METHAMIDOPHOS

Task 4: Exposure Profile

Contract No. 68-01-5830

Final Report

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Exposure Profile - Methamidophos

Introduction

Methamidophos is an organophosphorus insecticide and acaricide applied to field and vegetable crops. Annual use of methamidophos in the United States is estimated at about 0.9-1.2 million pounds; about 37-39% is used on potatoes, 24-30% on cotton, 10-19% on tomatoes, and 12-18% on cole crops (cabbage, broccoli, brussel sprouts, cauliflower, and Chinese cabbage). Minor use sites include lettuce and seed crops of sugar beets, carrots, alfalfa, and clover. Methamidophos is formulated as a 4 and 6 lb/gal emulsifiable concentrate, and can be applied aerially or by ground rig. Applicators need not be certified to apply methamidophos.

All Formulations

Adequate data are not available to fully assess the potential for exposure of humans and wildlife to methamidophos.

Methamidophos can be expected to readily leach in most types of soil (Thornton et al., 00029887; Tucker, 00014992). The potential for groundwater contamination may be mitigated as a result of degradation in water (Magee, 00014039) and soil (Leary and Tutass, 00014076; Lubkowitz, 05017379; Tucker, 00014497, and 00014991). Available data indicate the parent compound has a half-life of <2 weeks in soil under aerobic conditions. Data are needed on degradate mobility in order to fully assess the potential for exposure through groundwater contamination.

Methamidophos may enter aquatic systems via runoff from treated areas. Methamidophos is very soluble in water (Farm Chemicals Handbook, 1981, Meister Publishing Co., Willoughby, OH), and therefore should have a low octanol/water partition coefficient. Methamidophos does not accumulate in bass (Baychem Corporation, 00014015 and 00014016; Chemagro Corporation,

00014017 and 00014019; Stanley, 00014014 and 00014018) and other aquatic non-target organisms (Tucker, 00014496 and 00015242). Exposure of humans to methamidophos via ingestion of contaminated fish is not expected.

Human exposure to methamidophos during mixing, application, and reentry operations cannot be assessed due to the lack of available data. Dermal and ocular exposure could result from splashing during mixing and contact with dislodgeable residues in treated fields. Exposure in these cases could be minimized by wearing protective clothing. Inhalation exposure could occur as a result of spray drift and volatilization during reentry operations, this type of exposure could be minimized through the use of respirators. Wildlife may be exposed to methamidophos through contact with treated plants or soil residues. Data are not available to assess such exposure.

References

Baychem Corporation. 1972. Chemagro, Division of Baychem Corporation. Residue experiment: Report No. 31933. (Unpublished study prepared by Baychem Corp.) (00014015)

Baychem Corporation. 1972. Chemagro, Division of Baychem Corporation. Residue experiment: Report No. 31938. (Unpublished study received on unknown date under OFD956; submitted by Chevron Chemical Co., Richmond, CA; CDL:093266-H) (00014016)

Chemagro Corporation. 1971. Recovery of Monitor from bass and rainbow trout: Report No. 30,976. Dated Sept. 30, 1971. (Unpublished study prepared by Baychem Corp.) (00014017)

Chemagro Corporation. 1971. Recovery of Monitor from bass and rainbow trout: Report No. 30,977. Dated Sept. 30, 1971. (Unpublished study prepared by Baychem Corp.) (00014019)

Crossley, J. 1972. Hydrolysis of Orthene. (Unpublished study received Feb. 23, 1972 under 2G1248; submitted by Chevron Chemical Co., Richmond, CA; CDL:091774-T) (00014986)

Leary, J.B. 1968. Photodecomposition of Monitor insecticide in solution. (Unpublished study received Jan. 9, 1979 under 239-2404; submitted by Chevron Chemical Co., Richmond, CA; CDL:236718-A) (00014111)

Leary, J.B. 1968. Rates of hydrolysis of Monitor insecticide in aqueous solutions. (Unpublished study received Mar. 5, 1970 under OF0956; submitted by Chevron Chemical Co., Richmond, CA; CDL:093264-AQ) (00014078)

Leary, J.B., and H.O. Tutass. 1968. Degradation of Monitor insecticide in soil. (Unpublished study received Mar. 5, 1970 under OF0956; submitted by Chevron Chemical Co., Richmond, CA; CDL:093264-AN) (00014076)

Lubkowitz, J.A. 1975. Uptake and degradation of methamidophos by tomato plants and soils. in Origin and fate of chemical residues in food, agriculture and fisheries. p. 157-163. Proceedings and report of two research coordination meetings; 1973, 1974, Vienna, Austria. (05017379)

Magee, P.S. 1966. Hydrolysis of Monitor insecticide. (Unpublished study received Mar. 5, 1970 under OF0956; submitted by Chevron Chemical Co., Richmond, CA; CDL:093263-C) (00014039)

Stanley, C.W. 1971. A gas chromatographic method for the determination of Monitor in fish and water: Report No. 30975. Dated Sept. 30, 1971. (unpublished study received on unknown date under OF0956; prepared by Baychem Corp., submitted by Chevron Chemical Co., Richmond, CA; CDL:093266-J) (00014018)

Stanley, C.W. 1971. Analysis of bass and water for Monitor. Report No. 30979. (Unpublished study received on unknown date under OF0956; prepared by Baychem Corp.; submitted by Chevron Chemical Co., Richmond, CA; CDL: 093266-F) (00014014)

Thornton, J.S., J.B. Hurley, and J.J. Obrist. 1976. Soil thin-layer mobility of twenty-four pesticide chemicals: Report No. 51016. (Unpublished study received Jan. 28, 1980 under 5F1547; submitted by Mobay Chemical Corp., Pittsburgh, PA; CDL:099216-I) (00029887)

Tucker, B.V. 1972. Comparison of acephate soil leaching and stability in wet and dry soil. (Unpublished study received Mar. 27, 1973 under 239-EX-60; submitted by Chevron Chemical Co., Richmond, CA; CDL:223490-S) (00015209)

Tucker, B.V. 1973. Orthene and Ortho 9006 in Daphnia magna living in treated water. (Unpublished study prepared by Chevron Chemical Co., Richmond, CA) (00015242)

Tucker, B.V. 1972. Orthene leaching in soil. (Unpublished study including supplementary report, received Feb. 23, 1972 under 2G1248; submitted by Chevron Chemical Co., Richmond, CA; CDL:091774-AA) (00014992)

Tucker, B.V. 1972. Orthene soil metabolism - laboratory studies. (Unpublished study including supplement, received Feb. 23, 1972 under 2G1248; submitted by Chevron Chemical Co., Richmond, CA; CDL:091774-Z) (00014991)

Tucker, B.V. 1972. Residues in earthworms in Orthene and Ortho 9006 treated soil. (Unpublished study prepared by Chevron Chemical Co., Richmond, CA) (00014497)

Tucker, B.V. 1972. Residues of Orthene and Ortho 9006 in a marine diatom growing in treated water. (Unpublished study received Aug. 7, 1972 under 239-2406; submitted by Chevron Chemical Co., Richmond, CA; CDL:001571-U) (00014496)