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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Memorandum

Subject: 87-CA-28. Proposed Section 18 for the Use of Sethoxydim (Poast®, EPA Reg. No. 7969-58) on Dry Beans.
No Accession Number / No MRID Number
RCB #2580

From: Michael S. Metzger, Chemist
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Thru: Edward Zager, Section Head, SRS 2
Residue Chemistry Branch
Hazard Evaluation Division (TS-769C)

To: Emergency Response and Minor Use Section
Registration Division (TS-767C)

and

Toxicology Branch
Hazard Evaluation Division (TS-769C)

The California Department of Food and Agriculture requests a Section 18 Specific Exemption authorizing applications of the herbicide Poast® (20% sethoxydim emulsifiable concentrate) on dry beans (including baby lima beans, blackeyed peas and dark red kidney beans) to control Johnson grass. Applications would be made to approximately 32,000 acres.

Tolerances are established for residues of the herbicide Poast® (2-[1-(ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexene-1-one) and its metabolites containing the 2-cyclohexene-1-one moiety (calculated as the herbicide) ranging from 0.05(N) ppm for milk to 75FA ppm for peanut soapstock. Numerous tolerances are pending (40 CFR 180.412; 21 CFR 561.430). A Registration Standard has not been completed for sethoxydim.

The proposed use includes applications at 1.5-2.5 pints product (0.3-0.5 lbs.a.i.)/A/application to a maximum of 4

pints product (0.8 lbs.a.i.)/A/season. No interval between applications is specified. Applications could be made using ground (minimum 10 gallons water per acre) or aerial (minimum 5 gallons water per acre) equipment, and a PHI of 30 days would be imposed.

Metabolism studies for sethoxydim on alfalfa and soybeans were submitted in response to a deficiency cited in J. Onley's review of 1/12/84 (PP#3F2904, Acc. Nos. 073398, 073399; K. Arne, 6/26/85). These studies confirm that the residue of concern for sethoxydim in plants and animals includes parent plus metabolites containing the 2-cyclohexene-1-one moiety (calculated as parent).

Residue data have been provided with this Section 18 for sethoxydim applications to numerous types of dry beans utilizing a modification of BWC Agricultural Chemicals Method No. 30. Residue data have also been generated reflecting sethoxydim application to peas (succulent), green and lima beans and soybeans using Method No. 30. This method includes extraction of the raw agricultural commodity with organic solvents and water, clean-up by alkaline precipitation, oxidation to the pentanedioic acids, derivitization to the dimethyl esters, silica gel clean-up, HPLC clean-up (animal tissues only) and GLC analysis using a sulfur-specific detector. The limit of detection for the method is 0.05 ppm. Method Try-Outs have been performed successfully for soybeans and soybean commodities, eggs, milk, beef tissues and chicken tissues. Recoveries for dry bean samples ranged from 80-100% for the various sethoxydim metabolites at fortification levels of 0.05-20 ppm.

Residue data for dry beans are summarized on the next page. In most studies, 2 applications of Poast® were made at 0.5 + 0.3 lbs.a.i./A. In one study, a single application at 0.5 lbs.a.i./A was made. Types of beans analyzed in these studies included Great Northern, Kidney, Lima, Navy, Pinto, Small White and Southern peas. Method of application (ground vs. aerial) and total volume applied per acre were not specified. No chromatograms were submitted. Data from several field trials mentioned in the submission were not provided.

Based on these data, and for the purposes of this Section 18 only, we conclude that combined residues of sethoxydim and its metabolites are not likely to exceed 30 ppm in or on dry beans as a result of the proposed use.

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Sethoxydim Residues in Dry Beans*

Type of Bean	Application Rate (lbs.a.i./A)	Interval Between Apps.	PHI (days)	Combined Residues (ppm)	Control (ppm)
Great	0.5 + 0.3	40	30	4.7	<0.13
Northern	"	62	25	0.39, 0.71	<0.10
"	"	45	29	13.5, 13.7	<0.13
"	"	30	34	5.6	<0.10
Kidney	"	32	52	6.8	8.1
"	"	44	30	3.5	<0.10
"	"	51	31	5.6	<0.10
"	"	62	25	0.77	<0.10
"	"	71	32	<0.10**	<0.10
"	"	33	33	7.6	<0.19
Lima	"	32	71	1.1	<0.12
"	"	37	47	1.5	<0.13
"	"	53	31	5.0	<0.72
"	"	27	31	0.22	<0.10
Navy	"	40	30	5.7	<0.10
"	"	51	31	5.3	<0.10
"	"	62	25	1.7	<0.10
"	"	71	32	<0.10	<0.10
"	"	33	50	1.5	<0.10
Pinto	"	32	52	9.9	3.4
"	"	53	30	10.3	<0.10
"	"	51	31	7.2	<0.10
"	"	62	25	5.7	<0.10
"	"	42	31	9.5	<0.10
"	"	30	34	3.1	<0.10
Small White	"	32	52	12.1, 12.4	1.1
"	"	62	25	3.9	<0.10
Southern	"	4	37	3.0	<0.10
Pea	0.5	-	41	1.6	<0.10

* Results from several field trials were not submitted
**Including Non-detectable residues calculated as one-half the limit of detection (LOD = 0.05 ppm)

No residue data for dry bean vines or hay were submitted with this Section 18. No data are available reflecting applications of Poast® to any related commodity which would allow estimation of the residues likely to be present in or on dry bean vines or hay as a result of the proposed use.

Dry bean cannery waste would likely consist primarily of cull dry beans diverted from cannery to feed uses (see F. Ives, 5/26/87). Therefore, combined residues of sethoxydim and its metabolites in dry bean cannery waste would not likely exceed 30 ppm (same as dry beans) as a result of the proposed use.

Meat, Milk, Poultry and Eggs

The diets of dairy cattle could consist of 40 ppm sethoxydim residues based on alfalfa forage (80%, 40 ppm tolerance), dry bean seeds (15%, 30 ppm) and peanut soapstock (5%, 75 ppm). The sethoxydim residues in the diets of beef cattle would likely be less.

The diets of turkeys/broilers could consist of 16 ppm sethoxydim residues based on cottonseed meal (10%, 5 ppm), peanut meal (10%, 25 ppm), peanut soapstock (5%, 75 ppm), soybean meal (30%, 10 ppm), sugarbeet molasses (4%, 0.5 ppm), sunflower meal (15%, 20 ppm) and dry bean seed (10%, 30 ppm). The diets of laying hens could consist of 19 ppm sethoxydim residues based on cottonseed meal (1%, 5 ppm), peanut meal (10%, 25 ppm), peanut soapstock (5%, 75 ppm), soybean seed (50%, 10 ppm), sugarbeet molasses (4%, 0.5 ppm), sunflower meal (15%, 20 ppm) and dry bean seeds (15%, 30 ppm).

Ruminant (goat) and poultry feeding studies were submitted with PP#3F2904 and reviewed by K. Arne (6/26/85). The results of these studies are summarized below.

Goat Feeding Study

Feeding Level (ppm)	Sethoxydim Residues (ppm)				
	Milk	Fat	Kidney	Liver	Muscle
30	<0.01-0.03	<0.05	<0.05	<0.05	<0.05
100	<0.01-0.07	<0.05	<0.31	<0.05	<0.05
300	<0.01-0.11	0.07	<0.45	0.17	<0.05

Poultry Feeding Study

Feeding Level (ppm)	Sethoxydim Residues (ppm)					
	Eggs	Fat	Kidney	Liver	Muscle	Skin
25	-	<0.05	<0.75	0.4	0.06	0.10
80	-	0.05	1.4	0.42	0.10	0.23
250	-	0.17	1.46	1.26	0.21	0.60
1	<0.05	-	-	-	-	-
10	<0.05-0.34	-	-	-	-	-
100	<0.05-1.88	-	-	-	-	-

Based on these data, and for the purposes of this Section 18 only, we conclude that combined residues of sethoxydim and

its metabolites are not likely to exceed the established tolerances of 0.05(N) ppm for milk, 0.5 ppm for eggs and 0.2 ppm for the meat, fat and meat by-products of cattle, goats, hogs, horses, poultry (except liver and kidney) and sheep as a result of the proposed use. Residues in poultry kidney and liver could exceed the 0.2 ppm tolerance having maximum likely levels of 0.5 ppm and 0.4 ppm respectively as a result of the proposed use.

Conclusions

(1) The metabolism of sethoxydim in plants and animals is adequately understood. The residue of concern consists of sethoxydim and its metabolites containing the 2-cyclohexene-1-one moiety.

(2) Analytical methods are available for enforcement (BWC Agricultural Chemicals Method No. 30 (PAM II, Method I) and modifications of this method including that submitted with this Section 18 (non-CBI)).

(3) Combined residues of sethoxydim and its metabolites are not likely to exceed 30 ppm in dry beans and dry bean cannery waste as a result of the proposed use.

(4) No residue data are available reflecting applications of Poast® to dry bean vines or hay, nor can any available data be translated in order to estimate residues in or on these commodities as a result of the proposed use. RCB contacted J. Tompkins (Registration Division) regarding a grazing/feeding restriction for bean vines and hay treated under this Section 18 (8/10/87). Mr. Tompkins states that the submitter will accept a grazing/feeding restriction. We, therefore, conclude that this grazing/feeding restriction for dry bean vines and hay should be included on the Section 18 label.

(5) Residues are not likely to exceed the established tolerances of 0.05(N) ppm for milk, 0.5 ppm for eggs and 0.2 ppm for the meat, fat and meat by-products of cattle, goats, hogs, horses, poultry (except kidney and liver) and sheep as a result of the proposed use. Residue could exceed the established tolerances for poultry kidney and liver which could have maximum residues of 0.5 ppm and 0.4 ppm respectively as a result of the proposed use.

(6) Analytical reference standards are available from the Pesticides and Industrial Chemicals Repository.

Recommendations

TOX considerations permitting, and assuming that a grazing/feeding restriction for dry bean vines and hay is established, RCB has no objections to this Section 18. Agreements should be made with the FDA and the USDA regarding the legal status of the treated commodities in commerce since established tolerances could be exceeded for poultry liver and kidney as a result of the proposed use.

cc:Sethoxydim (Poast®) S.F., R.F., Section 18 S.F., Circu, M. Metzger, PMSD/ISB
RDI:E.Zager:EZ:8/11/87:RDS:8/11/87
TS-769C:RCB:M.Metzger:Rm803a:CM#2:8/11/87