

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: 3/2/79

SUBJECT: PP# 9F2159. Trifluralin on asparagus. Evaluation of analytical methods and residue data.

FROM: John H. Onley, Research Chemist, Residue Chemistry Branch, HED (TS-769)

TO: Product Manager No. 23-RD (TS-767) and TOX (TS-769)

Thru: Acting Chief, Residue Chemistry Branch *R.D. Schmitt for*

The Elanco Products Company, a Division of Eli Lilly and Co., proposes a tolerance of 0.05 ppm for residues of the herbicide, trifluralin (α, α, α -trifluoro-2,6-dinitro-N,N-dipropyl-p-toluidine--trade name, Treflan) in or on asparagus.

Trifluralin tolerances have been established for many commodities [40 CFR 180.207] at levels ranging from 0.05-2 ppm. Food additive tolerances of 2 ppm have been established for peppermint oil and spearmint oil [21 CFR 193.440].

A temporary tolerance (PP# 4G1501) of 0.05 ppm for residues of trifluralin in or on asparagus will expire on April 11, 1979.

Conclusions

1. The degradation of trifluralin in or on other crops has been adequately delineated. The residue of concern is considered to be the parent compound, trifluralin.
2. The ECGC Procedure No. 5801616 and ECGC/TLC Procedure No. 5801280/5801110 are adequate to enforce the proposed tolerances.
3. The data indicate that trifluralin residue will not exceed the proposed 0.05 ppm tolerance level.
4. The proposed use involves no feed items; there will be no problem of secondary residues resulting in meat, milk, poultry and eggs.
5. We do not expect nitrosamines of trifluralin to cause residue problems. However, it should be noted that trifluralin is a pre-RPAR candidate (Telephone conversation with Mr. Tom Miller-Project Manager - Special Pesticides (TS-791) - 1/19/79).

Recommendations

TOX and EFB considerations permitting, we recommend that the proposed tolerance be established. However, we must reiterate that trifluralin is a pre-RPAR candidate.

Detailed Considerations

Formulation

INERT INGREDIENT INFORMATION IS NOT INCLUDED

Trifluralin is formulated as a 4 lb/gal emulsive concentrate under the trade name, Treflan E. C., consisting of 44.5% technical trifluralin and 55.5% inert ingredients [REDACTED]

[REDACTED] The inert ingredients are cleared under Section 180.1001.

Additional information on the physical and chemical properties of trifluralin is found in Section A of PP# 7F0555. A modified trifluralin process was submitted to Registration Division on December 8, 1976 (Correspondence between Dr. G. W. Probst - Elanco Products Company and Dr. M. H. Rogoff - Registration Division).

Proposed Use

Treflan is used (split or single application) as a soil incorporated treatment to established asparagus after ferns are removed in the winter or early spring before spear emergence and/or after harvest is completed in late spring or early summer before ferning begins.

For split applications, the rates are 1-2 pints (0.5 - 1 lb a.i.)/acre: before harvest + 1-2 pints (0.5 - 1 lb a.i.)/acre: after harvest.

For single application, the rates are 2-4 pints (1-2 lbs ai.)/acre: before harvest or 2-4 pints (1-2 lbs a.i.)/acre: after harvest.

The recommended rates depend upon the soil texture and each rate is applied in 5 to 40 gallons of water per treated acre.

Nature of the Residue

The degradation of trifluralin in plants and animals has been elucidated in previous reviews (PP# 7G0533 - 10/31/66 - T. Woodward and PP# 7F0555 - 5/24/67 - R. Arnold and J. Wolff).

Trifluralin is absorbed and translocated in plants. The pathways for degradation indicate step - wise dealkylation and reduction. Radio-active tracer ($-C^{14}F_3$) studies in carrots show the total residues to be comprised of 80-85% parent compound; 1-7% metabolite, α,α,α -trifluoro-2,6-dinitro-N-(n-propyl)-p-toluidine; and suggested minor metabolites 4-trifluoromethyl-6-nitro-N,N-propyl-O-phenylene diamine and 3,5-dinitro-4-(di-n-propylamino)-benzoic acid.

No new metabolic data for trifluralin are presented in this petition. We expect the degradation pathways in asparagus to be similar to those found in carrots. The major residue of concern appears to be the parent compound, trifluralin.

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In animals, trifluralin and its metabolites were not found in blood, milk and tissue. Low amounts of metabolites 2,6-dinitro-4-trifluoromethylaniline; α,α,α -trifluoro-5-nitrotoluene-3,4-diamine; α,α,α -trifluoro-5-nitro-N⁴-(n-propyl)-toluene-3,4-diamine; and 2,6-dinitro-N-(n-propyl)-p-toluidine were found in feces and urine after large doses of trifluralin were administered. In dogs and goat studies, metabolite N², N²-di-(n-propyl)-3-nitro-5-trifluoromethyl-0-phenylenediamine was found to be the major residue in the urine and feces.

We conclude that the above metabolic studies are adequate for the establishment of the proposed tolerance.

Analytical Method

Trifluralin residue data in or on asparagus were acquired by Elanco Procedure 5801616, "Determination of Trifluralin in Agricultural Crops and Soil." The declared sensitivity of the method is about 0.01 ppm.

In brief, the sample is extracted with methanol, and aqueous sodium chloride solution is added to an aliquot of the extract. The sample is then cleaned up by liquid-liquid partition with methylene chloride and by a Florisil column. Measurement of trifluralin is made by electron capture gas-liquid chromatography.

Validation data are submitted on asparagus at a fortification level of 0.05 ppm; the recovery values range from 37 to 91% (average = 64%). Although a review of the recovery data shows 3 laboratories with values of 37-50%, we do not question the validity of the procedure; it is essentially the same procedure (Method II in PAM Vol. II) that our laboratory successfully tested on cucumbers and carrots at fortification levels of 0.05 and 1.5 ppm, respectively. Method 5801616 is reported to have a background of about 0.005 ppm. Samples having less than 0.01 ppm are evaluated as having no detectable residue (NDR).

In view of the above, we conclude that adequate methodology is available for enforcement of the proposed tolerance (0.05 ppm trifluralin) in or on asparagus.

Residue Data

Experimental studies were carried out in the States of Washington (Basin City, Dayton) and California (Salinas, Irvine). At Basin City, Washington, asparagus was grown in medium textured soil which was treated at different rates of 1, (1+1), and (2+2) lbs a.i./acre. No detectable trifluralin residue was found. At Dayton, Washington, medium textured soil treated at rates of (0.75 + 0.75 lb a.i./acre) yielded asparagus that contained no detectable residue. Experiments carried out at Salinas, California involved the following treatments: Fine soil - 1+1, 2, 2+2 and 4+4 lbs a.i./acre; Coarse soil - 0.5 + 0.5, 1, 1+1, and 2 lbs a.i./acre. From the fine soil treatments, residues in or on asparagus ranged between 0.01-0.02 ppm. No residues were found in asparagus that

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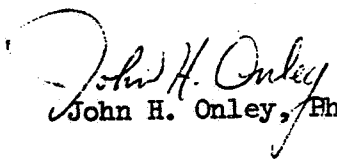
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was grown in the treated coarse textured soil. Experiments carried out at Irvine, California were done in coarse textured soil [(1+1) and 2 lbs a.i./acre] and medium textured soil [2 and (2+2) lbs a.i./acre]. Residues of 0.01 ppm trifluralin was found in only one experiment (medium textured soil - 2+2 lbs a.i./acre).

The above residue data were obtained from asparagus that was grown only on the West Coast. However, in a previous temporary petition (PP# 4G1501), residue data were presented where asparagus was grown in the States of Delaware, Illinois, Michigan, California and Washington. Trifluralin was applied at rates of 0.5 to 2 lbs a.i./acre on a broadcast basis after the last cutting but before ferning. Samples of spears were collected 4-8 weeks after application. Residue levels, except for two samples, were below the level of detection. The residues found in the two positive samples were below 0.02 ppm. The collective data demonstrate that residues of the parent compound should not exceed the 0.05 ppm proposed tolerance.

Meat, Milk, Poultry and Eggs

The proposed use involves no feed items; no problem of secondary residues in meat, milk, poultry and eggs is expected to occur.


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