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

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OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM February 8, 1994

SUBJECT: Amended use on wheat to change PHI from 70 days to 60 days in MN, MT, ND, and SD only.
TILLER® EC Herbicide: EPA Reg. No. 8340-38.
MRID 42915800, 42915801, 42915802.
CBTS Number 12608.

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Hoechst Celanese Corporation is requesting an amended registration (amended use) for TILLER® EC Herbicide for use on wheat in MN, MT, ND, and SD only. TILLER® EC Herbicide, EPA Reg. No. 8340-38 contains fenoxaprop-ethyl ((+-)-ethyl 2-[4-[(6--chloro-2-benzoxazolyl)oxy]phenoxy] propanoate), and isooctyl-esters of 2,4-D and MCPA.

Permanent tolerances for combined residues of fenoxaprop--ethyl ((+-)-ethyl 2-[4-[(6-chloro-2-benzoxazolyl)oxy]phenoxy] propanoate) and its metabolites 2-[4-[(6-chloro-2-benzoxazolyl)-oxy]phenoxy]propanoic acid and 6-chloro-2,3-dihydrobenzoxazol-2--one, each expressed as fenoxaprop-ethyl have been established previously (40 CFR 180.430(a)) for the raw agricultural commodities cottonseed, peanuts, peanut hulls, rice grain, soybeans, and wheat grain at 0.05 ppm, and wheat straw at 0.5 ppm. "Interim" tolerances (more properly called "tolerances with an expiration date"), to expire April 12, 1996, are established for residues of fenoxaprop-ethyl and its metabolites {2-[4-[(6--chloro-2-benzoxazolyl)oxy]phenoxy]propanoic acid} and 6-chloro--2,3-dihydrobenzoxazol-2-one each expressed as fenoxaprop-ethyl,

in meat, meat byproducts and milk. Feed additive tolerances for fenoxaprop-ethyl have not been established.

A registration standard has not been issued for fenoxaprop-ethyl.

We have recently discussed the proposed protocol for obtaining wheat residue data in support of a 60 day PHI in wheat in ND, SD, MN, and MT (EPA Reg. No. 8340-38, G. F. Kramer, 1-7-94).

CONCLUSIONS

1. The nature of the residue in plants and animals is adequately known. The residue of concern in plants and animals consists of fenoxaprop-ethyl and its free acid metabolite {2-[4-[(6-chloro-2-benzoxazolyl)oxy]phenoxy]-propanoic acid} and 6-chloro-2,3-dihydrobenzoxazol-2-one.

2. Adequate methods for the analysis of fenoxaprop-ethyl and its metabolites have been forwarded for publication in the Pesticide Analytical Manual.

3. For the purposes of amending the use to allow a 60 day PHI in the states of ND, SD, MT and MN, the geographical representation is adequate.

4. Previously submitted storage stability data are adequate to cover the currently submitted field trials. Additional storage stability data are not required.

5. Residues of fenoxaprop-ethyl and its metabolites are not expected to exceed existing tolerances when used according to the amended use pattern, with a 60 day PHI only in the states of Minnesota, Montana, North Dakota, and South Dakota, and a 70 day PHI in all other states. No detectable residues of fenoxaprop-ethyl were found in wheat grain or wheat straw harvested 60 days after application of TILLER® EC at 0.09 lbs. a.i./A.

6. Residues of fenoxaprop-ethyl in meat and milk from the proposed amended use are not likely to exceed the existing tolerances.

RECOMMENDATIONS

We recommend for the proposed amended use of TILLER® EC fenoxaprop-ethyl ((+-)-ethyl 2-[4-[(6-chloro-2-benzoxazolyl)oxy]-phenoxy] propanoate) and its metabolites 2-[4-[(6-chloro-2--benzoxazolyl)oxy]phenoxy]propanoic acid and 6-chloro-2,3-dihydro-benzoxazol-2-one, each expressed as fenoxaprop-ethyl on the raw agricultural commodity wheat.

DETAILED CONSIDERATIONS

Directions for Use:

TILLER® EC Herbicide contains 5.17% of the active ingredient fenoxaprop-ethyl, 10.355 of the isooctyl ester of 2,4-D, and 32.11% of the isooctyl ester of MCPA, equivalent to 0.44 pounds, 0.58 pounds, and 1.75 pounds per gallon respectively of the three ingredients. TILLER® EC Herbicide is used for control of green and yellow foxtail, volunteer and wild millet species, barnyardgrass, wild oats and certain broadleaf weeds in spring wheat and winter wheat (excluding durum). Apply by ground equipment in a minimum of 10 gallons of spray per acre. Apply by aerial application in a minimum of 5 gallons of spray per acre. Aerial application should be made at a maximum height of 10 feet above the crop.

The time of application is determined by the growth stage of the wheat. Apply TILLER® EC Herbicide when spring wheat begins to tiller (3-4 leaf stage) up to the 6 leaf stage. Winter wheat should have a minimum of three tillers before application. Do not spray spring or winter wheat after jointing begins. Depending upon weed species, apply 1 pint to 1.7 pints (16 to 27 fluid oz) per acre (equivalent to 0.05 to 0.09 lbs. a.i./A.).

Do not apply to durum wheat, rye, tame oats or corn. Do not apply more than 1 application in a growing season. Do not apply more than 1.7 pints per acre per growing season.

Do not apply TILLER® EC Herbicide within 60 days of harvesting wheat in the states of Minnesota, Montana, North Dakota, and South Dakota. Do not apply TILLER® EC Herbicide within 70 days of harvest in all other states. Do not apply this product through any sort of irrigation system.

Nature of the Residue

Plants:

Plant metabolism studies have been reported in soybeans (PP3G2940, R. Loranger, 11/9/83), rice (PP4G3035, R. Loranger, 6/7/84), cotton, peanuts and wheat (PP8F3599, M. Bradley, 5/20/88). It has been concluded that the metabolic pathway for fenoxaprop-ethyl is similar in these plants. The parent compound fenoxaprop-ethyl is cleaved to yield 2-[4-[(6-chloro-2--benzoxazolyl)oxy]phenoxy]propanoic acid which subsequently loses phenoxypropionic acid to yield 6-chloro-2,3-dihydrobenzoxazol-2--one.

The nature of the residue in plants is adequately known. The residue of concern in plants consists of fenoxaprop-ethyl and

its free acid metabolite {2-[4-[(6-chloro-2-benzoxazolyl)oxy]-phenoxy]propanoic acid} and 6-chloro-2,3-dihydrobenzoxazol-2-one.

Animals:

The metabolism of fenoxaprop-ethyl in animals has been previously considered in rats and lactating ruminants (see review of PP6F3316, 2/4/86). It was reported that 6-chloro-2,3-dihydro-benzoxazol-2-one constituted 75% of the residue in milk and 50% of the residue in the tissues of liver and kidney. No information was available concerning the relative amounts of parent and the two metabolites in ruminant tissues, since the analytical method used in the ruminant study was the enforcement method resulting in a common analyte, 6-chloro-2,3-dihydro-benzoxazol-2-one.

In our reviews of 2/2/90 and 12/14/90, PP9F3714, we have concluded that for tolerances of 0.5 and 0.05 ppm on wheat straw and grain respectively the residue of concern in ruminants and swine are parent compound, its free acid, fenoxaprop and 6-chloro-2,3-dihydrobenzoxazol-2-one.

Analytical Method:

The analytical method is the "9/5/86 HRAV-4" method discussed by Nancy Dodd review of 10/30/86, PP6F3316 Soybeans and Rice. This method has undergone a successful method trial in rice in our laboratories and has been forwarded for inclusion in the Pesticide Analytical Manual. In brief, the method involves reflux extraction with acetonitrile, water, and hydrochloric acid, column cleanup on Extrelut QE column. The hydrolysis product 6-chloro-2,3-dihydrobenzoxazol-2-one is reacted with acetic acid/pyridine, and the acetyl derivative is further cleaned up by reverse phase and silica gel chromatography. Quantitation is by electron capture gas chromatography. The analytical method detects the parent compound fenoxaprop-ethyl and its metabolites 2-[4-[(6-chloro-2-benzoxazolyl)oxy]phenoxy]-propanoic acid and 6-chloro-2,3-dihydrobenzoxazol-2-one, as the acetyl derivative of 6-chloro-2,3-dihydrobenzoxazol-2-one. Residues of these compounds are each expressed as fenoxaprop--ethyl equivalents. The method is claimed to be sensitive to 0.05 ppm of fenoxaprop-ethyl equivalents.

Recoveries of fenoxaprop-ethyl at fortification levels of 0.05 to 0.1 ppm ranged from 73.5% to 120.3% in wheat grain and 73.6% to 108.6% in wheat straw from fortification levels of 0.05 to 0.5 ppm. Recoveries of 6-chloro-2,3-dihydrobenzoxazol-2-one at fortification levels of 0.05 to 0.1 ppm ranged from 71.4% to 86.5% in wheat grain, and from 77.8% to 84.8% in wheat straw from fortification levels of 0.05 to 0.5 ppm. Recoveries of fenoxaprop (free acid) at fortification levels of 0.05 to 0.1 ppm

ranged from 83.9% to 101.6% in wheat grain, and from 74% to 96.1% in wheat straw from fortification levels of 0.05 to 0.5 ppm.

A recent method trial in our Beltsville laboratories has indicated that method HRAV-8 for analysis of fenoxaprop-ethyl, fenoxaprop (free acid), and its metabolite 6-chloro-2,3-dihydro-benzoxazol-2-one in meat, milk, and liver was slow (more than one work day) but it was considered adequate. The method is considered suitable for enforcement (PP6F3316). Multi-residue methods are available for residues of fenoxaprop-ethyl, fenoxaprop (free acid), and its metabolite 6-chloro-2,3-dihydro-benzoxazol-2-one under Protocol 1 through 4 and the data have been forwarded to FDA (See M. J. Bradley review of PP8F3599, 5/20/88).

Storage Stability

Storage stability data have been previously submitted in PP6F3316 (N. Dodd, 2/4/86) for residues of fenoxaprop-ethyl on soybeans for intervals up to 2 years and in PP8F3599 (M. Bradley, 5/20/88) in peanuts for intervals for up to 6 months. All samples discussed in this submission were analyzed within the above time frames, (< 5 months), and we are not requesting additional storage stability data.

Magnitude of the Residue - Field Trials

The residue data were generated by Hoechst Celanese Corporation and by its subcontractors Pan-Agricultural Laboratories, Madera, California, and Colorado Analytical Research and Development Corp. Colorado Springs, Colorado.

Geographical Representation

The field trials were conducted in Minnesota (MN) only. Previously submitted data reflecting shorter PHI's were generated in North Dakota (ND). [Residue data are available from other states in support of the 70 day PHI]. No field residue data are available for Montana (MT) and South Dakota (SD). For the purposes of amending the use to allow 60 day PHI in the states of ND, SD, MT and MN, the geographical representation is adequate.

Application:

Hard red spring wheat was treated at 0.1 (1x) and 0.2 lbs. (2x) a.i./A. Samples of intact heads, grain, and straw were taken at 50-54, 60, and 65 days. The 50-54 day samples were taken at the soft-dough growth stage. Application was made by ground equipment as a broadcast spray. In MN-01 a tractor mounted 20 foot boom power by compressed air was used while in MN-02 application was made by hand held compressed air back pack

sprayer. Standard regional cultural practices were followed for each trial location. Soil and climate data are included in the submission, and weather conditions were apparently typical for the locations. The 50-54 day samples were collected at each trial location by cutting intact-heads and straw with grass clippers. The 60 and 65 day wheat was harvested by combining with a small plot harvester. Grab subsamples (12) of straw and wheat grain were obtained from one of the three passes of the harvester. The harvested grain was cleaned by a gravity cleaner and transported on ice to the freezer.

Wheat Grain

No detectable residues of fenoxaprop-ethyl were found in wheat grain harvested 60 days after application of TILLER® EC at 0.09 lbs. a.i./A.

Wheat Straw

No detectable residues of fenoxaprop-ethyl were found in wheat straw harvested 60 days after application of TILLER® EC at 0.09 lbs. a.i./A.

Residues of fenoxaprop-ethyl and its metabolites are not expected to exceed existing tolerances on wheat when used according to the amended use pattern, with a 60 day PHI only in the states of Minnesota, Montana, North Dakota, and South Dakota, and a 70 day PHI in all other states.

Supporting Data:

Residue data were submitted in PP3F4182, fenoxaprop-ethyl on barley, which reflect application of Tiller® EC to barley at rates of 0.1-0.2 lbs. a.i./A. and PHI's ,of 58-78 days. No detectable residues (<0.05 ppm) were found in barley grain and straw (memo of D. Davis, 8/17/93). These data were generated in Minnesota, Montana, and North Dakota.

Meat, Milk, Poultry, and Eggs

Since we have concluded that residues of fenoxaprop-ethyl are not likely to exceed existing tolerances in wheat grain and wheat straw, existing meat and milk tolerances are adequate.

cc: RF,Circ(7), Cook, Amended Use File, PP9F3714
CBTS:7509C:Rcook:Rm804H
RDI:R.S.Quick:2/8/94:R.Loranger:2/8/94:de:2/8/94