Coberly 358

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

SUBJECT: Request for a tolerance for dimethoate [0, 0-dimethyl S-(N-methylcarbamoylmethyl) phosphorodithioate] and its oxygen analog.

DATE: 1 AUG 1975

FROM: TB

TO: PM

Pesticide Petition No.: 5F1642

Tolerance Requested: 2.0 ppm in or on soybean forage and soybean hay
0.05 in or on soybean seed

Recommendation: Establish tolerance

Use: Insecticide

Related Petitions: 255, 385, 7G0562, 7F0578, 8F0661, 9F0812, 9G0825, 8F0867, 0F0928, 0F0999, 8G1007, 1F1040, 1F1087, 3F1301, 8H2278, 4F1462, 5F1531

Established Tolerances: 40CFR 180.204

2 parts per million in or on alfalfa, apples, beans (dry, lima, snap), broccoli, cabbage, cauliflower, celery, collards, endive (escarole), grapefruit, kale, lemons, lettuce, mustard greens, oranges, pears, peas, peppers, spinach, Swiss chard, tangerines, tomatoes, turnips (roots and tops), and wheat (green fodder and straw).

1 part per million in or on corn fodder and forage, grapes, and melons.

0.2 part per million in or on potatoes and sorghum forage.

0.1 part per million (negligible residue) in or on corn grain.

0.1 part per million in or on cottonseed, pecans, safflower seed, and sorghum grain.

0.04 part per million (negligible residue) in or on wheat grain.

0.02 part per million (negligible residue) in eggs and in meat fat, and meat byproducts of cattle, goats, hogs, horses, poultry, and sheep.

Formulations: Cygon 267

Active Ingredient

33.25% Dimethoate [redacted]

Inert Ingredients***

[redacted]

All inerts cleared for use under 180.1001

INERT INGREDIENT INFORMATION IS NOT INCLUDED

Cygon 400

Active Ingredient

50.39% [redacted]

Inert Ingredient

[redacted]

Application Method: Sprayers (ground & airplane)
Application Rate: 1.0 to 1.5 pints per acre
Application Frequency: Repeat as necessary.

Toxicology

No new toxicity data were submitted with this petition.

Data compiled in the 1967 Evaluations of Some Pesticide Residues in Food by FAO on Dimethoate are as follows:

[redacted] INGREDIENT INFORMATION IS NOT INCLUDED

Acute Toxicity

Dimethoate

$LD_{50}$ (mg/kg Body-Weight)

| Animal | Route | Pure | Laboratory grade | Technical | Reference |
|---|---|---|---|---|---|
| Mouse, female | Oral | 60 | - | 60 | Sanderson & Edson, 1964 |
| Rat, male | Oral | 500-600 | 280-350 | 180-325 | Sanderson & Edson, 1964 |
| Rat, female | Oral | 570-680 | 300-356 | 240-336 | Sanderson & Edson, 1964 |
| Rat, male | Intraperi-toneal | - | 175-325 | - | Sanderson & Edson, 1964 |
| Rat, Female | Intraperi-toneal | - | 350 | - | Sanderson & Edson, 1964 |
| Rat, male | Intra-venous | - | 450 | - | Sanderson & Edson, 1964 |
| Hamster, male | Oral | - | 200 | - | Sanderson & Edson, 1964 |
| Guinea-pig | Oral | 550 | 600 | 350-400 | Sanderson & Edson, 1964 |
| Rabbit | Oral | 500 | 450 | approx. 300 | Sanderson & Edson 1964 |
| Hen | Oral | 50 | 40 | approx. 30 | Sanderson & Edson, 1964 |

Reproduction Study

3-generation mouse-no effect seen in fertility, lactation or survival of the pups to weaning, gross appearance of all pups produced, weights of major organs of $F_{2b}$ animals, and gross and microscopic appearance of tissues of the $F_{3b}$ animals autopsied at 21 days of age at dietary levels of 5, 15 and 50 ppm dimethoate.

Subacute Oral

Groups of 10 male rats were fed dimethoate at levels 0, 1, 5, 25 and 125 ppm for 15 weeks. At the 125 ppm level there was a slight decrease in rate of gain as well as slight muscular fibrillation. At 25 and 125 ppm there was a significant reduction of plasma and RBC ChE activity. At 5 ppm there was a 20% reduction of ChE activity while at 1 ppm there was no effect on ChE activity.

In another study groups of 20 rats were fed 0, 2, 8, 32 ppm for 90 days and 50, 100 and 200 ppm for 35 days. The highest dose which did not reflect a significant reduction in ChE activity was 32 ppm.

Other oral rat studies show the following:

| No. Rats/group | Length of Study | No Effect Level |
|---|---|---|
| 20 | 6-12 mos. | 0.5-0.8 mg/kg/day systemic |
| 20 | 5-1/2 mos. | 0.3-0.6 mg/kg/day systemic |
| - | 12 wks | 0.4-0.6 mg/kg/day systemic |
| 10-15 | 33 days | ChE depressed at 330 ppm |
| 25 | 28 days | ChE depressed in females at 1.6 ppm |

Guinea pigs fed lettuce & brassica containing dimethoate at levels up to 189 ppm for 3 weeks showed no effects.

Hens fed dimethoate at 30 ppm for 59 weeks in the drinking water showed reduced plasma ChE activity and a reduction in appetitie.

Demyelination study in hens showed no demyelination effects at 260 ppm (highest dose fed) for 4 weeks.

Dog- 3 groups of 4 dogs were fed dimethoate at levels 0, 2, 10 and 50 ppm for 13 weeks. RBC, ChE activity was only slightly decreased at the highest concentration while that of plasma was unaffected at any concentration.

Human Studies

20 subjects ingested 0.04 mg/kg dimethoate for 4 weeks. No toxic effect was observed, nor any significant change in the blood ChE activity.

36 male and female volunteers were given dimethoate at levels of 5, 15, 30, 45 and 60 mg for 14 to 57 days. No effects on ChE activity were seen at levels 5 and 15 mg, but there was some depression at 30 mg.

It was estimated that the level causing no significant toxicological effect for man is 0.2 mg/kg/day. Therefore, the ADI for man would be 0.02 mg/kg/day.

Conclusion: The proposed tolerances and the established tolerance will not exceed the ADI of 0.02 mg/kg/day (1.2 mg/day total intake).

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cc: CB, EEEB, Branch File, PP No. 5F1642

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