DICAMBA (240)

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EXPLANATION

Dicamba, a systemic broad-spectrum herbicide, was first evaluated by the 2010 JMPR. The 2010 Meeting estimated an ADI of 0–0.3 mg/kg, ARfD of 0.5 mg/kg, and recommended maximum residue levels for 21 commodities. These maximum residue levels were adopted as Codex MRLs at the Codex Alimentarius Commission in 2011 (REP 11/CAC, Appendix III, Part 2).

The 2010 JMPR received information on metabolism, method of analysis, storage stability, supervised residue trials and processing studies on soya beans. However, supervised trials were conducted in the USA with PHI of 7 days while the approved US label at that time indicated PHI of 14 days. Since no trials matched the GAP, the Meeting could not estimate a maximum residue level for soya bean (dry).

The label of one formulation, relevant to the trials, was since revised and approved with new PHI of 7 days matching that of the supervised trials. The current Meeting therefore evaluated the trial data on soya beans provided to the 2010 Meeting against the newly approved use on soya beans in the USA.

USE PATTERNS

The authorized use on soya beans in the USA is summarized in Table 1.

Table 1 Registered uses of dicamba on soya bean (dry) in the USA

Crop	Country	Formulation (g/kg or g/L and type)	F/G/P [a]	Application			PHI (days)
				Method	No. per crop season	kg as/ha per applic. [b] min.-max.	
VD Pulses							
Soya bean (dry)	USA	480SL	F	Spray	1 (pre-plant)	0.14–0.56	na
					1 (pre-harvest)	0.28–1.12	7 [c]
						(2.24/season)	

[a] F = outdoor or field use, G = glasshouse, P = protected

[b] Information given on active substance (as) refers to dicamba only

as = active substance

na = not applicable

[c] Revised PHI

RESIDUES RESULTING FROM SUPERVISED TRIALS ON CROPS

The information of supervised field trials of dicamba on soya beans conducted in the USA were received and summarized by the 2010 JMPR and transcribed in Table 2.

All trials were conducted outdoor. Application rates were reported as dicamba acid equivalents. Residue concentrations were reported for dicamba, 5-OH dicamba and DCSA. Residue concentrations are recorded unadjusted for recoveries or for residue values in control samples. Where trials were conducted in the same location, with the same varieties, similar formulations or different salt types, and at the same or similar timing, they are not regarded as independent and the highest

residues from these trials was recorded. Although trials included control plots, no control data are recorded in the tables below unless residues in control samples significantly exceeded the LOQ.

Total residues were calculated by summing up the concentrations of dicamba and 5-OH dicamba. In the trials, residues found to be below the limit of quantitation (LOQ) were reported as < LOQ.

Soya bean

The newly approved use of dicamba in soya bean consists of two different applications: application of up to 0.56 kg as/ha as a broadcast made to the soil surface approximately 14 prior to planting, and/or up to 1.12 kg as/ha applied 7 days prior to harvest. If both pre-plant and pre-harvest applications are used in one season, the maximum seasonal use rate must not exceed 2.24 kg as/ha. Soya bean plant is susceptible to dicamba and 1.12 kg as/ha is close to the maximum tolerable to the plant.

A total of 23 supervised field residue trials were conducted during the 1994 and 1995 growing seasons to determine residue levels of dicamba, DCSA, and 5-OH dicamba in the raw agricultural commodity, dry soya bean seed. The trials were designed to reflect the maximum possible applications.

Each formulation was applied according to the methods and conditions representing U.S. soya bean production. The states selected (Arkansas, Georgia, Illinois, Indiana, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, Ohio, and Tennessee) for these trials represent the major soya bean production areas in the United States.

In all trials, soya bean seed samples were collected at mature harvest stage. The samples were quickly frozen and shipped frozen to laboratory. Samples were kept frozen until homogenization and analysis.

Soya bean seed samples were analysed for dicamba, DCSA, and 5-OH dicamba according to analytical method AM-0941-1094-0. This method quantitates residues of dicamba, DCSA, and 5-OH dicamba using GC/ECD. Residues of dicamba + 5-OH dicamba are reported as total dicamba residues. Where concentration of 5-OH dicamba was below the LOQ, the value of LOQ was used for the calculation of total concentration.

For trials conducted in 1994, the mean dicamba recovery in dry soya bean seed was 90% ± 13% (n = 22) for all fortification levels (0.01 mg/kg and 0.1 mg/kg). The mean DCSA recovery in dry soya bean seed was 86% ± 12% (N = 22) for all fortification levels (0.02 mg/kg and 0.1 mg/kg). The mean 5-OH dicamba recovery in dry soya bean seed was 79% ± 13% (n = 22) for all fortification levels (0.02 mg/kg and 0.1 mg/kg).

For trials conducted in 1995, the mean dicamba recovery was 103 ± 12% (n = 10), the mean DCSA recovery was 96 ± 14% (n = 9), and the mean 5-OH dicamba recovery was 94 ± 12% (n = 9).

Initially, 17 supervised field residue trials were conducted during the 1994 growing season. Twelve trials (one trial in each of the following states: Arkansas, Georgia, Illinois, Indiana, Iowa, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, Ohio, and Tennessee) were conducted using the DMA^+ salt of dicamba formulation. In four of the 17 trials (Iowa, Illinois, Indiana, and Minnesota), three dicamba salt formulations (the dimethylamine salt (DMA^+), the diglycolamine salt (DGA^+), and the sodium salt (Na^+) salt of dicamba) were applied side by side to separate plots.

Statistical analysis of the data from the four trial location (Illinois, Indiana, Iowa, and Minnesota) where the side by side trials with DMA^+, DGA^+, and Na^+ salt formulations were conducted showed that the magnitude of the total residue was not influenced by the differences in formulation and therefore only the highest residues were included in the Table.

Six additional supervised field residue trials (using the DMA^+ salt of dicamba formulation) were conducted during the 1995 growing season to provide dicamba, DSCA, and 5-OH dicamba residue data in dry soya bean seed samples when dicamba was applied at the maximum proposed label rate use rate before planting and before harvesting dry soya bean seed. At the same time two decline studies were also conducted.

Of the six trials, one trial was conducted in Iowa, one in Illinois, one in Missouri, and one in North Carolina. The two decline studies were conducted in Illinois and Indiana.

Table 2 Residues of dicamba, 5-OH dicamba and DCSA from supervised trials on soya bean in the USA

CROP Country, Year *Location* (variety) Trial No.	Application					PHI (d)	Portion analysed	Residues (mg/kg)				Author Report Year Study No. DocID.
	Formulation	Method	Rate (kg as/ha)	Growth stage	No.			Dicamba	5-OH dicamba	DCSA	Total*	
US GAP	480 SL	Spray	0.56 +/or 1.12 (max 2.24/ season)	Pre-plant	1	NA						
				7 dbh	1	7						
Soya bean USA, 1994 *Nebraska* (Jacques 333) 608-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	1.00	< 0.01	0.01	1.01	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Iowa* (Payco 8818) 611-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	1.43	< 0.01	< 0.01	1.44	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Minnesota* (Pioneer 9006) 613-01	480SL 480SL 240SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.48	< 0.01	0.04	0.49	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Minnesota* (Pioneer 9006) 613-02	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.27	< 0.01	< 0.01	0.28	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Indiana* (Pioneer 9392) 615-01	480SL 480SL 240SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.81	< 0.01	< 0.01	0.82	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Indiana* (Pioneer 9392) 615-02	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	1.90	0.05	0.01	1.95	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Mississippi* (Northrup King 5960) 618-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.70	< 0.01	< 0.01	0.71	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Tennessee* (Holiday) 621-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.10	< 0.01	< 0.01	0.11	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Illinois* (Callahan 3377N) 624-01	480SL 480SL 240SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.46	0.05	0.05	0.51	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Illinois* (Asgrow) 624-02	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	3.30	0.32	0.12	3.62	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Georgia* (Bryan) 664-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.68	< 0.01	< 0.01	0.69	Jimenez, N.C. 1995 #133 1995/5298

CROP Country, Year *Location* (variety) Trial No.	Application					PHI (d)	Portion analysed	Residues (mg/kg)				Author Report Year Study No. DocID.
	Formulation	Method	Rate (kg as/ha)	Growth stage	No.			Dicamba	5-OH dicamba	DCSA	Total*	
Soya bean USA, 1994 *Arkansas* (Hartz 517) 665-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.55	< 0.01	0.01	0.56	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Ohio* (Madison GL3630) 667-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.65	0.02	0.01	0.67	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Missouri* (Williams 82) 668-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	1.30	< 0.01	0.02	1.31	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Missouri* (Pioneer 9381-) 668-02	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.28	< 0.01	< 0.01	0.29	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Iowa* (L2771) 669-01	480SL 480SL 240SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	1.40	0.27	0.07	1.67	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Louisiana* (Hartz 5164) 672-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.17	< 0.01	< 0.01	0.18	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1995 *North Carolina* (Hutcheson) 01-612-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	2.10	< 0.01	0.02	2.11	Guirguis, M.J. 1996 #147 1996/5312
Soya bean USA, 1995 *Illinois* (Asgrow 3237) 01-624-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.07	< 0.01	< 0.01	0.08	Guirguis, M.J. 1996 #147 1996/5312
Soya bean USA, 1995 *Missouri* (Pioneer 9362) 01-668-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.08	< 0.01	< 0.01	0.09	Guirguis, M.J. 1996 #147 1996/5312
Soya bean USA, 1995 *Iowa* (Kennedy IV) 01-669-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	7	seed	0.14	< 0.01	< 0.01	0.15	Guirguis, M.J. 1996 #147 1996/5312
Soya bean USA, 1995 *Indiana* (Pioneer 9301) 02-615-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	3 5 7 9 11	seed	0.43 0.06 0.05 0.07 0.02	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	0.01 < 0.01 < 0.01 < 0.01 < 0.01	0.44 0.07 0.06 0.08 0.03	Guirguis, M.J. 1996 #147 1996/5312
Soya bean USA, 1995 *Illinois* (Pioneer 9362) 02-624-01	480SL	foliar	0.560 2.240	pre-plant 14 dbp + 7dbh	2	3 5 7 9 11	seed	7.6 5.1 8.1 1.1 0.39	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	0.027 0.020 0.028 < 0.01 < 0.01	7.61 5.11 8.11 1.11 0.40	Guirguis, M.J. 1996 #147 1996/5312

* Dicamba + 5-OH dicamba; highest residue is taken into consideration in case different salt formulations of dicamba are applied side-by-side

dbp = days before planting

dbh = days before harvest

as = active substance

Animal feed stuffs

Soya bean forage and hay

Soya bean forage and hay samples were collected before the second application was made. Therefore, residues in these commodities came from pre-plant application.

Table 3 Residues of dicamba, 5-OH dicamba and DCSA from supervised trials on soya bean in the USA

CROP Country, Year *Location* (variety) Trial No.	Application					PHI (d)	Portion analysed	Residues (mg/kg)				Author Report Year Study No. DocID.
	Formulation	Method	Rate (kg as/ha)	Growth stage (BBCH)	No.			Dicamba	5-OH dicamba	DCSA	Total*	
Soya bean USA, 1994 *Nebraska* (-) 608-01	480SL	foliar	0.560	pre-plant 14 dbp	2	56	forage	< 0.01	< 0.01	< 0.01	< 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Iowa* (-) 611-01	480SL	foliar	0.560	pre-plant 14 dbp	2	54 110	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Minnesota* (-) 613-01	480SL 480SL 240SL	foliar	0.560	pre-plant 14 dbp	1	59 99	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Minnesota* (-) 613-02	480SL	foliar	0.560	pre-plant 14 dbp	1	58 112	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Indiana* (-) 615-01	480SL 480SL 240SL	foliar	0.560	pre-plant 14 dbp	1	55 118	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Indiana* (-) 615-02	480SL	foliar	0.560	pre-plant 14 dbp	1	66 107	forage hay (control)	< 0.01 < 0.01 < 0.01	< 0.01 < 0.01 < 0.01	< 0.01 0.02 0.02	< 0.02 <.0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Mississippi* (-) 618-01	480SL	foliar	0.560	pre-plant 14 dbp	2	55 141	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Tennessee* (-) 621-01	480SL	foliar	0.560	pre-plant 14 dbp	2	49 125	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Illinois* (-) 624-01	480SL 480SL 240SL	foliar	0.560	pre-plant 14 dbp	1	52 114	forage hay	0.07 < 0.01	< 0.01 < 0.01	0.017 < 0.01	0.08 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Illinois* (-) 624-02	480SL	foliar	0.560	pre-plant 14 dbp	1	50 134	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 0.02	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Georgia* (-) 664-01	480SL	foliar	0.560	pre-plant 14 dbp	1	58 126	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298

CROP Country, Year *Location* (variety) Trial No.	Application					PHI (d)	Portion analysed	Residues (mg/kg)				Author Report Year Study No. DocID.
	Formulation	Method	Rate (kg as/ha)	Growth stage (BBCH)	No.			Dicamba	5-OH dicamba	DCSA	Total*	
Soya bean USA, 1994 *Arkansas* (-) 665-01	480SL	foliar	0.560	pre-plant 14 dbp	1	50	forage	< 0.01	< 0.01	< 0.01	< 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Ohio* (-) 667-01	480SL	foliar	0.560	pre-plant 14 dbp	1	57 114	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Missouri* (-) 668-01	480SL	foliar	0.560	pre-plant 14 dbp	1	60 121	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Missouri* (-) 668-02	480SL	foliar	0.560	pre-plant 14 dbp	1	62 117	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Iowa* (-) 669-01	480SL 480SL 240SL	foliar	0.560	pre-plant 14 dbp	1	64 133	forage hay (control)	< 0.01 < 0.01 < 0.01	< 0.01 0.01 < 0.01	< 0.01 0.01 0.05	< 0.02 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1994 *Louisiana* (-) 672-01	480SL	foliar	0.560	pre-plant 14 dbp	1	49 112	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Jimenez, N.C. 1995 #133 1995/5298
Soya bean USA, 1995 *North Carolina* (-) 01-612-01	480SL	foliar	0.560	pre-plant 14 dbp	1	53 114	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	< 0.02 < 0.02	Guirguis, M.J. 1996 #147 1996/5312
Soya bean USA, 1995 *Illinois* (-) 01-624-01	480SL	foliar	0.560	pre-plant 14 dbp	1	52 88	forage hay	0.05 < 0.01	< 0.01 < 0.01	< 0.01 < 0.01	0.06 < 0.02	Guirguis, M.J. 1996 #147 1996/5312
Soya bean USA, 1995 *Missouri* (-) 01-668-01	480SL	foliar	0.560	pre-plant 14 dbp	1	63 108	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	0.02 < 0.01	< 0.02 < 0.02	Guirguis, M.J. 1996 #147 1996/5312
Soya bean USA, 1995 *Iowa* (-) 01-669-01	480SL	foliar	0.560	pre-plant 14 dbp	1	61 92	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	0.02 < 0.01	< 0.02 < 0.02	Guirguis, M.J. 1996 #147 1996/5312
Soya bean USA, 1995 *Indiana* (-) 02-615-01	480SL	foliar	0.560	pre-plant 14 dbp	1	59 110	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	0.02 < 0.01	< 0.02 < 0.02	Guirguis, M.J. 1996 #147 1996/5312
Soya bean USA, 1995 *Illinois* (-) 02-624-01	480SL	foliar	0.560	pre-plant 14 dbp	1	65 112	forage hay	< 0.01 < 0.01	< 0.01 < 0.01	0.01 < 0.01	< 0.02 < 0.02	Guirguis, M.J. 1996 #147 1996/5312

* Dicamba + 5-OH dicamba; highest residue is taken into consideration in case different salt formulations of dicamba are applied side-by-side

dbp = days before planting

as = active substance

FATE OF RESIDUES IN STORAGE AND PRCESSING

The 2010 JMPR received and reviewed information on processing of soya bean to oil. The summary of processing studies on soya bean is transcribed below.

Table 4 Summary of processing studies

Processed Product	Processing factor	
	Dicamba	Total residues
Soya bean		
Meal	0.35	0.36
Hulls	3.9	3.8
Grain dust	676	669
Refined oil	< 0.019	< 0.036

APPRAISAL

Dicamba, a systemic broad-spectrum herbicide used in a variety of crops, was first evaluated by the 2010 JMPR. The 2010 Meeting estimated an ADI of 0–0.3 mg/kg and an ARfD of 0.5 mg/kg. It recommended the following residue definition for plant and animal commodities:

Definition of the residue for plant commodities (for compliance with the MRL): Dicamba

Definition of the residue for plant commodities (for estimation of dietary intake): Sum of dicamba and 5-OH dicamba expressed as dicamba

Definition of the residue for animal commodities (for compliance with the MRL and for estimation of dietary intake): Sum of dicamba and DCSA.

The 2010 Meeting estimated maximum residue levels for 21 commodities, which were adopted as Codex MRLs by the Codex Alimentarius Commission in 2011 (REP 11/CAC, Appendix III, Part 2).

The 2010 JMPR received information on metabolism, method of analysis, storage stability, supervised residue trials and processing studies on soya beans. However, supervised trials were conducted in the USA with PHI of 7 days while the approved US label at that time indicated PHI of 14 days. As no trials matched the GAP, the Meeting could not estimate a maximum residue level for soya bean (dry).

The label of one formulation, relevant to the trials, has since been revised and approved with a PHI of 7 days, matching that of the supervised trials. The current Meeting was therefore able to evaluate the trial data on soya beans provided to the 2010 Meeting against the newly approved use on soya beans in the USA.

Results of supervised residue trials on crops

The information on supervised field trials of dicamba on soya beans conducted in the USA were received and summarized by the 2010 JMPR. All trials were conducted in the USA.

For all analytes and matrices, generally the LOQ was 0.01 mg/kg unless as otherwise stated. In summing for total residues, if dicamba and/or 5-OH dicamba were below the LOQ, the LOQ value of each was used for calculation.

Soya bean (dry)

A total of 23 trials were conducted. The new US GAP allows two different applications: an application of 0.56 kg ai/ha as a broadcast spray made approximately 14 days prior to planting and an application of 1.12 kg ai/ha applied 7 days prior to harvest. The maximum total application rate per season is 2.24 kg ai/ha.

In the supervised trials, pre-plant application of 0.56 kg ai/ha 14 days before planting and pre-harvest application of 2.24 kg ai/ha 7 days before harvest were made. The pre-harvest application rate was two times the GAP rate.

As foliar pre-harvest application was used throughout the supervised trials, the Meeting agreed to apply the proportionality approach to estimate a maximum residue level for soya bean (dry).

Residues of dicamba from trials with a pre-harvest application rate of 2.24 kg ai/ha and a PHI of 7 days, in ranked order were: 0.07, 0.07, 0.08, 0.10, 0.14, 0.17, 0.27, 0.28, 0.46, 0.48, 0.55, 0.65, 0.68, 0.70, 0.81, 1.00, 1.30, 1.40, 1.43, 1.90, 2.10, 3.30 and 8.1 mg/kg.

Applying a factor of 0.5 to estimate residues of dicamba 7 days after a pre-harvest application at the GAP rate of 1.12 kg ai/ha, residues of dicamba were estimated to be: 0.035, 0.035, 0.04, 0.05, 0.07, 0.085, 0.135, 0.14, 0.23, 0.24, 0.275, 0.325, 0.34, 0.35, 0.405, 0.50, 0.65, 0.70, 0.715, 0.95, 1.05, 1.65 and 4.05 mg/kg.

Based on these residue concentrations, the Meeting estimated a maximum residue level of 5 mg/kg for soya bean (dry). The Meeting also estimated a median residue for the purpose of calculating animal dietary burdens at 0.325 mg/kg.

The OECD Calculator indicated a maximum residue level of 4 mg/kg. However, the highest residue concentration calculated from all the supervised trials was 4.05 mg/kg. Normally the JMPR would not set a maximum residue level lower than the highest actual residue concentration, and therefore it recommended a maximum residue level of 5 mg/kg. .

Corresponding total residues of dicamba and 5-OH dicamba in ranked order were: 0.04, 0.04, 0.045, 0.055, 0.075, 0.09, 0.14, 0.145, 0.245, 0.255, 0.28, 0.335, 0.345, 0.355, 0.41, 0.505, 0.655, 0.72, 0.835, 0.975, 1.055, 1.81 and 4.055 mg/kg.

The Meeting estimated an STMR of 0.335 mg/kg.

Soya bean forage and hay

Soya bean forage and hay samples were collected before the second application was made to avoid abscission. Therefore, residues in these commodities came from pre-plant application only.

The label prohibits the use of fodder or hay after a pre-harvest application.

Since the residues from the pre-plant application were expected to be very low and harvesting soya bean plants before harvesting soya bean seeds does not seem to be a common practice, the Meeting confirmed the decision of the 2010 JMPR that there was no need for estimating a maximum residue level for soya bean forage and hay.

Fate of residues during processing

The 2010 Meeting received information on processing of soya beans to meal and oil.

Processing factor calculated for refined oil and its STMR-Ps are shown below:

Processed Orange Product	Processing factor		STMR/STMR-P (mg/kg)
	Dicamba	Total residues	
Soya bean			0.335
Refined oil	< 0.019	< 0.036	0.012

As there is no concentration of dicamba and 5-OH dicamba observed in refined oil, the estimation of a maximum residue level is not necessary for this commodity.

On the basis of the processing factor of 0.35, a median residue of 0.117 mg/kg was calculated for soya bean meal, which may be used as a livestock feed item.

Residue concentration was observed in soya bean hulls and grain dust which may also be used as animal feeds. The processing factors of dicamba calculated for these commodities were 3.9 and 676

respectively. From these factors, median residues in soya bean hulls and grain dust for the estimation of animal burden were calculated to be 1.3 and 226 mg/kg respectively.

Residues in animal products

Estimation of dietary burdens

Soya beans and processed soya bean products may be fed to dairy cattle, beef cattle, broilers and layers. The maximum and mean dietary burdens were calculated using the highest residue, STMR/STMR-Ps or median residue of dicamba in commodities for which maximum residue levels were recommended by the 2010 and current JMPR and their processed products on a basis of the OECD Animal Feeding Table.

5-OH Dicamba was not included in the calculation of animal burden as its concentrations in animal feeding items were very low and the feeding study with 5-OH dicamba resulted in very low uptake of 5-OH (< 0.01 mg/kg) into tissues, milk or blood of cattle at a dose equivalent to 59 ppm in the diet.

The resulting maximum and mean dietary burdens to be used for estimating maximum residue levels for commodities of animal origin (both mammals and poultry) were identical to those of the 2010 JMPR.

The Meeting concluded that there was no need to re-evaluate maximum residue levels, STMRs or HRs for commodities of animal origin.

The HR for poultry fat estimated by the 2010 JMPR was corrected to be 0.02 mg/kg.

RECOMMENDATIONS

On the basis of the data 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.

Definition of the residue for compliance with MRLs for plant commodities: *Dicamba.*

Definition of residues for estimation of dietary intake for plant commodities: *Dicamba and 5-OH dicamba.*

Definition of the residue for compliance with MRLs and for estimation of dietary intake for animal commodities: *Dicamba and 3,6-dichlorosalicylic acid (DCSA) expressed as dicamba.*

Residue is not fat-soluble.

Commodity		Recommended MRL, mg/kg		STMR/STMR-P mg/kg	HR/HR-P mg/kg
CCN	Name	New	Previous		
VD 0541	Soya bean (dry)	5	-	0.335 0.325 [a]	-
OR 0541	Soya bean oil, refined	-		0.012	-
AB 1265	Soya bean meal			0.117 [a]	
AB 0541	Soya bean hulls	-		1.3 [a]	-
	Soya bean grain dust	-		226 [a]	-

[a] mean residue for the estimation of animal dietary burden (residues of dicamba only).

DIETARY RISK ASSESSMENT

Long-term intake

The International Estimated Dietary Intakes (IEDIs) of dicamba were calculated for the 13 GEMS/Food cluster diets using STMRs and STMRPs estimated by the 2010 and current Meeting (see Annex 3 of the 2011 Report of the JMPR). The ADI is 0–0.3 mg/kg bw and the calculated IEDIs were 0–1% of the maximum ADI. The Meeting concluded that the long-term intake of residues of dicamba resulting from the uses considered by the current JMPR is unlikely to present a public health concern.

Short-term intake

The International Estimated Short-Term Intakes (IESTI) of dicamba were calculated for food commodity and its processed commodity using STMRs/STMR-Ps or HRs/HR-Ps estimated by the current Meeting (see Annex 4 of the 2011 Report of the JMPR). The ARfD is 0.5 mg/kg bw and the calculated IESTIs were 0% of the ARfD. The Meeting concluded that the short-term intake of residues of dicamba, when used in ways that have been considered by the JMPR, is unlikely to present a public health concern.

REFERENCES

Report No.	Author(s)	Year	Title, Report reference, Published/unpublished
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