

2,4-D/TOX

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PP# OG2301, PAPP OH5252. 2,4-D in water. Evaluation of analytical methods and residue data.

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The Water and Power Resources Service (formerly the Bureau of Reclamation), USDI in cooperation with the U.S. Army Corps of Engineers is requesting temporary tolerances for residues of the aquatic herbicide 2,4-D (applied as either the dimethylamine salt or the butoxyethanol ester) at 1 ppm in fish (edible flesh) and in crops. Additionally, a food additive tolerance of 0.1 ppm is being proposed for residues in potable water. These tolerances are to cover use of the products (under an EUP) in the control of Eurasian watermilfoil at the following locations:

Lake Seminole Florida - Georgia
Robert S. Kerr Reservoir, Oklahoma
Fort Cobb Reservoir, Oklahoma
Banks Lake, Washington

Total of 18,600 lbs ai (as the acid) will be used to treat a total of 620 surface acres in these four lakes/reservoirs. Some 3% of the Fort Cobb reservoir will be treated; less than 1% of the surface area of the other lakes/reservoirs will be treated.

A similar EUP was granted for use in the Fort Cobb reservoir during 1974-1975 (see R.J. Hummel evaluations of PP# 4G1487/PAP# 4H5048, dated 5/14/74, 7/15/74 and 3/27/75).

There is presently a 0.1 ppm food additive tolerance for residues of 2,4-D in potable water (Sec 193.100) from the following treatments:

- a.) Irrigation ditch banks in the Western United States.
- b.) For water hyacinth control in various quiescent or slow moving bodies of water.
- c.) For Eurasian watermilfoil control in dams and reservoirs controlled by the TVA.

From the above uses, the following tolerances for residues of 2,4-D have been established (Sec 180.142) on the noted crops:

- 1.) From (a) above, 0.1 ppm on various crops and crop groupings.
- 2.) From (b) above, 1 ppm in fish, shellfish and various crops and crops groupings.
- 3.) From (c) above, 1 ppm in fish.

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Additionally, tolerances for residues of 2,4-D have been established for various crops at levels ranging from 0.05-1000 ppm and include tolerances for residues in meat, milk, poultry and eggs.

Conclusions

1. The residue of concern in water, fish and irrigated crops is 2,4-D.
2. Adequate methods are available to enforce the proposed tolerances.
- 3a. Residues are not likely to exceed the requested 1 ppm level for residues in fish or crops.
- 3b. Residues in potable water are not likely to exceed the proposed food additive tolerance level of 0.1 ppm.
4. The established tolerances for residues in meat, milk, poultry and eggs are adequate to cover secondary residues from the use proposed here as well as the currently registered uses.

Recommendation

We recommend for the establishment of the requested temporary tolerances. The tolerance for residues in irrigated crops should be expressed in the same manner as Sec 180.142(c). The food additive tolerance should be expressed like Sec 193.100(c).

For any permanent tolerance request, we will need additional data for residues in water and fish, especially data reflecting the maximum proposed application rate. The petitioner should also be informed that the 3 week waiting intervals for the use of water for drinking or irrigation purposes is not practical for general use.

Note to PM: Nitrosamine analyses of the formulation Weedar 64 will be needed for any permanent tolerance request .

Detailed Considerations

Formulation

The two formulations that will be used under this EUP are registered products. One is Weedar 64, a liquid containing the dimethylamine salt of 2,4-D. There is the equivalent of 4 lbs of 2,4-D per gallon in this formulation. The second is Aqua-Kleen, a granular containing the butoxyethanol ester of 2,4-D at 20% (acid equivalent) of the formulation.

The inerts in both formulations are cleared under Sec 180.1001. The possibility exists for nitrosamines in the formulation Weedar 64. We believe nitrosamine data are available for this formulation; however, the registration jacket is missing. We are raising no questions for this EUP, but for a permanent tolerance nitrosamine data for this formulation will be needed.

Proposed Use

The application rate proposed here is the same as the presently registered rate for control of Eurasian watermilfoil in the TVA system, i.e. 20-40 lbs 2,4-D acid per surface acre. For the dimethylamine salt, treatments may be made by air, surface or subsurface techniques. For the butoxyethanol ester formulation, air or surface techniques are to be used. For both formulations application is not to be made within 1/2 mile of any municipal or domestic water intake. The use of water for domestic purposes is to be delayed for three weeks or until residue analyses show that it contains no more than 0.1 ppm 2,4-D. Water used for irrigation is not to be used for 3 weeks. Additionally, the treated water is not to be used to irrigate sensitive crops such as grapes, tomatoes and cotton until residue analyses show 2,4-D to be absent.

We consider these precautions practical for this limited experimental program. However, for any permanent tolerance, we would not consider the three week waiting intervals for the use of water for drinking or irrigation purposes practical for general use in lakes and reservoirs.

Nature of the Residue

The fate of 2,4-D in water and fish has been discussed in detail in a number of previous reviews (see D. Duffy evaluations of PPs 1F1046, 2/16/71; PPs 1E1136, 5/19/71; PPs 2E1221, 8/30/72; PPs 3E1390, 7/2/73 and the J. Wolff evaluation of PPs 3E1390, 8/8/73).

We have previously concluded that the residue of concern in water, fish and irrigated crops is 2,4-D and we reaffirm this previous conclusion.

Analytical Methods

While various methods have been used to analyze for residues of 2,4-D (see evaluations listed above), the PM I procedure is considered adequate for enforcement of the proposed tolerances.

Residue Data

Most of the available data has been discussed in previous evaluations. However, some additional residue data (for water and fish) from treatments made to the Fort Cobb reservoir in 1975 have been submitted. (Studies conducted at the Fort Cobb reservoir in 1974 were evaluated in the R.J. Hummel memo dated 7/15/74 in connection with PPs 4G1475/PAPs 4H5048.)

Water - In the 1975 program, 2,4-D (as either the dimethylamine salt or the butoxyethanol ester) was applied on 162 acres distributed among five coves. The application rate was 20 lbs (acid equivalent)/A. Samples were taken at intervals from 0 time to 14 days following treatment. Maximum residues were generally the highest within the first 14 hours after treatments. The maximum residue was 0.52 ppm in one sample 1 day after treatment. Residues were generally less than 0.002 ppm within 1 week after treatment. Samples were also taken at 4 "drift monitoring stations" along the central part of the reservoir. The highest residue at one of these stations was 0.03 ppm. Samples taken at the municipal water intake and the dam spillway never exceeded 0.01 ppm and were usually less than 0.001 ppm.

We consider these data acceptable to conclude that the 0.1 ppm tolerance request for residues in potable water adequate.

Fish - Samples of fish (carp, carpsucker and channel catfish) were collected from two of the treated coves at intervals of 7-8 days following treatment and near the dam (fish caught near the dam were considered "control" samples).

A total of 35 samples were analyzed with the highest residue levels found in the fish cove 13.2 (marina cove). The highest levels in individual fish were in samples of carpsucker (2.6, 0.7 and 0.5 ppm), carp (1.4 and 0.26 ppm) and in channel catfish (0.6 ppm). In nine samples collected from cove 8.3 (area 2) the highest level detected was 0.2 ppm in a sample of channel catfish; the remaining samples contained at most trace residues. In the "control area" relatively high levels were found in samples of carpsucker (1.8 ppm), carp (1 ppm) and channel catfish (0.7, 0.3 and 0.1 ppm). The remaining 14 "control" samples contained traces of non-detectable residues. These results are erratic; however, it should be noted that the fish were not confined to treated or untreated areas.

While these data cast some doubt on the adequacy of the proposed 1 ppm tolerance for residue in fish, we are raising no objections in connection with this RUP since only a very small portion of the lakes/reservoirs will receive treatment.

Irrigated Crops - While no new residue data have been submitted for residues in irrigated crops, we consider the restrictions on the label practical for this limited RUP and as a result expect no problems with residues exceeding the proposed 1 ppm level.

It should be noted that for any permanent tolerance request, we will need additional data for water and fish, especially data reflecting the maximum proposed rate.

Residues in Meat, Milk, Poultry and Eggs

We have previously concluded (and reaffirm here) that residues in meat, milk, poultry and eggs resulting from the use of 2,4-D in water would be insignificant when compared to secondary residues resulting from uses on various crops. Therefore, the establishment meat, milk, poultry and egg tolerance are adequate to cover secondary residues from this use as well as the presently registered uses.

Other Considerations

A classification system has been devised with the intent of being able to predict (at least to some degree of accuracy) the level of 2,4-D residues that might be expected in various bodies of water. Three variables were chosen as the most significant influences of residues. They are temperature, volume and depth. With the additional data that will be generated in connection with this RUP (as well as previously generated data) correlated to the classification system, some estimates may be possible for various bodies of water.