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

AUG 25 1986

Memorandum

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

Subject: 86-CA-23. Proposed Section 18 for Sethoxydim (Poast®, EPA Reg. No. 7969-58-AA) on Alfalfa. RCB #1316

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

and

Toxicology Branch
Hazard Evaluation Division (TS-769)

The California Department of Food and Agriculture requests to amend the section 18 label for which RCB previously recommended (M. Metzger, 6/19/86 and 8/11/86) to allow an additional application (3 total) of sethoxydim (Poast®, 20% emulsifiable concentrate, 1.53 lbs.a.i./gallon) to alfalfa. Poast® would be used on approximately 150,000 acres in the San Joaquin and Sacramento valleys to control foxtail species.

Tolerances are established for combined residues of sethoxydim [2-[1-(ethoxyimino)butyl]-5-[2-(ethoxythio)propyl]-3-hydroxy-2-cyclohexene-1-one] and its metabolites containing the 2-cyclohexene-1-one moiety ranging from 0.05 (N) ppm for milk to 15FA ppm for cottonseed soapstock; and include 0.2 ppm for the meat, fat and meat by-products of cattle, goats, hogs, horses, sheep and poultry, and 0.5 ppm for eggs. Numerous tolerances are pending including 20 ppm for alfalfa forage and hay (40 CFR 180.412). A Registration Standard has not been completed for sethoxydim.

The use reviewed in the above cited memos includes a maximum of 2 applications to alfalfa at a rate of 1.5 pints product (4.5 ozs.a.i.)/A in a minimum of 20 gallons of water/A using "ground spray irrigation" or aerial equipment. The following restrictions apply:

> Do not graze livestock on treated areas for 7 days. Do not feed treated hay to livestock for 20 days.

The present amendment to this section 18 requests the addition of a third application with all other parameters remaining unchanged.

A plant metabolism study for sethoxydim on alfalfa was submitted as an amendment to PP#3F2904 (Acc. Nos. 073398, 073399; K Arne, 6/26/85). It was concluded that the nature of the residue in alfalfa is adequately understood, and that the residue of concern consists of parent plus metabolites containing the 2-cyclohexene-1-one moiety.

The analytical method used to determine residues of sethoxydim and its metabolites in alfalfa forage, hay and seed is BWC Agricultural Method 30B. This method involves initial extraction of the RAC with methanol, precipitation with calcium hydroxide, dichloromethane partitioning, oxidation with hydrogen peroxide to form substituted pentanedioic acids, methylation, dichloromethane partitioning, silica gel column chromatography, and gas chromatography using a sulphur-specific flame photometric detector. Recoveries of sethoxydim and its metabolites ranged from 60-103% for alfalfa forage, 50-99% for hay and 83-110% for seed (at fortification levels of 0.05-30 ppm).

Residue data for alfalfa forage, hay and seed were submitted with PP#3F2904 (Acc. No. 071661). Alfalfa was treated at rates of 0.4, 0.5 or 1.0 lbs.a.i./A for either 1 or 2 applications, and samples of forage, hay and seed were obtained at 5-130 day PHI's. When two applications were made, the intervals between applications ranged from 20-107 days. Results are summarized in the table on the next page.

We calculate a 95% confidence limit based on these data for 3 applications at 0.5 lbs.a.i./A and reduce this value by a factor of 0.28/0.50 (proposed application rate/rate used for residue studies). Since no data are available for three applications of Poast®, we extrapolate using 95% confidence limits for 1 and 2 applications of the pesticide. Assuming approximately 75% recovery, we conclude that it is unlikely that total sethoxydim residues will exceed 30 ppm in alfalfa forage and 15 ppm in alfalfa hay.

Alfalfa meal is a processed commodity made by flash dehydration of alfalfa fodder. This method of dehydration is used rather than field-drying of the fodder because in the former method, loss of valuable nutrients is minimized. In the absence of residue data for alfalfa meal, and considering the attempt to minimize loss of nutrients (organic compounds) in the processing of fodder to produce alfalfa meal, we will assume that residues in alfalfa meal will be near those found in forage when a 20-day PHI is imposed and will therefore not exceed 15 ppm.

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Sethoxydim Residues in Alfalfa Forage, Hay and Seed

Commodity	Application Rate (lbs.a.i./A)	PHI	Residue Range (ppm)
Forage	0.5	5	10.2
"	"	7- 9	7.7 -10.7
"	"	10-20	0.27- 7.3
"	"	21-31	<0.05- 4.0
"	"	>38	<0.05-0.35
"	0.5 + 0.5	5	10.5
"	"	7- 9	8.0 -14.1
"	"	10-20	<0.05- 7.5
"	"	21-34	0.1 - 4.3
"	"	>37	<0.05- 1.3
"	0.4	23	4.4, 4.8
"	"	33	0.15
"	"	102	0.39
"	0.4 + 0.4	23	6.3
Hay	0.5	17	9.5
"	"	20-29	0.35- 5.6
"	"	31-38	0.43- 2.0
"	"	>47	<0.05- 1.6
"	0.5 + 0.5	17	12.05
"	"	20-28	0.56- 5.3
"	"	38	0.85- 4.3
"	"	>54	0.26- 0.27
"	0.4	17	10.4 ,10.5
"	"	33	<0.05
"	"	96	3.5 , 3.7
"	0.4 + 0.4	17	12.7
Seed	0.5	67	0.21
"	1.0	67	0.48

Meat, Milk, Poultry and Eggs

The diets of beef cattle could consist of 16.4 ppm sethoxydim residues based on 5% cottonseed soapstock (15 ppm tolerance), 5% soybeans (10 ppm), 20% sugar beet molasses (0.5 ppm), 20% sugar beet tops (0.2 ppm) and 50% alfalfa forage (30 ppm). The diets of dairy cattle could consist of 26.5 ppm sethoxydim residues based on 5% cottonseed soapstock (15 ppm), 15% soybeans (10 ppm), and 80% alfalfa forage (30 ppm). The diets of turkeys/broilers could consist of 3.6 ppm sethoxydim residues based on 5% cottonseed soapstock (15 ppm), 20% soybeans (10 ppm), 4% sugar beet molasses (0.5 ppm) and 5% alfalfa meal (15 ppm). The diets of laying hens could consist of 6.6 ppm sethoxydim residues based on 5% cottonseed soapstock (15 ppm), 50% soybeans (10 ppm), 4% sugar beet molasses (0.5 ppm) and 5% alfalfa meal (15 ppm).

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Sethoxydim residues in animals

Commodity	Residue (ppm) 50 ppm in Diet
Beef muscle	<0.03
" liver	<0.15 - 0.20
" kidney	<0.15 - 0.16
Milk	<0.05 - 0.06

Commodity	Residue (ppm) 25 ppm in Diet	80 ppm in Diet	250 ppm in diet
Chicken fat	<0.05	0.05	0.17
" kidney	0.75	1.04	1.46
" liver	0.40	0.42	1.26
" muscle	0.06	0.10	0.21
" skin	0.10	0.23	0.60
Eggs	0.31 - 1.08	1.04 - 3.9	2.15 - 11.9

Based on these data, we conclude that it is unlikely that the established tolerances of 0.2 ppm for the meat, fat and meat by-products of cattle, goats, hogs, horses, poultry and sheep, 0.05 (N) ppm for milk, and 0.5 ppm for eggs will be exceeded 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 parent plus metabolites containing the 2-cyclohexene-1-one moiety.

(2) Combined residues of sethoxydim are not likely to exceed 30 ppm in alfalfa forage, and 15 ppm in alfalfa hay and meal as a result of the proposed use. Residues are not likely to exceed the established tolerances of 0.2 ppm in the meat, fat and meat by-products of cattle, goats, hogs, horses, poultry and sheep, 0.05 (N) ppm in milk, and 0.5 ppm in eggs as a result of the proposed use.

(3) Analytical methods are available for enforcement (PP#3F2904, Acc. No. 071661 for hay and straw: Method No 30B; PP#0G2396, Acc. No. 099538 for animal tissues).

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

Recommendations

TOX considerations permitting, RCB has no objections to this section 18. An agreement should be made with the FDA regarding the legal status of the treated commodities in commerce.

cc:Sethoxydim (Poast®), S.F., R.F., Section 18 S.F., Circu,
M. Metzger, PMSD/ISB
RDI:E.Zager:EZ:8/22/86:RDS:8/22/86
TS-769:RCB:M.Metzger:MM:Rm814a:CM#2:8/22/86