System Designation	Anglersee	Wighltalsperre
Properties of Water		
Temperature [°C] ¹		21.6
pH 1 &		7.2
Redox Potential [mV] 1	183 2	189
Oxygen Saturation [%] ¹	~ O' 97, O' Y'	96.6
Total Organic Carbon (OC) [mg/L] ²	20 4.1	3.1 /223
Properties of Settiment		
Textural Class USD 5	Sand	Silt loam
Sand [%] [50 µm – 2 mm]	ن ^۴ لاپ 98	38
Silt [%]		53
Clay [%] ~ [< 20 m] &		9
pH (sediment / 0.00 M CaCl ₂ 1/2)	بري ۲.1	5.2
pH (segment water 1/19	7.4	5.3
TOC [g/kg] [*]	2.7 / 5.6	62.6 / 72.6
Cation Exchange Sapacity [meq/109 g]	2.4	8.6
Redox Potential [mV]	201	-101
Moisture [g H ₂ O ad 100 g dry weight]	28.6	207.4

¹ determined on-site immediately after sampling

 $^2~$ measured by principal investigator at start of the study / end of the study (test systems were applied before with 485 μL of 0.01 M TRIS buffer solution)

Amidosulfuron

Experimental Conditions 1.

The test was performed in systems consisting of cylindrical glass containers containing a water-tosediment volume ratio of 3/1 (v/v) and equipped with traps (permeable for oxygen) for the collection of carbon dioxide and volatile organic compounds. During incubation, the water was in smooth motion. The solid phase is kept well sedimented, except for short periods of disturbance in the still remaining flasks after each sampling interval, in order to introduce enough oxygen into the sediment phase, again. The untreated test systems were equilibrated to study conditions for 12 days prior to application. The equilibration was proven by repeated measurements of the oxygen saturation of the water, the pH value of the water and the sediment as well as the redox potential of the water and the sediment in representative test systems.

The study application rate (SAR) was based on a 10-fold single field application rate of approximation of 45 g/ha, resulting in a nominal study application rate 25.4 µg/test system, corresponding to 45/µg/L. ,Ô The actual SAR was 23.8 µg/test system corresponding to 45.8 µg/L.

The application solution was prepared in 0.01 NR Tris(hydroxymethyl)aminomethane (Vis) buffer solution of pH 7. 485 µL of the application solution were applied drop wise onto the water surface of the respective equilibrated test systems using pipette. After application the test vessels were fitted with the trap attachments (except DAT-0 samples).

The test systems were incubated under aerobic conditions in the dark for 100 days at 19.9 °C in a walk-in climatic chamber.

2. Sampling

2. Sampling Nine sampling intervals were distributed over the entiregincubation period of 100 days. Duplicate test systems were processed and analysed 3, 7, 19, 30, 49, 63, 84 and 100 days after treatment (DAT). Microbial activity was determined at start of equilibration as well as start (DAT-2) and end of the study (DAT-101).

Analytical Procedures 3.

At each sampling merval of the probic prase, the trap attachments were removed from the test systems and the water was carefully decanted from the sedunent. Solids were separated from the water by centrifugation. Afterwards, sediments were extracted three times at ambient temperature using acetonitrile/water (3, xA:1, k/y), followed by two pricrowave-accelerated extractions: first with acetonitrile/water (40° , v/v) at 70 °C and second with methanol/water (1:1, v/v) at 50 °C. After each extraction step, supernatant and water sediment system were separated by centrifugation and decantation.

The water and the sodiment extracts and were characterized by liquid scintillation counting and the primary chromatographic method (HPLC/radiodetection). The limit of detection (LOD) for the chromatographic method was 0.7% ART The amount of volatiles and non-extractable residues was determined by liquid sentillation counting and combustion/liquid scintillation counting, respectively. The identity of the test item and its degradation products was elucidated by HPLC-MS(/MS) and, if applicable, assigned by comparison of the retention times with those of reference items.

In order to set the current results on the pathway of degradation of amidosulfuron in water/sediment systems under aerobic conditions into context with the earlier water/sediment metabolism studies (KCA 7.2.2.3/01 and KCA 7.2.2.3/02) and to identify previously unknow major metabolites, a comparison was made by additionally analysing the degradates with the earlier used chromatographic methods (HPLC and TLC).

The data for the test item were evaluated according to the FOCUS (2006) guidance document on degradation kinetics using the software KinGUI 2.1 to derive the DT_{50} and DT_{90} values of amidosulfuron.

Model input datasets were the residual amounts of amidosulfuron found in each replicate test system at each sampling interval (see Table CA 7.2.2.3- 2 and Table CA 7.2.2.3- 3). The initial total recovery (material balance) at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model.

For the evaluation of the data three different kinetic models- single first order (SFO), first order multi compartment (FOMC), and double first order in parallel (DFOR)- were tested in order to determine the best fit kinetic model. The best-fit kinetic model was selected on the basis of the chi² scaled error criterion and on the basis of a visual assessment of the goodness of the fits (diagrams of measured and calculated values vs. time, diagrams of residuals vs. time)

II. RESULTS AND DISCUSSION

A. FINDINGS

Results indicated that the anticipated standardized aerobic conditions were maintained over the duration of the laboratory study

B. DATA

Table CA 7.2.2.3- 2 and Table CA 7.2.2.9- 3 summarise the degradation of [pyrimidyl-2- 14 C]amidosulfuron and the formation and degradation of its degradation products as a function of time.

Ro

Ô

Table CA 7.2.2.3- 2:	Degradation of midosuffuron in Water/sediment system Anglersee under Aerobic
	Conditions (expressed as percent of appred radioactivity; mean value of

.0

					\$ a		<u>_</u>				
	Ľ,	Replicate	ÿ	Q	Ô	Ś	DAT				
Compound	Source	Ňŏ.	Å.	S)	Ĩ	1€∕`	30	49	63	84	100
	Å,	_ ∖A ⊿	Ø 6.4	\$\$7.0	\$9.2	84.9	80.9	76.9	72.8	66.4	64.0
	Water 🏾 🌋	🖻 B 🎘	» 95.9 🖉	88.0 *	88.3	85.8	80.9	74.5	73.6	67.5	61.6
		Mean	96.2	87.£Q	88.8	85.3	80.9	75.7	73.2	66.9	62.8
~C	2	A	Û	7.1	8	8.6	9.0	9.7	9.5	9.7	8.6
amidosulfurøn	Sediment	∭×B ·	6 .9	J.1	9.6	9.3	9.2	9.3	9.5	8.7	8.7
		Mean	ິ 1.4 🌾	7.1	9.2	8.9	9.1	9.5	9.5	9.2	8.6
	\mathcal{A}	A_ℤ	98. 3 Ô	94.1	98.1	93.5	90.0	86.7	82.4	76.1	72.5
	Butire System	₿	96,8	95.P	97.9	95.0	90.2	83.9	83.1	76.2	70.4
		Mean	Q 7.6	Q4.6	98.0	94.3	90.1	85.3	82.7	76.1	71.4
×,	Q.	🗞 A 👌	Sn.d.	Ôñ.d.	n.d.	0.9	1.3	0.9	0.9	1.5	6.2
4	🔊 🕲 ater 🔍	р в С	n.d.,	🕅 n.d.	n.d.	1.2	1.4	0.9	< LOD	1.2	6.1
Å		Mean	n.ø	n.d.	n.d.	1.0	1.3	0.9	< LOD	1.3	6.2
a(gaanidino-		A h	nd.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.8
carbonyl)-	Sediment	Ľ₿ 、	Gn.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
sulfamic acid	.4 4	Mean 🔇	[≫] n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	< LOD
		A	n.d.	n.d.	n.d.	0.9	1.3	0.9	0.9	1.5	7.1
٥	Entire System	BÔ	n.d.	n.d.	n.d.	1.2	1.4	0.9	< LOD	1.2	6.1
	, T	Mean	n.d.	n.d.	n.d.	1.0	1.3	0.9	< LOD	1.3	6.6
	Ĩ										

		Replicate					DAT				
Compound	Source	No.	0	3	7	15	30	49	63	84	100
		Α	n.d.	n.d.	n.d.	< LOD	1.2	1.4	1.8	1.9	1.8
	Water	В	n.d.	n.d.	n.d.	< LOD	0.8	1.8	1.8	2.1	1.5
		Mean	n.d.	n.d.	n.d.	< LOD	1.0	1.6	1.8	2.0	1.6
		А	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
aguanidine	Sediment	В	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	, n.d.	n.d.
		Α	n.d.	n.d.	n.d.	< LOD	1.2	1.4/	1.8	1.9	1.8
	Entire System	В	n.d.	n.d.	n.d.	< LOD	0.8	LP:8	1,8	2.1	15
		Mean	n.d.	n.d.	n.d.	< LOD	1.0	1.6	A. 8	 2.0	×1/6
		A	n.d.	< LOD	< LOD	€ <u>6</u> °	0.7	n.d. V	🖌 n.d. 🎽	¶∳ĽOD	~n.d.
	Water	В	0.7	< LOD	< LOD	S COD	<lod< td=""><td>n.d.)</td><td>n.d</td><td>0.6%</td><td>🖉 n.d.</td></lod<>	n.d.)	n.d	0.6%	🖉 n.d.
		Mean	< LOD	< LOD	< LOD	S LOD	SLOD	(n.d.	n.d-	< LQD	n.d.
		A	n.d.	n.d.	n.d.	n.d.°	n.d.	n.d.	n/d.	IN Q.	n.d.
Reg 3	Sediment	В	n.d.	n.d.	n d	n.đ	n.d.″(n.d.	≈n.d.	Sn.d.	"M.d.
		Mean	n.d.	n.d.	Dd.	. મે.સે.	n _e d.	n.d	🖉 n.d. 💍	n.d. (⊘ [∞] n.d.
		A	n.d.	< LOD	≪yLOD	0.6	2 9.7	nd.	n.d.	< LOD	n.d.
	Entire System	В	0.7	< LOD [®]	K LOD	× LOD ²	⊮ LOD	n.d.	nd.	86	n.d.
		Mean	< LOD	< LOD	<lqd <="" td=""><td>< LOD</td><td>< LOD</td><td>[≫]n.d.</td><td>M.d.</td><td>≰LOD</td><td>n.d.</td></lqd>	< LOD	< LOD	[≫] n.d.	M.d.	≰LOD	n.d.
		A	n.d.	≪C@D	B	S	2,2	3.8	° 4.9 (€7.0	7.4
	Water	В	< LOD	C DOD	0%9	Q.2	2.1	4. ()*	5.1 "Ø	5.9	8.5
		Mean	< LOD	K LOD∕	y 0.8	Q 1.3	2.1	4.1	50	6.4	7.9
		A	n.d.	n.d. ♥	n.d.	n.d.	🎙 n.d. ۶	yn.d.	Øŋ.d.	n.d.	n.d.
adesmethyl	Sediment	В	nd	nce	n.d. "	nx(.)	n.đQ	n.d. 4	S√n.d.	n.d.	0.8
		Mean	m.d.	<u>(n).d.</u>	wod.	nd.	n.d.	n.d.	n.d.	n.d.	<lod< td=""></lod<>
		A D	n.d.	T ≫ LOD	[∞] 0.8	C 1.5	$O^{\mathbb{Z},2}$	\$2.8	4.9	7.0	7.4
	Entire System	BØ	< LOD	< LOD	° 0.9	1.2	2.1	4.4	5.1	5.9	9.3
		Mean	<1.00	< LQD	0.8	1.3	2.1	4.1	5.0	6.4	8.4
	XX7-4	KA N −	$\bigcirc 1$		onter.	n.d.	n	n.d.	n.d.	n.d.	n.d.
	water	S B		0.6		× COD	van d.	n.a.	n.d.	n.d.	n.a.
						< LOD		n.a.	n.a.	n.a.	n.a.
D	Sadima	AQ ¹	n.d.	< LOQ		0.0	n.a.	n.a.	n.d.	n.d.	n.a.
Keg 5	Seamen	Dy Maan	a.u.				n.a.	n.a.	n.u.	n.u.	n.u.
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Niean					n.a.	n.a.	n.a.	n.a.	n.u.
	Entiro Sustan						n.u.	n.u.	n.u.	n.u.	n.u.
			1.1.				n.d.	n.d.	n.u.	n.u.	n.u.
						- LOD	<b>II.U.</b>	n.d.	n.d.	n.u.	n d
	Waler	0 B	Om d	0 h d	K d	n d	<100	n d	n d	0.8	n d
ĺ		Mean	n.d &		n.d	n.d		n.d	n.d		n.d.
		A	n.đ	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Reg 7	Sedimen	B	1 AN	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d
	6	/ Mean	Si.d.	R.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Ű,	S"	A	n.d. %	LOD	n.d.	n.d.	<lod< td=""><td>n.d.</td><td>n.d.</td><td>n.d.</td><td>n.d.</td></lod<>	n.d.	n.d.	n.d.	n.d.
. 9	Entire System	ВС	n.d×	n.d.	n.d.	n.d.	<lod< td=""><td>n.d.</td><td>n.d.</td><td>0.8</td><td>n.d.</td></lod<>	n.d.	n.d.	0.8	n.d.
	.0	Mean	n.Ø	<lod< td=""><td>n.d.</td><td>n.d.</td><td>&lt; LOD</td><td>n.d.</td><td>n.d.</td><td>&lt; LOD</td><td>n.d.</td></lod<>	n.d.	n.d.	< LOD	n.d.	n.d.	< LOD	n.d.
A _ (		ÂX	an.d.	n.d.	n.d.	n.d.	1.5	3.6	4.4	5.2	2.4
ľ "Ś	Water 🕷	B 3	n.d.	n.d.	n.d.	n.d.	1.6	3.8	4.5	4.8	2.0
~	A. *	Mean	n.d.	n.d.	n.d.	n.d.	1.5	3.7	4.4	5.0	2.2
	<u> </u>	A.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	< LOD	n.d.
abiuret	Sediment	B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	< LOD	< LOD	n.d.
	1 A	Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	< LOD	< LOD	n.d.
	- Oř	А	n.d.	n.d.	n.d.	n.d.	1.5	3.6	4.4	5.2	2.4
	Entire System	В	n.d.	n.d.	n.d.	n.d.	1.6	3.8	4.5	4.8	2.0
		Mean	n.d.	n.d.	n.d.	n.d.	1.5	3.7	4.4	5.0	2.2

		Replicate					DAT				
Compound	Source	No.	0	3	7	15	30	49	63	84	100
		А	97.3	87.6	90.0	88.6	87.6	87.2	84.8	81.9	82.5
	Water	В	97.7	88.6	89.2	88.2	86.9	86.0	85.0	83.6	80.5
		Mean	97.5	88.1	89.6	88.4	87.3	86.6	84.9	82.8	81.5
Total		А	1.9	7.1	8.8	9.3	9.0	9.7	9.5	9.7	9.4
Extractable	Sediment	В	0.9	7.1	9.6	9.3	9.2	9.3	°9.5	8.7	9.5
Residues ¹		Mean	1.4	7.1	9.2	9.3	9.1	9.5	9.5	9.2	9.5
		Α	99.2	94.7	98.8	97.8	96.7	96.9	944	91.6	91.9
	Entire System	В	98.6	95.8	98.8	97.4	96.1	<b>Q9</b> .3	.94,5	92.3	90-0
		Mean	98.9	95.3	<b>98.8</b>	97.6	96.4 ₀	96.1	<b>94.4</b>	2.0	\$90.9
		Α	n.a.	0.1	0.2	<b>0</b> 4°	0.8	2.2 °	y 2.6	¥3.8 €	<i>"</i> ∾35.5
Carbon D	ioxide ²	В	n.a.	0.1	0.1	<i>9</i> .4	0.7	2,5%	2.6	3.8%	6.9
		Mean	n.a.	0.1	0.2	<b>€ 0.4</b>	<b>ð 0.8</b>	Q,4	2,76	3.8	6.2
		Α	n.a.	< 0.1	< 0.1	ℓ < 0. f	< 0.1	≰≶″0.1	<b>\$0</b> .1	<01	< 0 <u>9</u> 1
Volatile Organic	Compounds ²	В	n.a.	< 0.1	<0.	< 0.1	< 0.10	¢<0.1	<b>₽</b> 0.1	\$0.1	0.1
		Mean	n.a.	< 0.1	0.1	<b>≶0.1</b>	< 0,1	< 0,	∕∕≤0.1	< 0.1	∑ [≫] < 0.1
		Α	< 0.1	0.2	<i>≪</i> 0.4	0.7	<u></u> 0.9	13	1.7	2.0	° 2.3
Non-Extractab	le Residues ²	В	< 0.1	0.2 🔌	0.4 🖄	0.6	≫1.0	, 1.4		2,0	2.3
		Mean	< 0.1	0,2	0.49	0.7	1.0	∀1.4	<b>1.</b> 7	2.0	2.3
		Α	99.2	25×0	<u>98</u> .4	98.9	985	100.4	[©] 98.7_(	97.4	99.7
Total Rec	overy ¹	В	98.6 。	<b>Ø%</b> .1	99%3	.08.5	97.9	990	98.9Ø	°98.1	99.2
		Mean	98.9 🦿	∛95.5 _∕	ly 99.4 🦼	Q <b>98.</b> 7	<b>\$98.2</b>	99.8	<b>98.8</b>	97.8	99.4

 Image: Niean
 98.9
 99.4
 98.7
 98.2
 99.8
 98.8
 97.8
 99.4

 n.d.: not detected, n.a.: not analysed, DAT: days after treatment
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1
 1

	uu		<u> </u>	C	°∼y	<u>,</u> Q					
		Replicate	V R	<u>ا،                                     </u>	2	<u>~</u>	<u>ð</u> ðt	-			
Compound	Source	No. 兴		3	7 <i>Q</i>	15	^{&gt;&gt;} 30	49	63	84	100
	, N	AC,	95.3	80.1	62.9	46.%	25.4	6.6	2.5	1.0	n.d.
	Water	B″	\$5.6	8₽.5	6 <del>4</del> .7	A. 9.0	19.7	7.5	3.9	n.d.	n.d.
	water	Mean 着	955	2) 80 8	635	246.9	22.5	7.0	32	<	n d
			y row			y		/.0	0.2	LOD	mai
amidosulfuron	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		1.00	9.0Q	13.3	12.4	6.4	1.6	1.1	1.9	n.d.
annuosunui on	8ediment	& ^B	49	8.7	13,8	11.6	5.8	3.0	1.7	n.d.	n.d.
K		Alean	<b>A</b> 1.5	<b>8</b> .9	<b>≪1</b> 3.6	12.0	6.1	2.3	1.4	0.9	n.d.
		A	[©] 96.3 [°] ∧	89.1	75.6	59.1	31.8	8.2	3.7	2.9	n.d.
	Entite System	J B O	97.5 ^O	90.2 [×]	78.6	58.6	25.5	10.4	5.6	n.d.	n.d.
		Mean	96.9	89.7	77.1	58.8	<b>28.</b> 7	9.3	4.6	1.5	n.d.
°,		Ă	Dr.d.	Mid.	0.9	1.0	1.8	1.0	n.d.	3.0	2.1
ð a	Water	S B	Sn.d. 👡	Ôn.d.	n.d.	2.6	1.6	0.8	0.8	1.3	2.2
	°0 م	O Means	n.d., 🤅	n.d.	< LOD	1.8	1.7	0.9	< LOD	2.1	2.1
a(guanidino-		A	n.¢	n.d.	n.d.	n.d.	n.d.	< LOD	n.d.	n.d.	0.7
carbonyl)-	@Sedimetry	Å	nd.	n.d.	n.d.	n.d.	n.d.	< LOD	n.d.	n.d.	n.d.
sulfamic acid	, S	Mean 5	Gn.d.	n.d.	n.d.	n.d.	n.d.	< LOD	n.d.	n.d.	< LOD
×	8	A S	[≫] n.d.	n.d.	0.9	1.0	1.8	1.0	n.d.	3.0	2.8
	Entine System	В	n.d.	n.d.	n.d.	2.6	1.6	0.8	0.8	1.3	2.2
	R ^A A	Mean	n.d.	n.d.	< LOD	1.8	1.7	0.9	< LOD	2.1	2.5
		А	n.d.	n.d.	1.1	3.3	8.1	17.7	13.8	9.8	10.0
	Water	В	n.d.	n.d.	1.0	3.2	8.1	11.9	15.6	16.5	9.1
	0	Mean	n.d.	n.d.	1.1	3.3	8.1	14.8	14.7	13.2	9.5
		А	n.d.	n.d.	n.d.	n.d.	2.4	5.6	4.8	8.2	8.9
aguanidine	Sediment	В	n.d.	n.d.	n.d.	n.d.	2.5	4.5	5.5	7.7	9.0
-		Mean	n.d.	n.d.	n.d.	n.d.	2.4	5.1	5.1	8.0	9.0
-		А	n.d.	n.d.	1.1	3.3	10.4	23.3	18.6	18.1	18.9
	Entire System	В	n.d.	n.d.	1.0	3.2	10.6	16.4	21.0	24.2	18.1
		Mean	n.d.	n.d.	1.1	3.3	10.5	19.9	19.8	21.1	18.5

		Replicate					DAT				
Compound	Source	No.	0	3	7	15	30	49	63	84	100
		А	0.7	n.d.	1.1	1.1	n.d.	n.d.	n.d.	n.d.	n.d.
	Water	В	n.d.	n.d.	1.7	1.7	< LOD	n.d.	n.d.	n.d.	n.d.
Compound Reg 3 adesmethyl Reg 5 Reg 6 Reg 7		Mean	< LOD	n.d.	1.4	1.4	< LOD	n.d.	n.d.	n.d.	n.d.
		А	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Reg 3	Sediment	В	n.d.	n.d.	n.d.	n.d.	n.d.	n.da	n.d.	n.d.	n.d.
8		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.đ.	n.d.	n.d.	n.d.
	-	А	0.7	n.d.	1.1	1.1	n.d.	nd.	n.d.	n d/	n.d.
	Entire System	В	n.d.	n.d.	1.7	1.7	<lod< td=""><td>Ån.d</td><td>n.d.</td><td>D.d.</td><td>n.đ.</td></lod<>	Ån.d	n.d.	D.d.	n.đ.
	5	Mean	<lod< th=""><th>n.d.</th><th>1.4</th><th>1.4</th><th><lod< th=""><th>n.d. 🍘</th><th>n.d. A</th><th>n.d.</th><th>K.n.d.</th></lod<></th></lod<>	n.d.	1.4	1.4	<lod< th=""><th>n.d. 🍘</th><th>n.d. A</th><th>n.d.</th><th>K.n.d.</th></lod<>	n.d. 🍘	n.d. A	n.d.	K.n.d.
		A	n.d.	3.3	7.3	41.5	107	4.7	1.7	n.d.	Pn.d.
	Water	В	n.d.	2.7	6.6		-11.4	· 32	39	b.e	n.d.
		Mean	n.d.	3.0	7.0 \$		S111	639	26	sin d	n.d.
		A	n d	1.6	2.4 Č	27	24 \$	10	v 11 (	Øn d	ned
a -desmethyl	Sediment	B	n d	n d	1.5	2.10	2.10	1.0	1.0	nd	$\mathcal{N}_{nd}$
aucsnicenyi	Sediment	Mean	n d	0.8		506	2.3	1-0	1/1	n da	n d
		Δ	n.d.	49	× 197 <		A132	\$5.6	2.8	1.42	n d
	Entire System	B	n.d.	27 4	$\mathcal{D}_{82}^{\gamma}$	138 %	13.6	1 2	0/1 5	Qd	n d
	Entrie System	Moon	n.u.	2.7	₹ 0.2 € Ô	1110	13.0	4.0	36	$\mathcal{U}_{\mathbf{n}\mathbf{d}}^{\mathrm{n.u.}}$	n.u.
		A	1. <b>u.</b>	<i>കു</i> റ്റെ	0.2 5	14.0	13. <del>7</del>	<b>4.</b> 9	n d	n.u.	n.d.
	Water	B	1.4		n M	d d	nd	11.U.	n d	n d	n d
	vv ater	Maan	13		n.u.	Ond S	$\sqrt{\mathbf{n}}$ d		n.a. ⊂n d	n d	n d
		Δ	n d		$\int \frac{1}{0.8e^{\circ}}$	n de	$n d^{\diamond}$	n d <i>(</i>	n d	n.u.	n d
Reg 5	Sediment	B	11.9	ned.		mA	næ	n dc	nd	n.u.	n d
Kig 5	Sediment	Maan	, QÅ			A A	n	n	n.d.	n d	n d
		Δ	$\bigcirc^{\mathbf{n.u.}}_{14}$	VIOD	× 0 8	ond.	and.	s nd	n d	n.u.	n d
	Entire System	R Ô	1.1		×100	nd d	$P_{nd}^{n.u.}$	n d	n d	n d	n d
Compound Reg 3 adesmethyl Reg 5 Reg 6 Reg 7	Entire System	Mean	1.3	< LØD	< L@D	n dO	n d	n d	n d	n d	n d
		"A	n d		< KØD	ha	n P	n d	n d	n d	n d
	Water				¥7	es n d	san d	n d	n d	n d	n d
	vi ater	Mean	n d 🕅	<lod< td=""><td><lod< td=""><td>nd #</td><td>nd</td><td>n d</td><td>n d</td><td>n d</td><td>n d</td></lod<></td></lod<>	<lod< td=""><td>nd #</td><td>nd</td><td>n d</td><td>n d</td><td>n d</td><td>n d</td></lod<>	nd #	nd	n d	n d	n d	n d
			n 🕅	n dO	n d. Ø	n de	nd	n d	n d	n d	n d
Reg 6	Sediment	B	n d	n d	na	nad	n d	n d	n d	n d	n d
nug o		Mean	and	. Can d	d.	and .	n.d.	n.d.	n.d.	n.d.	n.d.
	- ôž		nd	2 n d		Qn d	n d	n d	n d	n d	n d
	Entire System		n d	<1.0E	07	n d	n d	n d	n d	n d	n d
		Mean	nad	< LOP	< LØD	n d	n d	n d	n d	n d	n d
		\ «Δ	Md	A Del	AN A	n d	n d	n d	n d	n d	n d
l k	Water	<b>O</b> B	Ond.	On d	≪n d	n d	n d	n d	n d	n d	n d
		Means	n.d. &.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
		A	n.al ,	n.dO	<lod< th=""><th>n.d</th><th>n.d</th><th>n.d</th><th>n.d</th><th>n.d</th><th>n.d</th></lod<>	n.d	n.d	n.d	n.d	n.d	n.d
Reg 7	Sedime	×8	Ra	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d
	5	//Mean	Sn.d.	Si.d.	<lod< th=""><th>n.d.</th><th>n.d.</th><th>n.d.</th><th>n.d.</th><th>n.d.</th><th>n.d.</th></lod<>	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Ő	Ś	A	nd 🗞	n d	<lod< th=""><th>n d</th><th>n d</th><th>n d</th><th>n d</th><th>n d</th><th>n d</th></lod<>	n d	n d	n d	n d	n d	n d
.4	Entric System	ВС	n d 🗐	nd	n d	n d	n d	n d	n d	n d	n d
		Mean	n D	n d	<lod< th=""><th>n d</th><th>n d</th><th>n d</th><th>n d</th><th>n d</th><th>n d</th></lod<>	n d	n d	n d	n d	n d	n d
N.	<u>¢</u>	a	and d	n d	n d	n d	14	4 7	2.6	89	10.6
v A	Water		⊘n d	n d	n d	n d	1.5	39	3.1	3.0	9.2
*	A s	Mean A	n.d.	n.d.	n.d.	n.d.	1.4	4.3	2.8	5.9	9.9
	C	A	n d	n d	n d	n d	nd	n d	1.0	0.8	nd
a -hiuret	Sediment	B	n d	n d	n d	n d	n d	n d	<lod< th=""><th>1.0</th><th>n d</th></lod<>	1.0	n d
a. piui et		Mean	n.d	n.d	n.d	n.d	n.d	n.d	<lod< th=""><th>0.9</th><th>n.d</th></lod<>	0.9	n.d
	- OF	Δ	n d	n d	n d	n d	14	4 7	3.6	96	10.6
	Entire System	B	n d	n d	n d	n d	1.4	39	31	4.0	9.2
		Mean	n.d.	n.d.	n.d.	n.d.	1.4	4.3	3.4	6.8	9.9

		Replicate									
Compound	Source	No.	0	3	7	15	30	49	63	84	100
		А	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	Water	В	n.d.	n.d.	n.d.	n.d.	n.d.	2.6	n.d.	n.d.	n.d.
		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	1.3	n.d.	n.d.	n.d.
		А	n.d.	n.d.	n.d.	n.d.	n.d.	n.d. 🔊	n.d.	n.d.	n.d.
Reg 9	Sediment	В	n.d.	n.d.	n.d.	n.d.	n.d.	n.d	n.d.	n.d.	n.d.
		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
		А	n.d.	n.d.	n.d.	n.d.	n.d.	. 'n∕d.	n.d.	n ď.	n.d.
	Entire System	В	n.d.	n.d.	n.d.	n.d.	n.d.	$\hat{\mathbb{O}}_{2.6}$	n.d.	n.d.	n.đ.
	5	Mean	n.d.	n.d.	n.d.	n.d.	n.da	1.3	n.d. 🔊	n.d.	Kn.d.
		A	1.4	< LOD	n.d.	∕n⊾d°	na	n.đ.V	n.d.	n.d.	n.d.
	Water	В	1.1	0.7	n.d.	m.d.	n.d.	s.n.d.	. n.Q.	n.d.	n.d.
		Mean	1.3	<lod< td=""><td>n.d. s</td><td>n.d.</td><td>Sn.d.</td><td>n.d.</td><td>æ.d.</td><td>sin d.</td><td>n.d.</td></lod<>	n.d. s	n.d.	Sn.d.	n.d.	æ.d.	sin d.	n.d.
		A	nd	<lod< td=""><td>0.8 C</td><td>n d[®]</td><td>nd &amp;</td><td>n d [^]</td><td>Nnd (</td><td>Øn d</td><td>ned</td></lod<>	0.8 C	n d [®]	nd &	n d [^]	Nnd (	Øn d	ned
Reg 5	Sediment	B	n d	nd	< LOP	n	n dØ	n de	n d	nd	Nn d
itteg 5	Seament	Mean	n d	< 1.0D			and a	næ	n/d.	n da	n d
		A	1.4	< LOD		nd nd	And	In d	nd	1.42	n.u.
	Entire System	R	1.4			$n d^{n}$	n d	n d	$\mathcal{O}_{\mathbf{h}} d$	$\mathcal{Q}_{d}$	n d
	Entire System	Maan	1.1	0.7		n d	nd	nd	nd (	$\mathcal{V}_{nd}^{n.u.}$	n.u.
		A	1.3 nd			11.04		n.d.	n do	n.d.	n.d.
	Watar	D A	n.u.				nd.	n.u.	11. <b>U</b>	n.u.	n.u.
	w ater	D	nd a				II.U.		11.94.	n.u.	n.u.
		Mean	n.u.	< LOD	× LOD	ra n.u.	° <b>n.u.</b> n d∾	, <b>11.0.</b>	n.u.	n.a.	n.a.
Dec	Sadimant	A D	11. <b>9</b>	nod	n.u.	n.u v	11.u.	n d	9 11.u.	n.u.	n.u.
Keg o	Seament	D			n.u.			II.U.	n.u.	n.u.	n.u.
		Mean	And.	0.a. ∕∕			<b>n.a.</b>		n.d.	n.a.	n.a.
	Entire System	A D	n.u.	/ II.U. »		nd (	$\mathcal{O}_{nd}^{\mathfrak{n}.\mathfrak{a}}$	· u.u.	n.u.	n.u.	n.a.
Compound Reg 9 Reg 5 Reg 6 Reg 7	Entire System		11.u	< LOD	0.7	n.u. A	nd	≫ 11.u. n.d	n.u.	n.u.	n.u.
		Mean				n.es	n.a.	n.a.	n.a.	n.a.	n.a.
	Watar				≈ II.C. 2/1	au.		n.u.	n.u.	n.u.	n.a.
	water		° °11.0. ∕	n.a.	n.u.		u.u.	n.a.	n.a.	n.a.	n.a.
			<u>n.a.</u>			n.a. 🚝	= <b>∖</b> n.a.	n.a.	n.a.	n.a.	n.a.
D 7	Calina		n.d. 🕵 🍾	n.d.		n.d	n.d.	n.d.	n.d.	n.a.	n.a.
Reg 7	Sealment	B%	n.d.	p.g.	n.g.°	nga	n.a.	n.a.	n.a.	n.a.	n.a.
	<u> </u>	Mean	On.d.	<b>A</b> ar.d.		( <b>n</b> :d.	n.d.	n.d.	n.d.	n.d.	n.d.
		A A	n.a.	n.a.		s'n.a.	n.d.	n.d.	n.d.	n.a.	n.a.
	Entre System	B	n.d	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
		Meañ	n.d.	n.d. ∛	< L(0))	n.d.	n.d.	n.d.	n.d.	<b>n.d.</b>	<b>n.d.</b>
L Å			( <u>1</u> ).d.	nyd.	Thea.	n.d.	1.4	4./	2.6	8.9	10.6
	water	wв	🔍 n.d. 🗞	⊎n.d.	n.d.	n.d.	1.5	3.9	3.1	5.0	9.2
		, wiean	n.d.	n.d.%	<b>n.d.</b>	n.d.	1.4	4.5	2.8	5.9	9.9
		A	n.a.	n.đ	n.d.	n.d.	n.d.	n.d.	1.0	0.8	n.d.
abiuret	Sedimeter	*82	rea.	n.d.	n.d.	n.d.	n.d.	n.d.	< LOD	1.0	n.d.
ð		Mean	Ön.d.	O ^{n.d.}	n.d.	n.d.	n.d.	n.d.	< LOD	0.9	n.d.
			) n.d. 🌾	n.d.	n.d.	n.d.	1.4	4.7	3.6	9.6	10.6
Ä	Entre System	ВО	n.ď.∾	n.d.	n.d.	n.d.	1.5	3.9	3.1	4.0	9.2
	a à	Mean	્રા.લ.	n.d.	n.d.	n.d.	1.4	4.3	3.4	6.8	9.9
y a	× ×	×.	O ^{n.'d.}	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
↓ √	Water	B A	≫ n.d.	n.d.	n.d.	n.d.	n.d.	2.6	n.d.	n.d.	n.d.
	l de c	📈 Mean 🚝	n.d.	n.d.	n.d.	n.d.	n.d.	1.3	n.d.	n.d.	n.d.
		A A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
Reg 9	Sediment	B	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	\$`	Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	"0"	A	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	Entire System	В	n.d.	n.d.	n.d.	n.d.	n.d.	2.6	n.d.	n.d.	n.d.
		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	1.3	n.d.	n.d.	n.d.

		Replicate	DAT								
Compound	Source	No.	0	3	7	15	30	49	63	84	100
		А	97.5	83.4	72.8	63.6	47.4	34.7	20.5	22.7	22.7
	Water	В	96.7	84.8	74.9	66.5	42.3	29.9	26.9	20.8	20.5
		Mean	97.1	84.1	73.8	65.0	44.9	32.3	23.7	21.7	21.6
Total		Α	1.0	10.6	16.5	15.1	12.5	9.4	9.1	10.9	11.0
Extractable	Sediment	В	1.9	8.7	15.4	14.1	11.7	9.7	9.4	8.7	10.4
Residues ¹		Mean	1.5	9.7	15.9	14.6	12.1	95	9.3 _°	9.8	10.7
		Α	98.5	94.0	89.3	78.6	59.9	<b>4</b> ¥.0	29.6	35%	33.6
	Entire System	В	98.6	93.5	90.3	80.6	54.1	Step 39.6	36.3	29.5	<del>20</del> .9
		Mean	98.6	93.8	89.8	79.6	57.0	41.8	ຶ 33.0 🔎	31.5	<b>X</b> 32.2
Carbon Dioxide ²		Α	n.a.	0.1	0.2	10.4°	0.9	1.6%	1.9	3.8,~	₿ 5.9
		В	n.a.	0.1	0.2	0.3	0.7	<1.¥	1.6	2,2	5.4
		Mean	n.a.	0.1	0.2 🔉	ي 0.3 ₍	<b>0.8</b>	<u>گ</u> اً.4	<b>A</b> .7	×3,4	5.6
Volatila Organia Compounds		Α	n.a.	< 0.1	< 0.1	< 0.1	< 0.1%	∕ [°] <0.1 ∕ [∞]	ي< 0.1 ⁽	0.1 🖉	< 0.1
	e compounds	В	n.a.	< 0.1	<0.9	< 0.1	< 0.0%	< 0,2	< 0.15	< 0.1 C	× 0.1
		Mean	n.a.	< 0.1	Ø.1	<b>9</b> .1	≶0.1	< 0,1	< (ð.)	< 0	< 0.1
	_	Α	0.2	4.2	^%9.7``	20.4	37.3	~\$ <u>4</u> .3	66.5	50 T	57.2
Non-Extractat	ole Residues ²	В	0.2	3.5 ~		18.6	42.6	51.1	©59.5	64.9	60.9
		Mean	0.2	3.8	9.0	19,5	40.0	52.7	63.0	62.0	59.0
		A	98.7	~98:3	2 <b>8</b> .1	<b>20</b> 7	988.7	99.9°	98.0	96.5	96.7
Total Recovery ¹		В	98.8 🦏	<b>997</b> .1	g 98.9	Q9.5	97.4	<b>\$U</b> ?8	9705	97.3	97.1
		Mean	98.8	[∦] 97.7 ∕	<b>∀ 99.0</b> _	Ø 99.5	<b>\$97.8</b>	<b>95.9</b>	@ <b>9</b> 7.7	96.9	96.9

n.d.: not detected, n.a.: not analysed, DAT: days after treatment

¹ Difference to Material Balance values due to roughding errors as well as clear up and chuomatographic losses.

² Values taken from Material Balance.

## C. MATERIAL BALANCE

The amount of dosed test item was determined at DAT-9 before during and after the application and was set to 100% AR for all samples. The total radioactivity recovery (mean of duplicates) of all sampling intervals ranged from 97 8 to 101.3% AR in water/sediment system Anglersee (overall mean 99.7% AR, RSD 0.9%) and from 96.8 to 100.3% AR in water/sediment system Wiehltalsperre (overall mean 98.5% AR, RSD 4.2%), see also Table CA 7.2.2 22 and table CA 7.2.2.3-3.

V

The complete material behavior found a all sampling intervals (mean of duplicates) in both water/sediment systems demonstrated that no significant portion of radioactivity dissipated from the vessels or was lost during processing of theses samples

## D. EXTRACTABLE AND NON-EXTRACTABLE RESIDUES

Residues in water decreased from 97.9% AR at DAT-0 to 81.5% AR at DAT-100 in water/sediment system Anglersee and from 97.4% AR at DAT-0 to 21.9% AR at DAT-100 in water/sediment system Wiehltalsperre

Extractable residues in sediment increased from 1.5% AR at DAT-0 to 9.9% AR at DAT-100 in water/sediment system Anglersee and from 1.6% AR at DAT-0 to 16.5% AR at DAT-100 in water/sediment system Wiehlfalsperr

Extractable residues in the total system (water and sediment extracts) decreased from DAT-0 to DAT-100 from 9.3 to 91.3% AR in water/sediment system Anglersee and from 99.0 to 32.5% AR in water/sediment system Wiehltalsperre.

Non-extractable residues (NER) increased from DAT-0 to DAT-100 from < 0.1 to 2.3% AR in system Anglersee. In system Wiehltalsperre, NER increased from DAT-0 to DAT-63 from 0.2 to 63.0% AR and decreased then to 59.0% AR until DAT-100.

Ø

# Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

## E. VOLATILES

The maximum amount of carbon dioxide formed in the test systems was 6.2% AR in water/sediment system Anglersee and 5.6% AR in water/sediment system Wiehltalsperre.

Formation of volatile organic compounds was not significant, values being < 0.1% AR at all sampling intervals in both water/sediment systems. See also Table CA 7.2.2.3- 2 and Table CA 7.2.2.3- 3 for details.

## F. DEGRADATION OF PARENT COMPOUND

Amidosulfuron dissipated from the water due to degradation and translocation into the sediment. The amount of amidosulfuron in the water decreased from DAT-0 to DAT-100 from 96.2 to 62.8% AR in system Anglersee and from 95.5% AR to non-detectable amounts in system Wiehltaksperre.

C

The amount of amidosulfuron in the sediment extracts increased in system Anglersee from DAU0 to DAT-49 from 1.4 to 9.5% AR and decreased then to 80% AR at DAT-100. In system Wiehltasperre, the amount of amidosulfuron in the sediment extracts increased from DAT-0 to DAT-7 from 1.5 to 13.6% AR and decreased then to non-detectable amounts at DAT-40.

The amount of amidosulfuron in the total system decreased from DAT-0 to DAT-100 from 97.6 to 71.4% AR in system Anglersee and from 96.9% AR to non-detectable amounts in system Wiehltalsperre.

Besides the formation of carbon dioxide, four major degradation products wore identified during the study. A.-(guanidinocarbonyl)sulfamic acid was detected in water sediment system Anglersee with max. amounts of 6.2% AR at DAT-100 (water) and 6.6% AR at DAT-100 (entire system) and in Wiehltalsperre with max. amounts of 2.4% AR at DAT-400 (water) and 2.5% AR at DAT-100 (entire system). A.-guanidine was detected in water sediment system Anglersee with max. amounts of 14.8% AR at DAT-400 water) 2.0% AR at DAT-84 (entire system) and in Wiehltalsperre with max. amounts of 14.8% AR at DAT-400 water) 2.0% AR at DAT-100 (redire system) and in Wiehltalsperre with max. amounts of 14.8% AR at DAT-400 (water) 2.0% AR at DAT-100 (redire system) and in Wiehltalsperre with max. amounts of 14.8% AR at DAT-400 (water) 2.0% AR at DAT-100 (redire system) and in Wiehltalsperre with max. amounts of 14.8% AR at DAT-400 (water) and 3.4% AR at DAT-100 (entire system) and in Wiehltalsperre with max. amounts of 7.9% AR at DAT-400 (water) and 3.4% AR at DAT-100 (entire system) and in Wiehltalsperre with max. amounts of 7.9% AR at DAT-400 (water) and 5.4% AR at DAT-15 (sediment) and 14.0% AR at DAT-60 (entire system). Amidosulfuron-biuret was detected in water/sediment system Anglersee with max. amounts of 5.0% AR at DAT-84 (water) and 5.0% AR at DAT-84 (entire system) and in Wiehltalsperre with max. amounts of 5.0% AR at DAT-84 (water) and 5.0% AR at DAT-84 (entire system) and in Wiehltalsperre with max. amounts of 5.0% AR at DAT-84 (water) and 5.0% AR at DAT-84 (entire system) and in Wiehltalsperre with max. amounts of 5.0% AR at DAT-100 (water), 0.9% AR at DAT-84 (entire system) and in Wiehltalsperre with max. amounts of 9.9% AR at DAT-100 (water), 0.9% AR at DAT-84 (sediment) and 9.9% AR at DAT-000 (entire system).

The comparison of the chromatographic methods used in this study and the previously performed studies (KCA 7.2.2.301, KCA 7.2.2.3/02 and KCA 7.2.2.3/03) showed that the new proposed pathway of degradation is very well represented by the separation of peaks during the Knoch study (KCA 7.2.2.3/01) All three significant unknowns listed therein were identified as amidosulfuron-(guanidinocarbonyl)sulfamic acid (BCS-BI49539), amidosulfuron-guanidine (BCS-CO41839) and amidosulfuror biuret BCS-CO51287

Furthermore, it was supported that the chromatographic method previously used in the Gildemeister study (KCA 7.2.2.3/02 and KCA 7.2.2.3/03) was not suitable for the separation of amidosulfuron and its metabolites (for detailed information see beginning of section CA 7.2.2.3.

The experimental data could be best described by a double first order in parallel (DFOP) and a single first order (SFO) kinetic model for dissipation from water, and degradation in the total system, respectively. The  $DT_{50}$  values for the dissipation of amidosulfuron from the water were 171 and 12.7 days in water/sediment system Anglersee and Wiehltalsperre, respectively. The  $DT_{50}$  values for the degradation of amidosulfuron in the total water/sediment system were 227 and 16.5 days in water/sediment system Anglersee and Wiehltalsperre, respectively.

## III. CONCLUSIONS

Amidosulfuron dissipated rapidly (system Wiehltalsperre) to slowly (system Anglersee) from the water in water/sediment systems under aerobic conditions in the laboratory in the dark. The calculated best fit DT₅₀ values for the dissipation of amidosulfuron from water were 171 and 12.7 days in water/sediment system Anglersee and Wiehltalsperre, respectively. In the total water/sediment system amidosulfuron was degraded well (system Wiehltalsperre) to slowly (system Anglersee). The calculated best fit DT₅₀ values for the total system were 227 and 16.5 days in water/sediment system Anglersee and Wiehltalsperre, respectively.

Formation of carbon dioxide was up to 6.2% AR at study end in water/sediment system Anglersee.

Besides carbon dioxide, four major degradation products vore identified during the study: Amidosulfuron-(guanidinocarbonyl)sulfamic acid (max. water: 62% AR at DAT-100° in water/sediment system Anglersee; max. entire system: 6.6% AR at DAT-000 in water/sediment system Anglersee); amidosulfuron-guanidine (max. water: 4.8% AR at DAT-49 in water/sediment system Wiehltalsperre; max. entire system: 221% AR at DAT-84 in water/sediment system Wiehltalsperre), amidosulfuron-desmethyl (max. water) 11.4% AR at DAT-47 in water/sediment system Wiehltalsperre; max. sediment: 2.6% AR at DAT-51 in water/sediment system wiehltalsperre; max. sediment: 2.6% AR at DAT-15 in water/sediment system amidosulfuron-biuret (max. water: 9.9% AR at DAT-100 in water/sediment system Wiehltalsperre; max. sediment: 0.9% AR at DAT-84 in water/sediment system Wiehltalsperre; max. sediment: 0.9% AR at DAT-84 in water/sediment system Wiehltalsperre; max. sediment: 0.9% AR at DAT-84 in water/sediment system Wiehltalsperre; max. sediment: 0.9% AR at DAT-84 in water/sediment system Wiehltalsperre; max. sediment: 0.9% AR at DAT-84 in water/sediment system Wiehltalsperre; max. sediment: 0.9% AR at DAT-84 in water/sediment system Wiehltalsperre; max. sediment: 0.9% AR at DAT-84 in water/sediment system Wiehltalsperre

In the loamy test system Wiehltatsperre and double the saturation was tast and high NER amounts (max. 59% AR) were formed, whereas in the saturation was moderate and just low NER amounts (max 2.3% AR) were formed.

One further study on metabolism of anidosulturon in water/sediment systems, dated 1992, could not be traced in the baseline dossier for indocumented reason, for completeness, it is therefore included here on supplemental dossier level and simmarized in analogy to the procedures for new studies. Study discussion however revealed significant analytical deficiencies questioning the validity of this test. The study is considered superseded by the results of two subsequently conducted water/sediment experiments, see reported under KCN7.2.2.301 and KCA 7.2.2.3/02 before.

	L'L	0_0	·	
Report: 🕺	لٍ∛ <b>K</b> ⊄A 7.2ٍ!	Q:3/03;	; 1	992; M-137873-01-1
Title: 🔪 🖗	Aloe 0750	32-14 Aero	bie aquatic me	etabolism
Report No.: 🔊	A48276		Ő [¥]	
Document No.:	.Õ [♥] M- <b>Ø</b> [*] 787.	3-00-1	1	
Guideling(s):	C USEPA (*	=EPA): \$162	2-4	
Guideline deviation	n(s): 🖉 🗸			
GLP/GEP:	⇒ ^s yes _Ø′	, O´		
«С ^у	4 4 9	A V		

## Executive Summary

The route and rate of degradation [pyrimidyl-2-¹⁴C]amidosulfuron were studied in two water/sediment systems under aerobic conditions in the dark in the laboratory for 112 days at  $20 \pm 2$  °C.

Water/Sediment	Source	Sediment type	рН		OM
system			water	sediment	[%]
river Nidda	Frankfurt a.M., Germany	silt loam	6.8	7.0	1.7
gravel-pit	Frankfurt a.M., Germany	sand	6.5	7.0	5.1

A study application rate of 0.125 mg/kg (corresponding to 0.025 mg per test system and an initial concentration in water of approx. 0.139 mg/L) was applied based on the assumption that 70% of the field application rate of 0.045 kg/ha would reach the surface water.

The test was performed in static systems consisting of Erlenmeyer flasks containing a water-tosediment ratio of 9/1 (*w/w*) and equipped with traps for the collection of carbon dioxide and volatile organic compounds.

Mean material balances were 97.6% AR for water/sediment system river Nidda (range from 92, to 103.8% AR) and 98.2% AR for water/sediment system gravel pit (range from 92, to 1021% AR).

The maximum amount of carbon dioxide at study end (DQAT-112), was 4% AR in water/sediment system river Nidda and 3% AR in water/sediment system graveOpit. Formation of other (unpolar) volatiles was insignificant as demonstrated by values 01% AR at all sampling intervals in both water/sediment systems.

Residues in water of water/sediment system river Nidda decreased from 97.6% AR al DAT-0 to 75.8% AR at DAT-112. Residues in water of water sediment system grave pit decreased from 95.3% AR at DAT-0 to 80.9% AR at DAT-112

Extractable residues in the sediment of water/sediment system river Nidda increased from 5.8% AR at DAT-0 to 7.5% AR at DAT-2 and remained in the range of 4.5 to 6.1% AR until study end (DAT-112). Extractable residues in the sediment of water/sediment system gravel pit decreased from 7.3% AR at DAT-0 to 3.2% AR at DAT-7, remained constant until DAT-84 and slightly increased to 6.0% AR at DAT-112.

Extractable residues in the entire softem of water sediment system river Nidda decreased from 103.4% AR at DAT-0 to 80.8% AR at DAT-112. In the entire system of water/sediment system gravel pit extractable residues decreased from 102.6% AR at DAT-0 to 86.8% AR at DAT-112.

Non-extractable residues (NER) in the water/sediment system ever Nidda increased from 0.5% AR at DAT-0 to 10.6% AR at DAT-112. In the water/sediment system gravel pit NER increased from 0.5% AR at DAT-0 to 5.4% AR at DAT-112.

The amount of amidosulfuton in the water decreased from DAT-0 to DAT-112 from 97.6 to 46.5% AR in system fiver Nuda and from 95% to 4.4% AR in system gravel pit.

The amount of amidosultaron in the sedment extracts of water/sediment system river Nidda increased from 5.8% AR at DAT-0 to 7.3% AR at DAT-2 and decreased then to 3.3% AR at study end (DAT-112) In the sediment extracts of water sediment system gravel pit the amount of amidosulfuron decreased from 7.3% AR at DAT of 0.5% AR at study end (DAT-112).

The arount of amido alfuror in the total system decreased from DAT-0 to DAT-112 from 103.4 to 49.8% AR in system river Nidda and from 102.6 to 4.6% AR in system gravel pit.

Two degradation products were identified with the following maximum occurrences: amidosulfuron-ADHP (AE F094206) with 39.7% at DAT-84 (system gravel pit) and amidosulfuron-desmethyl (AE F101630) with 29.5% AR at DAT-42 (system gravel pit).

The total unidentified residues amounted to a maximum of 50.8% AR at study end (DAT-112) only in water/sediment system gravel pit with two single components reaching 10.9% AR (m2) and 33.7% AR (m3). At all other sampling intervals unidentified residues were  $\leq 0.3\%$  AR for both water/sediment systems.

## Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

The half-lives of amidosulfuron the water/sediment systems was estimated graphically and by regression calculation and were 106 to 120 days (graph.) and 114 - 126 days (calcul.) for system river Nidda and 57 to 63 days (graph.) and 21 - 31 days (calcul.) for system gravel pit.

## **I. MATERIALS AND METHODS**

A. MATER	IALS
1. Test Iten	n
[pyrimidyl-2- ¹⁴ C	Clamidosulfuron
Batch:	17040 II
Specific Activity	y: 1.27 MBq/mg
Radiochemical I	Purity: > 97%
Chemical Purity	not reported

#### 2. Test System

The study was carried out using two water/sediment systems originating from an old branch of the river Nidda in Frankfurt a.M., Germany and a gravel pit near Frankfurt a.M., Germany Water and sediment were collected from the same area. Water and sediment were stored for 8 days at about 20 °C prior to incubation. The wet sediments were passed through a 2 mm sieve. The characteristics of the sediment and the associated water layer are summarised in Toble CA 7.2.2.3 and Table CA 7.2.2.3 5.

Properties of Sediment		
Parameter 🚀	River Nidda	Gravel pit
Geographic Location	Frankfurt a.Mc	near Frankfurt a.M.
S L	Hesse N X	Hesse
	Germany A	Germany
Soil Taxonomic Classification (USDA)	silt kom	sand
Sand (2000 – $50 \mu m$ ) [%]	\$ 3.3	90.7
Silt (< 50 2 µm) [ ]	J 56.4 J	6.4
Clay 🞸 µm) 🖉 🖉	۵۶ <u>۱8.2</u> ۱8.2	2.9
pH 2		7.0
Grganic Matter [%6		5.1
Cation Exchange Capacity [meq/100 g]	ر 14.8	3.1

Table CA 7.2.2.3-4:: Physico-chemicationaracteristics of sediment

## Table CA 7.2.2.3-5: Physico-chemical characteristics of water

	<u>y iy içi</u>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
Properties of Waters			
Paran	neter	River Nidda	Gravel pit
pł	b ² 0 0	6.8	6.5
Oxygen Concen	tration [mg/L]	8.2	7.4
Microbiological analy	sis O		
at start [cells/mL]	aerobic bacteria	12	67
Å	^{actinomycetes}	<10	<10
Ô	fungi	2	0
at end [cells/g]	aerobic bacteria	$3.9 * 10^5$	$5.8 * 10^4$
	actinomycetes	$4.0 * 10^2$	$4.3 * 10^3$
	fungi	$1.2 * 10^3$	$1.8 * 10^4$
### **B.** STUDY DESIGN

### 1. Experimental conditions

The static test system for aerobic degradation in water/sediment consisted of Erlenmeyer flasks containing 20 g sediment (dry weight) and 180 g water resulting in a water-to-sediment ratio of 1/9 (*w/w*) and a water depth of approx. 1 cm. Each test vessel was fitted with trap attachments (permeable for oxygen) containing soda lime for absorption of carbon dioxide and glass work coated with paraffin oil for adsorption of volatiles.

The study application rate (SAR) was 0.125 mg/kg assuming that about 70% of the test substance reaching the surface water, resulting in a SAR of 0.025 mg per test system. The set item was applied dropwise onto the water surface of the respective water/sediment system in 520  $\mu$ L actions of a pipette.

The test systems were incubated at  $20 \pm 2$  °C in the dark

### 2. Sampling

Ten sampling intervals were distributed over the entire incubation period of O2 day Duplicate samples were processed and analysed 0, 2, 7, 14, 21, 28, 42, 61, 84 and 112 days after treatment (DAT). Microbial viability of the soil was determined a start and end of the study.

### 3. Analytical procedures

At each sampling interval the water was separated from the sediment by centrifugation. About 50 mL of acetonitrile were added to the water samples in order to stop biotic processes. The sediment was extracted with acetonitrile/water (44; v/w) until tess that 2% of the applied radioactivity were extractable. The radioactivity content of the combined sediment extracts and the combined acetone soil extracts was determined by 2SC. Water and sediment extracts were analysed by reversed phase HPLC/radiodetection. The limit of detection for HPLC/radiodetection analysis of the soil extracts was 0.03% AR.

Non-extractable residues were determined by combustion LSC.

Test item and degradation products were prentified by HPLC and comparison with the retention behaviour of reference compounds

The degradation kinetics of the term was determined using first order kinetics and linear regression as well as by graphical means.

### II. RESULTS AND DISCUSSIO

### A. FINDINGS

DAŤĂ

Results indicated that the anticipated standardized aerobic conditions were maintained over the duration of the laboratory study

### B.

A summary of key data on total recovery and the distribution of radioactivity into the various components formed in water and sediment is given in Table CA 7.2.2.3- 6 and Table CA 7.2.2.3- 7.

### Table CA 7.2.2.3- 6:Degradation of [pyrimidyl-2-14C] amidosulfuron in water/sediment system river<br/>Nidda

Component/M	latrix	Repl. DAT											
-		No.	0	2	7	14	21	28	42	61	84	112	
		1	98.7	90.8	91.5	87.1	86.3	91.0	85.6	Ô80.6	63.2	42.6	
	Water	2	96.4	92.5	92.0	88.4	90.6	94.0	86.5	76.3	60.9	50.4	
		Mean	97.6	91.7	91.8	87.8	88.5	92.5	86.1	7 <b>8.5</b> °	62.L	46.5	
		1	5.0	7.3	5.3	3.1	5.3	5.6	53	, ØØ`	3Q″	2.00	
amidosulfuron	Sediment	2	6.6	7.3	4.3	5.3	5.2	6.0	<b>O</b> \$7.6	\$.0	a 3.5	\$.6	
		Mean	5.8	7.3	4.8	4.2	5.3	。5.8 美	🖉 5.5 🗞	⁰ 4.5	<b>3.5</b>	<b>≫</b> 3.3	
	Entire	1	103.7	98.1	96.8	90.2	91.6	96.6 *	90.9	84.@	66.6	45.5	
	System	2	103.0	99.8	96.3	93.7	999.8	100,0	92.¥	81.9	64.4%	54.0	
	5		103.4	99.0	96.6	92.0	93.7	• <b>98.3</b>	& 9 <b>1.5</b>	~ 89.0	<b>65.5</b>	49.8	
	Water	1	n.a.	n.d.	n.a.	n.d. 🥑	n.a. 🔬	p ^{en.d.}	n.a.	$\gamma$ n.d. $\lambda$	1/2 d	≥_0.5 ≥ 4 7	
	vv ater	∠ Moon	n.u.	n.d.	n.u.		n d	n d	$\mathbf{n} d 0$	2.0	10.9	∦ 4./ ∕11	
		1	n d	n.d.	n d	nd d	n/d		n d	2.0		n d	
a -ADHP	Sediment	2	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	and.	and.	$\mathbb{Q}_{1,2}$	n.d.	
	~	Mean	n.d.	n.d.	n.d.	n.d.)	n.d. 🤇	0.3	D [°] n.d. ⁴	D 0.3 🔏	1.2	n.d.	
	Entine	1	n.d.	n.d.	A.C.	n:R	n d	0.5	n.¢	0.6	8.5	3.5	
	Entire	2	n.d.	n.d. 🍾	n.d.	"n.d.	and.	₽€.dj.	næ.	4.0	15.5	4.7	
	System	Mean	n.d.	n.d	' <b>n.d.</b> (	Ö ⁿ .d.	Žň.d.	<b>AY</b> .3	, ≪₩.d.	<u>ک</u>	12.1	4.1	
		1	n.d.	p.T.V	n.d.	n.d. 🖴	n.d.	Øn.d.	≫n.d. "	n.d.	n.d.	1.4	
	Water	2	n.d.	<b>D</b> .U.	p dz	nd	n.d	n.d	n.d.	n.d.	n.d.	2.8	
		Mean	n.d. (	<b>⊅ n.d.</b>	"n.d.	s∕a,d.	nđ.	n:d,>	n.d.)	n.d.	n.d.	2.1	
	G 1' (	1	n.d	n.d.%	∫ n.d.	∽∕n.d.	₩.d.	And.	n.d.	n.d.	n.d.	0.2	
m2	Sediment	2	n.d.	n a	n.d.	n.d.	n.d.	Q ^{n.d.}	n.d.	n.d.	n.d.	0.3	
			n.a.	nd.	n _d a, *	n.et	n.a.	n.d.	<b>n.a.</b>	n.a.	n.a.	<b>U.3</b>	
	Entire	$\frac{1}{2}$	n d 🗐	$n d_{\delta}$	nd.	n.y.	n d	n.u.s	n d	n d	n d	3.1	
	System	Mean	n.d.	n.d.	n.d.	n.d.	n.d.		n.d.	n.d.	n.d.	2.4	
		Ň	"n.d.	n.d.	n.d.	n.d.Ø	n.d. 4	n.d.	n.d.	n.d.	n.d.	10.9	
	Water	2	n.d.	√ya.d.	ñ.d.	n O s	nø	n.d.	n.d.	n.d.	n.d.	8.5	
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Mean	🔊 n.d. «	n.d.	a.d.	m.u.	n.g.	n.d.	n.d.	n.d.	n.d.	9.7	
		b v	n.d	n.d	n.d.	Sn.d.	Jr.d.	n.d.	n.d.	n.d.	n.d.	0.7	
m3	Sediment	°~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	RØ.	nd	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.4	
		Mean	n.d.	n.d.	p.d.	n.e.	n.d.	n.d.	n.d.	n.d.	n.d.	0.6	
	Entire	1 C	[*] n.d. 7	n.d.	Brd.	¥2d ² .	n.d.	n.d.	n.d.	n.d.	n.d.	11.6	
	System	2	n.d.	n.d.	^{≫n.d.} 《	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	8.9	
		Nrean ©1	n.e.	n.a.	n.a.	∦ n.d.	n.a.	n.d.	n.a.	n.a.	n.a.	12.1 16.1	
	Water &	\mathbb{P}_{2}^{1}	wind.	and d	n.u.	n d	n d	n.d.	3.4	8.3 7 7	3 5	10.1	
		Mean	n.d. 🖑	n.d.	Gi.d.	n.d.	n.d.	n.d.	3.6	8.1	7.7	13.6	
	, OX	10	n.d.O	n.d	n.d.	n.d.	n.d.	n.d.	0.2	n.d.	n.d.	1.1	
adesmethyl	Sedment	@2	n.d.	nat	n.d.	n.d.	n.d.	n.d.	0.1	n.d.	n.d.	0.9	
	<i>(</i>) <i>(</i>)	Mean	"An.d.	∕n∕d.	n.d.	n.d.	n.d.	n.d.	0.2	n.d.	n.d.	1.0	
8	Entire 🔊		n.d.s	Pn.d.	n.d.	n.d.	n.d.	n.d.	3.6	8.5	11.8	17.2	
¥Q	System	2	n.d 🖉 🎖	n.d.	n.d.	n.d.	n.d.	n.d.	3.8	7.7	3.5	12.0	
	System,	Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.8	8.1	7.7	14.6	
	Water		" W d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	
	water	Ŋ> 2	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	
		Mean 1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	
m8	Sediment	2	n.a.	0.4 nd	n.u. 0 4	0.5	n.u.	n d	0.1 n.d	n.a.	nd	n.u.	
110	Seament	∠ Mean	n.d	0.2	0.4	0.3	n.d	n.d	0.1	n.d	n.d.	n.d.	
		1	n.d.	0.4	n.d.	0.3	n.d.	n.d.	0.1	n.d.	n.d.	n.d.	
	Entire	2	n.d.	n.d.	0.4	0.3	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	
	System	Mean	n.d.	0.2	0.2	0.3	n.d.	n.d.	0.1	n.d.	n.d.	n.d.	

Component/Matrix		Repl.						DAT				
		No.	0	2	7	14	21	28	42	61	84	112
		1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	12.3
	Water	2	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	11.3
		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	11.8
Sum of		1	n.d.	0.4	n.d.	0.3	n.d.	n.d.	0.1	Øn.d.	n.d.	0.9
unidentified	Sediment	2	n.d.	n.d.	0.4	0.3	n.d.	n.d.	n.d.	n.d.	n.d.	0.7
Residues		Mean	n.d.	0.2	0.2	0.3	n.d.	n.d.	0A) ×	n.d.	n.d.	0.8
	Entiro	1	n.d.	0.4	n.d.	0.3	n.d.	n.d.	, OH	, nCal.	nQ.	13.2
	Sustam	2	n.d.	n.d.	0.4	0.3	n.d.	n.d.	Of.d.	n.d.	_∢ n.d.	×12.0
	System	Mean	n.d.	0.2	0.2	0.3	n.d.	。 n.d. 🦼	0.1 🗞	<i>o</i> n.d. A	, n.d. 🛛	12.6
		1	98.7	90.8	91.5	87.1	86 D	91.0	88.9	89.0O	82.4	74.3
	Water	2	96.4	92.5	92.0	88.4	,90.6	94Q0	80X	8 <u>7</u> .9	78.7	77.3
		Mean	97.6	91.7	91.8	87.8 (88.5	» 9 2 .5	& 89 .5	≈ 88.5	80.6	75,8
Total		1	5.0	7.7	5.3	3.4 0	5.3 🔬	⁹ 6.1 (5.5	ĵ⊳ 4.6 _	\$ 4.5	KA.8
Extractable S	Sediment	2	6.6	7.3	4.6	550	5.20	6.0	5.7 Ô	©5.0 (مُ 4.7	5.1
Residues		Mean	5.8	7.5	5.0	4,5	₅ <u>5</u> .€∕	641	5,6	4.8	4.6	5.0
	Entiro	1	103.7	98.5	96.8	Q90.5 /	91.6	°27.1	94.4	3 26	86)9	79.1
	Sustam	2	103.0	99.8	96.6	^{\$} 93.9) ² 95.8	≪} 00.0	L95.8	S9 2.9	<i>®</i> 3.4	82.4
	System	Mean	103.4	99.2	26.7	92,2	93.7	98.6 ⁽	95.1	0° 93.3 Å	¥ 85.2	80.8
		1	n.a.	< 0.1	ÓØ.1	<10\$\$	< 0	0.1	0.3	1.1~	1.0	4.4
CO_2		2	n.a.	< 0.1	X 0.1	0.1 چ	630!1	≪0/1	, Ø	0.9	2.5	3.9
		Mean	n.a.	< 0.1	° < 0.1 (ື< 0.1 ຼ	ØŠ 0.1	A .1	, [≪] Ø.4	4.0	1.8	4.2
Volatile Orga	nic	1	n.a.	$< 0, \overline{1}$	< 0.1	< 0.1	< 0.1	¢0.1 _≈ (×0.1	\$0.1	< 0.1	< 0.1
Compounds	inc	2	n.a.	0).1	<	< 0.	< 0,1	< 0.1 °	< 0.1	< 0.1	< 0.1	< 0.1
Compounds		Mean	n.a. 🤇	≮0.1 ′	≪0.1	<\$0,1	$< \mathbf{O}^{\nu}$	< 0.200	< Q.1Û	< 0.1	< 0.1	< 0.1
		1	n.a	< 0.1%	K 0.1	`≪≫0.1	&Ø .1	. 0.1	~0.3	1.1	1.0	4.4
Total Volatile	es	2	na.	< 0, 0	< 0.1	< 0.1	< 0.1	O [₹] 0.1	0.4	0.9	2.5	3.9
		Mean	n.a.	\$Q.1	< 0,1) [%]	< 0.1K	< 0.1	[™] 0.1 Č	0.4	1.0	1.8	4.2
Non-extractal	h	1	ڳ 0.5 _($\bigcirc 0.5$	₩Ž	Ìr.≱	2.9	2,3	3.0	4.1	4.4	12.6
Residues		2	0.4	ھ 0.5	1.0	1.3	2.0	3.4	3.1	4.0	6.1	8.5
Residues		Mean	0,5 %	0.5	1.1 ([×] 1.3	2.1	<u>~2.4</u>	3.1	4.1	5.3	10.6
		Ň	104.2	99.0	98.0	91.7Q	93.7	∲ ^{99.5}	97.7	98.8	92.3	96.1
Total Recover	Total Recovery		103.4	400.3	27.6	950	978	102.4	99.3	97.8	92.0	94.8
		Mean	∿ 103.8 _% ®	99.7	~9⁄7.8	93.5	25,8	101.0	98.5	98.3	92.2	95.5



Table CA 7.2.2.3- 7:Degradation of [pyrimidyl-2-14C] amidosulfuron in water/sediment system gravel
pit

Component/I	Matrix	Repl.					DA	٩T				
		No.	0	2	7	14	21	28	42	61	84	112
		1	95.8	94.2	95.9	85.6	82.1	81.8	62.1	Ôj51.1	13.5	7.8
	Water	2	94.7	94.0	95.7	96.5	86.8	89.5	76.0	38.9	40.7	0.9
		Mean	95.3	94.1	95.8	91.1	84.5	85.7	69.1	4 5. 0 °	27.	4.4
amidosulfuro	~	1	6.7	5.4	1.5	3.8	3.5	2.9	Z#2	Ø	0@)°	0.9
n	Sediment	2	7.9	7.0	3.7	2.0	3.0	3.6	Q2.9	¥.7	<u>4</u> 1.5	S.
		Mean	7.3	6.2	2.6	2.9	3.3 。	3.3			<u>, 1.0</u>	0.5^{2}
	Entire	1	102.5	99.6	97.4	89.4	800	84./* @\$v1	04.5 วัณด	52.00	13.9	8.3
	System	Z Moon	102.0	101	99.4	98.3 94.0 &	87.0		(10)99 5/1 6	40.9	44.2	0.9
		1	n d	n d	90.4	94.0 C	n d /	©00.9 (∕nd	71.0 7 n d	40.0	€40.1 ⊘47.5	4.0 ≪1/7.2
	Water	2	n.d.	n.d.	n.d.	nd	n Ø	n.d.	n.d.Ĉ	b 19.2.C	27.2	9.4
		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	nGt.	næ	18.1	37.4	13.3
		1	n.d.	1.7	1.2	n.d.	n.d.	n.d.	n.d.	2	279	0.8
aADHP	Sediment	2	n.d.	n.d.	n.d.	n.d	n.d. 📈	n.d. a	n.d.	£1.5	Ø1.8	- 1
		Mean	n.d.	0.9	0.6	na	n.dÛ	n.d. 0	n.d. 4	ີ້ 1.4 ຊໍ້	¥ 2.4	0.8 ²
	Entire	1	n.d.	1.7	8 ²	ñRd.	n el.	n.d.	n.a.	18.4	50.4	18.0
	System	2	n.d.	n.d.	∼n.d.	🖉 n.d.	jn/d.	≪nµ.d.	R. .	20.7	29.0	9.4
	System	Mean	n.d.	0.9	0.6 🔘	🥤 n.d. 🖉	n.d.	Çn.d.	n.d.	¥9.4	39.7	13.7
	N 7 - 4 - 11	1	n.d.	n d. V	n.d.	n.ď.∀	n.d. «	n.d.	n.d.	n.d.	n.d.	6.8
	water	2 Maan	n.a.	ma.	Ba.	a.	n a	n:a	n.d	n.a.	n.a.	13.1
			n.a.	Un.a. nd∜	n.d.	n.a.	Ind.	n.a.		n.a.	n.a.	10.0
m?	Sediment	2	n.u.s	n dÛ	n da	y n.u. n da	n d é	n d	n d	n d	n d	1.0 _ 1
1112	Seament	Mean	n.d	20 C	nd	©.h∕a	n.d.	n.dô	n.d.	n.d.	n.d.	1.8
	п. /:	1	Mn.d.	n.d.	n.d.	°n⊮d.	n.a.	n.d.	n.d.	n.d.	n.d.	8.6
	Entire	2	n.d. 🖉	n.d. 🔊	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	13.1
	System	Mean	n.d	n.d.	n.d.	n.d. 🕡	n.d. 🖄	n .d.	n.d.	n.d.	n.d.	10.9
		Ň	JI.d.	n.d.	n.d.	n.	n.d.	n.d.	n.d.	n.d.	n.d.	28.2
	Water	2	n.d.	Ayd.	nd.	nd.	43.4	n.d.	n.d.	n.d.	n.d.	37.7
		Mean	∧ n.d. ∢	n.d.	ni.d.	M.d.	w.d.	n.d.	n.d.	n.d.	n.d.	33.0
2	C LO	. Þ*	n.d	n.d.	n.d.	y n.d.	p∕n.d.	n.d.	n.d.	n.d.	n.d.	1.4
m3	Sedmaent		PA-CO	n.d.	n.de	n.d	n.d.	n.d.	n.d.	n.d.	n.d.	- ¹ 1 4 2
			n.a.	dia.	A. a. a.	nd.	n.a.	n.a.	n.a.	n.a.	n.a.	1.4 - 20.6
	Entirę 🖓	2	n d	$\int_{nd}^{n.u.}$	nd .	n d	n d	n d	n d	n d	n d	27.0 37.7
	System	Méan	n.d	n.d.Ĉ	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	33.7
	N.	S.	n.a.	n-d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.2
	Water 👌	2	n.d.	Dr.d.	, d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.6
5		Mean	🖌 n.d. 🍕	🕅 n.d. 💊	Qn.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.4
.4		10	n.d	n.d (🎽 n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
m4	Sediment	Ĵ	n.d.	n.¢	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	- 1
T.		Mean	Ap.d.	nd.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
4	Entire		n.d.	Sn.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.2
	System,		n.a,j	n.d.	n.a.	n.d.	n.d.	n.a.	n.d.	n.a.	n.a.	3.0 3.4
		1	n.u.	n.a.	n.a.	n.u.	n.a.	n.u. n.d	n.u. n.d	n.a.	n.a.	3.4 n d
	Water 🖉	2	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d	n.d	3.6
	S	Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.8
	<u>"""</u>	1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
m5	Sediment	2	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	- 1
		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	Entire	1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
	System	2	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	3.6
		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.8

Component/I	Matrix	Repl.	epl. DAT												
		No.	0	2	7	14	21	28	42	61	84	112			
		1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.			
	Water	2	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	1.5			
		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.8			
		1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	Øn.d.	n.d.	0.6			
m6	Sediment	2	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d	n.d.	n.d.	- ¹			
		Mean	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	0.6			
	Entire	2	n.a. n.d	n.a.	n.d.	n.d.	n.d.	n.a.	mru.	nag.	n d				
	System	2 Mean	n.u.	n.d.	n.u.	n.u.	n.u.	$n de^{\square}$	ри.u. n d∘.	$\mathcal{O}_{nd}^{n.u.}$	and	×1.3			
		1	n.d.	n.d.	n.d.	1.3	100	14.7	31.2	23.6°	22.1%	20.0			
	Water	2	n.d.	n.d.	n.d.	n.d.	S.7	6.4	193	35.9	17.4	9.0			
		Mean	n.d.	n.d.	n.d.	0.7 💍	8.4	Q10.6 (2⁄5.3	~29.5	19.8	14,5			
		1	n.d.	n.d.	n.d.	0.10	n.d	🎽 n.d. 🍙	1.0	Sn.d. 4	Qn.d.	≪1.3			
adesmethyl	Sediment	2	n.d.	0.4	n.d.	ğ.2	n Ø	n.d.	0.6Ĉ) n.d.) n.d. 🧳	- ¹			
		Mean	n.d.	0.2	n.d.	. 0.2	nd.	n.el.	0.8	n.d.	n.d	1.3 ²			
	Entire	1	n.d.	n.d.	n.d. 🔬	Q ^{*1.4} 🦱	11.0	4 .7	32.2	<u>3</u> 26	2Q) î	21.3			
	System	2	n.d.	0.4	n.d.	0.20	5.7 🗶	ງ [°] 6.4 ຝ	19.9	\$35.3	Ø7.4	9.0			
	5	Mean	n.d.	0.2	nd	0.8	8.4		26.1	0 [°] 29.5	¥19.8	15.2			
	XX	1	n.d.	n.d.	OS ^d .	maga.	n ef.	n.d. ^y	n:a	n.d	n.d.	n.d.			
	water	2 Maan	n.d.	n.a.	r≫n.a.	n.a.	onza.	san di sa	0%.Ø.	n.a.	n.a.	n.a.			
		Niean	n.a.	n.d.	n.a. ()	n.a. 🖉	n.d.	n.d.	r∾ n.u. ∕nd	Snd	n.a.	n.a.			
m8	Sediment	2	n d		n H	11.u. y	nad.	n°d	$n d \mathcal{Q}$	n d	n d	_ 1			
mo	Seament	Mean	n.d.	Ün.d.	°≈ n.d.		md.	^	n.d	n.d.	n.d.	n.d.			
		1	n.de	n.d. %	n.d.	≫ n.d. (Un.d.	e Gi.d. a	n.d.	n.d.	n.d.	n.d.			
	Entire System	2	n.d.	n.dÔ	n.d _e	0.1	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.			
	System	Mean	n.d.	ad.	n.d.	Q (1)	n.d.	n.dÔ	n.d.	n.d.	n.d.	n.d.			
		1	Sn.d.	On.d.	\n_d.	°⁄ny∕d.	, n.a.	n.e	n.d.	n.d.	n.d.	38.2			
	Water	2	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	59.5			
		Mean	n.d.	n.d	n.d.	🎽 n.d. 🕖	n.d. 🖄	📡 ñ.d.	n.d.	n.d.	n.d.	48.9			
Sum of	~	Ň	n.d.	n.d. [®]	n.d.	n.	n.d	n.d.	n.d.	n.d.	n.d.	3.8			
Unidentified	Sediment	$\sum_{i=1}^{2}$	n.d.	rsv.d.	n.e.	ne.	ter.	n.d.	n.d.	n.d.	n.d.	- ¹			
Residues	Ŭ.	Mean	^ℕ n.d. ₄	n.d.	n.d.	1%.d.	as.d.	n.d.	n.d.	n.d.	n.d.	3.8 ²			
	Entip	$\sim 0'$	n.q	n.u.	n.u.	p" n.u. ∝ n.d	rn.d.	n.a. n.d	n.d.	n.a.	n.a. n.d	42.0			
	Sýstem	Moon	nd	n G	n.u.		n.u.	n d	n.u.	n.d.	n.u.	59.5 50.8			
			95.8 ¢	942	A.U.	×88 9	93 0	96.5	93 3	91.5	83.0	83.2			
	Water	2	94.7	94.0	95.7	96.5	92.4	95.8	95.2	93.3	85.2	78.5			
	L	Mean	95.	94,1Ĉ	95.8	91.7	92.7	96.2	94.3	92.4	84.1	80.9			
Total		Â	<i>26</i> 7	6	2.6	3.9	3.5	2.9	3.1	2.7	3.2	6.4			
Extractable	Sediment	2	7.9	F .4	£G77	2.3	3.0	3.6	3.5	3.2	3.2	5.5			
Residues 🏾 🖉		Mean	/ 7.3	چ 7.3	O <u>3.2</u>	3.1	3.3	3.3	3.3	3.0	3.2	6.0			
9	Entite	10	1025	101.3	[≫] 98.5	90.8	96.5	99.4	96.4	94.2	86.2	89.6			
	System	, P	102.6	104	99.4	98.8	95.4	99.4	98.7	96.5	88.4	84.0			
		Mean	4.92.6	101.4	99.0	94.8	96.0	99.4	97.6	95.4	87.3	86.8			
	γ ~		n.a.	$\ll 0.1$	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	1.5	2.6			
€02 «	A		n.a,	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0./	1.0	3.2			
		1	п.а. Ф8	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0.0	1.0	< 0.1			
Volatile Organ	ic 🖗 _⊄	\mathbb{A}_{2}^{1}	na.	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1			
Compounds	S	Mean	n.a.	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1			
	404	1	n.a.	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.4	1.5	2.6			
Total Volatiles		2	n.a.	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0.7	1.6	3.2			
		Mean	n.a.	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.1	0.6	1.6	2.9			
		1	0.5	0.4	0.5	0.6	0.7	0.8	1.6	2.4	3.9	5.3			
Non-extractabl	e Residues	2	0.5	0.4	0.7	0.6	0.9	0.9	1.6	2.6	2.8	5.4			
		Mean	0.5	0.4	0.6	0.6	0.8	0.9	1.6	2.5	3.4	5.4			

Component/Matrix	Repl.		DAT												
	No.	0	2	7	14	21	28	42	61	84	112				
	1	103.0	101.7	99.0	91.4	97.2	100.2	98.0	97.0	91.6	97.5				
Total Recovery	2	103.1	101.8	100.1	99.4	96.3	100.3	100.4	99.8	92.8	92.6				
	Mean	103.1	101.8	99.6	95.4	96.8	100.3	99.2	98.4	92.2	95.1				

DAT: days after treatment; n.a.: not analysed; n.d.: not detected

¹ no evaluable chromatogram

² single value

С. MATERIAL BALANCE

Mean material balances were 97.6% AR for water/sediment-system elver Nidda (range from \$2.2 to 103.8% AR) and 98.2% AR for water/sediment system grave pit (range from 92.2 to 903.1% AR).

EXTRACTABLE AND NON-EXTRACTABLE RESIDUES:[&] D.

Residues in water of water/sediment system river Nudda degreased from 956% AR at DAT-0 to 75.8% AR at DAT-112. Residues in water of water/sediment system gravel pit decreased from 95.3% AR at DAT-0 to 80.9% AR at DAT-112.

Extractable residues in the sediment of water/sediment system fiver Nidda increased from 5.8% AR at DAT-0 to 7.5% AR at DAT-2 and remained in the range of 4.5 to 60% AR at later study end (DAT-112). Extractable residues in the sediment of water sediment system gravel pit decreased from 7.3% AR at DAT-0 to 3.2% AR at DAT-V, remained constant upril DAT-84 and slightly increased to 6.0% AR at DAT-112.

Extractable residues in the entire system of water/sediment system river Nidda decreased from 103.4% AR at DAT-0 to 80.8% AR at DAT-112. In the entire system of water/sediment system gravel pit extractable residues decreased from 02.6% AR at BAT-0 to 86.8% AR at DAT-112.

Non-extractable residues (NER) in the water/sediment system river Nidda increased from 0.5% AR at DAT-0 to 10.6% AR at DAT-122. In the water sediment system gravel pit NER increased from 0.5% AR at DAT-0 to \$4% AR at DAT-112.

E.

E. VOLATILES The maximum amount of carbon dioxide at study end (DAT-112) was 4% AR in water/sediment system river Nidda and 3% (AR in water/sediment system gravel-pit. Formation of other (unpolar) volatiles was insignificant as demonstrated by values < 01% AR at all sampling intervals in both water/sediment systems.

DEGRADATION OF PAREST COMPOUND F.

The amount of any osulfaron in the water decreased from DAT-0 to DAT-112 from 97.6 to 46.5% AR in system river Oidda and from 95.3 to 4.4% AR in system gravel pit.

The appoint of amidos of furon in the sediment extracts of water/sediment system river Nidda increased from 5.8% AR at DAT-0 to 7.3% AR at DAT-2 and decreased then to 3.3% AR at study end (DAT-112). In the sediment extracts of water/sediment system gravel pit the amount of amidosulfuron decreased from 3% AR at DAT-0 to 0.5% AR at study end (DAT-112).

The amount of amidosulfuron in the total system decreased from DAT-0 to DAT-112 from 103.4 to 49.8% AR in system river Nidda and from 102.6 to 4.6% AR in system gravel pit.

Two degradation products were identified with the following maximum occurrences: A.-ADHP with 39.7% at DAT-84 (system gravel pit) and a,-desmethyl with 29.5% AR at DAT-42 (system gravel pit).

The total unidentified residues amounted to a maximum of 50.8% AR at study end (DAT-112) only in water/sediment system gravel pit with two single components reaching 10.9% AR (m2) and 33.7% AR (m3). At all other sampling intervals unidentified residues were $\leq 0.3\%$ AR for both water/sediment systems.

The half-lives of amidosulfuron the water/sediment systems was estimated graphically and by regression calculation and were 106 to 120 days (graph.) and 114 – 126 days (calcul.) for system river Nidda and 57 to 63 days (graph.) and 21 – 31 days (calcul.) for system gravel pit.

III. CONCLUSIONS

The degradation of amidosulfuron was strongly dependent on the nature of the surface water/sediment system with a mean half-life of 20 and 120 days for system@river Nidda and gravet pit, respectively. Regarding the properties of the two systems with influence on the degradation of the test substance, the most significant differences apart from the textur@were the cation exchange capacity and the organic matter content. Therefore it can be assumed that in systems with high organic matter content and with low capacity to adsorb ionisable substances (i.e. gravel pit) the degradation of amidosulfuron will be faster than in other systems.

In conclusion, it can be stated that amidosulfation is moderated degraded in water/second systems. This degradation is accompanied by a delayed mineralisation and by the formation of two unidentified degradation products at study end, only.

Study discussion and comment:

The study is included only for formal completeness, but considered unreliable due to chromatographic deficiencies. The chromatographic method employed was not suitable for the separation of amidosulfuron and its metabolites as the HPLC chromatograms showed a fraction eluting most probably at the system dead time. This desulted in an insufficient separation efficiency and false metabolite assignments which could have been caused by an ald and/or overloaded HPLC column. The generally poor chromatographic behaviour is deponstrated by the chromatograms of references AE F094206 and AB F101630 within the study report of Ginemeister. For AE F101630 an additional second major peak was detected with a retention time < 5 minutes, whereas AE F094206 eluted with a retention time 3 minutes and therefore most propably within the dead time of the system. Additionally, the peak of AE £09420 (mad a cominant and tailing peak shoulder. The deficiency of the chromatographic method of this study was also confirmed in the newly conducted study

; 2016; M-552591-01-1 (KCA 7.22.3/02). Herein, the method of Gildemeister was additionally used to compare the analytical results of both studies. For AE F101630 a shift of the retention time of approx. 15 minutes was shown although using the same method, and constitutes a strong indication of an overloaded CPLC column within the Gildemeister study. Concerning polar peak assignment to the reference standard amidosulfuron-ADHP (AE F094206), reference is made to the clarification provided in the study ; 2016; M-552591-01-1 (KCA 7.2.2.3 (02).

Report:	KCA 7.2.2.3/04; ; ; 2016	5; M-553510-01-1
Title:	Amidosulfuron (AMS) and metabolites - Kinetic	evaluation of aerobic aquatic
	degradation under laboratory conditions	
Report No.:	EnSa-15-0497	
Document No.:	M-553510-01-1	
Guideline(s):	none	Čo.
Guideline deviation(s):	none	
GLP/GEP:	no	

Executive Summary

A kinetic analysis of residue data from the two aerobic water/codiment degradation strolles MxD9268-01-1 and M-552591-01-1 (Baseline Dossier KCA 7.2,23/01 and Supplemental Dossier KCA 7.2.2.3/02) was performed with the software KinGUI 20 according to FOCUS kinetics (2014) to derive half-lives for amidosulfuron and its degradation, products amidosulfuron-desmethyl (AE F101630), amidosulfuron-ADMP (AE F092946), amidosulfuron-guandine (BCS-CO41839), amidosulfuron-biuret (BCS-CQ51287) and amidosulfuron-guandine (BCS-CO41839), BI49539), which are suitable for modelling purpose and trigger evaluation.

Single first order was the most appropriate kinetic model for modelling/purpose and trager evaluation for the degradation of amidosulfuron and its metabolites in all water/sediment systems under aerobic conditions in the dark in the laboratory at 20 °C and test concentrations of 0.045 and 0.045 mg/L water.

The dissipation half-lives of amidosulfuron (for modelling purpose and trigger evaluation) were 40.6 days in the water and 56.9 days in the sediment (geometric means). The degradation half-life of amidosulfuron in the total system was 501 days (geometric means).

The dissipation half-lives of a. desmethyl (AE F101630) (for modelling purpose and trigger evaluation) were 29.9 days in the water and 26.5 days in the sediment (geometric means). The degradation half-life of a.-desmethyl in the total system was 13.4 days (geometric mean). The dissipation half-life of a.-ADMP (AF F092944) (for modeling purpose and trigger evaluation) was 26.4 days in the sedurent (single value) and could not be determined for water. The degradation halflife of a.-ADMP in the lotal system was 4.05 days (single value). The dissipation half-life of a.guanidine (BCS CO41839) (for modelling purpose and trigger evaluation) was 94.4 days in the water (single value) and could not be determined for sediment. The degradation half-life of a.-guanidine in the total system was 142 days (single value). The dissipation half-life of a.-(guanidinocarbony) sulfatoric acid@BCS-B149539 (for modelling purpose and trigger evaluation) was 69.6 days in the water (single value) and could not be determined for the sediment. The degradation half-life of a (guanidinocarbonyl)sulfamic aged in the total system was 111 days (single value). Halflives for a Diuret BCS-COV1287 Fould not be evaluated as residue concentrations showed no clear plateau or decline, or were too low

METHODS

I.

Residue data from the two aerobic water/sediment degradation studies M-199268-01-1 and M-552591-01-1 (Parseline Dossier/KCA 7.2.2.3/01 and Supplemental Dossier KCA 7.2.2.3/02) were used. In these studies, the degradation of amidosulfuron was studied in water/sediment systems Bickenbach, Unter Widdersheim, Anglersee and Wiehltalsperre under aerobic conditions in the dark in the laboratory for up to 180 days at 20 °C and test concentrations of 0.015 and 0.045 mg/L water.

The kinetic analysis was performed according to FOCUS kinetics (2014) using the software KinGUI 2.1 with four different kinetic models: single first order, first order multi compartment, hockey-stick (double first order sequential) and double first order in parallel. Model input datasets were the residual amounts found in each replicate test system at each sampling interval. The initial

recovery at DAT-0 was included in the parameter optimization procedure, but for optimal goodness of fit, the value was allowed to be estimated by the model. The most appropriate kinetic model for modelling purpose and trigger evaluation was selected on the basis of a detailed statistical analysis including visual assessment of the goodness of the fits, chi² scaled-error criterion, t-test significance, correlation analysis and standard deviation. The DT₅₀ value was calculated from the resulting kinetic parameters. The degradation of degradation products was described with the single first order model for modelling purpose.

II. RESULTS

The SFO model described the degradation of amidosulufron well in an systems as the residuals are small and randomly distributed resulting in good visual files. No indications of possible pon-SFO degradation behavior could be observed in any of the systems. Therefore, SFQ model was used for both parent and its metabolites in the pathway fit to describe the degradation process in all cases. Table CA 7.2.2.3-8 to Table CA 7.2.2.3-13 are summarizing the results of the Dinetic analysis d C ___

Table CA 7.2.2.3- 8:	Kinetic parameters for the degradation of amidosulfuron in water/sediment system
	under aerobic conditions for modeling purpose according to FOCUS

~

				. @			\sim	0	<u>&</u> 1	
Water / sediment system	pH water	pH sed (CaCl2)	t. °C	DT ₅₀ /DT ₉₀ whole sv	St. (72)7	DT50 DT90 water	St. (χ ²) τ	DC50 DT90 sed	St. (χ ²)	Method of calculation Whole sys/ water/ sed
Bickenbach ^{a)}	8.7	8.1	20 ©	9101 / 334	7.08	94.9, 915	\$¥.25 ∧	•1 10 / 365 ¥	17.6	SFO / SFO / SFO
Unter Widdersheim ^{a)}	8.8	7.7	20	16,5 /54.90	15.1	€¥1.8 / 39.2 [™]	169	13.0 / 43.3	13.4	SFO / SFO / SFO
Anglersee ^{b)}	7.8		Ê.	227 954	P.S.	178 / 590 ~	2.68	391 / >1000	-	SFO / SFO / SFO
Wiehtalsperre ^{b)}	7.2	5.2	20 0	046.6 / 55.2	4.40	13.6 95.0	3.98	18.8 / 62.6	10.76	SFO / SFO /SFO
Geometric mean			Ø (50°1 / 166		4 0.6 / 135		56.9 / 177		
a) : 2000): MA1/992	68-01-1		.~>	1.					

Table CA 7.2.2.3-9:Kinetic parameters for the degradation of a.-desmethyl (AE F101630) in
water/sediment system under aerobic conditions for modelling purpose according
to FOCUS

Precursor from which the f.f. was derived was amidosulfuron													
Water / sediment system	pH water	pH sed (CaCl ₂)	t. °C	DT ₅₀ /DT ₉₀ whole sys.	FF	St. (χ ²)	DT50 /DT90 water	St. (χ ²)	DT56 /DfF90 Sed	St. (χ^2)	Method of calculation Whole sys/ water Sed		
Bickenbach ^{a)}	8.7	8.1	20	na	na	na	na °	na	na k	na O	na Ora / na		
Unter Widdersheim ^{a)}	8.8	7.7	20	17.5 / 58.2	0.409	18.¢	34.3↓ Ö [×] 114∠ [×]	1207	22.2 K 73.8 J	13.6	SFO / SFO / SFO		
Anglersee ^{b)}	7.8	7.3	20	na	na	Qna ~	nà s	na		na	ng na / na		
Wiehtalsperre ^{b)}	7.2	5.2	20	10.2 / 33.8	10 /469	139 Q	26. 800	182	31.67 105	14,5)	SFO / SFO / SFO		
Geometric mean				13.4 / 44.4	ő		29.9/99/ 3	Z° Z	26.5 / 87.9 ©				
Arithmetic mean					0.439	ţ,							
na: not available a) ; 2000; I b) ;	M-19926	8-01-1 ; 2016; N	1-552	2591207-1									

 Table CA 7.2.2.3-10:
 Kinetic parameters for the Degradation of a. ADMP (AE F092944) in water/sectiment system under according to FOCUS

 to FOCUS
 Image: Construction of a section of a s

	2	¥ a	0		y a	×							
Precursor from which the O. was derived was amidosulfuron													
Water / sediment	water	pHJ Sed (CaCl2)	t. O	DT ₅₀ DT ₉₀ where sys.	FF JO	A S	DT ₅₀ /DT ₉₀ water	St. (χ ²)	DT50 /DT90 sed	St. (χ ²)	Method of calculation Whole sys/ water/ sed		
Bickenbach ^{a)}	8 .7		20 /	na ka	Ga	na	na	na	na	na	na / na / na		
Unter Widdersbeim ^{a)}	8.8 Q	7.7 N	20	4.05 / 135	0.235	18.9	na	na	26.4 / 87.7	9.54	SFO / na / SFO		
Geometric mean				4,08/13.5			na		26.4 / 87.7				
Arithmetic mean	nV	A	N	P	0.235								
na: not available		, and the second											

a) ; 2000; M-199268-01-1

Kinetic parameters for the degradation of a.-guanidine (BCS-CO41839) in Table CA 7.2.2.3-11: water/sediment system under aerobic conditions for modelling purpose according to FOCUS

Precursor from which the f.f. was derived was amidosulfuron-desmethyl												
Water / sediment system	pH water	pH sed (CaCl ₂)	t. °C	DT ₅₀ /DT ₉₀ whole sys.	FF	St. (χ ²)	DT50 /DT90 water	St. (χ ²)	DT562 /DF50 Sed	St. (χ ²)	Method of calculation Whole sys/ water/Sed	
Anglersee ^{a)}	7.8	7.3	20	na	na	na	na	na	na v	dia D	na Ara / na	
Wiehtalsperre ^{a)}	7.2	5.2	20	142 / 472	0.585	7.92 ©	94.4 J O 314 J	5. 82	na v	na 🖉	SFO / SFO / na	
Geometric mean				142 / 472	Q,		964.4 / 9714	9				
Arithmetic mean					0,585	2°	ð,	. 04	- A	Ś		
na: not available		; 2016; N	1-552	2591-01-		Ç (5		O) }		

Table CA 7.2.2.3-12:

Kinetic parameters for the degradation of a.-(guantidinocarbonyl)sulfamic acid (BCS-CQ51287) in water/sediment system under aerobie conditions for modelling purpose according to FOCUS _O` ,°N Õ Ĩ

, V

Precursor from which the f.f. was derived was amidosulfuron-desmethyl													
Water / sediment system	pH water	pH sed (GaCl2)	t. ℃	DO 50 Whole	/DT e sys. V	FF ×	\$ st. (χ ²)	DP50 /DT90	St. (χ ²)	DT ₅₀ /DT ₉₀ sed	St. (χ ²)	Method of calculation Whole sys/ water/ sed	
Anglersee ^{a)}	7. 8 7	7.3	20 20	na P		na 🎝	'na	-fra S ²	na	na	na	na / na / na	
Wiehtalsperre ^a)	7.2	5.2	20	na Ô		na 🔍	nya Na	na	na	na	na	na / na / na	
Geometric mean	<u> </u>	Ł	Ø	na	Č [¥]	×		na		na			
Arithmetic mean			S	Ő	× –	na							
na: not available,			M-&	2591-0 •									

Table CA 7.2.2.3-13:Kinetic parameters for the degradation of amidosulfuron-biuret (BCS-BI49539) in
water/sediment system under aerobic conditions for modelling purpose according
to FOCUS

Precursor from which the f.f. was derived was amidosulfuron-desmethyl											
Water / sediment system	pH water	pH sed (CaCl ₂)	t. °C	DT50 /DT90 whole sys.	FF	St. (χ ²)	DT ₅₀ /DT ₉₀ water	St. (χ ²)	DT 50 /DJ 50 stel	$\mathbf{St.}_{(\chi^2)}$	Method of calculation Whole sys/ water/yed
Bickenbach ^{a)}	8.7	8.1	20	na	na	na	na	na	na °~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	na O	na Ora / na
Unter Widdersheim ^{a)}	8.8	7.7	20	111 / 369	1	15.0	59.6/23 59.6/23	3.25°	Ma	na 🕺	SFO / SFO / na
Anglersee ^{b)}	7.8	7.3	20	na	na Q		na ×	Øna	na C	ha	na / na
Wiehtalsperre ^{b)}	7.2	5.2	20	na	na	na Q	na č	n O	na 🔗	pra-	na / na / na
Geometric mean	ı			111 / 369		2	69.6 / 231	,	fra o	*	
Arithmetic mean	1					L.		ð "°	la l		
na: not available					Ó ^y	, Q	A A		<u> </u>		

a) ; 2000; M-199268-01-1

OIII. CONCLUSIONS

The dissipation half-lives of a midosulfuron (for modelling purpose and trigger evaluation) were 40.6 days in the water and 56.9 days in the sediment (geometric means). The degradation half-life of amidosulfuron in the total system was 50.1 days (geometric mean).

The dissipation half-lives of a desmethyl (AE F101630) (for modelling purpose and trigger evaluation) were 29.9 days in the water and 26.5 days in the sediment (geometric means). The degradation half-life of a desmethyl in the total system was 13.4 days (geometric mean). The dissipation half-life of a ADMP (AE F092944) (for modelling purpose and trigger evaluation) was 26.4 days in the sediment (single value) and could not be determined for water. The degradation half-life of a guanidine (BCS-CO49339) (for modelling purpose and trigger evaluation) was 94.4 days in the water (single value) and could not be determined for water. The degradation half-life of a guanidine (BCS-CO49339) (for modelling purpose and trigger evaluation) was 94.4 days in the water (single value) and could not be determined for the sediment. The degradation half-life of a.-guanidine in the total system was 142 days (single value). The dissipation half-life of a.-guanidine in the total system was 142 days (single value). The dissipation half-life of a.-guanidine in the total system was 142 days (single value). The dissipation half-life of a.-guanidine in the total system was 142 days (single value). The dissipation half-life of a.-guanidine in the total system was 142 days (single value). The dissipation half-life of a.-guanidine in the total system was 142 days (single value). The dissipation half-life of a.-guanidine in the total system was 111 days (single value). Half-life of a -(guanidinocarbonyl)sulfamic acid in the total system was 111 days (single value). Half-lives for a.-bure (BCS-Q51287) could not be evaluated as residue concentrations showed no clear plateau or decline, or were too low.

CA 7.2.2.4 Irradiated water/sediment study

2016: M

The route and rate of degradation of amidosulfuron in water and sediment were comprehensively studied in sections CA 7.2.1.1 to CA 7.2.1.3 and CA 7.2.2.1 to CA 7.2.2.3. Therefore, the route and rate of degradation of amidosulfuron in irradiated water/sediment systems were not separately studied.

CA 7.2.3 Degradation in the saturated zone

The degradation of amidosulfuron in the saturated zone was not studied since amidosulfuron is not expected to reach the saturated zone after its use according to good agricultural practices.

Model calculations and the results of the lysimeter study demonstrate that the risk of groundwater contamination by amidosulfuron is very unlikely. Therefore studies of the degradation in the saturated zone are not required.

CA 7.3 Fate and behaviour in air

CA 7.3.1 Route and rate of degradation in an

31880

The degradation rate of amidosulfuron in air was evaluated during the Amex Linclusion using the Atkinson method, and was considered acceptable during the original EU review of amidosulfuron (EFSA scientific report 2007, 116, 1-86).

Studies submitted and evaluated for the first inclusion of anydosulforon on Annex I;

Report:KTitle:ADecument No.:CDocument No.:MGuideline(s):EGuideline deviation(s):---GLP/GEP:n

KCA 7.3.1/01; 1993; M-131886-01-2 Assessment of the reaction of gamic more cules with OH addicals of the troposphere by the method of Attainson (1998)

EU agreed endpoint according to the Review Report for amid@ulfuron (EFSA scientific report 2007, 116, 1-86):

 DT_{50} in air was stimated to be OZ5 d (QPI-radic conceptration: 5 x 10⁵ molecules/cm³).

New studies (new EU-evaluated Submitted in context of Annex I approval renewal:

Preceding the publication of the FOCUS AD report (2008), the calculation presented in study KCA 7.3.1/01 was based on an atmospheric hydroxyl radical concentration and timescale different from the recommended standard value of 1.5 x 10 molecules/cm³ over a 12 hour daylight period. An updated Atkinson calculation was therefore performed using FOCUS Air proposed standard parameters and the most recent AOP Win version, and is submitted within this supplemental dossier for approval renewal of amidosulfuron

Additional new information has been generated to investigate the atmospheric degradation potential of two soil metabolites of amidosulfuron, ADMP and ADHP, triggered by vapour pressures exceeding the indicator value of 10⁻³ Pa at 20 °C for possible volatility from soil.

Report:	KCA 7.3.1/02; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Title:	Amidosulfuron: Calculation of the chemical half-life in the troposphere
Report No.:	EnSa-16-0086
Document No.:	M-547942-01-1
Guideline(s):	Commission Regulation (EU) No 283/2013 in accordance with Regulation (EC) No 1107/2009; US EPA OCSPP Test Guideline: N/A
Guideline deviation(s):	none
GLP/GEP:	no vy v k

Executive Summary

The half-life in air of amidosulfuron was estimated according to structure-activity relationship (SAR) methods developed by Atkinson *et al.*

The half-life in air was estimated with 0.052 days (long-term scenario) assuming the typical OH radical concentration averaged over 12 hours (1.5 x 10^6 radical scenario). \sim

It is concluded that amidosulfuron will be rapidly begraded in air thereby excluding a potential for long-range transport in the atmosphere.

ETHODS

The half-life of amidosulfuron in air was estimated according to structure activity relationship (SAR) methods developed by Atkinson *et al.* The approach of Atkinson *et al.* was based on a comprehensive set of experimental data to result in a quantitative structure activity relationship (QSAR) mathematic model that allows for estimation by calculation, starting from the indicate structure of a compound. The calculation procedure has been transferred into the personal computer program "Atmospheric Oxidation Program" (AOP) by Meylan & Howard. The current version AOPWINTM 1.92a (U.S. EPA, 2010) was used for the calculations being part of the EPI Suite M set of programs.

Considering the chemical structure of amidosulfuron it can be concluded that reactions with photochemically produced hydroxyl radicals will mainly determine its degradation rate in air. The typical OH radical concentration of $1.5 \times 10^{\circ}$ radicals cm³ per day (12 hours) was taken for the long-term estimation.

II. RESULTS AND DISCUSSION

The overall reaction rate of amidosulturon with hydroxyl radicals is estimated to be 204.9848 x 10^{-12} cm³ x molecule⁻¹ x s⁻¹. This rate is derived mainly from incremental reactions like hydrogen abstraction (39848 x 10^{-12} cm³ x molecule⁻¹ x s⁻¹), reaction with N, S and OH (1.0000 x 10^{-12} cm³ x molecule⁻¹ x s⁻¹) and an addition reaction to the aromatic ring (assumed value of 200.0000 x 10^{-12} cm³ x molecule⁻¹ x s⁻¹.

Based on the overall hydroxyl radical reaction rate constant in combination with the long-term concentration of these radicals in the atmosphere, i.e. 1.5×10^6 radicals/cm³, the half-life of amidosulfution in air was estimated with 0.052 days. This estimate should be regarded as worst-case assumption as the approach does not consider the contribution of any other reactive species to the overall atmospheric degradation of amidosulfuron in air.

III. CONCLUSIONS

Amidosulfuron will be degraded in air with an estimated half-life of 0.052 days.

Report:	KCA 7.3.1/03; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Title:	AE F092944: Calculation of the chemical half-life in the troposphere
Report No.:	EnSa-16-0084
Document No.:	M-549736-01-1
Guideline(s):	Commission Regulation (EU) No 283/2013 in accordance with Regulation
	(EC) No 1107/2009
	US EPA OCSPP Test Guideline: N/A
Guideline deviation(s):	none
GLP/GEP:	no X a V a

Executive Summary

The half-life in air of amidosulfuron-ADMP (AE F092944), @degradation product of amidosulfuron, was estimated according to structure-activity relationship (SAR) methods developed by Atkinson *et al.*

The half-life in air was estimated with 0.053 days ([Gag-term, Scenario]) assuming the typical OH radical concentration averaged over 12 hours ($1.5 \times 10^{\circ}$ radical Com³)

It is concluded that amidosulfuron-ADMP will be rabitly degraded in air, thereby excluding a potential for long-range transport in the atmosphere.

ETHŎD

The half-life of amidosulfuron-ADMP (AE F092944) in air was estimated according to structureactivity relationship (SAR) methods developed by Atkinson *et al.* The approach of Atkinson *et al.* was based on a comprehensive set of experimental data to result in a quantitative structure-activity relationship (QSAR) mathematic model that allows for estimation by calculation, starting from the molecular structure of a compound. The calculation procedure has been transferred into the personal computer program "Atmospheric Oxedation Program" (AOP) by Meylan & Howard. The current version AOPWINTM 1.92a (U.S. EPA, 2010) was used for the calculations being part of the EPI SuiteTM set of programs.

Considering the chernical structure of amidosulfuron ADMP it can be concluded that reactions with photochemically produced hydroxy radicals will thanly determine its degradation rate in air. The typical OH radical concentration of 1.5 50° radicals/cm³ per day (12 hours) was taken for the long-term estimation

^O II. ^CRESULTS AND DISCUSSION

The overall reaction rate of amproved function-ADMP (AE F092944) with hydroxyl radicals is estimated to be 201.6592 x 10⁻¹² cm³ x molecule x s⁻¹. This rate is derived mainly from incremental reactions like hydrogen abstraction ($V.6592 \times 10^{-12}$ cm³ x molecule⁻¹ x s⁻¹) and an addition reaction to the aromatic ting (assumed value of 200.0000 x 10⁻¹² cm³ x molecule⁻¹ x s⁻¹).

Based on the overall hydrox radical reaction rate constant in combination with the long-term concentration of these radicals in the atmosphere, i.e. 1.5×10^6 radicals/cm³, the half-life of amidosulfuron-ADMP in air was estimated with 0.053 days. This estimate should be regarded as worst-case assumption as the approach does not consider the contribution of any other reactive species to the overall atmospheric degradation of amidosulfuron-ADMP in air.

III. CONCLUSIONS

Amidosulfuron-ADMP (AE F092944), a degradation product of amidosulfuron, will be degraded in air with an estimated half-life of 0.053 days.

Report:	KCA 7.3.1/04; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	016; M-547839-01-1
Title:	AE F094206: Calculation of the chemical	half-life in the troposphere
Report No.:	EnSa-16-0085	1 1
Document No.:	M-547839-01-1	
Guideline(s):	Commission Regulation (EU) No 283/2	013 in accordance with Regulation (EC)
	No 1107/2009;US EPA OCSPP Test Gu	ideline US EPA OGSPP Test Guideline:
	N/A	
Guideline deviation(s):	none	
GLP/GEP:	no	
		\mathcal{O}' , \mathcal{O}' , \mathcal{A} , \mathcal{X}
Executive Summary		
The half-life in air of	amidosulfuron-ADHP (AE F094206)	a degradation product of amidosulfuron.
was estimated accordin	og to structure-activity relationship	R) methods developed by Atkinson et al
was estimated accordin		
The helf life in air w	vag actimated with 0.052 days Ning t	a soonorio) as Queina Que tur SI OU
The nan-me in all w	as estimated with 0.055 days flong-te	astanning the type at OH
radical concentration a	veraged over 12 nours (1.5 x 10° radice	ns/cm ²
It is concluded that a	amidosulfuron-ADHP will be rapidly	v degraded in air thereby excluding a
potential for long-range	e transport in the atmosphere. Q	Ŭ ^K _A _O
	K. MĚTHODS	, v v

The half-life of amidosulfuron-ADHD (AE F094206) in air was estimated according to structureactivity relationship (SAR) methods developed by Atkinson *et al.* The approach of Atkinson *et al.* was based on a comprehensive set of experimental data to result in a quantitative structure-activity relationship (QSAR) mathematic model that allows for estimation by calculation, starting from the molecular structure of a compound. The calculation procedure has been transferred into the personal computer program "Atmospheric Oxidation Program" (AOP) by Meylan & Howard. The current version AOPWINTM 1.926 (U.S. EPA, 2010) was used for the calculations being part of the EPI SuiteTM set of programs

Considering the chemical structure of aminosulfuron ADHe, it can be concluded that reactions with photochemically produced hydroxil radicals with mainly determine its degradation rate in air. The typical OH radical concentration of 1.5% 10° radicals/cm³ per day (12 hours) was taken for the long-term estimation.

RESULTSAND DISCUSSION

The overall reaction rate of amidosulturon-ADHP (AE F094206) with hydroxyl radicals is estimated to be 200.2800 x 10^{-2} cm³ s molecule⁻¹ x s⁻⁰ This rate is derived mainly from incremental reactions with N, S and OH (0.2800 x 10^{-12} cm³ x molecule⁻¹ x s⁻¹) and an addition reaction to the aromatic ring (assumed value of 200.0000 x 10^{-12} cm³ cmolecule⁻¹ x s⁻¹).

 \bigcirc

Based on the overall hydroxyl radical reaction rate constant in combination with the long-term concentration of these radicals in the atmosphere, i.e. 1.5×10^6 radicals/cm³, the half-life of amidosulfuron DHP in air was estimated with 0.053 days. This estimate should be regarded as worst-case assumption as the approach does not consider the contribution of any other reactive species to the overall atmospheric degradation of amidosulfuron-ADHP in air.

III. CONCLUSIONS

Amidosulfuron-ADHP (AE F094206), a degradation product of amidosulfuron, will be degraded in air with an estimated half-life of 0.053 days.

CA 7.3.2 Transport via air

Based on a Henry's constant of 1.6 x 10^{-6} Pa m³/mol and a vapour pressure of $< 1.3 \times 10^{-6}$ Pa (20 °C) amidosulfuron is not expected to volatilise in significant amounts.

Any amidosulfuron that might enter the atmosphere would not be subject to gas phase transport over large distances, due to rapid indirect photochemical degradation; $DT_{50air} = 0.052$ days for hydroxyl radical reaction. A risk of atmospheric transport of potentially volatile coll metabolites can also be excluded due to similarly rapid degradation.

CA 7.3.3 Local and global effects

Local and global effects of amidosulfuron were not estimated since no agnificant exposure of amidosulfuron is expected.

CA 7.4 Definition of the residue

CA 7.4.1 Definition of the residue for misk assessment

Study submitted and evaluated for the first inclusion of amidosulfuron on Annex I:

 Report:
 KCA 7.4 001;
 2002; M-285010-01-P

 Title:
 Definition of the elevance siducut soil (statement)

 Report No.:
 C01459

 Document No.:
 M268010-01-P

 Guideline (s):
 M268010-01-P

 GLP/GEP:
 no

Statement listed in the boseline consister included here for formal completeness only, no summary provided.

In the light of new data as presented before the residue definitions relevant for risk assessment for each compartment are updated as follows:

Compartment	Residue Definition	Major Metabolite in
	Amidosulfuron	(parent substance)
	ADesmethyl (AE F101630)	Aerobic soil, anaerobic soil
Soil	ADesmethyl-chloropyrimidine (BCS-CO41838)	Aerobic soil
5011	AGuanidine (BCS-CO41839)	Aerobic soil
	ABiuret (BCS-CQ51287)	Aerobic soft
	AADMP (AE F092944)	Aerobic soil
	Amidosulfuron	(parent substance)
	ADesmethyl (AE F101630)	Aerobic soft anaerobic soil
	ADesmethyl-chloropyrimidine (BCSCO41838)	Agrobic soil
Groundwater	AGuanidine (BCS-CO41839)	🖌 🔨 Aerobic soil 🔬 °
Groundwater	ABiuret (BCS-CQ51287)	Aeropic soil
	AADMP (AE F092944)	Aerobic soft
	A -ADHP (AE F094200	Lysuneter leachate,
		Cánaerobic soil
	Amidosoffuron	(parent)substance)
	A -Desmethyl (AFO 1016 W	Aerobic water/sediment
		Aerobie soil, anaerobic soil
	ADesmethyl-choropyrightine BCS-CO41838	Aerobic soil
Surface Water	AGuanidire/BCS-6041839	Aerobic soil, Aerobic
		water/sediment
	, ABiget (BCS-CO51287)	Aerobic soil, Aerobic
		water/sediment
	A ADMP (AE F092944)	Aerobic soil, Aerobic
		water/sediment
	A Wuanidinocarbonyi)sulfamic acua (BCS 28149539)	Aerobic water/sediment
Air	O A Amidosulfureto	(parent substance)

CA 7.4.2 Definition of the residue for monitoring

The residue definition for monitoring is and dosult from only for compartments soil and water and air.

Further information related to MCA Section 7, not having defined headline in the document template:

Specific investigations were made by the notifier to exclude a risk of forming potentially toxic conversion products upon the processing of drinking water with ozone. These investigations were triggered by an apparent structural similarity (but not equivalence) of the side chain moiety of amidosulfuron to that of another active substance, Tolylfluanid. For the latter, in 2006 the risk of forming a nitrosamone via novel route of ozone reaction was discovered by researchers of German Water Technology Center, Karlsruhe, and triggered respective concerns at EU Commission level as well for substance amidosulfuron.

To provide timely clarification for Bayer CropScience, an extensive set of data analysis and experimental activities were initiated shortly after this discovery. These activities were first reported as a number of individual documents, to enable short-term submissions to react to authority concerns. All

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

studies were of investigative, research-type character, no official testing guidelines were applicable for this highly substance specific topic.

After testing programme completion and confirmation of the absence of a risk, these individual activities were summarised in a comprehensive overview document that is found discussed in the "Addendum to Monograph prepared in the context of post Annex I procedure @www Annex II data)", Dec. 2010, rev. 1 Feb. 2011. Upon request by the RMS the data is re-submitted for approval renewal as formally "new information", under data point KCA 7.4.2/01 below. The individual statements and reports KCA 7.4.2/01 to KCA 7.4.2/09 are covered therein, and are listed for formal completeness only, as they had been previously submitted to various regulators.

Overall case summary document:

Report:	KCA 7.4.2/01; 2010; 4436496201-1	
Title:	Overview on data and investigations to confirm the absence of a risk of N-new oso	
	substance generation from an dousulfur on and its metabolites up ozone based wat	er
	treatment	
Report No.:	M-364962-01-1 X X C C	
Document No.:	M-364962-01-1	
Guideline(s):	not specified	
Guideline deviation(s):	not specified $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$ $\sqrt{2}$	
GLP/GEP:		

A structural resemblance of the sulfamide type side chain characteristic for the Amidosulfuron substance family to the N,N-dimethylsulfamide molety present within Totylfluanid triggered research activity to clarify whether or not a similar risk of N-nifeoso substance generation might apply to any Amidosulfuron-derived components under the conditions of ozone-based drinking water disinfection.

Via a complex matrix-dependent parrangement feaction, the NNT dimethylsulfamide moiety present in the fungicide active ingredient Tolylfluanid was found convertible to N-nitroso-dimethylamine (NDMA) upon aqueous ozonation. Since that concerned notety is in substance liberated as N,Ndimethylsulfamide opon the soil metabolism of Tolyffluand and has potential to leach, this process led to elevated NDMA levels in certain Szone-processed drinking waters that were produced from affected groundwater (Figure 7.42-1).







The chemical formula of the Herbicide active ingredient Annalosulfacon (AE F075732) was noted to include a substructure element of remote similarity to the nitrosamine precursor moiety within Tolylfluanid: a side-chain located sulfaconde (NSO₂-N) however differing in its substituent pattern (Figure 7.4.2-2).

That moiety is retained in several metabolities of Amidosulfuron in soil, including some of expected mobility.



	$ \begin{array}{c} $
Tolylfluanid structure family:	Amidosulfuron structure family: N-methyl N-methylsulfonylsulfamide-moiety
parent substance:	parent substance:
$R1 = \sum_{C H_3} CH_3$	

To clarify whether or not a risk of similar-like behaviour to Tolylfluanid might be posed by Amidosulfuron, Bayer CropScience has investigated the case via a number of laboratory experiments, accompanied by intense literature review:

- Ozonation of Amidosulfuron parent substance, followed by analysis for NDMA
- Ozonation of mobile metabolite Amidosulfuron-guanidine (BCS-CO4189), followed by analysis for NDMA
- Ozonation of metabolite Amidosulfuron-guanidine, followed by mass spectrometry screening for selected hypothetical N-nitroso structures
- Establishment of an analytical screening test for the unspecific determination of total N-X nitroso compounds' after aqueous ozonation
- Ozonation of metabolite Amidosulfuron-guanidine, followed by unspecific determination of 'total N-nitroso compounds'
- Chemical synthesis of the sulfamide core structure of Anidosulfuron as a substance, followed by chemical property analysis

In each of the experiments, N,N-dimethylsulfamile was included as positive control substance to enable a direct comparison between Tolylflumid- and Amidosulfuron derived components in the identical test setup and water matrix.

The present document provides, after blief introduction to theoretical implications, an overview summary and interpretation of all relevant experimental data. Clear and consistent conclusion is that there is no indication for an analogour behaviour of Amidosulturon to folylfloanid, i.e. no generation of any nitroso substance could be observed in any test conducted on the Amidosulfuron structure family.

Thorough theoretical and comparative experimental assessment however confirmed that the differing substituent pattern of both molecule families translates into significantly differing behaviour upon aqueous ozonation. For the Amidosulfuron type suffamide chain meither NDMA nor any further N-nitroso compounds other than NDMA were found formed under conditions that led to a pronounced NDMA formation from N,N-dimethylsulfamide.

Moreover, it was demonstrated that the substituted suffamide moiety of Amidosulfuron in pure substance is a hydrolytically very unstable component. In difference to N,N-dimethylsulfamide such component would not be able to persist or spread in actuatic systems.

Herewith, a Tolytfluanid like risk for ozone-processed drinking water is clearly not indicated for the Amidosulfuron structure family including its mobile metabolites.

Individual documents, previously submitted to member states and Commission on ad-hoc basis for timely clarification of concerns?

Report:	KA 7.4.2702; 2007; M-284774-01-1 MIDO&ULFURON: Expected behaviour of amidosulfuron and its metabolites upon
	water processing using ozone
Report No.:	M-284774-01-1
Document No.:	M-284774-01-1
Guideline(s):	not specified
Guideline deviation(s):	not specified
GLP/GEP:	no

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Report:	KCA 7.4.2/03; ; 2007; M-286421-01-1
Title:	Amidosulfuron (AE F075032): Test for formation of N-nitroso-dimethylamine upon
	drinking water ozonation
Report No.:	MEF-07/167
Document No.:	M-286421-01-1
Guideline(s):	none
(-):	- supportive screening test -
Guideline deviation(s).	none
GLP/GEP:	
Domonte	KCA 7 4 2/04:
	KCA /.4.2/04, KCA /.4
The.	Annuosunui on - Statement of Bayer Clopscience of the possibility ar generation of
	a nuroso component via ozone reaction ova nyprudeticar don-radiou aced side chain
	iragment of amidosulfuron
Report No.:	M-291246-01-1
Document No.:	M-291246-01-1
Guideline(s):	not applicable
Guideline deviation(s):	not applicable
GLP/GEP:	
Report:	KCA 7.4.2/05; ; 2607; M-264055-01-4 🔊
Title:	N-Methyl-N-sulfamoylmethanesulfonarinde (BCS-AA10633): Hydrolytic degradation
Report No.:	MEF-07/313
Document No.:	M-291055-01-1
Guideline(s):	OECD 111; EU/94/37/EC and 95/36/EC amending 91/414/EC, US EPA, Subdivision
	N, Section 1@41; Canada PMRA DACO Number 8.2.3.2 Japan MAFF, 12 Nousan
	8147 × × × × × ×
Guideline deviation(s):	The test stem was not stable in aqueous solution. Therefore, it was not possible to
	determine the initial concentration. The degradation date according first order was
	evaluated from the decrease of area country in repeated LC-MS/MS injections
	impediately after dissolution of the test rem in the buffer solutions. The test was
	performed agambient temperature (injector temperature 23-25°()
GLP/GEP.	
Bonort:	$V \subset A \stackrel{\circ}{\rightarrow} A 2/06$
Title:	NCA 7.4.2/00, manufacture quantilita): Absence of NDMA after exerction of
The.	Stinking Optor
Banart Nation	MEE 400/726
Decument New	M 2 69 1 2 0 3 4 4 4
Cuidalina(a):	None (supporting to:
Guideline deviction (%)	None (supportive test)
Guideline deviation(s):	Aut appurable
GLP/GEP:	
Report:	KG (7/.4.2/6), 2010; M-364694-01-1
Title:	Brief summary of pretest: Ozonation of BCS-CO41839 (amidosulfuron-guanidine) in
_ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	Wap water
Report No.:	⁷ MEF-09/058 0 [°]
Document No. ⁹	M-304694-04-1
Guideline(s):	nome (supportive test)
Guideline deviation(s):	not applicable
GLP/GEP: »	no
S.	v
"O*	

Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Report: KCA 7.4.2/08 Image: 2009; Mar28163-01-1 Title: Technical feasibility of using a group specific analytical method for testing the potential of chemicals to form N-nitroso components upon ozone-based water processing Report No: MEF-08/559 Document No: M-328163-01-1 Guideline deviation(s): not applicable Guideline deviation(s): not applicable Guideline deviation(s): not applicable Corenation of BCS-CO41839 (amidosulfiron-guandine) fallowed by malytical screening for non-specific N-nitroso subfances Report No: MEF-09/735 Document No: M-300307-02-1 Guideline deviation(s): not applicable Guideline deviation(s): not applicable Guideline deviation(s): None (supportive test) Guideline deviation(s): not applicable		
Title: Technical feasibility of using a group specific analytical method for testing the potential of chemicals to form N-nitroso components upon ozone-based water processing Report No.: MEF-08/559 Document No: M-328163-01-1 Guideline deviation(s): not applicable GLP/GEP: no Report: KCA 7.4.2/09; Title: Ozonation of BCS-CO41839 (amidosulfilgon-guantome) fallowed by inalytical screening for non-specific N-nitroso subfances. Report: MEF-09/755 Document No: M-360307-02-1 Guideline(s): Non (supportive test) Guideline(deviation(s): not applicable Guideline deviation(s): not applicable Guideline(s): not applicable	Report:	KCA 7.4.2/08; ; ; ; 2009; M-328163-01-1
constrained of chemicals to form N-nitroso components upon ozone-based water processing Report No.: MEF-08/559 Document No.: M-328163-01-1 Guideline(s): not applicable Guideline(s): not applicable Guideline(s): not applicable GLP/GEP: no Report: KCA 7.4.2/09 Title: Ozonation of BCS-CO41839 (amidosulfuging guandime) fallowed by shalytical screening for non-specific N-nitroso subdances Report No.: MEF-09/735 Document No.: M-360307-02-1 Guideline(s): None (supportive test) Guideline(s): none applicable Guideline(s): not applicable Totapplicable n	Title:	Technical feasibility of using a group specific analytical method for testing the
processing Report No.: MEF-08/559 Document No.: M-328163-01-1 Guideline deviation(s): not applicable Guideline deviation(s): not applicable GLP/GEP: no Report: KCA 7.4.2/09; Title: Ozonation of BCS-CO41839 (amidosulfuron guantame) fullowed by smalytical screening for non-specific N-nitroso substances Report: MEF-09/735 Document No.: MEF-09/735 Document No.: M-360307-02-1 Guideline deviation(s): not applicable GLP/GEP: no CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosulfuron and its residues in the various compartments of the enveronment, with mo indigenions for persistence or accumulation. Under recommended use conditions for unacceptable feaching of pacific compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are surgarise direc. Report: KCA 7.5/01 Yet383-01-2 2002.200 Title: Precree of astricide tesidues the groundwaters: monitori		potential of chemicals to form N-nitroso components upon ozone-based water
Report No.: MEF-08/559 Document No.: M-328163-01-1 Guideline(s): not applicable GLP/GEP: no Report: KCA 7.4.2/09 Title: Ozonation of BCS-CO41839 (amidosulfuron-guantome) followed by shalytical screening for non-specific N-nitross subfances Report No.: MEF-09/735 Document No.: MEF-09/735 Document No.: M-360307-02-1 Guideline deviation(s): not applicable GLP/GEP: no CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosulfuron and its residues in the various compartments of the envitonment, with no indications fop persistence or accumulation. Under recommended use conditions for unaceptable feaching of particlence or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the fotifier Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised Here. Report: KCA 7.401 Yerence of apsticide residues the groundwaters: monitoring in Simrishamn in 2002-2007 Report No.: Ne457483-012 Title: Presence of apsticide residues the groundwaters: monitoring in Simrishamn in 200		processing
Document No.: M-328163-01-1 Guideline(s): not applicable GLP/GEP: no Report: KCA 7.4.2/09: 2010; M-360307-02-1 Title: Ozonation of BCS-CO41839 (amidosulfifton-guandine) failowed by analytical screening for non-specific N-nitroso subfances Report No.: MEF-097735 Document No.: M-360307-02-1 Guideline deviation(s): not applicable GLP/GEP: no CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of apidosulfuron and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions no unacceptable teaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the forified Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5/01 Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5/01 M-457483-01-2 Document No: M-457483-01-2 Document No.: M-457483-01-2 Document No.: M-45748-3 M-45748-3 M-45748-3 M-45748-3 M-45748-3 M-45748-3 M-45748-3 M-45748-3 M-45748-3 M-45748-3 M-45748-	Report No.:	MEF-08/559
Guideline (s): not applicable GLP/GEP: no Report: KCA 7.4.2/09; 2010; M-360307.02-1 Title: Ozonation of BCS-CO41839 (amidosulfuror-guandine) fallowed by analytical screening for non-specific N-nitroso subtances Report: MEP-09/735 Document No: MEP-09/735 Document No: M-360307-02-1 Guideline deviation(s): not applicable Guideline deviation(s): not applicable <th>Document No.:</th> <th>M-328163-01-1</th>	Document No.:	M-328163-01-1
Guideline deviation(s): not applicable GLP/GEP: no Report: KCA 7.4.2/09: 2010; M.360307-02-1 Title: Ozonation of BCS-CO41839 (amidosulfuron-guandme) followed by analytical screening for non-specific N-nitros subfances, Report No.: MEF-09/735 Document No.: M-360307-02-1 Guideline(s): None (supportive test) Guideline(s): None (supportive test) Guideline(s): not applicable GLP/GEP: no CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosulfuron and its residues in the various compartments of the envelopment, with no indications for persistence or accumulation. Under recommended use conditions no unacceptable leaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier Four studies reporting on monitoring activities including subfance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5/01 M-457483-01-2 Document No: M-457483-01-2 Document No: M-457483-01-2 D	Guideline(s):	not applicable
GLP/GEP: no Report: KCA 7.4.2/09; 2010; M-360307-02-1 Title: Ozonation of BCS-CO41839 (amidosulfuron-guantame) fallowed by analytical screening for non-specific N-nitroso subdances Report No.: MEF-09/735 Document No: M-360307-02-1 Guideline(s): None (supportive test) Guideline deviation(s): not applicable GLP/GEP: no CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosultaron and its residues in the various compartments of the environment, with no indigations for persistence or accumulation. Under recommended use conditions to unacceptable fleaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier. Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.501 M-457483-01-2 M-457483-01-2 Document No: M-457483-01-2 Document No:<	Guideline deviation(s):	not applicable
Report: KCA 7.4.2/09; 2010; M-360307-02-1 Title: Ozonation of BCS-CO41839 (amidosulfution-guantame) fallowed by analytical screening for non-specific N-nitroso subfances Report No.: MEF-09/735 Document No.: M-360307-02-1 Guideline deviation(s): not applicable GLP/GEP: no CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosulturon and its residues in the various compartments of the environment, with no indications, for persistence or accumulation. Under recommended use conditions of unacceptable teaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier. Four studies reporting on monitoring activities including substance indiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5/01 M-457483-01-2 Document No: M-457483-01-2 Document No: M-457483-01-2 Guideline(s): not applicable Guideline(s): not applicable Four studies reporting on monitoring activities including substance indiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5/01 M-457483-01-2<	GLP/GEP:	
Report: KCA 7.4.2/09 2010; M.360307-02-1 Title: Ozonation of BCS-CO41839 (amidosulfiton-guantfine) fallowed by analytical screening for non-specific N-nitroso subfances Report No.: MEF-09/735 Document No.: M-360307-02-1 Guideline(s): None (supportive test) Guideline(s): not applicable GLP/GEP: no CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of andosultaron and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions to unacceptable leaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier. Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5/01 Title: Presence of preside esidues in groundwaters: monitoring in Simrishamn in 2002-2007. Report No.: M-457483-01-2 Document No.	-	
Title: O'zonation of BCS-CO41839 (amidosulturon-guanafune) future of paralyteat screening for non-specific N-nitroso substances Report No.: MEF-09/735 Document No.: M-360307-02-1 Guideline deviation(s): not applicable GLP/GEP: no CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of apidosulturon and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions to unacceptable feaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no no nonitoring studies under outdoor conditions were conducted by the notified Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5/01. M-457483-012 M-457483-012 Document No: M-457483-012 Document No: M-457483-012 M-457483-012 M-457483-012 Document No: M-457483-012 In Jan. 2007 All municipal water were of Simirishamn, south Sweden, were sampled and analysed for	Report:	KCA /.4.2/09; 2010; M-36030/-02-1
Report No.: MEF-09/735 Document No.: M-360307-02-1 Guideline(s): None (supportive test) Guideline deviation(s): not applicable GLP/GEP: no CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosultation and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions no unacceptable teaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notified. Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: CCA 7.5/01 Title: Presence of resticide testidues for groundwaters: monitoring in Simrishamn in 2002-2007. Report No.: M-457483-01-2 Document Noc M-457483-01-2 Cuideline(s): not applicable Guideline(s): not applicable <th>l itle:</th> <th>Ozonation of BCS-CO41839 (amidosulfuron-guanitarine) fallowed by analytical</th>	l itle:	Ozonation of BCS-CO41839 (amidosulfuron-guanitarine) fallowed by analytical
Report No.: MiEP-09/733 Document No.: M-360307-02-1 Guideline(s): None (supportive test) Guideline(s): not applicable Guideline(s): not applicable GLP/GEP: no CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of andosulfuron and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions no unacceptable teaching of pariot compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notified. Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: CCA 7.501 M-457483-012 Precence of perside residues in groundwaters: monitoring in Simrishamn in 2002-2007. Report No.: M-457483-01-2 Document No. M-457483-01-2 Document No. M-457483-01-2 In Jan. 2007 All municipal water were of Simrishamn, south Sweden, were sampled and analysed for	Den ent Me	Screening for non-specific N-nitroso substances
Document No: M-300307-02-1 Guideline(s): None (supportive test) Guideline deviation(s): not applicable CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosultaron and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions no unaceptable feaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5(01;	Report No.:	MEF-09/735
CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosulfaron and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions of unacceptable feaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notified Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5(01) Title: KCA 7.5(01) CA 457483-012 Document No: M-457483-012 Document No: M-4	Guideline(s):	Nona (supportive test)
CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosulturon and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions to una ceptable feaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.501 Title: Presence of pasticide residues in groundwaters: monitoring in Simrishamn in 2002- 2007. Report No.: M-457483-01-2 Document No. M-457483-01-2 Document No.	Guideline deviation(s):	not applicable
CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosultaron and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions to unacceptable teaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier. Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: M-457483-012 Title: Presence of assicide tesidues for groundwaters: monitoring in Simrishamn in 2002- 2007. Report No.: Document No. M-457483-01-2 Document No. M-457483-	CL P/CFP.	
CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosultaron and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions no unacceptable leaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: CCA 7.5/01: Title: Presence of pesticide residues in groundwaters: monitoring in Simrishamn in 2002- 2007. Report No: Presence of pesticide residues in groundwaters: monitoring in Simrishamn in 2002- 2007. Report No: Presence of pesticide residues in groundwaters: monitoring in Simrishamn in 2002- 2007. Report No: Presence of pesticide residues in groundwaters: monitoring in Simrishamn in 2002- 2007. Report No: Presence of speciable Guideline(s): not applicable GLP/GEP: not In Jan. 2007 All municipal water were of Sourishamn, south Sweden, were sampled and analysed for		
CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosultaron and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions no unacceptable feaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notified Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: Title: Report No.: Document No Guideline(s): Guideline(s): Guideline deviation(s): not applicable GLP/GEP: In Jan. 2007 All municipal water were sof Soffrishamn, south Sweden, were sampled and analysed for		
CA 7.5 Monitoring data Laboratory, lysimeter, and field data demonstrated the degradability of amidosultaron and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions no unacceptable feaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notified Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: Title: Report No.: Document No. Document No. Guideline (s): Guideline (s): Guideline (s): M-457483-01-2 Document No. Hasplicable GLP/GEP: In Jan. 2007 All municipal water were sof Soffrishamn, south Sweden, were sampled and analysed for		
Laboratory, lysimeter, and field data demonstrated the degradability of amidosultaron and its residues in the various compartments of the environment, with no indications for persistence or accumulation. Under recommended use conditions no unacceptable feaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: Title: Report: Report No.: Document No. M -457483-01-2 Document No. M -457483-01-2 Document No. M -457483-01-2 Document No. M -457483-01-2 Document No. M -455483-01-2 Document No. D -455483-01-2 D -455483-01-	CA 7.5 Monit	oring data
Particular of the environment, with not indications for persistence or accumulation. Under recommended use conditions no unacceptable feaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notified Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5/01: KCA 7.5/01: KCA 7.5/01: M-457483-012 Title: Presence of persicide essidues in groundwaters: monitoring in Simrishamn in 2002-2007. Report No.: Document No. M-457483-012 M-457483-012 Document No. M-457483-012 M-457483-012 In Jan. 2007 all municipal water were soft of Simrishamn, south Sweden, were sampled and analysed for	Laboratory lysimeter	and field data demonstrate the degradability of smidoculturon and its residues
Under recommended use conditions to unacceptable leaching of parent compound or of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5/01; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;	in the various comparts	net for the environment, with no indigations the persistance or accumulation
Childer recommended use conditions to unacceptable reaching of parent compound of of any relevant degradates to groundwater is to be expected. Therefore, no monitoring studies under outdoor conditions were conducted by the notifier Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: KCA 7.5/01; Title: Precence of pesticide excluses to groundwaters: monitoring in Simrishamn in 2002-2007. Report No.: M-457483-01-2 Document No M-457483-01-2 Guideline(s): mot applicable Guideline deviation(s): not applicable Guideline deviation(s): not applicable In Jan. 2007 all municipal water webs of Simirishamn, south Sweden, were sampled and analysed for	Inder recommended w	a conditions on unconstable locability of paratt compound or of any relevant
Gegradates to groundwater is to be expected. Atherefore, no monitoring studies under outdoor conditions were conducted by the notified. Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: CA 7.5/01; Title: Presence of pesticide residues to groundwaters: monitoring in Simrishamn in 2002-2007. Report No.: M-457483-01-2 Document No M-457483-01-2 Guideline deviation(s): not applicable Guideline deviation(s): not applicable In Jan. 2007 all municipal water webs of Somrishamn, south Sweden, were sampled and analysed for	describertes to group de	se conditions no unacceptable reacting of parent compound of of any relevant
Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: (CA 7.5/01; (CA 7.5/0	degradates to ground	ted her the getter and a meretolog, no monitoring studies under outdoor
Four studies reporting on monitoring activities including substance andiosulfuron were found in the open literature, and are summarised here. Report: Title: Report No.: Document No.: M-457483-01-2 Document No.: M-457483-01-2 M-457483-01	conditions were conduc	
Pour studies reporting on monitoring activities including substance and osulfuron were found in the open literature, and are summarised here. Report: RCA 7.5/01; Title: Precence of pesticide essidues for groundwaters: monitoring in Simrishamn in 2002-2007. Report No.: M-457483-01-2 Document No M-457483-01-2 Guideline (s): not applicable Guideline deviation(s): not applicable GLP/GEP: Total and analysed for		
Report: Title: Report No.: Document No.: Guideline (s): Guideline deviation(s): In Jan. 2007 all municipal water webs of Signrishamn, south Sweden, were sampled and analysed for	Four studies reporting	on monitoring activities including substance andiosulturon were found in the
Report: KCA 7.5/01;	open literature, and are	summarised here.
Report: KCA /.5(01) (2012); Title: Precence of pesticide essidues for groundwaters: monitoring in Simrishamn in 2002- Report No.: M-457483-01-2 Document No M-457483-01-2 Guideline(s): not applicable Guideline deviation(s): not applicable GLP/GEP: No In Jan. 2007 all municipal water webs of Sintrishamn, south Sweden, were sampled and analysed for	Derest	
Title: Presence of pesticide estidues to groundwaters: monitoring in Simrishamn in 2002- 2007. Report No.: Document No. M-457483-01-2 Guideline(s): Guideline deviation(s): not applicable GLP/GEP: In Jan. 2007 all municipal water webs of Simrishamn, south Sweden, were sampled and analysed for	Report:	; 2012; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ; ;
Report No.: Document No. Guideline (s): Guideline deviation(s): In Jan. 2007 all municipal water webs of Signrishamn, south Sweden, were sampled and analysed for	Title:	M-45/483-01 2° C C C
Report No.: Document No.: M-457483-01-2 Guideline(s): Guideline deviation(s): not applicable GLP/GEP: In Jan. 2007 all municipal water webs of Smrishamn, south Sweden, were sampled and analysed for	Thie.	2 $\sqrt{2}$
Document No Guideline(s): Guideline deviation(s): not applicable GLP/GEP: In Jan. 2007 all municipal water webs of Sin rishamn, south Sweden, were sampled and analysed for	Report No :	$\mathcal{N}_{-45748} \mathcal{Q}_{01-2} \approx \mathcal{Q}_{-6} \mathcal{Q}_{-6}$
Guideline(s): Guideline deviation(s): not applicable GLP/GEP: In Jan. 2007 all municipal water webs of Sontrishamn, south Sweden, were sampled and analysed for	Document No	M_{-45}^{+45}
Guideline deviation(s): not applicable GLP/GEP:	Guideline(s):	not applicable
GLP/GEP: In Jan. 2007 all municipal water webs of Sörishamn, south Sweden, were sampled and analysed for	Guideline deviation(x):	not applicable
In Jan. 2007 all municipal water webs of Sin rishamn, south Sweden, were sampled and analysed for	GLP/GEP:	$\hat{\mathbf{m}}$
In Jan. 2007 all municipal water webs of Sorrishamn, south Sweden, were sampled and analysed for		$\tilde{\mathcal{Y}} \sim \mathcal{Y} \sim \mathcal{Q}' \sim \mathcal{Q}'$
	In Jan. 2007 All munic	ipal water were of Smirishamn, south Sweden, were sampled and analysed for
the presence of plant protection product residuals and included amidosulfuron. In total 34 wells were		
analysed. The samples were analysed at an accredited laboratory with respect to 77 different		
parameters of @lant protection broducts which either are used or have been used in the recharge area of		
the wells. Norindings of anicosulfuron were reported.	the wells. No findings of	of aniposulfuron were reported.



Document MCA: Section 7 Fate and behaviour in the environment Amidosulfuron

Report:	KCA 7.5/02;	-	•	• •
	-	; 2008; M-555	5933-01-1	
Title:	Bioforsk report - Vol. 3 nr	. 105 2008 - Trans	port of sulfonylure	ea herbicides from a
	barley field in Norway: Fi	eld and laboratory	studies - Including	g development of an
	analytical method for sulf	onylurea herbicides	s with LC-MS/MS	
Report No.:	M-555933-01-1			ða -
Document No.:	M-555933-01-1		a di seconda di s	2
Guideline(s):	none		. 4	0 @
Guideline deviation(s):	none		^م ي ا	
GLP/GEP:	no		R	
				A V
The transport of amic	losulfuron in soil was st	udied in a fiæld	study in Norw	av as well as in soil

Soil column leaching study part

columns in the laboratory.

The soil column leaching study was performed under controlled laboratory conditions at 10 °C according to OECD guideline 312 using soil originating from the instreated field plots of the respective field study (clay loam to silt loam). Amidoculfuron was formulated as Gratil 75 WG (750 g amidosulfuron/kg) and applied with 47 μ g amidosulfuron percolumn. The tracer, polassium bromide (KBr), was applied at the same time as amidosulfuron if order to follow the transport of water (78.5 mg KBr per column, corresponding to 52.7 mg Br/column). The test was performed using stainless steel columns (inner diameter f0 cm and height 50 cm) packed in layers which corresponded to those sampled at the field (0 – 10 00 – 25 and 25 – 45 cm, sieved to a particle size ≤ 4 mm) and pre-wetted with artificial rain (0.01 M CaCh). The test item was applied evenly across the surface of the soil columns which were eluted under saturated conditions with approximately 280 mm rainfall during 48 hours. Eight water samples the were analysed by HPLC MS/MS with a LOQ of 0.1 mg/mL.

Amidosulfuron was not refected to drainage water from two of three columns. In the third column amidosulfuron was found in five of eight water fractions. The total amount recovered was 0.009% of added amidosulfuron. However, in the some column, only 32% of added bromide was recovered and it is therefore considered as strange that amidosulfuron was detected in this column. One explanation may be non-uniform packing of the soll column. Furthermore, tribenuron-methyl, which was applied within the study to different soil columns was found in the leachate of untreated control columns as well as in the leachate of columns treated with amidosulfuron, only. The authors explain these findings with the contamination of the soil with tribenuron-methyl, caused by application of tribenuron-methyl to the sampled field plot, in the previous year. Regarding the very fast degradation of tribenuron-methyl in the leachate 42 months after application. Additionally, tribenuron-methyl hydrolyses applied at a pH around 4 – 5, the sampled water fractions represented an acidic environment favouring the degradation of parent tribenuron-methyl. Therefore, it appears even more unikely to find any unaltered, tribenuron-methyl in the leachate of untreated soil columns. Altogener, these findings most possibly indicate a contamination of the samples with the respective compounds and therefore should not be taken as evidence of the leachate of untreated soil columns.

Field study part

The experimental size of the field study was located at the eastern side of the lake Årungen 35 km south of Oslo. The experimental plots were 27 m long and 7 m wide with a slope of 13%. The soil represented a loam with total carbon contents of 3% in the upper layer (0 - 20 cm) and 2% in the lower layer (20 - 40 cm). The soil was tile drained more than 40 years ago (depth of approx. 1 m), so physical conditions are well stabilized.

The plot was subject to autumn ploughing and spring harrowing and barley was sown in May 2007. Amidosulfuron and the tracer bromide were applied 7 June 2007 with application rates of 58.2 g/ha a.s. for amidosulfuron (Gratil) and 100 kg KBr/ha, corresponding to 67 kg Br/ha at the time of spraying. Additionally, tribenuron-methyl (Express) was applied at an application rate of 9.1 g/ha (a.s.). Each spring approximately 90 kg N/ha have been applied to the fields.

Water proportional samples were collected from surface run-off and drainage water. The sampling frequency varied from a couple of days to several weeks depending on apount of runoff. Samples were analysed by HPLC-MS/MS with a LOQ of 0.1 ng/mL.

Ŧ The experimental period was wetter than normal. Especially, the symmer months fune and July received much higher amounts of precipitation than normal@what favoured_runoff gt_plant`protection products. In addition, higher temperatures than normal were observed during the wonter months, with periods above 0 °C, during December and January propote high run-off of water.

A peak concentration of amidosulfuron of 0.31 µg/L was breasured at the first significant rainfall event (27 June) inducing drainage water after application after time between application and collection of drainage water samples was only 20 days, which might explain the relatively high values. At the next sampling periods, 5 July (day 28 after spraying) and 6 December (day 182), the concentrations of amidosulfuron were much lower with 0.03 and 0.004 µg/L, of y.

Much less water left the field as surfage runoff, and there was only one sampling event during the summer months. At 29 July (day 52), 2 µg/L of amidosulfuron was measured in the surface run-off. Negligible amounts were measured in surface run off for the next two sampling events in January (day 224 and 231).

It has to be stated that the field plot had a steep slope of which can result in a higher runoff compared to a typical agricultural used field site.

Report:

Guideline deviation(s)

GLP/GEP:

none noO

Title:

2011: M-555940-01-1 Bjoforskæpport - XA. 6 nr 00, 2011 - Multi-year transport studies of sulfonylurea herbigides from abarley field in Norway, 2007-2010 - Including development of LC-MS/MS methods for L quantitative analysis of sulfonylurea herbicides and degradation products M-555940@1-1 Report No .: 1-555949-01 Document No .: Guideline(s): none

The transport of amidosulfuron through surface and drainage water was studied in controlled field plots at a site in-Norway in two replicate years. Phase 1 of the project was performed in 2007-2008 and is reported in KCA 75/03. Phase 2, which is summarized in the current report was performed in 2009-2010 at the same field plot as phase 1. In addition to amidosulfuron also its degradation product amidosulfuron-desmethyl (AE F101630) was monitored in the second phase.

For a description of the field site see KCA 7.5/02. Barley was sown in May 2009.

The field was sprayed with 58 g amidosulfuron/ha and 9 g tribenuron-methyl/ha on the 7 June 2007 and the 18 June 2009. Water-proportional sampling of surface and drainage water was performed during the study periods.

Differences in the hydrological regime for the period 2007-08 and 2009-10 resulted in major differences in the loss of pesticides. Intensive rain episodes shortly after application of pesticides resulted in much higher water flow and losses of pesticides for the summer of 2007 compared to 2009. A mild and rainy winter of 2008 also promoted higher losses of the degradation products of sulfonylurea herbicides in 2008 compared to 2010. The winter of 2009/10 was much colder than the average winter temperature for the normal period (1960-90).

In 2009-10 peak concentrations of amidosulfuron of 0.01 µg/L were measured at the first significant flow event after application for both the surface and drainage water. Maximum concentration of the degradation product of amidosulfuron, amidosulfuron-desmethyl, was measured at the first significant flow period after application, and reached a concentration of Q.015 µg/E in dramage water in August 2009.



Four monitoring campaigns were conducted in 2004 and 2005 to determine the presence of plant protection product residuals, including and dosulfuron, in the European take Geneva. Samples were taken two times in spring (April 2000 and 2005), and once in autumn (September 2004). Nine different depths were sampled; six in the epikimion-metalimmion (0-10 m; 0, 1, 5, 7.5, and 10 m), and four in the hypolimnion 10-300 m; 30, 100, 305, and 309 m). Average concentrations of amidosulfuron ranged between 0.016 and $0.019 \mu g/L$ in the epilimnion and between 0.014 and 0.021 $\mu g/L$ in the hypothesistion.

re conducted in 2004 at. including and 2005), and a including and 2005), and a including and 2005), and a including and 2005), and including and 2005, and including