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

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

DATE: July 14, 2006

ACTION MEMORANDUM

SUBJECT: Inert Reassessments: One Exemption from the Requirement of a Tolerance for 1-Tetradecanamine, *N*, *N*-Dimethyl-, *N*-Oxide (Myristamine Oxide; CAS Reg. No. 3332-27-2)

FROM: Pauline Wagner, Chief Pauline Wagner 7/17/06
Inert Ingredient Assessment Branch

TO: Lois A. Rossi, Director
Registration Division

I. FQPA REASSESSMENT ACTION

Action: Reassessment of one inert ingredient exemptions from the requirement of a tolerance. Current exemptions are to be maintained.

Chemical: 1-Tetradecanamine, *N*, *N*-Dimethyl-, *N*-Oxide

Table 1. Tolerance Exemptions Expression

40 CFR	Inert Ingredients	Limits	Uses (Pesticidal)	CAS Reg. No. and 9 CI Name
180.920	1-Tetradecanamine, *N*, *N*-dimethyl-, *N*-oxide (CAS Reg. No. 3332-27-2)	None	Component in water-soluble film	3332-27-2 1-Tetradecanamine, *N*,*N*-dimethyl-, *N*-oxide

Use Summary:

Myristamine oxide is one of the principal surfactants used in the formulation of cosmetics, toiletries, and pharmaceuticals. Amine oxide mixtures containing myristamine oxide are used as foam boosters and stabilizers, detergents, emollients, and conditioners in shampoos, dishwashing detergents, heavy-duty detergents, bar soap, bubble-bath, shaving soaps, after and pre-shave lotions, and foam rubber. The compound is also used as a dispersing agent in viscose

and paper coatings. Myristamine oxide is also used in toilet bowl and drain cleaners. As an inert ingredient in pesticide formulations, myristamine oxide is used as a component in water-soluble films used to deliver pre-packaged measured unit doses of pesticide products used on growing crops only.

II. MANAGEMENT CONCURRENCE

I concur with the reassessment of the one exemption from the requirement of a tolerance for the inert ingredient 1-Tetradecanamine, *N*, *N*-dimethyl-, *N*-oxide (CAS Reg. No. 3332-27-2). I consider the one exemption established in 40 CFR 180.920 to be reassessed for purposes of FFDCA's section 408(q) as of the date of my signature, below. A Federal Register Notice regarding this tolerance exemption reassessment decision will be published in the near future.

Lois A. Rossi

Lois A. Rossi, Director
Registration Division

Date: July 24, 2006

CC: Debbie Edwards, SRRD
Joe Nevola, SRRD

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MEMORANDUM

SUBJECT: Reassessment of One Exemption from the Requirement of a Tolerance for 1-Tetradecanamine, *N*, *N*-Dimethyl-, *N*-Oxide (Myristamine Oxide; CAS Reg. No. 3332-27-2)

FROM: R. Tracy Ward, Biologist R. Tracy Ward
Inert Ingredient Assessment Branch (IIAB)
Registration Division (7505P)

TO: Pauline Wagner, Chief
Inert Ingredient Assessment Branch
Registration Division (7505P)

Background

Attached is the science assessment for 1-Tetradecanamine, *N*, *N*-dimethyl-, *N*-oxide (Myristamine oxide; CAS Reg. No. 3332-27-2), which, to facilitate reading, is referred to by its synonym myristamine oxide for the rest of this document. This assessment summarizes available information on the use, physical/chemical properties, toxicological effects, exposure profile, environmental fate, and ecotoxicity of myristamine oxide. The purpose of this document is to reassess the one existing exemption from the requirement of a tolerance for residues of myristamine oxide when used as an inert ingredient (component in water-soluble film) in pesticide formulations as required under the Food Quality Protection Act (FQPA).

Executive Summary

This assessment evaluates myristamine oxide, an inert ingredient for which one exemption from the requirement of a tolerance exists when used as a component of water-soluble film in pesticide formulations applied to growing crops only under 40 CFR 180.920.

Myristamine oxide is a member of a class of chemicals called alkyl dimethyl amine oxides (amine oxides), which are dipolar surfactants that are generally used in detergents in conjunction with other surfactants. It is often a component of dimethyl (C_{10}-C_{16}-alkyl) amine N-oxide (ADAO) and dimethyldodecylamine *N*-oxide (DDAO) mixtures. In the consumer product

and cosmetic industry, these chemicals are used as foam stabilizers, thickeners and emollients, and emulsifying and conditioning agents. The amine oxides, as a chemical class, have similar chemical structures and physical properties, and there is sufficient data and information to characterize the amine oxides. Because there is very little information available on myristamine oxide, the available data on other amine oxides have been used in this report to assess the hazard potential of myristamine oxide. A Toxic Substance Control Act Interagency Testing Committee (TSCA ITC 1983) summary, toxicological studies submitted to the U.S. EPA by Proctor & Gamble (Counts and Dhonau 2003), and relevant literature were used to develop this hazard assessment.

Myristamine oxide is expected to be absorbed by the oral and dermal routes and rapidly excreted by mammals. It is also expected to have low acute toxicity by the oral and dermal routes of exposure. A subchronic oral study in DDAO established a no observed adverse effect level (NOAEL) of 0.1% (63 mg/kg/day) and a lowest observed adverse effect level (LOAEL) of 0.2% (112 mg/kg/day), based on cataracts in males and decreased body weight gains in both sexes. There was no evidence of carcinogenicity, mutagenicity, or increased sensitivity to amine oxides in laboratory studies. Based on the structural similarity of myristamine oxide to DDAO, ADAO, and C_{12}-C_{16} dimethylamine oxide, myristamine oxide is expected to have similar subchronic toxicity, be noncarcinogenic, and nonmutagenic. For ADAO, developmental toxicity was observed at 100 mg/kg/day and no increased sensitivity was observed. Based on the structural similarity of myristamine oxide to ADAO, the developmental toxicity of myristamine oxide is expected to be similar to ADAO.

The tolerance exemption for myristamine oxide limits it to use as a component of water-soluble film in pesticide formulations applied to growing crops only. Water soluble films are used to deliver pre-packaged measured unit doses of pesticide products. Water soluble packaging is most typically used in the application of commercial pesticide products. Exposures to myristamine oxide may occur through the diet (drinking water and food), but are limited by its use pattern (as a component of water-soluble films), low solubility in water, and its ready biodegradation in the environment. Water soluble packaging is not typically used in home garden pesticide products, therefore, residential exposures (inhalation and dermal) are not expected.

Taking into consideration the available information on myristamine oxide, there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure when considering dietary exposure and all other non-occupational sources for which there is reliable information. Therefore, it is recommended that the one exemption from the requirement of a tolerance established for residues of myristamine oxide when used on growing crops only under 40 CFR 180.920 can be considered reassessed as safe under section 408(q) of the FFDCA.

I. Introduction

This report provides a qualitative assessment for myristamine oxide, an inert ingredient which has one exemption from the requirement of a tolerance when used as a component of

water soluble films in pesticide formulations applied to growing crops only under 40 CFR 180.920.

II. Use Information

A. Pesticide Uses

The one tolerance exemption expression for myristamine oxide is presented in Table 1.

Table 1. CFR and CAS Registry Numbers and Names for Myristamine oxide

40 CFR	Inert Ingredient	Limits	Uses (Pesticidal)	CAS Reg. No. and Name
180.920*	1-Tetradecanamine, *N*, *N*-dimethyl-, *N*-oxide (CAS Reg. No. 3332-27-2)	None	Component in water-soluble film	3332-27-2 1-Tetradecanamine, *N*,*N*-dimethyl-, *N*-oxide

*Residues listed in 40 CFR 180.920 are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only.

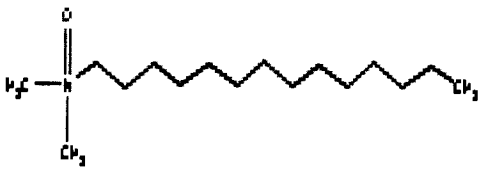
B. Other Uses

Myristamine oxide is one of the principal surfactants used in the formulation of cosmetics, toiletries, and pharmaceuticals (Klein 1981, as cited in TSCA ITC 1983). Armak (1982, as cited in TSCA ITC 1983) reported that coco-dimethylamine oxide (myristamine oxide is a component of this mixture) is used as a foam booster and stabilizer, detergent, emollient, and conditioner in shampoos, dishwashing detergents, heavy-duty detergents, bar soap, bubble-bath, shaving soaps, after and pre-shave lotions, and foam rubber. The compound is also used as a dispersing agent in viscose and paper coatings. Myristamine oxide is also used in toilet bowl and drain cleaners (the National Institutes of Health (NIH) Household Products Database at http://hpd.nlm.nih.gov).

III. Physical and Chemical Properties

Some physical and chemical characteristics of myristamine oxide, along with its structure and nomenclature, are found in Table 2.

Table 2. Physical and Chemical Properties of Myristamine Oxide

Parameter	Value	Reference
Structure		ChemIDPlus 2004
CAS Reg. No.	3332-27-2	ChemIDPlus 2004

Parameter	Value	Reference
Molecular formula	C16-H35-N-O	
Molecular Weight	257.46	EPISuite 2004
Synonyms	1-Tetradecanamine, *N*, *N*-dimethyl-, *N*-oxide; *N*, *N*-Dimethyltetra-decylamine-*N*-oxide; Myristyldimethyl-amine oxide	ChemIDPlus 2004
	Dimethyl-tetradecyl-amine *N*-oxide	TSCA ITC 1983
Physical State	Clear liquid	TSCA ITC 1983
Melting Point	183.3 °C*	EPISuite 2004
Boiling Point	449.82 °C *	
Density	N/A	
Water Solubility	0.32 mg/L @ 25 °C *	
Log P (octanol-water)	5.6552*	
Henry's Law Constant	1.18×10^{-8} atm-m^3/mole*	
Vapor Pressure	1.1×10^{-8} mm Hg*	

*Estimated using U.S. EPA's modeling software, EPISuite 2004, available at http://www.epa.gov/opptintr/exposure/docs/EPISuitedl.htm.

IV. Hazard Assessment

A. Hazard Profile

The primary sources used to assess the hazard potential of myristamine oxide include the acceptable studies summarized in a report submitted by Proctor and Gamble and a TSCA ITC report.

B. Metabolism and Pharmacokinetics

When administered orally and dermally, dimethyldodecylamine *N*-oxide (DDAO) is absorbed and rapidly excreted by mammals (TSCA ITC 1983). Based on the structural similarity between myristamine oxide and DDAO, myristamine oxide is expected to have an absorption pattern and metabolism similar to DDAO.

In an absorption study, rats were orally administered 1 or 100 mg/kg of [1-dodecyl-^{14}C] DDAO, while rabbits were dosed with 1 or 37-57 mg/kg of the substance (Rice 1977, as cited in TSCA ITC 1983). After 24 hours >80% of the radioactivity was excreted, predominately in the urine, but also in the feces, and in exhaled CO_2.

Rats, mice and rabbits were exposed cutaneously to [methyl-^{14}C]-DDAO for 72 hours at dose levels of 10, 1, and 10 mg, respectively (Rice 1977). At the end of 72-hours 35% (in rats), 36% (in mice) and 61% (in rabbits) of the administered radioactivity was found in the excreta and body tissues (excluding the application site).

In a biotransformation study, rats and rabbits were given DDAO (amount unspecified; Turan and Gibson 1981) by gavage. Between 0 and 24 hours after dosing, urine was collected and analyzed for metabolites. There was no evidence of unmetabolized DDAO in the urine.

N,*N*-dimethyl-4-aminobutyric acid and its *N*-oxide (ω, β-oxidation products of DDAO) accounted for 28% of the dose in rabbits and 23% in rats. The authors suggested that the metabolic pathways for DDAO include: shortening of the dodecyl chain by ω, β-oxidation, amine oxide reduction, and hydroxylation of mid-chain carbons. The authors also observed some *N*-monomethyl amino compounds (i.e. dealkylated products), but these were attributed to non-biological degradation resulting from the analytical procedures.

C. Toxicological Data

Acute Toxicity:

In an acute oral toxicity study (MRID 444752-01 1978, as cited in Counts and Dhonau 2003), rats were given a single gavage dose of 0, 2.0, 2.8, 3.9, 5.4, or 7.6 g/kg bw of DDAO and observed for 14 days. A dose-related increase in decreased motor activity, diarrhea, salivation, blanching, and nasal hemorrhage was observed, and an LD_{50} of 4.8 g/kg bw was determined. Myristamine oxide, which is structurally similar to DDAO, is expected to have a similar median lethal dose and dose-related increases in toxicity in rats.

Rabbits had 2 mL/kg (1,880 mg/kg) of DDAO applied to their clipped (intact or abraded) skin and covered with gauze (MRID 444752-02 1978, as cited in Counts and Dhonaou 2003). The gauze was removed after 24 hours, and the treated area of the skin gently wiped to remove residual material, and the rabbits observed for 14 days. Severe erythema, desquamation, fissuring and eschar were observed, but there were no deaths, so the dermal LD_{50} was determined to be >2 mL/kg (1,880 mg/kg). Based on myristamine oxide's structural similarity to DDAO, it is also expected to have severe dermal effects in rabbits.

Repeated Dose Toxicity:

In a 90-day feeding study rats were fed 0, 0.1, 0.2, or 0.4% (0, 63, 112, or 236 mg/kg/day for males; 0, 80, 150, or 301 mg/kg/day for females) of DDAO in the diet for 13 weeks (MRID 444752-03 1978, as cited in Counts and Dhonau 2003). There were no treatment-related mortalities. At the high (0.4 %) dose level, reduced food consumption, decreased body weight gains (by 23% in males and 26% in females), and cataracts in 60% of males and 40% of females was observed. Reduced food consumption, reduced body weight gains (by 8% in males and 18% in females), and lenticular opacities (cataracts) in 16% of males were observed at the 0.2% treatment group. The no observed adverse effect level (NOAEL) for this study is 0.1% (63 mg/kg/day) in the diet, and the lowest observed adverse effect level (LOAEL) is 0.2% (112 mg/kg/day), based on cataracts in males and decreased body weight gains in both sexes. Myristamine oxide is expected to have a similar NOAEL and LOAEL based on its similarity to DDAO.

Genotoxicity:

DDAO was non-mutagenic in TA1535, TA1538, TA98 and TA100 strains of *Salmonella typhimurium* in the Ames test, both with and without metabolic activation (Andrews, Lijinsky

and Snyder 1984). Myristamine oxide is similar to DDAO and is, therefore, expected to be non-mutagenic.

Developmental Toxicity:

In a developmental toxicity study, rats were gavaged with 0, 25, 100, or 200 mg/kg/day of dimethyl (C_{10}-C_{16}-alkyl) amine N-oxide (ADAO), 27% amine oxide on days 6-19 of pregnancy (MRID 447624-01 1999, as cited in Counts and Dhonau 2003). Adult rats dosed with 100 or 200 mg/kg/day had increased salivation and labored breathing as well as reduced weight gain and food consumption. There were some delays in fetal ossification observed in the mid-dose (100 mg/kg/day) animals. At the 200 mg/kg/day dose-level, there was one pup death, and fetal body weights and live litter sizes were decreased, while early resorptions increased in this group. In addition, at the 200 mg/kg/day dose level, there were delays in skeletal ossification and reduced fetal body weights, which were associated with maternal toxicity. No fetal malformations were observed at any dose level. The maternal NOAEL was 25 mg/kg/day, and the maternal LOAEL was 100 mg/kg/day, based on decreased body weight. The developmental NOAEL was also 25 mg/kg/day, and the developmental LOAEL was 100 mg/kg/day, based on increased incidence of skeletal variations. Because myristamine oxide is structurally similar to ADAO, myristamine oxide is expected to have a similar maternal and developmental toxicity endpoints.

Carcinogenicity:

In a two-year chronic feeding study, rats were given 0, 0.01, 0.1, or 0.2% w/v of 100% C_{12}-C_{16} dimethylamine oxide (equivalent to 0, 4.24, 42.3, or 87.4 mg/kg in males and 0, 5.23, 52.6, or 107 mg/kg in females) via feed (Cardin, Domeyer and Bjorkquist 1985). There were no significant differences in survival, compound-related mean feed consumption, clinical chemistry or ophthalmology. Body weights in treated males were lower compared to controls at several time points during the study. Mean body weights were significantly lower at 0.2%. There were increases in kidney, heart, ovary, and brain weights in females, and in brain weights in males at the high-dose due to decreases in mean body weight. Mean absolute liver weight was decreased statistically in males at 0.1%, but was within the range of normal biologic variability and, therefore, not considered related to test substance administration. There were no compound-related histopathological effects, and no evidence of carcinogenicity after chronic administration of C_{12}-C_{16} dimethylamine oxide. The NOAEL for systemic effects was 42.3 mg/kg in males, and 52.6 mg/kg in females. The LOAEL was 87.4 mg/kg in males and 107 mg/kg in females, based on decreased body weights and increased organ weights. Myristamine oxide is similar to C_{12}-C_{16} dimethylamine oxide, and is, therefore, expected to also be noncarcinogenic.

D. Special Considerations for Infants and Children

Developmental toxicity to ADAO was observed only at maternally toxic doses. The maternal NOAEL was 25 mg/kg/day, and the maternal LOAEL was 100 mg/kg/day, based on decreased body weight. The developmental NOAEL was also 25 mg/kg/day, and the developmental LOAEL was 100 mg/kg/day, based on increased incidence of skeletal variations and decreased body weight. Based on its structural similarity to ADAO, myristamine oxide is

expected to have developmental toxicity endpoints similar to ADAO. Oral exposure from the inert ingredient use of myristamine oxide (as a component of water soluble film) is expected to be well below these levels. Based on this information, there is no concern, at this time, for increased sensitivity to infants and children to myristamine oxide when used as an inert ingredient in pesticide formulations. For the same reason, a safety factor analysis has not been used to assess risk and, therefore, the additional tenfold safety factor for the protection of infants and children is also unnecessary.

V. Environmental Fate Characterization and Drinking Water Considerations

Myristamine oxide is readily biodegradable in the environment, and is therefore, unlikely to reach drinking water at levels of concern from it use as an inert ingredient component of water-soluble films in pesticide formulations (TSCA ITC 1983).

Myristamine oxide has a relatively low solubility, which limits its concentration in formulations to approximately 0.32 mg/L (it is noted that certain formulations contain substances that increase the solubility of other compounds in the formulation). Certainly, its solubility in the environment should not exceed that threshold of 0.32 mg/L. It is not expected to volatilize in the ambient air due to its low vapor pressure of 1.1×10^{-8} mm Hg. Volatilization from moist soils and water are not likely based on a low Henry's Law Constant of 1.18×10^{-8} atm-m^3/mole.

Biodegradability studies on coco-dimethylene oxide reported that 97% of the compound degraded within 5 days by sludge, 99% degraded within 5 days by activated sludge (at a pH range of 7 to 8), and 100% of a 20 ppm coco-dimethylene oxide mixture degraded within 23 hours in aerated synthetic sewage (TSCA ITC 1983). Myristamine oxide, which is structurally similar to coco-dimethylene oxide, is expected to be relatively rapidly biodegradable in soils as well.

Based on its octanol/water partition coefficient of 4.5×10^5, myristamine oxide has the potential to bioaccumulate in fish and other aquatic organisms. However, it is possible that the molecule is metabolized by the fish; at this time this remains an uncertainty.

VI. Exposure Assessment

The tolerance exemption for myristamine oxide limits the use to a component of water-soluble film in pesticide formulations applied to growing crops only. Water soluble films are used to deliver pre-packaged measured unit doses of pesticide products. Water soluble packaging is most typically used in the application of commercial pesticide products. Exposures to myristamine oxide may occur through the diet (drinking water and food), but are limited by its use pattern (as a component of water-soluble films), low solubility in water, and its ready biodegradability in the environment. Water soluble packaging is not typically used in home garden pesticide products, therefore, residential exposures (inhalation and dermal) are not expected.

VII. Aggregate Exposure

In examining aggregate exposure, the FFDCA section 408 directs EPA to consider available information concerning exposures from the pesticide residue in food and all other non-occupational exposures, including drinking water (from ground water or surface water) and exposure through pesticide use in gardens, lawns, or buildings (residential and other indoor uses).

For myristamine oxide, a qualitative assessment for all pathways of human exposure (food, drinking water, and residential) is appropriate given the lack of human health concerns associated with exposure to this chemical as an inert ingredient (component of water-soluble film) in pesticide formulations.

VIII. Cumulative Exposure

Section 408(b)(2)(D)(v) of the FFDCA requires that, when considering whether to establish, modify, or revoke a tolerance, the Agency consider "available information" concerning the cumulative effects of a particular pesticide's residues and "other substances that have a common mechanism of toxicity." Unlike other pesticides for which EPA has followed a cumulative risk approach based on a common mechanism of toxicity, EPA has not made a common mechanism of toxicity finding as to myristamine oxide and any other substances, and this material does not appear to produce toxic metabolites produced by other substances. For the purposes of this tolerance action, therefore, EPA has not assumed that myristamine oxide has a common mechanism of toxicity with other substances. For information regarding EPA's efforts to determine which chemicals have a common mechanism of toxicity and to evaluate the cumulative effects of such chemicals, see the policy statements released by EPA's Office of Pesticide Programs concerning common mechanism determinations and procedures for cumulating effects from substances found to have a common mechanism on EPA's website at http://www.epa.gov/pesticides/cumulative.

IX. Human Health Risk Characterization

Myristamine oxide is expected to be absorbed by the oral and dermal routes and rapidly excreted by mammals. It is also expected to have low acute toxicity by the oral and dermal routes of exposure. A subchronic oral study in DDAO established a no observed adverse effect level (NOAEL) of 0.1% (63 mg/kg/day) and a lowest observed adverse effect level (LOAEL) of 0.2% (112 mg/kg/day), based on cataracts in males and decreased body weight gains in both sexes. There was no evidence of carcinogenicity, mutagenicity, or increased sensitivity to amine oxides in laboratory studies. Based on the structural similarity of myristamine oxide to DDAO, ADAO, and C_{12}-C_{16} dimethylamine oxide, myristamine oxide is expected to have similar subchronic toxicity, be noncarcinogenic, and nonmutagenic. For ADAO, developmental toxicity was observed at 100 mg/kg/day and no increased sensitivity was observed. Based on the structural similarity of myristamine oxide to ADAO, the developmental toxicity of myristamine oxide is expected to be similar to ADAO.

The tolerance exemption for myristamine oxide limits the use to a component of water-soluble film in pesticide formulations applied to growing crops only. Water soluble films are used to deliver pre-packaged measured unit doses of pesticide products. Water soluble packaging is most typically used in the application of commercial pesticide products. Exposures to myristamine oxide may occur through the diet (drinking water and food), but are limited by its use pattern (as a component of water-soluble films), low solubility in water, and its ready biodegradability in the environment. Water soluble packaging is not typically used in home garden pesticide products, therefore, residential exposures (inhalation and dermal) are not expected.

Taking into consideration the available information on myristamine oxide, there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure when considering dietary exposure and all other non-occupational sources for which there is reliable information. Therefore, it is recommended that the one exemption from the requirement of a tolerance established for residues of myristamine oxide when used on growing crops only under 40 CFR 180.920 can be considered reassessed as safe under section 408(q) of the FFDCA.

X. Ecotoxicity and Ecological Risk Characterization

Studies indicate that amine oxides are moderately toxic to aquatic invertebrates. The acute toxicity (96-hour LC_{50}) of ADAO to *Daphnia magna* is 1.0 mg/L, and chronic toxicity testing established a no-observed effect concentration (NOEC) of 0.70 mg/L and a first effect concentration of 0.88 mg/L (Maki 1979, as cited in TSCA ITC 1983). Proctor & Gamble submitted the following unpublished data to the TSCA ITC (1983) which are consistent with Maki's findings:

> The acute toxicity (96-hour LC_{50}) of ADAO to freshwater fish (e.g. bluegill, fathead minnow, goldorfen) ranges from 2.4 to 6.4 mg/L.
>
> The acute toxicity of ADAO to pink shrimp, a marine invertebrate, is 8.2 mg/L.
>
> The toxicity of ADAO to algae (5-day algistatic concentration) ranges from 1.0 to 5.0 mg/L.
>
> Chronic toxicity testing on fathead minnows indicates the NOEC is 0.42 mg/L, with a first-effect concentration of 0.88 mg/L.

Based upon the fact that the solubility of myristamine oxide is only 0.32 mg/L and the concentration of the compound in natural waters cannot exceed that threshold, significant limitations from its use pattern as an inert ingredient (component of water-soluble film) in pesticide formulations, and its relatively rapid biodegradation in the environment, ecological risk concerns are not likely to occur from the use of myristamine oxide as an inert ingredient in pesticide formulations.

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