

ACETOCHLOR (280)

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EXPLANATION

Acetochlor is a selective herbicide from the chloroacetanilide class used against grasses and broadleaf weeds in a variety of crops. It inhibits protein synthesis in shoot meristems and root tips. It was first and last evaluated by JMPR in 2015 (T, R), when an ADI of 0–0.01 mg/kg bw and an ARfD of 1 mg/kg bw were established. The residue definition for compliance with the MRL and for estimation of dietary exposure (for animal and plant commodities) is the sum of compounds hydrolysable with base to 2-ethyl-6-methylaniline (EMA) and 2-(1-hydroxyethyl)-6-methylaniline (HEMA), expressed in terms of acetochlor. The residue is not fat soluble.

Acetochlor was scheduled at the Fiftieth Session of the CCPR for the evaluation of additional uses by the 2019 Extra JMPR. The Meeting received new information on soya bean metabolism study, analytical method data and residue trials on soya bean and alfalfa (forage and hay).

Plant metabolism

A plant metabolism study conducted with acetochlor on soya beans after pre-plant (PP-T) or post-emergence (POE-T) application was reviewed by JMPR 2015, when metabolite identification were conducted only on forage and hay extracts, which contained the highest residues. The new study submitted to the present Meeting involves the characterization and identification of the metabolites in soya bean seed extracts from the original study (Kurtzweil *et al.*, 2016). Metabolites associated with the peaks of interest of the POE-T and PP-T extract profiles were isolated and purified by liquid chromatography, and characterized chromatographically by acid pressure hydrolysis and by LC/MS. These metabolites were acetochlor *tert*-sulfinylacetic acid, acetochlor *tert*-sulfinyllactic acid and acetochlor 1-hydroxyethyl *sec*-oxanilic acid, along with another metabolite that was not identified, but likely belongs to the same hydroxyethylmethylaniline-forming class of chemistry as the 1-hydroxyethyl *sec*-oxanilic acid based on results from acid pressure hydrolysis. The metabolite associated with another PP-T peak was characterized as a natural product, possibly a carbohydrate. The metabolites or conjugate identified result from pathways that have been previously proposed for the metabolism of acetochlor in crops (JMPR 2015).

The three metabolites identified in this study are accounted for by the current analytical residue methodology. The *tert*-sulfinylacetic acid and *tert*-sulfinyllactic acid are both converted to 2-methyl-6-ethylaniline (EMA) and the 1-hydroxyethyl *sec*-oxanilic acid is converted to 2-(1-hydroxyethyl)-6-methylaniline (HEMA) in the method. A summary of the identified or characterized metabolites is provided in Table 1.

Table 1 Identified or characterized metabolites in following pre-plant (PP-T) or post-emergence (POE-T) soya bean seed

Metabolite	Treatment	Ret. Time (min)	Ret. Time (min)	mg/kg eq	% TRR
acetochlor <i>tert</i> -sulfinylacetic acid	POE-T	46.7	51.75	0.029	15.1
acetochlor <i>tert</i> -sulfinyllactic acid	POE-T	41.8	46.25	0.016	8.3
acetochlor 1-hydroxyethyl <i>sec</i> -oxanilic acid	POE-T	8.3	9.25	0.019	9.9
acetochlor 1-hydroxyethyl <i>sec</i> -oxanilic acid + Unknown <i>m/z</i> 149	PP-T	8.2	9.25	0.013	7.4
Unknown natural product	PP-T	5.8	5.75	0.12	6.9

RESIDUE ANALYSIS**Analytical methods**

Method ME-1738-03 (Huang, 2016), which was used to analyse the soya bean seed and alfalfa (forage and hay) is a modification of the method ME-1215 (evaluated by the 2015 JMPR), in which sample size was decreased to 125 mg and the extraction solvent was changed from acetonitrile:water to methanol:water. Crop matrices are freezer-milled, weighed into 96-well format tubes, methanol/water added; the samples are capped and agitated on a high-speed shaker for extraction, then centrifuged. An aliquot of the extract is hydrolysed in aqueous sodium hydroxide, quenched with aqueous sulfuric acid, and an aliquot of the hydrolysate is mixed with isotopically labelled EMA and HEMA internal standards (IS), and then processed through an Oasis MCX SPE plate if additional selectivity is needed. Alternatively, the IS can be added along with the extraction solution. Representative compounds that generate EMA (*tert*-sulfonic acid) and HEMA (1-hydroxyethyl-*tert*-oxanilic acid) on base hydrolysis are used as reference materials for fortification and method validation. The eluate is analysed by LC-MS/MS. The quantitation and confirmation transitions for EMA are m/z 136→91 and m/z 136→119, respectively. For HEMA the transitions are m/z 136→119 and m/z 136→91, respectively. The LOQ of the method is either 0.010 or 0.025 mg/kg depending on the matrix and analyte. The residue is calculated as the sum of HEMA and EMA, and expressed as acetochlor. Recoveries are shown in Table for pre-study validation and Table 3 for in-study validation.

Table 2 Recovery results for EMA and HEMA from pre-study validation (n=6)

Analyte	Level (mg/kg)	Quantitation Transition		Confirmation Transition	
		Mean recovery (%)	RSD (%)	Mean recovery (%)	RSD (%)
Cotton Seed					
EMA	0.01	108	3.8	109	6.6
	0.25	103	8.7	103	7.5
	4	107	1.7	108	2.1
HEMA	0.01	105	2.2	105	7.6
	0.25	95	6.6	94	7.4
	4	99	1.2	99	1.1
Soya bean seed					
EMA	0.01	103	9.9	105	10.9
	0.25	105	7.2	107	8.7
	4	112	1.5	113	0.9
HEMA	0.01	96	6.3	96	7.0
	0.25	100	0.9	102	1.8
	4	101	2.0	101	1.8
Corn Grain					
HEMA	0.01	97	5.0	99	5.5
	0.25	92	2.0	91	1.6
	4	94	2.4	94	2.9

Table 3 Recovery results for EMA and HEMA from in-study validations (quantification transition)

Analyte	Level (mg/kg)	No. of samples (n)	Mean recovery, %	RSD (%)
Cotton seed				
EMA	0.01	14	110	5.4
	0.25	6	97	2.2
	4	6	98	3.9
HEMA	0.01	14	105	5.3
	0.25	6	98	1.6
	4	6	102	1.8

Analyte	Level (mg/kg)	No. of samples (n)	Mean recovery, %	RSD (%)
Soya bean seed				
EMA	0.01	16	101	7.4
	0.25	6	105	4.9
	4	6	105	5.0
HEMA	0.01	16	111	4.4
	0.25	6	104	1.6
	4	6	110	3.2
Soya bean seed				
EMA	0.024	6	101	3.7
	0.24	6	114	2.1
	3.88	6	118	2.7
HEMA	0.024	6	87	8.0
	0.24	6	99	6.6
	3.86	6	90	10.7
Corn grain				
EMA	0.025	6	78	6.2
	0.05	6	94	4.8
	0.09	6	87	4.3
	0.25	6	97	10.0
HEMA	0.01	16	111	4.7
	0.025	6	108	2.8
	0.05	6	101	0.8
	0.09	6	103	3.1
	0.25	6	99	2.4
Alfalfa forage				
EMA	0.025	5	85.0	11.3
	4	5	103	8.9
HEMA	0.025	5	83.7	9.0
	4	5	86.1	5.6
Alfalfa hay				
EMA	0.025	5	86.2	10.3
	4	5	85.2	9.1
HEMA	0.025	5	80.7	9.7
	4	5	89.1	9.5

The calibration curves for both transitions of EMA and HEMA were linear with coefficient of determination (R^2) values of > 0.990 . A linear fit with $1/\times$ weighting was used. No significant interferences ($> 30\%$ of the LOQ) were observed within the retention window of any analyte in any matrix using the quantitation ion transition (precursor-to-product transition) except EMA in corn grain with an LOQ at 0.01 mg/kg. The LOQ and LOD for each EMA and HEMA quantitation transition for all the matrices are summarized in Table 4.

Table 4 LOD Values for EMA and HEMA from ME-1738-03

Matrix	Analyte (Precursor Ion/Product Ion) (amu)	LOQ (mg/kg)	LOD (mg/kg)
Cotton Seed ¹	EMA Primary (136/91)	0.01	0.0013
	EMA Secondary (136/119)	0.01	0.0023
	HEMA Primary (134/119)	0.01	0.0007
	HEMA Secondary (134/91)	0.01	0.0025
Corn Grain ^b	EMA Primary (136/91)	0.025	0.0041
	EMA Secondary (136/119)	NA	NA

Matrix	Analyte (Precursor Ion/Product Ion) (amu)	LOQ (mg/kg)	LOD (mg/kg)
	HEMA Primary (134/119)	0.01	0.0015
	HEMA Secondary (134/91)	0.01	0.0017
Soya bean seed ^a	EMA Primary (136/91)	0.01	0.0032
	EMA Secondary (136/119)	0.01	0.0036
	HEMA Primary (134/119)	0.01	0.0019
	HEMA Secondary (134/91)	0.01	0.0021
Soya bean seed ^b	EMA Primary (136/91)	0.025	0.0030
	HEMA Primary (134/119)	0.025	0.0056
Alfalfa forage ^b	EMA Primary (136/91)	0.025	0.0111
	EMA Secondary (136/119)	0.025	0.015
	HEMA Primary (134/119)	0.025	0.0086
	HEMA Secondary (134/91)	0.025	0.011
Alfalfa hay ^b	EMA Primary (136/91)	0.025	0.010
	EMA Secondary (136/119)	0.025	0.012
	HEMA Primary (134/119)	0.025	0.009
	HEMA Secondary (134/91)	0.025	0.0087

^a Pre-study data;

^b In-study data.

Method ME-2024 (Vogl, 2017) involves extraction of canola and soya bean matrices with 80% methanol in water, centrifugation and an aliquot of extract transferred to a vial containing EMA and HEMA internal standards and 50% sodium hydroxide solution. The vials are placed in a forced-air oven for at least 1 hour at approximately 95 °C to hydrolyse acetochlor residues, cooled to room temperature, and cold 50% formic acid added to quench the base. After vortexing the vials, a portion of the hydrolysed extract is filtered, centrifuged and submitted to quantification of EMA and HEMA by LC-MS/MS. The recovery results are shown in Table 5.

Table 5 Validation recovery results for EMA and HEMA in canola and soya bean seed (Method ME-2024)

Analyte	Fort. level (mg/kg)	No. of samples (n)	Quantitation Transition			Confirmation Transition		
			Recoveries (%)	Overall mean % ± std Dev	RSD (%)	Recoveries (%)	Overall mean % ± std Dev	RSD (%)
Canola Seed								
EMA	0.025	5	106, 94, 103, 100, 99	100 ± 4.5	4.5	108, 100, 97, 96, 108	102 ± 5.8	5.7
	0.25	5	98, 97, 93, 93, 94	95 ± 2.3	2.5	102, 97, 96, 95, 97	97 ± 2.7	2.8
HEMA	0.025	5	91, 90, 86, 91, 94	90 ± 2.9	3.2	85, 86, 87, 87, 82	85 ± 2.1	2.4
	0.25	5	95, 85, 83, 82, 83	86 ± 5.4	6.3	86, 85, 88, 91, 89	88 ± 2.4	2.7
Canola Meal								
EMA	0.025	5	85, 90, 85, 91, 80	86 ± 4.4	5.1	100, 87, 83, 86, 90	89 ± 6.5	7.3
	0.25	5	88, 88, 95, 87, 83	88 ± 4.3	4.9	89, 88, 93, 84, 79	87 ± 5.3	6.1
HEMA	0.025	5	83, 82, 83, 83, 87	84 ± 1.9	2.3	82, 87, 84, 89, 76	84 ± 5.0	6.0
	0.25	5	85, 82, 85, 81, 82	83 ± 1.9	2.3	85, 81, 78, 81, 85	82 ± 3.0	3.7
Canola Oil								
EMA	0.025	5	87, 86, 83, 84, 79	84 ± 3.1	3.7	92, 87, 90, 81, 83	87 ± 4.6	5.3
	0.25	5	102, 89, 88, 95, 98	94 ± 5.9	6.3	105, 87, 88, 94, 97	94 ± 7.3	7.8
HEMA	0.025	5	88, 95, 92, 90, 90	91 ± 2.6	2.9	84, 90, 87, 84, 87	86 ± 2.5	2.9
	0.25	5	92, 86, 82, 88, 89	87 ± 3.7	4.3	95, 85, 82, 88, 89	88 ± 4.9	5.5
Soya bean Seed								
EMA	0.025	5	80, 75, 85, 92, 92	85	8.8	88, 98, 93, 88, 92	92	4.5

Analyte	Fort. level (mg/kg)	No. of samples (n)	Quantitation Transition			Confirmation Transition		
			Recoveries (%)	Overall mean % \pm std Dev	RSD (%)	Recoveries (%)	Overall mean % \pm std Dev	RSD (%)
	0.25	5	84, 83, 82, 82, 92	85	5.0	84, 82, 83, 82, 94	85	6.0
HEMA	0.025	5	84, 92, 91, 93, 90	90	3.9	76, 87, 98, 91, 87	88	9.1
	0.25	5	77, 78, 79, 81, 84	80	3.5	78, 80, 81, 85, 84	82	3.5

All calibration curves (0.0075 to 4.0 mg/kg) used linear regression with 1/x weighting and had coefficients of determination (R^2) higher than 0.99. In general, no significant interferences (> 30% of the LOQ) were observed for EMA or HEMA for all matrices across all transitions, and no significant biases from matrix effects were observed. The LOQ for both EMA and HEMA was determined to be 0.025 mg/kg and the LOD was calculated as the standard deviation multiplied by the one-tailed t-test at 99% confidence for n-1 degrees of freedom, where n is equal to the number of replicates, as shown in Table 6.

Table 6 LOD calculations for EMA and HEMA

Matrix	Canola Seed		Canola Meal		Canola Oil		Soya bean Seed	
	Std Dev (s)	LOD ($s \times t_{0.99}$)	Std Dev (s)	LOD ($s \times t_{0.99}$)	Std Dev (s)	LOD ($s \times t_{0.99}$)	Std Dev (s)	LOD ($s \times t_{0.99}$)
EMA m/z 136/91	0.00114	0.00427	0.000532	0.00199	0.000774	0.00290	0.00275	0.0103
EMA m/z 136/77	0.00146	0.00546	NA	NA	0.00112	0.00420	0.00200	0.00748
HEMA m/z 134/119	0.000740	0.00277	0.000697	0.00261	0.000663	0.00248	0.000671	0.00251
HEMA m/z 134/115	0.000546	0.00205	0.00129	0.00485	0.000563	0.00211	0.00132	0.00496
EMA m/z 136/91	0.00181	0.00679	0.00107	0.00402	0.000911	0.00341	0.00190	0.00713
EMA m/z 136/77	0.000983	0.00368	0.00167	0.00624	0.00146	0.00547	0.00106	0.00398
HEMA m/z 134/119	0.000780	0.00292	0.000457	0.00171	0.000537	0.00201	0.000923	0.00346
HEMA m/z 134/115	0.00193	0.00724	0.00127	0.00476	0.00105	0.00395	0.00199	0.00746

Data from an independent laboratory validation (ILV) of method ME-2024 was also submitted (Bending & Przybylek, 2018), confirming the satisfactory performance and LOQ of 0.025 mg/kg for both EMA and HEMA (expressed as acetochlor equivalents).

Stability of pesticide residues in stored analytical samples

The stability of acetochlor incurred residues in the soya bean samples after more than eight years of frozen storage was estimated based on the analysis conducted when the study was performed (2007) and in 2016. The results are shown in Table 7.

Table 7 Comparison of incurred residues in treated soya bean seed obtained in the 2016 study (MSL0029938) with those obtained in the 2007 study (MSL0020719)

Sample site	EMA			HEMA			EMA + HEMA		
	2007	2016	% remaining	2007	2016	% remaining	2007	2016	% remaining
AR-1	0.193	0.221	115	0.056	0.082	146	0.249	0.303	122
IA-4	0.212	0.289	136	0.072	0.098	136	0.284	0.387	136
IL-2	0.157	0.191	122	0.058	0.094	162	0.215	0.285	133
IL-3	0.192	0.193	100	0.083	0.125	151	0.275	0.318	116
LA	0.283	0.331	117	0.099	0.126	127	0.381	0.457	120
MN-2	0.117	0.161	138	0.047	0.063	134	0.163	0.224	137
MO	0.177	0.228	129	0.061	0.090	148	0.239	0.318	133
NC	0.101	0.124	123	0.038	0.063	166	0.138	0.187	136

	Average	122	Average	146	Average	129
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USE PATTERN

Acetochlor is registered for uses in a variety of food crops in various countries. GAP information relevant for this evaluation is shown in Table 8.

Table 8 Summary of Good Agricultural Practices for acetochlor in the USA using ground broadcast spray of micro-encapsulated formulation (359 g/L)

Crop	Application		Application rate per treatment			PHI (days)	Remarks
	growth stage (j)	number	kg ai/hL	water L/ha	kg ai/ ha		
Soya bean	Apply pre-plant, at-planting, or pre-emergence, and post-emergence, optimally at growth stage V2–V3, before reaching stage R2.	1–2	1.12 to 1.80	≥93.6	1.05 to 1.68	—	Do not exceed 3.36 kg ai/ha per year.
Alfalfa	Apply pre-plant, at-planting, or pre-emergence, and post-emergence (up to or at the 4th-trifoliolate stage [new stands], or following spring green-up [fall-planted or established stands], or between cuttings).	1–3	1.12 to 1.80	≥93.6	1.05 to 1.68	≥20	Do not exceed 3.36 kg ai/ha per year.

RESULTS OF SUPERVISED RESIDUE TRIALS ON CROPS

Soya bean

A study was conducted in 2007 with soya bean at 21 sites in the United States, stored under frozen conditions and analysed in 2016. The residues were demonstrated to be stable over the storage period. The results are shown in Table 9.

Table 9 Residues of acetochlor in soya bean seed from trials conducted in the USA in 2007 using 2 post-emergence applications of a microencapsulated formulation (Report MSL0029938). Residues are reported as acetochlor equivalents. Residues reported as < LOQ were considered at LOQ for the calculation of the total residues

Site code State Location	Crop variety	Application rate			Growth stage	Residues, mg/kg			DAT (days)
		kg ai/ha	water (L/ha)	kg ai/hL		EMA	HEMA	Total	
AR-1 Arkansas Crittenden	AG4403RR	1.69	130	1.30	V5 / R1-R2	0.061,	0.048,	0.109,	90
		1.67	131	1.28		0.081 (0.071)	0.058 (0.053)	0.138 (0.12)	
AR-2 Arkansas Jackson	JG55R505C	1.67	186	0.90	R2	0.147,	0.115,	0.262,	83
		1.71	191	0.90		0.118, (0.133)	0.101 (0.108)	0.219 (0.24)	
IA-1 Iowa Jefferson	Asgrow 3101	1.66	163	1.02	R1	0.026,	<0.025,	0.051,	90
		1.69	146	1.16		<0.025 (0.025)	<0.025 (<0.025)	<0.050 (0.05)	
IA-2 Iowa Wapello	AG 3802	1.65	149	1.11	R1	<0.025,	<0.025,	<0.050	97
		1.71	149	1.15		<0.025 (<0.025)	<0.025 (<0.025)	<0.050 (<0.05)	
IA-3 Iowa Dickinson	NK S19-L7	1.66	145	1.14	R1-R2	0.067,	0.030,	0.096	100
		1.70	191	0.89		0.086 (0.076)	0.035 (0.032)	0.121 (0.11)	
IA-4	92M52	1.68	180	0.94	R2	0.097,	0.076,	0.173	83

Site code State Location	Crop variety	Application rate			Growth stage	Residues, mg/kg			DAT (days)
		kg ai/ ha	water (L/ha)	kg ai/ hL		EMA	HEMA	Total	
Iowa Guthrie		1.67	178	0.94		0.084 (0.091)	0.076 (0.076)	0.161 (0.17)	
IL-1 Illinois Clinton	5N382 RR	1.68 1.68	183 132	0.92 1.27	R1-R2	0.591, 0.495 (0.543)	0.377, 0.355 (0.366)	0.968 0.850 (0.91)	80
IL-2 Illinois Clinton	NK 37N4	1.67 1.71	110 133	1.51 1.29	R1-R2	0.108, 0.120 (0.114)	0.078, 0.084 (0.081)	0.186 0.204 (0.20)	91
IL-3 Illinois Effingham	Trisler T-3463 RR	1.69 1.69	144 148	1.18 1.15	R2	0.105, 0.099 (0.102)	0.111, 0.097 (0.104)	0.216 0.196 (0.21)	73
IL-4 Illinois Stark	AG3101	1.73 1.69	153 146	1.13 1.16	R1-R2	0.124, 0.080 (0.102)	0.088, 0.077 (0.083)	0.212 0.158 (0.19)	78
IN-1 Indiana Parke	T-3463RR	1.70 1.71	146 143	1.17 1.20	R1	0.054, 0.097 (0.076)	0.057, 0.069 (0.063)	0.111 0.166 (0.14)	90
IN-2 Indiana Montgomery	T-3463RR	1.69 1.73	146 145	1.16 1.19	R1	0.048, 0.050 (0.049)	0.051, 0.060 (0.056)	0.099 0.110 (0.10)	93
LA Louisiana St. Landry	AG 5905	1.70 1.69	174 140	0.98 1.21	R2	0.237, 0.181 (0.209)	0.071, 0.087 (0.079)	0.308 0.268 (0.29)	77
MN-1 Minnesota Stearns	90M60-N201	1.69 1.65	152 148	1.12 1.11	R2	<0.025, <0.025 (<0.025)	<0.025, <0.025 (<0.025)	<0.050 <0.050 (<0.05)	86
MN-2 Minnesota Freeborn	Pioneer 91M30	1.68 1.66	151 142	1.12 1.17	R2	0.048, 0.061 (0.055)	0.062, 0.060 (0.061)	0.110 0.122 (0.12)	82
MO Missouri Adair	Asgrow AG3802	1.65 1.68	142 154	1.16 1.09	R1-R2	0.141, 0.163 (0.152)	0.062, 0.084 (0.073)	0.203 0.247 (0.23)	96
NC N. Carolina Wayne	NK 565-M3	1.68 1.68	172 120	0.98 1.40	R1, beginning to flower	0.195, 0.104 (0.150)	0.119, 0.081 (0.100)	0.314 0.185 (0.25)	103
NE Nebraska York	WW152201	1.33 1.69	140 187	0.95 0.90	BBCH 61, R-1	0.069, 0.073 (0.071)	0.125, 0.124 (0.125)	0.194 0.197 (0.20)	87
OH-1 Ohio Fayette	Crop Plan RC 3935	1.68 1.64	146 146	1.15 1.12	R1-R2	0.074, 0.077 (0.076)	0.071, 0.076 (0.074)	0.146 0.153 (0.15)	78
OH-2 Ohio Pickaway	Crows 3518 R	1.71 1.65	149 147	1.15 1.12	R1-R2	0.120, 0.081 (0.100)	0.142, 0.102 (0.122)	0.262 0.183 (0.22)	78
SC S. Carolina Barnwell	97M50	1.67 1.69	137 140	1.22 1.21	R2	0.232, 0.221 (0.227)	0.282, 0.278 (0.280)	0.514 0.499 (0.51)	99

Alfalfa

Residue trials were conducted in 2013 and 2014 at 14 major growing regions in the United States. Hay samples were cut at the same time as forage samples, but were air-dried to a moisture level of 10-20% before taken from the field. Acetochlor residues in alfalfa forage were reported on the samples as collected, on fresh weight basis. Treatments involved either a 1.7 kg ai/ha pre-emergence application followed by a 1.7 kg ai/ha application at the 4th trifoliolate stage, or a post-harvest application between cuttings. The results are showing in Table 10.

Table 10 Acetochlor residues in alfalfa forage and hay after a pre-emergence and/or post-emergence application in the United States in 2013/2014 (Study report MSL0027578) using microencapsulated formulation. Residues are reported as acetochlor equivalents.

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total	
01PA Pennsylvania DKA44-16RR	1.68 1.70	172.4 175.5	0.975 0.970	1) BBCH 00 bare soil pre- emergence 2) BBCH 14 4 th trifoliolate expanded	Forage 1 post app.	0.404, 0.368 (0.386)	0.136, 0.121 (0.129)	0.540, 0.489 (0.52)	49
					Forage 2 1 st regrowth	0.110, 0.182 (0.146)	0.088, 0.093 (0.091)	0.198, 0.275 (0.24)	81
					Forage 3 2 nd regrowth	0.112, 0.112 (0.112)	0.127, 0.112 (0.120)	0.239, 0.224 (0.23)	123
					Forage 4 3 rd regrowth	0.117, 0.107 (0.112)	0.119, 0.115 (0.117)	0.236, 0.222 (0.23)	158
	1.68 1.70	172.4 175.5	0.975 0.970	1) BBCH 00 bare soil pre- emergence 2) BBCH 14 4 th trifoliolate expanded	Hay 1 post app.	0.944, 0.931 (0.938)	0.342, 0.316 (0.329)	1.29, 1.25 (1.3)	51
					Hay 2 1 st regrowth	0.319, 0.327 (0.323)	0.281, 0.334 (0.308)	0.600, 0.661 (0.63)	84
					Hay 3 2 nd regrowth	0.358, 0.366 (0.362)	0.414, 0.376 (0.395)	0.772, 0.742 (0.76)	124
					Hay 4 3 rd regrowth	0.196, 0.239 (0.218)	0.267, 0.285 (0.276)	0.463, 0.524 (0.49)	160
01PA Pennsylvania DKA44-16RR	1.72	177.3	0.973	BBCH 14 4 th trifoliolate expanded	Forage 1	0.480, 0.441 (0.461)	0.197, 0.144 (0.171)	0.677, 0.585 (0.63)	49
					Hay 1 Post app	0.920, 0.870 (0.895)	0.307, 0.275 (0.291)	1.23, 1.15 (1.2)	51
	1.70	175.1	0.972	2) BBCH 11- first trifoliolate	Forage 2 Post app	0.536, 0.524 (0.530)	0.203, 0.187 (0.195)	0.739, 0.711 (0.73)	29
					Forage 3 1 st regr. ⁴	0.206, 0.247 (0.227)	0.180, 0.178 (0.179)	0.386, 0.425 (0.41)	71
					Forage 4 2 nd regr.	0.176, 0.155 (0.166)	0.162, 0.124 (0.143)	0.338, 0.279 (0.31)	106
	1.70	175.1	0.972	2) BBCH 11- first trifoliolate	Hay 2 Post app	1.33, 1.23 (1.28)	0.587, 0.562 (0.575)	1.92, 1.79 (1.9)	32
					Hay 3 1 st regr.	0.661, 0.616 (0.639)	0.587, 0.516 (0.552)	1.25, 1.13 (1.2)	72
					Hay 4 2 nd regr.	0.417, 0.364 (0.391)	0.395, 0.357 (0.376)	0.812, 0.721 (0.77)	106
2NJ New Jersey DKA44-16RR	1.76 1.76	191.1 171.8	0.920 1.02	1) Bare soil, pre-emergence 2) 4 th trifoliolate	Forage 1 post app.	0.134, 0.122 (0.128)	0.081, 0.099 (0.090)	0.215, 0.221 (0.22)	49
					Forage 2 1 st regrowth	0.109, 0.120 (0.115)	0.089, 0.081 (0.085)	0.198, 0.201 (0.20)	85
					Forage 3 2 nd regrowth	0.055, 0.064 (0.059)	0.060, 0.063 (0.061)	0.114, 0.127 (0.12)	125

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total	
	1.76 1.76	191.1 171.8	0.920 1.02	1) Bare soil, pre-emergence 2) 4 th trifoliolate	Forage 4 3 rd regrowth	0.103, 0.106 (0.105)	0.126, 0.139 (0.133)	0.229, 0.245 (0.24)	165
					Hay 1 post app.	0.306, 0.292 (0.299)	0.189, 0.203 (0.196)	0.495, 0.495 (0.50)	52
					Hay 2 1 st regrowth	0.306, 0.292 (0.299)	0.312, 0.280 (0.296)	0.618, 0.572 (0.60)	90
					Hay 3 2 nd regrowth	0.116, 0.135 (0.126)	0.160, 0.155 (0.158)	0.276, 0.290 (0.28)	129
					Hay 4 3 rd regrowth	0.255, 0.220 (0.238)	0.303, 0.318 (0.311)	0.558, 0.538 (0.55)	171
2NJ New Jersey DKA44-16RR	1.77	172.9	1.02	4 th trifoliolate	Forage 1	0.106, 0.100 (0.103)	0.077, 0.062 (0.069)	0.183, 0.162 (0.17)	49
					Forage 2 (1 st regr)	0.079, 0.086 (0.082)	0.086, 0.079 (0.082)	0.165, 0.165 (0.17)	85
	1.77	172.9	1.02	4 th trifoliolate	Hay 1 Post app	0.247, 0.271 (0.259)	0.147, 0.159 (0.153)	0.394, 0.430 (0.41)	52
					Hay 2 (1 st regrowth)	0.281, 0.248 (0.265)	0.289, 0.271 (0.280)	0.570, 0.519 (0.55)	90
	1.78	197.9	0.900	2 nd stubble/ cut 7/5/14	Forage 3 Post	0.233, 0.225 (0.229)	0.212, 0.221 (0.217)	0.445, 0.446 (0.45)	37
					Forage 4 1 st regrowth	0.238, 0.214 (0.226)	0.264, 0.257 (0.261)	0.502, 0.471 (0.49)	77
	1.78	197.9	0.900	2 nd stubble/ cut 7/5/14	Hay 3 Post app	0.646, 0.677 (0.662)	0.609, 0.547 (0.578)	1.26, 1.22 (1.2)	41
					Hay 4 1 st regrowth	0.596, 0.562 (0.579)	0.663, 0.652 (0.658)	1.26, 1.21 (1.2)	83
03IL Illinois DKA44-16RR	1.70 1.71	182.2 105.8	0.934 1.62	1) BBCH 00 - bare soil pre- emergence 2) BBCH 13	Forage 1 post app.	0.526, 0.665, 0.582, 0.589 (0.591)	0.084, 0.157, 0.122, 0.162 (0.131)	0.610, 0.822, 0.704, 0.751 (0.72)	38
					Forage 2 1 st regrowth	0.092, 0.101 (0.096)	0.124, 0.120 (0.122)	0.216, 0.221 (0.22)	73
					Forage 3 2 nd regrowth	0.052, 0.075 (0.064)	0.084, 0.105 (0.094)	0.136, 0.180 (0.16)	117
					Forage 4 3 rd regrowth	0.050, 0.056 (0.053)	0.059, 0.067 (0.063)	0.109, 0.122 (0.12)	146
				1) BBCH 00 - bare soil pre- emergence 2) BBCH 13	Hay 1 post app.	0.813, 0.827 (0.820)	0.174, 0.223 (0.199)	0.987, 1.05 (1.0)	40
					Hay 2 1 st regrowth	0.142, 0.193 (0.168)	0.187, 0.246 (0.217)	0.329, 0.439 (0.38)	75
					Hay 3	0.114,	0.177,	0.291,	122

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total	
					2 nd regrowth	0.099 (0.106)	0.164 (0.171)	0.263 (0.28)	
					Hay 4 3 rd regrowth	0.108, 0.046 (0.077)	0.157, 0.078 (0.117)	0.265, 0.124 (0.19)	150
03IL Illinois DKA44-16RR	1.75	107.9	1.62	BBCH 13	Forage 1	0.191, 0.230 (0.211)	0.089, 0.083 (0.086)	0.280, 0.313 (0.30)	38
					Hay 1 Post app	0.363, 0.540 (0.452)	0.160, 0.190 (0.175)	0.523, 0.730 (0.63)	40
	1.64	113.5	1.44	BBCH 29	Forage 2 Post app	2.59, 1.81 (2.20)	0.848, 0.615 (0.732)	3.44, 2.43 (2.9)	20
					BBCH 29	Forage 3 1 st regrowth	0.142, 0.157 (0.150)	0.184, 0.178 (0.181)	0.326, 0.335 (0.33)
				BBCH 29	Forage 4 2 nd regrowth	0.106, 0.139 (0.123)	0.120, 0.115 (0.118)	0.226, 0.265 (0.24)	93
				BBCH 29	Hay 2 Post app	3.84, 2.87 (3.36)	1.13, 0.909 (1.02)	4.97, 3.78 (4.4)	22
				BBCH 29	Hay 3 1 st regrowth	0.386, 0.357 (0.372)	0.387, 0.370 (0.379)	0.773, 0.727 (0.75)	69
BBCH 29	Hay 4 2 nd regrowth	0.151, 0.169 (0.160)	0.218, 0.210 (0.214)	0.369, 0.379 (0.37)	97				
04WI Wisconsin DKA44-16RR	1.67 1.68	179.8 185.7	0.928 0.905	1) Premerger. 2) 4 th trifoliolate	Forage 1 post app.	0.143, 0.305, 0.095, 0.101 (0.161)	0.058, 0.071 (0.065)	0.177, 0.274 (0.23)	50
					Forage 2 1 st regrowth	0.148, 0.177 (0.163)	0.098, 0.110 (0.104)	0.246, 0.287 (0.27)	84
					Forage 3 2 nd regrowth	0.190, 0.179 (0.185)	0.092, 0.103 (0.098)	0.282, 0.282 (0.28)	119
					Forage 4 3 rd regrowth	0.140, 0.133 (0.137)	0.139, 0.133 (0.136)	0.279, 0.266 (0.27)	172
	1.67 1.68	179.8 185.7	0.928 0.905	1) Premerger. 2) 4 th trifoliolate	Hay 1 post app. (2 apps.)	0.463, 0.318 (0.391)	0.216, 0.143 (0.180)	0.679, 0.461 (0.57)	57
					Hay 2 1 st regrowth	0.302, 0.290 (0.296)	0.247, 0.245 (0.246)	0.549, 0.535 (0.54)	92
					Hay 3 2 nd regrowth	0.332, 0.421 (0.377)	0.238, 0.309 (0.274)	0.570, 0.730 (0.65)	125
Hay 4 3 rd regrowth					0.317, 0.301 (0.309)	0.309, 0.302 (0.306)	0.626, 0.603 (0.62)	179	
4WI Wisconsin DKA44-16RR	1.68	185.7	0.905	4 th trifoliolate	Forage 1	0.110, 0.116 (0.113)	0.060, 0.049 (0.055)	0.170, 0.165 (0.17)	50
	1.68	185.7	0.905	4 th trifoliolate	Hay 1	0.261,	0.134,	0.395,	57

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)	
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total		
					Post app	0.226 (0.244)	0.122 (0.128)	0.348 (0.37)		
	1.68 1.67	185.7 184.5	0.905 0.905	7 days after 1 st cutting	Forage 2 Post app	0.283, 0.283 (0.283)	0.118, 0.147 (0.133)	0.401, 0.430 (0.42)	27	
					Forage 3 1 st regrowth	0.208, 0.195 (0.202)	0.108, 0.109 (0.109)	0.316, 0.304 (0.31)	62	
					Forage 4 2 nd regrowth	0.243, 0.210 (0.227)	0.242, 0.215 (0.229)	0.485, 0.425 (0.46)	115	
	1.68 1.67	185.7 184.5	0.905 0.905	7 days after 1 st cutting	Hay 2 Post app	0.917, 1.24 (1.08)	0.410, 0.398 (0.404)	1.33, 1.64 (1.5)	35	
					Hay 3 1 st regrowth	0.530, 0.398 (0.464)	0.296, 0.331 (0.314)	0.826, 0.729 (0.78)	68	
					Hay 4 2 nd regrowth	0.423, 0.374 (0.399)	0.343, 0.298 (0.321)	0.766, 0.672 (0.72)	122	
	05IA Iowa DKA44-16RR	1.68 1.68	174.1 160.9	0.965 1.04	1) BBCH 00 2) BBCH 14	Forage 1 post app.	0.150, 0.159 (0.155)	0.129, 0.135 (0.132)	0.279, 0.294 (0.29)	51
						Forage 2 1 st regrowth	0.077, 0.070 (0.074)	0.052, 0.037 (0.045)	0.129, 0.108 (0.12)	84
						Forage 3 2 nd regrowth	0.152, 0.133 (0.143)	0.107, 0.099 (0.103)	0.259, 0.232 (0.25)	123
					Forage 4 3 rd regrowth	0.179, 0.198 (0.189)	0.145, 0.160 (0.153)	0.324, 0.358 (0.34)	162	
					Hay 1 post app.	0.611, 0.540 (0.576)	0.430, 0.409 (0.420)	1.04, 0.949 (0.99)	55	
					Hay 2 1 st regrowth	0.098, 0.212 (0.155)	0.074, 0.147 (0.111)	0.173, 0.359 (0.27)	86	
					Hay 3 2 nd regrowth	0.388, 0.409 (0.399)	0.282, 0.261 (0.272)	0.670, 0.670 (0.67)	126	
					Hay 4 3 rd regrowth	0.440, 0.490 (0.465)	0.355, 0.411 (0.383)	0.795, 0.901 (0.85)	164	
05IA Iowa DKA44-16RR	1.68	160.3	1.05	BBCH 14	Forage 1	0.125, 0.126 (0.126)	0.079, 0.084 (0.082)	0.204, 0.210 (0.21)	51	
				BBCH 14	Forage 2 (1 st regrowth)	0.146, 0.091 (0.118)	0.078, 0.076 (0.077)	0.224, 0.166 (0.19)	84	
	1.68	177.1	0.949	BBCH 14	Hay 1 Post app	0.528, 0.526 (0.527)	0.264, 0.282 (0.273)	0.792, 0.808 (0.80)	55	
					Hay 2 (1 st regrowth)	0.393, 0.338 (0.366)	0.281, 0.245 (0.263)	0.674, 0.583 (0.63)	86	
	1.68	177.1	0.949	BBCH 13	Forage 3 Post app	0.391, 0.460 (0.426)	0.146, 0.161 (0.154)	0.537, 0.621 (0.58)	28	
					Forage 4	0.294,	0.193,	0.487,	67	

Acetochlor

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total	
	1.68	177.1	0.949	BBCH 13	1 st regrowth	0.239 (0.267)	0.184 (0.189)	0.423 (0.46)	
					Hay 3 Post app	1.46, 1.47 (1.47)	0.551, 0.644 (0.598)	2.01, 2.11 (2.1)	31
					Hay 4 1 st regrowth	0.758, 0.748, 0.645, 0.585, 0.895 (0.731)	0.563, 0.419, 0.507 (0.499)	1.24, 1.22 (1.2)	69
06MN Minnesota DKA44-16RR	1.70 1.66	157.6 131.2	1.08 1.26	1) 0	Forage 1 post app.	0.674, 0.891 (0.783)	0.285, 0.302 (0.294)	0.959, 1.19 (1.1)	24
					Forage 2 1 st regrowth	0.182, 0.197 (0.190)	0.128, 0.152 (0.140)	0.310, 0.349 (0.33)	69
					Forage 3 2 nd regrowth	0.072, 0.071 (0.071)	0.090, 0.071 (0.081)	0.162, 0.142 (0.15)	127
				2) 4 th trifoliolate	Hay 1 post app.	1.39, 1.54 (1.47)	0.508, 0.548 (0.528)	1.90, 2.09 (2.0)	28
					Hay 2 1 st regrowth	0.368, 0.424 (0.396)	0.299, 0.331 (0.315)	0.667, 0.755 (0.71)	75
					Hay 3 2 nd regrowth	0.081, 0.078 (0.080)	0.089, 0.089 (0.089)	0.171, 0.167 (0.17)	133
06MN Minnesota DKA44-16RR	1.69	133.2	1.26	4 th trifoliolate	Forage 1	0.577, 0.534 (0.556)	0.206, 0.198 (0.202)	0.783, 0.732 (0.76)	24
				4 th trifoliolate	Hay 1 Post app (1 app)	1.31, 1.29 (1.30)	0.455, 0.442 (0.449)	1.77, 1.73 (1.8)	28
06MN Minnesota DKA44-16RR	1.69	138.3	1.22	2) regrowth (1-3 inches)	Forage 2 Post app	0.472, 0.401 (0.437)	0.219, 0.187 (0.203)	0.691, 0.588 (0.64)	39
					Forage 3 1 st regrowth	0.109, 0.093 (0.101)	0.145, 0.153 (0.149)	0.254, 0.246 (0.25)	97
	1.69	138.3	1.22	2) regrowth (1-3 inches)	Hay 2 Post app (2 apps)	0.928, 0.693 (0.811)	0.422, 0.328 (0.375)	1.35, 1.02 (1.2)	45
					Hay 3 1 st regrowth	0.143, 0.148 (0.146)	0.208, 0.200 (0.204)	0.351, 0.348 (0.35)	103
07MO Missouri DKA44-16RR	1.69	175	0.965	1) Seeded - pre-emergence 2) BBCH 14	Forage 1 post app.	0.108, 0.075 (0.092)	0.096, 0.065 (0.080)	0.204, 0.140 (0.17)	49
					Forage 2 1 st regrowth	0.134, 0.153 (0.144)	0.102, 0.125 (0.114)	0.236, 0.278 (0.26)	80
					Forage 3 2 nd regrowth	0.127, 0.133 (0.130)	0.152, 0.161 (0.157)	0.279, 0.294 (0.29)	119
					Forage 4 3 rd regrowth	0.062, 0.060 (0.061)	0.044, 0.054 (0.049)	0.106, 0.113 (0.11)	161
	1.69	175	0.965		Hay 1	0.315, 0.268, 0.583,			53

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total	
				1) Seeded - pre-emergence 2) BBCH 14	post app.	0.246 (0.281)	0.218 (0.243)	0.464 (0.52)	
					Hay 2 1 st regrowth	0.347, 0.291 (0.319)	0.310, 0.260 (0.285)	0.657, 0.551 (0.60)	82
					Hay 3 2 nd regrowth	0.322, 0.286 (0.304)	0.420, 0.353 (0.387)	0.742, 0.639 (0.69)	120
					Hay 4 3 rd regrowth	0.161, 0.153 (0.157)	0.160, 0.158 (0.159)	0.321, 0.311 (0.32)	164
07MO Missouri DKA44-16RR	1.69	176.0	0.961	BBCH 14	Forage 1	0.115, 0.091 (0.103)	0.070, 0.057 (0.063)	0.185, 0.148 (0.17)	49
					Forage 2 (1 st regrowth)	0.141, 0.130 (0.136)	0.111, 0.103 (0.107)	0.252, 0.233 (0.24)	80
					Hay 1 Post app	0.257, 0.174 (0.216)	0.137, 0.123 (0.130)	0.394, 0.297 (0.35)	53
					Hay 2 (1 st regrowth)	0.344, 0.374 (0.359)	0.329, 0.345 (0.337)	0.673, 0.719 (0.70)	82
	1.68	176.6	0.951	BBCH 22	Forage 3 Post app	3.76, 4.56 (4.16)	1.45, 1.78 (1.62)	5.21, 6.34 (5.8)	24
					Forage 4 1 st regrowth	0.257, 0.213 (0.235)	0.179, 0.161 (0.170)	0.436, 0.374 (0.41)	66
	1.68	176.6	0.951	BBCH 22	Hay 3 Post app	9.81, 8.67 (9.24)	3.38, 4.04 (3.71)	13.2, 12.7 (13.0)	25
					Hay 4 1 st regr.	0.926, 0.891 (0.909)	0.645, 0.636 (0.641)	1.57, 1.53 (1.6)	69
08NE Nebraska DKA44-16RR	1.67 1.69	192.4 177.7	0.867 0.952	1) BBCH 0 2) BBCH 14	Forage 1 post app.	0.056, 0.122 (0.089)	0.049, 0.127 (0.088)	0.105, 0.249 (0.18)	57
					Forage 2 1 st regrowth	0.266, 0.196 (0.231)	0.174, 0.142 (0.158)	0.440, 0.338 (0.39)	91
					Forage 3 2 nd regrowth	0.249, 0.284 (0.267)	0.160, 0.205 (0.183)	0.409, 0.489 (0.45)	122
					Forage 4 3 rd regrowth	0.071, 0.050 (0.060)	0.068, 0.058 (0.063)	0.139, 0.109 (0.12)	156
					Hay 1 post app.	0.560, 0.662 (0.611)	0.418, 0.473 (0.446)	0.978, 1.14 (1.1)	62
					Hay 2 1 st regrowth	0.560, 0.554 (0.557)	0.513, 0.438 (0.476)	1.07, 0.992 (1.0)	97
					Hay 3 2 nd regrowth	0.763, 0.784 (0.774)	0.740, 0.812 (0.776)	1.50, 1.60 (1.6)	132
					Hay 4 3 rd regrowth	0.281, 0.219 (0.250)	0.330, 0.260 (0.295)	0.611, 0.479 (0.55)	167
08NE	1.69	178.1	0.950	BBCH 14	Forage 1	0.077,	0.065,	0.143,	57

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)				
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total					
Nebraska DKA44-16RR	1.68	177.9	0.944			0.064 (0.071)	0.059 (0.062)	0.123 (0.13)					
					Forage 2 (1 st regrowth)	0.110, 0.112 (0.111)	0.090, 0.091 (0.090)	0.200, 0.203 (0.20)	91				
					Hay 1 Post app	0.306, 0.340 (0.323)	0.185, 0.229 (0.207)	0.491, 0.569 (0.53)	62				
					Hay 2 (1 st regrowth)	0.382, 0.358 (0.370)	0.318, 0.326 (0.322)	0.700, 0.684 (0.69)	97				
				2) BBCH 24	Forage 3 Post app	0.579, 0.556 (0.568)	0.269, 0.232 (0.251)	0.848, 0.788 (0.82)	24				
				Forage 4 1 st regrowth	0.092, 0.094 (0.093)	0.109, 0.085 (0.097)	0.201, 0.179 (0.19)	58					
				Hay 3 Post app	1.83, 1.58 (1.71)	1.15, 1.09 (1.12)	2.98, 2.67 (2.8)	34					
				1) BBCH 14 2) BBCH 24	Hay 4 1 st regrowth	0.379, 0.391 (0.385)	0.434, 0.401 (0.418)	0.813, 0.792 (0.80)	69				
				09IN Indiana DKA44-16RR	1.72 1.69	160.2 151.8	1.08 1.11	1) BBCH 0 2) BBCH 09	Forage 1 post app.	0.251, 0.173, 0.276, 0.239 (0.235)	0.208, 0.151, 0.207, 0.182 (0.187)	0.459, 0.324, 0.483, 0.421 (0.42)	42
									Forage 2 1 st regrowth	0.248, 0.227 (0.238)	0.243, 0.225 (0.234)	0.491, 0.452 (0.47)	83
					Forage 3 2 nd regrowth	0.126, 0.110 (0.118)	0.175, 0.161 (0.168)	0.301, 0.271 (0.29)	176				
					Hay 1 post app.	0.656, 0.755 (0.706)	0.533, 0.559 (0.546)	1.19, 1.31 (1.3)	46				
					Hay 2 1 st regrowth	0.687, 0.754 (0.721)	0.750, 0.771 (0.761)	1.44, 1.53 (1.5)	86				
					Hay 3 2 nd regrowth	0.224, 0.252 (0.238)	0.359, 0.385 (0.372)	0.583, 0.637 (0.61)	180				
09IN Indiana DKA44-16RR	1.70	152.8	1.114	BBCH 09	Forage 1	0.178, 0.179 (0.179)	0.091, 0.105 (0.098)	0.269, 0.284 (0.28)	42				
					Forage 2 (1 st regrowth)	0.179, 0.162 (0.171)	0.165, 0.140 (0.153)	0.344, 0.302 (0.32)	83				
				BBCH 09	Hay 1 Post app	0.735, 0.549 (0.642)	0.257, 0.224 (0.241)	0.992, 0.773 (0.88)	46				
					Hay 2 (1 st regr.)	0.458, 0.552 (0.505)	0.394, 0.579 (0.487)	0.852, 1.13 (0.99)	86				
				2) BBCH 09	Forage 3 Post app	0.249, 0.313 (0.281)	0.190, 0.203 (0.197)	0.439, 0.516 (0.48)	92				
				1) BBCH 09	Hay 3 Post app	0.887, 0.876	0.477, 0.504	1.36, 1.38	96				

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)	
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total		
10SD South Dakota DKA44-16RR	1.69 1.77	118.5 136.8	1.43 1.2	1) Pre-emerg. 2) BBCH 13	(2 apps)	(0.882)	(0.491)	(1.4)		
					Forage 1 post app.	3.45, 3.40 (3.43)	0.514, 0.558 (0.536)	3.96, 3.96 (4.0)	23	
					Forage 2 1 st regrowth	0.348, 0.462 (0.405)	0.078, 0.079 (0.079)	0.426, 0.541 (0.48)	50	
					Forage 3 2 nd regrowth	0.374, 0.324 (0.349)	0.103, 0.095 (0.099)	0.477, 0.419 (0.45)	74	
	1.69 1.77	118.5 136.8	1.43 1.2	1) Pre-emerg. 2) BBCH 13	Forage 4 3 rd regrowth	0.159, 0.144 (0.152)	0.130, 0.106 (0.118)	0.289, 0.250 (0.27)	112	
					Hay 1 post app.	4.17, 5.82 (5.00)	1.93, 1.81 (1.87)	5.98, 7.75 (6.9)	25	
					Hay 2 1 st regrowth	1.38, 1.67 (1.53)	0.339, 0.414 (0.377)	1.72, 2.08 (1.9)	53	
					Hay 3 2 nd regrowth	0.456, 0.397 (0.427)	0.347, 0.307 (0.327)	0.803, 0.704 (0.75)	77	
	10SD South Dakota DKA44-16RR	1.74	134.4	1.29	1) BBCH 13	Hay 4 3 rd regrowth	0.339, 0.436 (0.388)	0.415, 0.471 (0.443)	0.754, 0.907 (0.83)	116
						Forage 1	3.72, 4.20 (3.96)	0.583, 0.799 (0.691)	4.30, 5.00 (4.7)	23
1.74		134.4	1.29	1) BBCH 13	Hay 1 Post app	4.38, 3.74, 4.80 (4.43)	1.18, 1.24 (1.21)	5.30, 5.98 (5.6)	25	
					1.74	134.4	1.29	2) BBCH 11	Forage 2 Post app	1.40, 1.65 (1.53)
Forage 3 1 st regrowth		0.495, 0.447 (0.471)	0.129, 0.120 (0.125)	0.624, 0.567 (0.60)					45	
Forage 4 2 nd regrowth		0.171, 0.203 (0.187)	0.141, 0.154 (0.148)	0.312, 0.357 (0.34)					83	
Hay 2 Post app		1.86, 2.27 (2.07)	0.690, 0.809 (0.750)	2.55, 3.08 (2.8)					24	
1.74		134.4	1.29	2) BBCH 11	Hay 3 1 st regrowth	0.976, 0.951 (0.964)	0.526, 0.534 (0.530)	1.50, 1.49 (1.5)	48	
	Hay 4 2 nd regrowth				0.535, 0.747 (0.641)	0.476, 0.590 (0.533)	1.01, 1.34 (1.2)	87		
11NE Nebraska DKA44-16RR	1.68 1.66	177.4 174.6	0.95 0.95	1) 0 2) BBCH 14	Forage 1 post app.	0.457, 0.587 (0.522)	0.406, 0.454 (0.430)	0.863, 1.04 (0.95)	58	
					Forage 2 1 st regrowth	0.225, 0.180 (0.203)	0.147, 0.109 (0.128)	0.372, 0.289 (0.33)	86	
					Forage 3 2 nd regrowth	0.204, 0.228	0.093, 0.115	0.297, 0.343	112	

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total	
						(0.216)	(0.104)	(0.32)	
					Forage 4 3 rd regrowth	0.127, 0.117 (0.122)	0.063, 0.073 (0.068)	0.190, 0.190 0.190	142
	1.68 1.66	177.4 174.6	0.95 0.95	1) 0 2) BBCH 14	Hay 1 post app. (2 apps.)	1.26, 1.37 (1.32)	0.853, 0.911 (0.882)	2.11, 2.28 (2.2)	62
					Hay 2 1 st regrowth	0.523, 0.574 (0.549)	0.711, 0.628 (0.670)	1.23, 1.20 (1.2)	93
					Hay 3 2 nd regrowth	0.650, 0.556 (0.603)	0.485, 0.438 (0.462)	1.14, 0.994 (1.1)	115
					Hay 4 3 rd regrowth	0.444, 0.470 (0.457)	0.399, 0.353 (0.376)	0.843, 0.823 (0.83)	150
11NE Nebraska DKA44-16RR	1.69	178.1	0.95	BBCH 14	Forage 1	0.417, 0.389 (0.403)	0.314, 0.313 (0.314)	0.731, 0.702 (0.72)	58
					Forage 2 (1 st regrowth)	0.195, 0.177 (0.186)	0.141, 0.136 (0.139)	0.336, 0.313 (0.33)	86
	1.69	178.1	0.95	BBCH 14	Hay 1 Post app (1 app)	0.709, 0.857 (0.783)	0.451, 0.495 (0.473)	1.16, 1.35 (1.3)	62
					Hay 2 (1 st regrowth)	0.386, 0.335 (0.361)	0.514, 0.499 (0.507)	0.900, 0.834 (0.87)	93
	1.68	141. 3	1.19	2) BBCH 25	Forage 3 Post app	2.02, 1.74 (1.88)	0.560, 0.584 (0.572)	2.58, 2.32 (2.5)	19
					Forage 4 1 st regrowth	0.296, 0.254 (0.280)	0.189, 0.168 (0.179)	0.485, 0.422 (0.45)	49
					Hay 3 Post app	3.11, 3.38 (3.25)	1.31, 1.50 (1.41)	4.42, 4.88 (4.7)	22
					Hay 4 1 st regrowth	0.854, 0.880 (0.867)	0.671, 0.836 (0.754)	1.53, 1.72 (1.6)	57
12UT Utah DKA44-16RR	1.67 1.66	171.3 175.1	0.974 0.947	1) BBCH 0 2) BBCH 14	Forage 1 post app. (2 apps.)	0.135, 0.135 (0.135)	0.067, 0.071 (0.069)	0.202, 0.206 (0.20)	38
					Forage 2 1 st regrowth	0.176, 0.062 (0.119)	<0.025, <0.025 (<0.025)	0.201, 0.087 (0.14)	72
					Forage 3 2 nd regrowth	<0.025, <0.025 (<0.025)	<0.025, <0.025 (<0.025)	<0.050, <0.050 (<0.05)	108
					Hay 1 post app. (2 apps.)	0.398, 0.396 (0.397)	0.303, 0.289 (0.296)	0.701, 0.685 (0.69)	44
					Hay 2 1 st regrowth	0.194, 0.152 (0.173)	0.140, 0.136 (0.138)	0.334, 0.288 (0.31)	79
					Hay 3 2 nd regrowth	0.076, 0.068 (0.072)	0.078, 0.074 (0.076)	0.153, 0.143 (0.15)	114
	1.70	178.5	0.954	BBCH 14	Forage 1	0.071, 0.079	0.028, 0.029	0.099, 0.108	38

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total	
						(0.075)	(0.028)	(0.10)	
	1.70	178.5	0.954	BBCH 14	Hay 1 Post app (1 app)	0.218, 0.270 (0.244)	0.135, 0.146 (0.141)	0.353, 0.416 (0.39)	44
12UT Utah DKA44-16RR	1.70	178.5	0.954	1) BBCH 14	Forage 2	0.114,	0.036,	0.150,	31
	1.69	173.3	0.976	2) BBCH 12	Post app (2 apps)	0.145 (0.130)	0.054 (0.045)	0.199 (0.17)	
					Forage 3 1 st regrowth	0.027, 0.034 (0.031)	<0.025, <0.025 (<0.025)	0.050, 0.055 (0.05)	67
					Hay 2 Post app	0.331, 0.418 (0.370)	0.234, 0.336 (0.285)	0.565, 0.744 (0.66)	38
					Hay 3 1 st regrowth	0.133, 0.123 (0.128)	0.136, 0.139 (0.138)	0.269, 0.262 (0.27)	73
13CA California RR841	1.70	148.4	1.15	1)Pre- emergence 2) Mid- vegetative	Forage 1	0.463,	0.139,	0.602,	39
	1.67	140.5	1.19		post app.	1.01, 0.415, 1.08 (0.742)	0.336, 0.180, 0.433 (0.272)	1.35, 0.595, 1.51 (1.0)	
					Forage 2 1 st regrowth	0.071, 0.267, 0.078, 0.228 (0.161)	0.043, 0.243, 0.045, 0.259 (0.147)	0.119, 0.499, 0.124, 0.487 (0.31)	82
					Forage 3 2 nd regrowth	0.222, 0.279 (0.251)	0.133, 0.153 (0.143)	0.355, 0.432 (0.39)	116
	1.70	148.4	1.15	1)Pre- emergence 2) Mid- vegetative	Hay 1 post app.	3.17, 0.62, 2.31, 0.499 (1.65)	0.912, 0.358, 0.878, 0.355 (0.626)	3.64, 0.916 (2.3)	48
	1.67	140.5	1.19		Hay 2 1 st regrowth	0.647, 0.498 (0.573)	0.528, 0.384 (0.456)	1.18, 0.882 (1.0)	90
					Hay 3 2 nd regrowth	0.269, 0.385 (0.327)	0.327, 0.362 (0.345)	0.596, 0.747 (0.67)	125
	13CA California RR841	1.68	141.9	1.18	Mid-vegetative	Forage 1	0.366, 0.744, 0.361, 0.907 (0.595)	0.218, 0.278, 0.235, 0.372 (0.276)	0.584, 1.022, 0.596, 1.279 (0.87)
Mid-vegetative					Forage 2 (1 st regrowth)	0.302, 0.303 (0.303)	0.240, 0.224 (0.232)	0.542, 0.527 (0.54)	82
1.68		141.9	1.18	Mid-vegetative	Hay 1 Post app	1.88, 4.49, 1.65, 4.23 (3.06)	0.644, 1.21, 0.693, 1.38 (0.982)	2.52, 5.70, 2.34, 5.61 (4.0)	48
				Mid-vegetative	Hay 2 (1 st regrowth)	0.635, 0.232, 0.754, 0.277 (0.540)	0.828, 0.295, 0.670, 0.245 (0.510)	1.46, 0.527, 1.42, 0.522 (0.99)	90
13CA California	1.68	141.9	1.18	1) Mid- vegetative	Forage 3	0.506,	0.166,	0.672,	25
	1.68	148.8	1.13	Post app	1.07,	0.256,	1.33,		

Site code State, variety, Treatment	Application rate			Growth stage	Commodity analysed	Residues (mg/kg)			DAT (days)
	kg ai/ ha	water (L/ha)	kg ai/ hL			EMA	HEMA	Total	
RR841				2) Mid-vegetative	(2 apps)	0.401, 0.874 (0.713)	0.169, 0.229 (0.205)	0.570, 1.10 (0.92)	
				1) Mid-vegetative 2) Mid-vegetative	Forage 4 1 st regrowth	0.048, 0.042 (0.045)	0.055, 0.033 (0.044)	0.103, 0.074 (0.09)	67
	1.68 1.68	141.9 148.8	1.18 1.13	1) Mid-vegetative 2) Mid-vegetative	Hay 3 Post app (2 apps)	3.46, 4.29 (3.88)	1.03, 1.23 (1.13)	4.49, 5.52 (5.0)	34
14WA Washington DKA44-16RR	1.68 1.68	140.8 140.5	1.19 1.20	1) Pre-emerg. 2) BBCH 14	Forage 1 post app. (2 apps.)	0.374, 0.391 (0.383)	0.396, 0.451 (0.424)	0.770, 0.842 (0.81)	70
					Forage 2 1 st regrowth	0.161, 0.198 (0.180)	0.163, 0.166 (0.165)	0.324, 0.364 (0.34)	112
					Forage 3 2 nd regrowth	0.159, 0.155 (0.157)	0.108, 0.101 (0.105)	0.267, 0.256 (0.26)	145
					Forage 4 3 rd regrowth	0.258, 0.244 (0.251)	0.199, 0.212 (0.206)	0.457, 0.456 (0.46)	201
	1.68 1.68	140.8 140.5	1.19 1.20	1)Pre-emergence 2) BBCH 14	Hay 1 post app.	1.67, 1.32 (1.50)	2.09, 1.52 (1.81)	3.76, 2.84 (3.3)	79
					Hay 2 1 st regrowth	0.421, 0.333 (0.377)	0.603, 0.428 (0.516)	1.02, 0.761 (0.89)	117
					Hay 3 2 nd regrowth	0.608, 0.513 (0.561)	0.779, 0.595 (0.687)	1.39, 1.11 (1.2)	153
					Hay 4 3 rd regrowth	0.544, 0.510 (0.527)	0.619, 0.561 (0.590)	1.16, 1.07 (1.1)	210
14WA Washington DKA44-16RR	1.68	140.4	1.20	BBCH 14	Forage 1	0.258, 0.322 (0.290)	0.336, 0.359 (0.348)	0.594, 0.681 (0.64)	70
	1.68	140.4	1.20	BBCH 14	Hay 1 Post app	0.886, 0.855 (0.871)	1.11, 1.24 (1.18)	2.00, 2.10 (2.1)	79
	1.69	140.9	1.20	BBCH 15	Forage 2 Post app	0.513, 0.544 (0.529)	0.214, 0.259 (0.237)	0.727, 0.803 (0.77)	29
					Forage 3 1 st regrowth	0.324, 0.330 (0.327)	0.186, 0.209 (0.198)	0.510, 0.539 (0.53)	62
					Forage 4 2 nd regrowth	0.323, 0.378 (0.351)	0.339, 0.325 (0.332)	0.662, 0.703 (0.68)	118
					Hay 2 Post app	4.16, 2.78 (3.47)	1.26, 0.977 (1.12)	5.42, 3.76 (4.6)	34
					Hay 3 1 st regrowth	0.880, 1.11 (0.995)	0.953, 1.45 (1.20)	1.83, 2.56 (2.2)	70
Hay 4 2 nd regrowth	1.01, 0.881 (0.946)	1.12, 1.11 (1.12)	2.13, 1.99 (2.1)	127					

APPRAISAL

Acetochlor is a selective herbicide belonging to the chloroacetanilide class that was first and last evaluated for residues and toxicological aspects by the 2015 JMPR, when an ADI of 0–0.01 mg/kg bw and an ARfD of 1 mg/kg bw were established. The residue definition for compliance with the MRL and for dietary risk assessment (for animal and plant commodities) is the sum of compounds hydrolysable with base to 2-ethyl-6-methylaniline (EMA) and 2-(1-hydroxyethyl)-6-methylaniline (HEMA), expressed in terms of acetochlor. The residue is not fat soluble.

Acetochlor was scheduled at the Fiftieth Session of the CCPR for the evaluation of additional uses by the 2019 Extra JMPR. The Meeting received new information on metabolism in soya bean, analytical method data, and residue trials on soya bean and alfalfa (forage and hay).

Metabolism in plants

The present Meeting received information on the identification of metabolites in soya bean seed extracts from a metabolism study on soya beans after pre-plant or post-emergence applications that had been previously evaluated by the Meeting. The identified acetochlor metabolites were its *tert*-sulfinylacetic acid, *tert*-sulfinyllactic acid and 1-hydroxyethyl *sec*-oxanilic acid, which were also previously identified in soya bean feed commodities. These metabolites are covered by the current definition of the residue based on the common moieties EMA and HEMA.

Methods of analysis

The methods developed to quantify residues of acetochlor in plant and animal matrices involve hydrolytic conversion of metabolites to the EMA or HEMA chemophores, which are quantified and expressed as total acetochlor residues. They involve extraction with methanol/water mixture, followed by hydrolysis of residues with aqueous hydroxide solution. The main differences between the previous and the new methods are the clean-up conditions, sample sizes and instrumentation for quantification (LC-MS/MS in more recent versions). LOQs are typically 0.025 mg/kg each for EMA and HEMA. Representative compounds that generate EMA (*tert*-sulfonic acid) and HEMA (1-hydroxyethyl-*tert*-oxanilic acid) on base hydrolysis are used as reference materials for fortification and method validation. The methods are suitable for analysis of acetochlor and related metabolites in plant and animal matrices.

Stability of residues in stored analytical samples

The stability of incurred residues analysed as EMA and HEMA in the soya bean samples after more than eight years of frozen storage was estimated based on the analysis conducted when the study was performed (2007/8) and when the samples were again analysed in 2016. The results were submitted to the present Meeting. On average (n=8), the percent remaining was 122% for EMA and 149% for HEMA, probably due to modifications in the LC-MS/MS analytical method used in the original study. The Meeting concluded that acetochlor residues in soya bean seeds are stable for at least 8 years.

In 2015, JMPR concluded that acetochlor residues were also stable in several plant matrices including alfalfa forage and clover hay for at least 330 days under freezer storage conditions (-20 °C).

Results of supervised residue trials on crops

Soya bean, dry

The critical GAP for acetochlor on soya bean in the USA is pre-plant/pre-emergence, and post-emergence (before the R2 growth stage, full flowering) at up to 1.7 kg ai/ha and not exceeding a maximum rate per year of 3.4 kg ai/ha. Supervised trials were conducted in the USA in 2007. In 13 independent trials conducted according to GAP, total residues in soya bean seeds were < 0.05, 0.05, 0.10, 0.11, 0.12, 0.14, 0.15, 0.19, 0.20, 0.22, 0.23, 0.25 and 0.91 mg/kg.

The Meeting estimated a maximum residue level of 1.5 mg/kg and a STMR of 0.15 mg/kg for soya bean, dry.

Alfalfa

The critical GAP for acetochlor in alfalfa in the USA is pre-plant/at-planting/pre-emergence and post-emergence (up to or at the 4th-trifoliolate stage - new stands - or following spring green-up - fall-planted or established stands - or between cuttings), with a maximum rate of 3.4 kg ai/ha per year and a PHI of at least 20 days. Supervised trials were conducted in the USA in 2013 and 2014. In eight trials conducted according to GAP, total residues in alfalfa forage were 0.82, 0.92, 1.1, 1.9, 2.5, 2.9, 4.0 and 5.8 mg/kg, and in alfalfa hay were 2.0, 2.8 (2), 4.4, 4.7, 5.0, 6.9 and 13.0 mg/kg (fresh weight basis).

The Meeting estimated a maximum residue level of 30 mg/kg (dry basis) for alfalfa hay.

The Meeting withdrew the previous recommendation for legume animal feed of 3 mg/kg and recommended a maximum residue level of 3 mg/kg for legume animal feed, except alfalfa hay.

The Meeting also estimated a median residue of 4.55 mg/kg and a highest residue of 13 mg/kg for alfalfa hay (fresh weight basis), a median residue of 2.2 mg/kg and a highest residue of 5.8 mg/kg for alfalfa forage.

Fate of residues during processing

The processing factors for soya bean oil, meal and hulls estimated by the 2015 JMPR are 0.11, 1.2 and 0.72, respectively. Therefore, considering a STMR of 0.15 mg/kg for soya bean seeds, the Meeting estimated a STMR-P of 0.016 mg/kg for soya bean oil, a median residue of 0.18 mg/kg for soya bean meal and of 0.108 mg/kg for soya bean hulls.

Animal feedstuffs

Estimation of livestock dietary burdens

Dietary burden calculations for beef cattle, dairy cattle and poultry are provided below. The dietary burdens were estimated using the OECD diets listed in Appendix IX of the 3rd edition (2016) of the FAO Manual. Considering the items estimated by the 2015 and present JMPR, livestock dietary burdens were estimated for cattle and poultry.

Summary of livestock dietary burden (ppm acetochlor equivalents of dry matter diet)

Commodity	US-Canada		EU		Australia		Japan	
	Max	Mean	Max	Mean	Max	Mean	Max	Mean
Beef cattle	2.33	0.87	12.27	4.47	16.57 ^a	6.29 ^c	1.63	0.68
Dairy cattle	4.28	1.43	7.77	2.65	10.75 ^b	3.87 ^d	3.82	1.44
Poultry-broiler	0.11	0.11	0.16	0.16	0.10	0.10	0.08	0.08
Poultry-layer	0.11	0.11	0.61 ^e	0.18 ^f	0.10	0.10	0.07	0.07

^a Highest maximum beef or dairy cattle dietary burden suitable for maximum residue level estimated for mammalian tissues

^b Highest maximum dairy cattle dietary burden suitable for maximum residue level estimated for mammalian milk

^c Highest mean beef or dairy cattle dietary burden suitable for STMR estimated for mammalian tissues.

^d Highest mean dairy cattle dietary burden suitable for STMR estimated for milk.

^e Highest maximum poultry dietary burden suitable for maximum residue level estimated for poultry tissues and eggs.

^f Highest mean poultry dietary burden suitable for STMR estimated for poultry tissues and eggs.

Animal commodity maximum residue levels

Based on the estimated dietary burden and the results of farm animal feeding studies evaluated by the 2015 JMPR, the calculations used to estimate highest total residues for use in estimating maximum residue levels, STMR and HR values are shown below.

	Feed level	Residues	Feed level	Residues (mg/kg) in			
	(ppm) for milk residues	(mg/kg) in milk	(ppm) for tissue residues	Muscle	Liver	Kidney	Fat
MRL beef or dairy cattle							
Feeding study ^a	-		15	-	< 0.02	0.04	-
	50	< 0.02	50	< 0.02	0.02	0.09	<0.02
Dietary burden and high residue	10.75	< 0.0043	16.57	<0.0007	0.02	0.0418	<0.02
STMR beef or dairy cattle							
Feeding study ^b			5	-	-	<0.02	-
			15	-	<0.02	0.03	-
	50	< 0.02	50	<0.02	0.02	0.07	<0.02
Dietary burden and median residue estimate	3.87	< 0.0015	6.29	<0.0025	0.02	0.0213	<0.0025

^a Highest residues for tissues and mean residues for milk

^b Mean residues for tissues and mean residues for milk

The Meeting estimated a maximum residue level of 0.05 mg/kg, a STMR of 0.0213 mg/kg and a HR of 0.0418 mg/kg for edible offal (mammalian) to replace the previous recommendation.

The Meeting confirmed its previous recommendations for meat (mammalian except marine mammals), mammalian fat (except milk fat) and milks.

No residues were observed in eggs and poultry tissues on dosing laying hens at up to 50 ppm in the diet for 28 days. Considering the poultry dietary burden of 0.61 ppm (highest maximum) and 0.18 ppm (highest mean), the Meeting confirmed its previous recommendation for poultry commodities.

RECOMMENDATIONS

On the basis of the data obtained from supervised trials the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue limits and for IEDI and IESTI assessment.

Residue definition for compliance with the MRL and for dietary risk assessment for animal and plant commodities: *Sum of compounds hydrolysable with base to 2-ethyl-6-methylaniline (EMA) and 2-(1-hydroxyethyl)-6-methylaniline (HEMA), expressed in terms of acetochlor.*

The residue is not fat soluble

CCN	Commodity	Recommended Maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
		New	Previous		
AL 1020	Alfalfa hay	30 (dw)	-	Median: 4.55 (as)	Highest: 13 (as)
AL 0157	Legume animal feed	W	3 (dw)		
AL 0157	Legume animal feed, except alfalfa hay	3 (dw)	-		
VD 0541	Soya bean (dry)	1.5	-	0.15	
MO 0105	Edible offal (mammalian)	0.05	0.02*	0.0213	0.0418
OR 0541	Soya bean oil, Refined			0.016	

Additional recommendations for livestock dietary burden

	Median residue (mg/kg, fresh basis)	Highest residue (mg/kg, fresh, basis)
Alfalfa forage	2.2	5.8
Soya bean hulls	0.108	
Soya bean meal	0.18	

DIETARY RISK ASSESSMENT

Long-term dietary exposure

The ADI for acetochlor is 0–0.01 mg/kg bw. The International Estimated Daily Intakes (IEDIs) for acetochlor were estimated for the 17 GEMS/Food Consumption Cluster diets using the STMR or STMR-P values estimated by the JMPR. The results are shown in Annex 3 of the 2019 Extra JMPR Report.

The IEDIs accounted for 0 to 4% of the maximum ADI. The Meeting concluded that the long-term dietary exposure to residues of acetochlor from uses considered by the JMPR is unlikely to present a public health concern.

Acute dietary exposure

The ARfD for acetochlor is 1 mg/kg bw. The International Estimate of Short Term Intakes (IESTIs) for acetochlor were calculated for the food commodities for which HRs/HR-Ps or STMRs/STMR-Ps were estimated by the present Meeting. The results are shown in Annex 4 of the 2019 Extra JMPR Report.

The IESTIs were 0% of the ARfD for the general population and for children. The Meeting concluded that the acute dietary exposure to residues of acetochlor from uses considered by the present Meeting is unlikely to present a public health concern.

Threshold of toxicological concern (TTC) approach for metabolites

Acetochlor *tert*-sulfinylactic acid and acetochlor 1-hydroxyethyl *sec*-oxanilic acid are unlikely to be genotoxic, and could be assessed using the TTC Cramer Class III of 1.5 µg/kg bw per day.

The metabolites acetochlor *tert*-sulfinylactic acid and acetochlor 1-hydroxyethyl *sec*-oxanilic acid were identified in metabolism studies, found in maize grain, soya bean seed and poultry commodities (<10% TRR). They belong to the group of metabolites that are hydrolysed in the analytical methods for plant and animal commodities to form EMA and HEMA.

The maximum IEDI calculated for acetochlor (based on total EMA and HEMA) from commodities considered by the JMPR (Annex 3) was 0.385 µg/kg bw. The Meeting concluded that dietary exposure to residues of acetochlor *tert*-sulfinylactic acid and acetochlor 1-hydroxyethyl *sec*-oxanilic acid from the uses considered by the JMPR is unlikely to present a public health concern.

REFERENCES

Study No.	Author(s)	Year	Study Title
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