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

DEC 5 1989

OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

Memorandum

SUBJECT: Fonofos (Dyfonate®) on Processed Sugar Beet Products.  
Amendment to Remove Geographical Restriction.  
EPA Reg. No. 10182-180 and EPA Reg. No. 10182-135  
MIRD #406204-03, DEB # 5845 and 5846.

FROM: Freshteh Toghrol, Ph.D., Chemist *F. Toghrol*  
Special Registration Section II  
Dietary Exposure Branch  
Health Effects Division (H7509C)

THRU: Leung Cheng, Acting Section Head *L. Cheng*  
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TO: W. H. Miller, PM-16  
Registration Division (H7505C)

In response to the deficiencies recited in DEB's reviews of 1/6/87 (M. S. Metzger) and 8/21/89 (F. Toghrol), ICI Americas Inc. submitted a residue study for fonofos on processed sugar beet products. The deficiencies cited in DEB's memo of 8/21/89 are restated below, followed by the registrant's response and DEB's comments:

Deficiency #1, Restated from DEB memo dated 8/21/89

The available residue data for applications of Dyfonate® as described in the proposed use are inadequate. Data are required reflecting the maximum proposed use rate from representative sugar beet growing areas (CA, MN, ID, ND, and MI).

Petitioner's Response

The petitioner ICI Americas Inc., submitted (5/26/89) residue data (from 6 field trials) for fonofos (Dyfonate® 20G) in or on sugar beet grown in CA, ID, MI, MN, and ND (see F. Toghrol memo dated 8/21/89).

DEB'S Comments restated from DEB's memo dated 8/21/89

1. The submitted residue data are adequate to support a national registration for the use of Dyfonate 10G, and 20G on sugar beets.
2. Established tolerances (40 CFR 180.221) for fonofos and its metabolite fonofos oxon in or on sugar beet tops at 0.1 ppm is adequate to cover this proposed amended registration.
3. Deficiency #1 is resolved.

Deficiency #2 Restated from DEB's memo dated 8/21/89

A sugar beet processing study is required in order to estimate residues in dehydrated pulp, molasses and refined sugar.

Petitioner's Response

The petitioner ICI America's Inc. has submitted a sugar beet processing study to the Agency on 5/11/88 (MIRD #40620403). Sugar beets (Var. BJ-19) were grown in plots near Crookstone, Minnesota. Total of three plots were used, one untreated control plot and two treated plots. Each treated plot received one application of Dyfonate® applied in-furrow at planting, at 1.5 lb ai/A (1X registered use) and 3.75 lb ai/A (2.5X) to the respective plots. At maturity, sugar beets from each plot were shipped to American Crystal Sugar Company in Moorehead, Minnesota for subsequent processing. Additionally, 1 kg samples from each plot were frozen within 45 minutes of harvest and sent frozen to ICI Americas Western Research Center (WRC), Richmond, California for residue analysis. The sugar beets were processed into dry pulp, molasses, and refined sugar. The processing procedure is briefly summarized below: The beets with tops removed are washed and sliced into cossettes that are metered in a diffuser in which the sugar is extracted with hot water to make a raw juice. The pulp is pressed and dried (dry pulp sample). The raw juice is purified with milk of lime and carbon dioxide, filtered and concentrated under vacuum to obtain a concentrated liquor with about 63% dissolved solids. The concentrated juice is boiled under vacuum until the sugar crystallizes. The sugar is separated from the syrup (molasses) by

centrifugation, washed and dried.

The analytical method used to generate data is "Determination of Fonofos and Fonofos Oxon Residues in Potato Matrices by Gas Chromatography", ICI Americas Report No. RRC 88-24. The method is modified for sugar beet and sugar beet processed products as follows: Fonofos and fonofos oxon are extracted from sugar beets and pulp by maceration in the presence of toluene. The extracts are analyzed directly for fonofos and fonofos oxoh by using capillary gas chromatography with nitrogen/phosphorus detection. Molasses and refined sugar are extracted with toluene after adding water to the samples in a 2:1 (water:sample) ratio. A detection limit of 0.01 ppm was achieved for all samples using this method. Percent recoveries for fonofos at 0.01 ppm fortification level, ranged from 70 to 110 in all commodities with a mean of 88%. Percent recoveries for fonofos oxon at 0.01 ppm fortification ranged from 80 to 120 with a mean of 103.

Storage stability data for potatoes as a representative of the root crop group are submitted. These data indicated that fonofos is stable up to two years under frozen conditions, with recovery ranging from 76 to 97%. Sugar beets and sugar beet processed products in this study were stored not more than 132 days.

Residues of fonofos and fonofos oxon in processed fractions were all non-detectable. Summary of the residue data for fonofos and fonofos oxon in sugar beets (tops and roots), refined sugar, molasses and dried pulp is provided below:

<u>Sample Type</u>	<u>Rate lb ai/A</u>	<u>Fonofos/fonofos oxon ppm found</u>
Sugar beet tops	1.5 (1X)	<0.01/<0.01
Sugar beet tops	3.75 (2.5X)	<0.01/0.01
Sugar beet roots	1.5	<0.01/0.01
Sugar beet roots	1.5	<0.01/0.01
Sugar beet roots	3.75	0.037/<0.01
Sugar beet roots	3.75	<0.01/0.01
Dry pulp	1.5	<0.01/0.01
Dry pulp	1.5	<0.01/0.01
Molasses	1.5	<0.01/0.01
Molasses	3.75	<0.01/0.01
Refined Sugar	1.5	<0.01/0.01
Refined sugar	3.75	<0.01/0.01

DEB's Comment

Results from the above study show no concentration of fonofos and fonofos oxon residues in refined sugar, molasses and dry pulp.

Deficiency #2 is resolved

Deficiency #3, Restated from DEB's memo dated 8/21/87

Sugar beet commodities are used as ruminant and poultry feed items. Ruminant and poultry metabolism and feeding studies is required by the Fonofos Registration Standard and must be submitted.

Petitioner's Response

The petitioner in their cover letter 5/26/89 states that poultry and goat feeding studies have been submitted to the Agency [poultry, 7/15/88 (MIRD 40749501), and goat 6/10/88 (MIRD # 4057501)].

DEB'S Comment

The above cited studies were reviewed by DEB W. Smith, 8/26/89, indicating terminal residue of concern in meat, milk, poultry, and eggs is methyl phenyl sulfone. Goat and hens received 3 ppm and 15 ppm of labelled fonofos. The results of <sup>14</sup>C distribution in different tissues (received 15 ppm) were as follows: For goat fat (0.58 ppm), muscle (0.43 ppm), kidney (1.42 ppm), liver (1.39 ppm) and milk (ca. 0.5 ppm) and for hens fat (1.2 ppm), muscle (0.82 ppm), liver (1.59 ppm), and eggs (1.62 pm).

Sugar beet processed fractions may be fed to livestock and poultry, but since sugar beet tops, molasses and sugar beet pulp contain non detectable residues, finit transfer of secondary residues to meat and milk from these feed items is not expected.

Fonofos is registered for use on other feed items. At this time no final conclusion regarding the need for meat and milk tolerances is being made.

DEB reserves decision on the need for tolerances of residues in meat, milk, poultry and eggs and feeding studies pending resolution of deficiencies in the data concerning the magnitude of residues in feed items (W. Smith, 8/26/89).

Conclusion

1. The submitted residue data are adequate to support a national registration for Dyfonate 10G (EPA Reg. No. 1082-180) and 20G (EPA Reg. No. 10182-135) on sugar beets.
2. The established tolerance (40 CFR 180.221) for fonofos and its metabolite fonofos oxon in or on sugar beet tops at 0.1 ppm is adequate to cover this proposed amended registration.
3. Results from a sugar beet processing study do not show any concentration of fonofos or fonofos oxon in refined sugar, molasses and dry pulp.
4. At this time no final conclusion regarding the need for meat and milk tolerances is being made. DEB reserves decision on the need for tolerances of residues in meat, milk, poultry and eggs and feeding studies pending resolution of deficiencies in the data concerning the magnitude of residues in feed items (W. Smith, 8/26/89).

Recommendation:

Tox consideration permitting, we have no objection to the elimination of current geographical restrictions for the use of fonofos on sugar beet.

cc: Fonofos (Dyfonate), RF, SF, Reg. Standard File, Circ., Reviewer (Freshteh Toghrol), SACB (R. Tomberlin), ISB/PMSD (Eldredge).  
RDI: L. Cheng, Acting Section Head(11/30/89), E. Zager Deputy Branch Chief(12/1/89).  
H7509C DEB: F.T., CM#2: RM:802: 557-7887 , F.T. (12/5/89).