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

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OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCESMEMORANDUM

SUBJECT: PP# 9F3712. Metalaxyl on Green Hops. Petition to Revise Tolerance. MRID# 409094-01. DEB Nos. 4811, 4812, 4813.

FROM: Stephanie H. Willett, Chemist *SHW*  
Tolerance Petition Section 2  
Dietary Exposure Branch  
Health Effects Division (H7509C)

THRU: Richard D. Schmitt, Ph.D., Acting Chief  
Dietary Exposure Branch  
Health Effects Divisions (H7509C) *Richard D. Schmitt*

TO: Lois Rossi, PM 21  
Registration Division (H7505C)  
and  
Toxicology Branch-HFM Support  
Health Effects Division (H7509C)

Ciba-Geigy Corporation is requesting an increase in the present tolerance of metalaxyl [N-(2,6-dimethylphenyl)-N-(methoxyacetyl-alanine methyl ester)] and its metabolites containing the 2,6-dimethylaniline moiety and N-(2-hydroxymethyl-6-methylphenyl)-N-methoxyacetyl) alanine methyl ester on green hops from 0.5 ppm to 2 ppm in the subject petition.

Tolerances are established on several R/C's in 40 CFR 180.408 at levels ranging from 0.05 to 20 ppm. Food and feed additive tolerances are established in 40 CFR 185.4000 and 186.4000, respectively, at levels ranging from 0.4 to 20 ppm. DEB recently recommended for the establishment of a 20 ppm tolerance on dried and spent hops, a level adequate to cover use of metalaxyl on hops imported from Germany (see memo of S.H. Willett dated 11/17/88, FAP# 7H5532).

The product and residue chemistry chapters of the Final Registration Standard and Tolerance Reassessment (FRSTR) was issued on June 22, 1987. Several data gaps were cited.

### Conclusions and Recommendations

DEB concludes that residue chemistry requirements have been adequately addressed for this tolerance revision only. All previous deficiencies cited in the product and residue chemistry chapters of the metalaxyl FRSTR and in pending petition requests still apply. TOX considerations permitting, DEB recommends for the revised tolerance of 2 ppm metalaxyl and its major metabolites on green hops.

### DETAILED CONSIDERATIONS

#### Manufacture and Formulation

The formulation proposed for use on green hops is Ridomil<sup>®</sup> 2E fungicide (EPA Reg. No. 100-607). Ridomil<sup>®</sup> 2E contains 25.1% technical grade metalaxyl (2 lb ai/gal).

Technical grade metalaxyl has a purity of about 90%. The impurities are not expected to present any residue problems when the chemical is used as proposed here. Note that additional information concerning the technical grade active ingredient and the likely impurities has been requested in the FRSTR.

#### Proposed Use

Ridomil 2E is presently applied to the soil surface over the crowns after pruning but before training at 0.5 lb ai/A in a minimum of 20 gallons of water for control of downy mildew. For persistent infections the petitioner is proposing additional applications of up to two foliar sprays of metalaxyl at 0.5 lb ai/A/app in a tank mix combination with a copper fungicide. The total amount of metalaxyl to be applied in a season is 1.5 lb ai/A. The fungicide is to be applied with ground equipment in a minimum of 50 gallons of water. The proposed PHI is 45 days. It is assumed that previous animal feeding restrictions and precautions for use on hops will still apply.

#### Nature of the Residue

No new metabolism studies were submitted with this petition. Plant metabolism studies on lettuce, potatoes, grapes and other plant commodities were reviewed in support of other petitions and are summarized in the residue chemistry chapter of the FRSTR. It was concluded there that the nature of the residue in plants is adequately understood. Animal metabolism studies on rats and goats have previously been reviewed in support of other petitions and are also summarized in the residue chemistry chapter of the metalaxyl

FRSTR. The nature of the residue in animals was not considered to be adequately understood. Additional animal metabolism study data are required in response to data gaps cited in the FRSTR.

DEB will consider the nature of the residue to be adequately understood in both plants and animals for the purpose of this petition only, since hops is considered a minor crop. The residues to be regulated are metalaxyl and its metabolites containing the 2,6-dimethylaniline moiety, and N-(2-hydroxy-methyl-6-methyl-phenyl)-N-methoxyacetyl) alanine methyl ester. However, DEB still requires that the data gaps cited in the residue chemistry chapter of the FRSTR and other petition reviews concerning the nature of the residue in animals be filled.

#### Analytical Methodology

Analytical methods (GC) are available in the Pesticide Analytical Manual, Volume II, for analysis of metalaxyl and its major metabolites in several crops (Method I) and in animal tissues, milk and eggs (Method II). The limits of detection are 0.1 ppm in liver and kidney, 0.05 ppm in crops and meat, and 0.01 ppm in milk. Satisfactory method validation has been conducted by EPA on both methods. Therefore adequate analytical methods are available for enforcement of the proposed tolerance.

Data have been submitted on the recovery and behavior of metalaxyl and two of its metabolites (CGA-6286 and CGA-37734) tested through FDA multiresidue protocols I through IV in PAM I. Multiresidue test information are still required for the metabolite CGA-94689. DEB will not require this information to support this tolerance revision since hops can be considered a minor crop.

#### Residue Data

Field trials were conducted in Washington and Oregon, which are the major hop producing states. Hops were treated with one application of Ridomil 2E at 0.5 lb ai/A followed by two additional applications of Metalaxyl 48.8 WP at 1.95 lbs ai/A (0.49 lbs ai/A metalaxyl plus 1.46 lbs ai/A copper hydroxide). The total amount of metalaxyl applied was approximately equal to the maximum label rate of 1.5 lb ai/A. A 2X rate using Ridomil 2E at 1.0 lbs ai/A and Metalaxyl 48.8 WP at 3.9 lb ai/A (2 applications) was also applied to plots at the test locations. Samples were collected at 44 and 46 day PHI's. Samples were collected at random and frozen at -15°C until analyzed.

Samples were analyzed using Ciba-Geigy analytical method AG-395. The method determines metalaxyl and its major metabolites (detection limit 0.05 ppm). This GC method has been validated by EPA laboratories and is deemed to be adequate for data collection

and enforcement purposes. For these analyses, control samples were fortified at 1 and 2 ppm. Recoveries ranged from 74 to 110%. All samples were stored for approximately 11 months prior to analysis. Storage stability data are on record which support the stability of metalaxyl and its major metabolites in plants at -15 °C for periods of up to 12 months (see FRSTR).

The following residue data were submitted.

TABLE I. RESIDUES OF METALAXYL IN HOPS RESULTING FROM APPLICATIONS OF RIDOMIL 2E PLUS METALAXYL 48.8 WP

<u>Test Location</u>	<u>Rate</u>	<u>PHI (Days)</u>	<u>Sample</u>	<u>ppm Metalaxyl Equivalents</u>	
Oregon	control	-	green cones	0.21*	
	1X	46		1.2	
	1X	46		0.84	
	2X	46		0.79	
	control	-	dry cones	0.13*	
	1X	46		2.1	
	1X	46		2.5	
	2X	46		2.0	
	Washington	control	-	green cones	0.08
		1X	44		0.19
1X		44	0.24		
2X		44	0.42		
2X		44	0.53		
control			dry cones	0.73*	
1X		44		1.4	
1X		44		1.4	
2X		44		1.8	
2X		44	1.1		

\*Results were not corrected for control values

Results were corrected for procedural recoveries <100%

The maximum metalaxyl residues in green and dry hops treated at the 1X level were 1.2 and 2.5 ppm, respectively. The highest levels reported in the 2X treated samples of green and dry hops were 0.79 and 2.0 ppm, respectively.

Some processing study data were submitted with the tolerance revision request. Data submitted on spent hops, wort, yeast and

beer indicated that residues were nondetectable (<0.05 ppm), except in one yeast sample where 0.17 ppm metalaxyl was detected. This sample was a combination of 1X and 2X treated samples which were inadvertently mixed.

Data on green (wet) hops submitted in support of the previous tolerance of 0.5 ppm were obtained from treatment rates of up to 1.8 lb ai/A, applied to soil and foliage (see PP# 1F2537, memo of P.V. Errico dated 4/9/82). Total residues of 0.14-0.18 ppm and 0.2 ppm were reported in green hops treated at 0.5 and 1 lb ai/A, respectively, for a 108 day PHI. When one soil application of 0.5 lb ai/A is combined with two foliar applications of 0.2 lb ai/A (total 0.9 lb ai/A) total residues of 0.17-0.18 ppm were reported for a 35 day PHI. Doubling the soil and foliar application rates gave 0.71-0.89 ppm of total residues at a 35 day PHI. When metalaxyl was applied to soil at rates of 0.5 and 1 lb ai/A, total residue levels ranged from 0.36 to 1.2 ppm and 0.69 to 3.4 ppm, respectively, at 108 to 139 day PHIs. One soil application of 0.5 lb ai/A and 2 foliar applications of 0.2 lb ai/A gave reported total residues of 0.46 to 1.3 ppm at 35 to 38 day PHIs. Increasing the soil and foliar rates two fold lead to reported total residues of 3 to 4.6 ppm in samples harvested 35 days after the treatment. Controls were reported as 0.042 to 0.52 ppm. The analytical methodology used was AG-348, which is the regulatory method.

Additional residue data from field trials conducted in Germany were submitted in support of the 20 ppm tolerance on dry hops (FAP# 7H5532). Metalaxyl was applied to hops in excess of the label rate of 3.37 lb ai/A (German label). Samples were harvested about 14 days after the last treatment and analyzed. Residue levels ranged from 2.1 to 4.1 ppm on green hops, 10 to 16 ppm on dry hops, and <0.3 to 0.35 ppm on spent hops. Residue levels were determined using Ciba-Geigy Method 395, but with a modification in the determinative step (limit of quantitation 0.3 ppm).

DEB considers the residue data submitted to be adequate to support the revised tolerance of 2.0 ppm on green hops. The 20 ppm tolerance on dry and spent hops is adequate to cover potential residues in both domestic and imported dry and spent hops.

#### Meat, Milk, Poultry and Eggs

Spent hops are an animal feed item comprising up to 5% of the diet in beef and dairy cattle. Based on the available data on the processing of green hops to spent hops (see the discussion under residue data), residues in spent hops resulting from the current use will most likely not exceed 0.5 ppm. Therefore, the maximum expected contribution to the diet of cattle from the proposed use is  $\leq 0.025$  ppm (0.5 ppm x 5%). Although brewer's grain, a byproduct of the beer brewing industry which includes hops, is also an animal feed item, no residue data are required for brewer's grain since

hops comprise such a small percentage of it.

Presently, U.S. tolerances are established at 0.4 ppm in animal fat, kidney, and liver; 0.05 ppm in meat and meat byproducts (except kidney and liver); and 0.02 ppm in milk. The residue chemistry chapter of the metalaxyl FRSTR reserved any conclusion regarding the adequacy of established tolerances for meat and milk because additional livestock metabolism data and residue data for certain feed commodities were required.

Requests for future tolerance revisions and proposals will likely require that these studies be submitted prior to DEB approval. However, the proposed use on hops will result in an insignificant additional contribution to the diet of beef and dairy cattle compared to other feed commodities on which metalaxyl is used (e.g., peanut hay - 20 ppm tolerance x 60% of the diet of dairy cattle = 12 ppm). Therefore DEB will not withhold approval of the tolerance increase for this minor crop.

Since no poultry feed items are involved, no secondary residues are expected to occur in poultry and eggs from this use.

#### Other Considerations

An International Residue Limit status sheet is attached to this review. There are no Codex, Mexican or Canadian residue limits for metalaxyl on green hops. Therefore, no compatibility problems exist.

Attachment: International Residue Limit Status Sheet

cc: RF, SHWillet, PP#9F3712, Circ, ISB/PMSD (E. Eldredge), R. Tomerlin (SACB/TAS)

H7509C:DEB:CM#2:RM810:X1439:SHW:shw-4/10/89  
RDI: D. Edwards, 4/10/89; R. Loranger, 4/10/89

*J. Jones*  
*3/21/87*

INTERNATIONAL RESIDUE LIMIT STATUS

CHEMICAL metolaxyl

CODEX NO. \_\_\_\_\_

CODEX STATUS:

No Codex Proposal  
Step 6 or above (on green  
hops)\*

Residue (if Step 8): \_\_\_\_\_

Metolaxyl per se

Crop(s) Limit (mg/kg)

PROPOSED U.S. TOLERANCES:

Petition No. 953712

RCB Reviewer S. H. Killeff 3-21-87

Residue: metolaxyl and its

metabolites containing the 2,6-  
dimethylaniline moiety\*

Crop(s) Limit (mg/kg)

green hops 200

CANADIAN LIMITS:

No Canadian limit (on hops)

Residue: \_\_\_\_\_

Crop(s) Limit (mg/kg)

MEXICAN LIMITS:

No Mexican limit

Residue: \_\_\_\_\_

Crop(s) Limit (mg/kg)

**BEST COPY AVAILABLE**

\* There is a 10 ppm Codex limit on dry hops

NOTES:

\* and N-(2-hydroxymethyl-6-methylphenyl)-N-  
methoxyacetyl-alanine methyl ester