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

OFFICE OF PREVENTION,
PESTICIDES, AND TOXIC SUBSTANCES

DATE: January 3, 2006

ACTION MEMORANDUM

SUBJECT: Inert Reassessment: Propylene glycol alginate (CAS Reg. No. 9005-37-2).

FROM: Pauline Wagner, Chief Pauline Wagner 1/4/06
Inert Ingredient Assessment Branch
Registration Division (7505C)

TO: Lois A. Rossi, Director
Registration Division (7505C)

I. FQPA REASSESSMENT ACTION

Action: Reassessment of one inert exemption from the requirement of a tolerance. The reassessment decision is to maintain the inert tolerance exemption "as-is."

Chemical: Propylene glycol alginate

CFR: 40 CFR 180.910

CAS Registry Number and Name: CAS Reg. No. 9005-37-2; Alginic acid, ester with 1,2-propanediol

Table 1. Tolerance Exemption Being Reassessed in this Document

40 CFR 180§	Tolerance Exemption Expression	Limits	Use Pattern (Pesticidal)	CAS Registry Number and name
.910	Propylene glycol alginate	--	Defoaming agent	9005-37-2; Alginic acid, ester with 1,2-propanediol

Use Summary: As an inert pesticide ingredient, propylene glycol alginate is exempt from the requirement for a tolerance when used as a defoaming agent in pesticide formulations applied to growing crops, or to raw agricultural commodities after harvest. Pesticide products containing propylene glycol alginate are used as herbicides, fungicides, and insecticides. It has also been approved by the U.S. Food and Drug

Administration as a direct food additive, and may be found in a variety of cosmetic and pharmaceutical products.

List Reclassification Determination: The current List Classification for propylene glycol alginate is List 4B. Because EPA has determined that there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure to propylene glycol alginate when used as an inert ingredient in pesticide formulations, the List Classification for propylene glycol alginate will remain List 4B.

II. MANAGEMENT CONCURRENCE

I concur with the reassessment of the exemption from the requirement of a tolerance for the inert ingredient propylene glycol alginate (CAS Reg. No. 9005-37-2), and with the List reclassification determination, as described above. I consider the exemption established in 40 CFR 180.910 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

January 12, 2006

Date:

cc: Debbie Edwards, SRRD
Joe Nevola, SRRD

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

OFFICE OF PREVENTION,
PESTICIDES, AND TOXIC SUBSTANCES

January 3, 2006:

MEMORANDUM

SUBJECT: Reassessment of One Exemption from the Requirement of a Tolerance for Propylene Glycol Alginate (CAS Reg. No. 9005-37-2).

FROM: Christina M. Jarvis Christina M Jarvis 01/03/06
Reregistration Branch II
Health Effects Division (7509C)

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

BACKGROUND

Attached is the science assessment for propylene glycol alginate. This assessment summarizes available information on the use, physical/chemical properties, toxicological effects, exposure profile, environmental fate, and ecotoxicity of propylene glycol alginate. The purpose of this document is to reassess the existing exemption from the requirement of a tolerance for residues of propylene glycol alginate as required under the Food Quality Protection Act (FQPA).

EXECUTIVE SUMMARY

This document evaluates propylene glycol alginate, a pesticide inert ingredient for which one exemption from the requirement for a tolerance exists. An inert ingredient is defined by the U.S. Environmental Protection Agency (USEPA) as any ingredient in a pesticide product that is not intended to affect a target pest.

As an inert pesticide ingredient, propylene glycol alginate is exempt from the requirement for a tolerance when used as a defoaming agent in pesticide formulations applied to growing crops or to raw agricultural commodities after harvest (40 CFR 180.910). Pesticidal products containing propylene glycol alginate as an inert ingredient are used as herbicides, fungicides, and insecticides. Propylene glycol alginate is also approved for use by the U.S. Food and Drug Administration (US FDA) as a direct food additive (21 CFR 172.858 and 172.210) and may be found in a variety of cosmetic and pharmaceutical products.

The data base for propylene glycol alginate consists of acute, subchronic, and chronic studies in animals, as well as genotoxicity, mutagenicity, carcinogenicity, developmental, and reproductive studies. No relevant neurotoxicity data have been identified for propylene glycol alginate.

Available animal studies have shown that propylene glycol alginate is practically non-toxic. It is not a genotoxic agent/carcinogen/developmental/reproductive toxicant. The World Health Organization (WHO) concluded that reduced growth and loose stools are the predominant adverse health effects in animals, likely due to poor absorption in the gastrointestinal tract.

When used as an inert ingredient in pesticide formulations, exposure to propylene glycol alginate would primarily be through the oral route, via consumption of raw agricultural commodities to which pesticide products containing propylene glycol alginate have been applied, and/or through drinking water. Exposure may also occur through the dermal and inhalation routes of exposure, via the use of residential pesticide products containing propylene glycol alginate as an inert ingredient (i.e., herbicides, fungicides, and insecticides).

Should propylene glycol alginate be ingested, it will likely be absorbed and hydrolyzed in the human body via known metabolic pathways to form acetate, lactate, or glycogen. It biodegrades readily and is not expected to bioaccumulate in the environment, and is non-volatile. Concern for exposures via drinking water is likely to be low. An acute dermal study is not available; however, propylene glycol alginate is non-irritating to the eyes and skin of rabbits. Because propylene glycol alginate is non-volatile, inhalation exposure and risk is also expected to be minimal.

Taking into consideration available toxicity and exposure information, the Agency has determined that there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure (dietary and non-occupational sources of exposure) to propylene glycol alginate used as an inert ingredient in pesticide formulations. Therefore, it is recommended that the exemption from the requirement of a tolerance under 40 CFR 180.910 can be considered reassessed as safe under section 408(q) of the Federal Food, Drug, and Cosmetic Act.

I. Introduction

This report provides a qualitative assessment for propylene glycol alginate, a pesticide inert ingredient with one tolerance exemption under 40 CFR 180.910. There is sufficient information to conduct this assessment.

II. Use Information

A. Pesticides

The tolerance exemption for propylene glycol alginate, when used as an inert ingredient in pesticide formulations, is provided in Table 1 below.

Table 1. Tolerance Exemption Being Reassessed in this Document

40 CFR 180	Tolerance Exemption Expression	Limits	Use Pattern (Pesticidal)	CAS Registry Number and name
.910[a]	Propylene glycol alginate	--	Defoaming agent	9005-37-2 Alginic acid, ester with 1,2-propanediol

[a] Residues listed in 40 CFR 180.910 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 or to raw agricultural commodities (RACs) after harvest.

B. Other Uses

Aside from its use as an inert ingredient in pesticidal products, propylene glycol alginate may also be directly added to food as an emulsifier, flavoring adjuvant, formulation aid, stabilizer, surfactant, or thickener. Examples of foods to which propylene glycol alginate may be added include frozen dairy desserts, frostings, cheeses, gelatins and puddings, gravies and sauces, jams and jellies, condiments and relishes, seasonings and flavorings, and baked goods. It may also be used as a coating on fresh citrus fruit. Table 2 summarizes the direct food additive uses (FDA uses) of propylene glycol alginate.

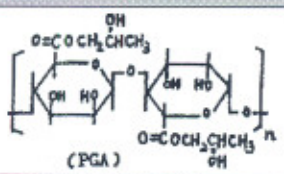
Table 2. FDA Direct Food Additive Uses for Propylene Glycol Alginate

Name	21 CFR	Use Pattern
propylene glycol alginate	172.858	Used as an emulsifier, flavoring adjuvant, formulation aid, stabilizer, surfactant, or thickener in foods
propylene glycol alginate	172.210	Used as a coating on fresh citrus fruit

III. Physical and Chemical Properties

Some of the physical and chemical characteristics of propylene glycol alginate, along with its structure and nomenclature, are found in Table 3. Propylene glycol alginate is an ester of alginic acid in which some of the carboxyl groups are esterified with propylene glycol, some neutralized with an appropriate alkali, and some remain free.

Table 3. Physical and Chemical Properties of Propylene Glycol Alginate

Parameter	Value	Reference
Structure	 (PGA)	http://www.ChemPlan.com
CAS #	9005-37-2	

CAS Name	Alginic acid, ester with 1,2-propanediol	EPA SRS 2004
Empirical Formula	$(C_9H_{14}O_7)_n$	US FDA 1972
Molecular Weight	234.2	US FDA 1972
Common Names	Kelcoloid, Hydroxypropyl alginate	US FDA 1972
Physical State	White to yellowish, fibrous or granular powder	US FDA 1972
Melting Point	NA	--
Boiling Point	NA	--
Water Solubility	Soluble in water	US FDA 1972
Other Solubility	Soluble in solutions of dilute organic acids	US FDA 1972
Relative Density (water=1)	NA	--
Vapor Pressure	NA	--
log Kow	NA	--
Henry's Law Constant	NA	--

NA = Not Available.

IV. Hazard Assessment

Propylene glycol alginate is being evaluated as part of the US EPA's tolerance reassessment process of inert ingredients. No information was found to indicate that propylene glycol alginate has been the subject of a previous hazard or risk assessment by the US EPA. A literature review was conducted by the World Health Organization (WHO) in 1993. The alginates were also evaluated by the US FDA in 1972 (as 'Generally Recognized as Safe,' or GRAS, food ingredients) and in 1973 (as food ingredients). In 1974, the US FDA prepared a teratologic evaluation of propylene glycol alginate in rabbits. These sources represent the primary sources of information consulted in this assessment.

A. Hazard Profile

The available toxicity data base for propylene glycol alginate consists of acute, subchronic, and chronic studies in animals, as well as genotoxicity, mutagenicity, carcinogenicity, developmental, and reproductive studies. No relevant neurotoxicity data have been identified for propylene glycol alginate.

Propylene glycol alginate is of low acute toxicity via the oral route of exposure, and is non-irritating to the eyes and skin of rabbits. Acute dermal and inhalation studies are not available. According to the WHO (1993), reduced growth and loose stools are the predominant adverse health effect of propylene glycol alginate (in animal studies), similar to other compounds that are poorly absorbed.

Available toxicity data are summarized in the following section.

B. Toxicological Data

Acute Toxicity

Available data on acute oral toxicity are summarized in Table 4, and indicate low toxicity. Groups of 60 rats were dosed with 5 g/kg bw propylene glycol alginate by

gavage or were fed a diet containing 50 to 70% propylene glycol alginate for 24 hours. No adverse effects were observed. Autopsy 14 days after treatment did not reveal compound-related abnormalities (Woodward, 1972, as cited in WHO 1974).

Rats given 10 g/kg bw propylene glycol alginate orally as a suspension in corn oil showed transient depression. No other effects were noted (Newell and Maxwell, 1972, as cited in WHO 1974).

Rabbits receiving an application of propylene glycol alginate as an aqueous paste on abraded skin or receiving an ocular application of dry powdered propylene glycol alginate did not reveal signs of irritation (Woodard Res. Corp., 1972, as cited in WHO 1993).

Table 4. Summary of Acute Toxicity Data for Propylene Glycol Alginate

Parameter	Toxicity Value	Reference
Oral LD_{50}	7200 mg/kg (rat); 7600 mg/kg (rabbit); 7800 mg/kg (mouse)	WHO 1993
Dermal LD_{50}, rabbit	NA	--
Inhalation LC_{50}, rat	NA	--
Eye Irritation, rabbit	Non-irritating	WHO 1993
Skin Irritation, rabbit	Non-irritating	WHO 1993

NA = Not Available.

Subchronic Toxicity

Two groups of 6 female rats received a diet containing 21.5% propylene glycol alginate and 21.5% glucose or a normal diet containing 21.5% glucose for 4 weeks (MRCL, 1951 as cited in WHO, 1993). After 4 weeks of treatment two animals / group were killed and the remaining four animals / group received a normal diet for an additional 4 weeks. Thereafter, the original control group received a diet containing 21.5% propylene glycol alginate and the original test group received a control diet for 2 weeks. The test group showed slight growth retardation but appearance and behavior were normal. Feces of the test group were slimy. Histopathology of liver, kidneys and intestine of the two animals / group that were killed after the initial 4 weeks treatment time did not reveal abnormalities.

Fifteen male rats received 5% (w/w) propylene glycol alginate (2500 mg/kg bw/day) in the diet for 30 days. No diarrhea was seen and bowel habit was normal. Urinalysis did not reveal abnormalities. All rats showed distension of the caecum, five rats showed distension of a portion of the ileum. Twelve rats showed distension of the colon to some degree, with soft contents. Soft ill-formed fecal pellets were seen in ten rats. No further macroscopic changes were seen. Histopathology was not carried out (Anderson *et al.*, 1991, as cited in WHO 1993).

Four groups of three guinea pigs received 0, 5, 10 or 15% (0, 2000, 4000, or 6000 mg/kg bw/day) propylene glycol alginate in their diet for 26 weeks. Body weight gain was reduced in test groups but mean food intake was similar to controls. Histopathology of various organs revealed no significant lesions (Nilson and Wagner 1951, as cited in WHO 1993).

Chronic Toxicity

Three groups of three male and three female Beagle dogs received a diet containing 0, 5, 10 or 15% (approximately 0, 1250, 2500, or 3750 mg/kg bw/day) propylene glycol alginate for one year (Woodard, 1959 as cited in WHO 1993). Stool conditions were variable at the 15% dietary level. For the treated animals, weight gain and food consumption were normal. No effects on hematological (no details) parameters or serum urea nitrogen, serum alkaline phosphatase, blood glucose or urinalysis (no details) were seen. Organ weights were comparable to controls. Histopathology (21 tissues) did not reveal compound-related changes.

Four groups of 10 mice (bw 12-18 g) received 0, 5, 15 or 25% (0, 6500, 19,500, or 32,500 mg/kg bw/day) propylene glycol alginate in their diet for 12 months. At week 39, one control mouse and one mouse of the group fed 15% in the diet were killed. In the 25% group, increased mortality, a decreased maximum body weight, decreased food intake and increased water consumption were seen. At the 15% dose level a slightly decreased maximum body weight and a slightly decreased food intake were seen; the effects were probably due to increased water absorption of the diet which caused enough bulk to limit food intake (Nilson and Wagner, 1951 as cited in WHO 1993).

Genotoxicity

Propylene glycol alginate demonstrates no evidence of genotoxicity (WHO 1993).

Neurotoxicity

No relevant data identified; however, available acute and subchronic studies do not report neurotoxic signs after high doses of propylene glycol alginate.

Mutagenicity

Propylene glycol alginate produced no mutagenic effects when administered to 140 rats in doses of 0, 30, 2500, or 5000 mg/kg. No adverse effects were manifested in either metaphase chromosomes from rat bone marrow, or anaphase chromosomes from *in vitro* cultures of human embryonic lung cells, in the presence of propylene glycol alginate at levels of 5000 and 1000 mg/kg, respectively, for periods as long as 48 and 42 hours (FDA 1972).

Carcinogenicity

During their life span, four groups of ten male and ten female rats (beginning at age of four weeks) received 0, 5, 15 or 25% (approximately 0, 2500, 7500, or 12,500 mg/kg

bw) propylene glycol alginate in their diet (Nilson and Wagner, 1951 as cited in WHO 1993). Life-span was slightly reduced and decreased food consumption was seen at the 15 and 25% dose-levels. Death of rats in control as well as test groups was usually due to myocardial fibrosis, pneumonia and the multiplicity of cumulative processes associated with aging. There were no lesions attributed to toxemia or to local irritative intestinal effects. The bulky diets caused loose and smeary feces and weight gain was reduced, probably due to inanition. Organ weights were not determined. Histopathology of major tissues (liver, kidneys, spleen, heart, brain, lung, stomach, small intestines, large intestines, ovaries/testes) did not reveal any abnormalities.

Developmental and Reproductive Toxicity

Developmental: Groups of 10 to 15 pregnant rabbits were dosed with 0, 8, 37, 173 or 800 mg propylene glycol alginate/kg bw/day as a suspension in corn oil on gestation days (GD) 6-18. A Caesarean section was then performed on Day 29. Propylene glycol alginate caused no differences in survival and/or development between treated and control maternal or fetal rabbits.

Groups of 22-32 pregnant albino CD-1 mice received 0, 8, 36, 170 or 780 mg/kg bw/day propylene glycol alginate (as a suspension in corn oil) by gavage from GD 6-15 (FDRL, 1972 as cited in WHO 1993). There was no effect on nidation or maternal or fetal survival up to 170 mg/kg bw/d. The number of abnormalities seen in either soft or skeletal tissues did not differ from the number occurring spontaneously in controls. At 780 mg/kg bw/day, maternal toxicity resulted in 7/32 deaths. Surviving dams and fetuses carried to term appeared normal.

Groups of 24 pregnant Wistar rats received 0, 7, 33, 155 or 720 mg/kg bw/day propylene glycol alginate (as a suspension in corn oil) by gavage from GD 6-15. A caesarean section was performed on Day 20, and dams and fetuses were examined for pathological and teratological effects. No compound-related effects were observed (FDRL, 1972 as cited in WHO 1993).

Groups of 20 to 23 pregnant golden hamsters received 0, 7, 33, 150 or 700 mg/kg bw/day propylene glycol alginate (as a suspension in corn oil) by gavage from GD 6-10 (FDRL, 1974 as cited in WHO 1993). A caesarean section was performed on day 14. There was no evidence of maternal toxicity or effect on reproduction. Fetal examination did not reveal compound-related abnormalities.

Reproductive: Groups of 20 male and 20 female rats received 0 or 5% (approximately 0 or 2500 mg/kg bw) propylene glycol alginate in their diet for 2 years as the parent generation of a multi-generation study. After 5-6 months, some F_0 animals were mated to produce an F_1 generation. Seven males and seven females were F_1 controls, and 10 males and 10 females the test group. The F_1 generation was fed a similar test diet and mated after 4 months to produce the F_2 generation. The F_2 generation consisted of nine male and ten female controls, and nine male and nine female test animals, and were also kept on a similar test diet. The F_1 and F_2 generations were sacrificed after 202 and 212 days, respectively. No differences from controls were noted regarding mortality, general condition, mean body weight, fertility, gestation data, lactation and survival for

the F_1 and F_2 generation. Hematology was performed in the F_2 generation only, and no abnormalities were identified. Organ weights were not determined. Gross and microscopic examination of 6 major organs did not show any abnormalities (Morgan 1959, as cited in WHO 1993).

C. Metabolism and Pharmacokinetics

Propylene glycol alginate has been shown to be hydrolyzed to propylene glycol and alginic acid *in vitro* by simulated digestive juices. In one experiment, simulated gastric juices showed practically no effect, while simulated intestinal juice at pH 7.5 hydrolyzed 25% of the ester in four hours and 65% of the ester in 12 hours (McNeely and Shepherd, 1966, as cited in WHO 1993).

Only the propylene glycol moiety is absorbed and metabolized. The alginate moiety is excreted unchanged in the feces of rats and mice. Released propylene glycol is absorbed and metabolized by usual pathways to acetate, lactate, or glycogen, and disappears completely from the body after five days. The alginate moiety and the unhydrolyzed propylene glycol alginate were not absorbed from the gastrointestinal tract, but were excreted in the feces (Sharratt and Dearn, 1972, as cited WHO 1993).

D. Special Considerations for Infants and Children

Propylene glycol alginate is of low toxicity. A reproductive toxicity study shows no differences between the control group and the F1 and F2 generations regarding mortality, general condition, mean body weight, fertility, gestation data, lactation, and survival. In a developmental toxicity study in rabbits, it was determined that propylene glycol alginate caused no differences in the survival and/or development between treated and control maternal or fetal rabbits. In a developmental toxicity study in rats, no compound-related effects were observed in dams or fetuses.

Based on this information, there is no concern, at this time, for increased sensitivity to infants and children to propylene glycol alginate 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

The environmental fate of propylene glycol alginate is relatively unknown. It is an ester of alginic acid in which some of the carboxyl groups are esterfied with propylene glycol, some neutralized with an alkali, and some remain free. Structurally, propylene glycol alginate is $[C_9H_{14}O_7]n$ esterified; the number of 'n' units vary. The structural formula weight of a single unit is approximately 234; however, this substance is considered a macromolecule with a formula weight averaging between 10,000 and 600,000. Propylene glycol alginate is water soluble and likely resistant to hydrolysis and photolysis; in fact, the very nature of the compound's synthesis is to increase resistance

to acid conditions so it can be added to low pH drinks, such as juices. Biodegradation is likely given the compound's structure, but estimates of half-life are unknown and would be uncertain given the variable make-up of these compounds.

Propylene glycol alginate is soluble, non-volatile, and not likely to be mobile. Leaching to ground water may occur in sandy or porous soils. Potential to volatilize from surface waters is very low and atmospheric degradation is probable. Propylene glycol alginate is not expected to bioaccumulate in the environment.

Concern for exposures via drinking water is likely to be low. This conclusion is based on propylene glycol alginate's probable, non-quantifiable biodegradation, and likely removal in drinking water treatment plants via flocculation, coagulation, and sedimentation.

VI. Exposure Assessment

Pesticide products containing propylene glycol alginate as an inert ingredient are used as herbicides, fungicides, and insecticides. Propylene glycol alginate is also found in a variety of pharmaceutical and cosmetic products. The use of propylene glycol alginate as a direct food additive (emulsifier, flavoring adjuvant, formulation aid, stabilizer, surfactant, or thickener in foods) has been approved by the US FDA for a number of years (21 CFR 172.858 and 21 CFR 172.210).

Human exposures to residues of propylene glycol alginate may occur via the dietary (food and drinking water) and/or residential pathways of exposure. For the dietary pathway, exposure to residues of propylene glycol alginate would primarily be through the oral route, via consumption of raw agricultural commodities to which pesticide products containing propylene glycol alginate have been applied, and/or via consumption of drinking water. Based on the environmental fate properties of propylene glycol alginate, it is expected to biodegrade readily and does not bioaccumulate in the environment. It is also soluble, non-volatile, and unlikely to be mobile. Exposure to propylene glycol alginate in drinking water is likely to be low.

Exposure may also occur via the residential pathway of exposure (dermal and inhalation routes of exposure), through the use of residential pesticide products containing propylene glycol alginate as an inert ingredient (i.e., insecticides, fungicides, and herbicides). While dermal exposure may be possible, inhalation exposure is expected to be minimal due to its lack of volatility.

VII. Aggregate Exposures

In examining aggregate exposure, the Federal Food, Drug, and Cosmetic Act (FFDCA) section 408 directs EPA to consider available information concerning exposures from the pesticide residue in food and all other nonoccupational 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 propylene glycol alginate, 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 propylene glycol alginate as an inert ingredient in pesticide formulations.

VIII. Cumulative Exposure

Section 408(b)(2)(D)(v) of 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 propylene glycol alginate 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 propylene glycol alginate 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

Propylene glycol alginate exhibits low acute toxicity when administered by the oral route. In animal studies, propylene glycol alginate did not cause developmental or reproductive toxicity at any of the tested doses. Carcinogenicity studies indicate it is not a carcinogen, and *in vitro* studies show an absence of genotoxic effects. The WHO concluded that reduced growth and loose stools are the predominant adverse health effects in animal studies, likely due to poor absorption via the gastrointestinal tract.

Exposure to propylene glycol alginate as a result of its use as an inert ingredient in pesticidal products is possible through the dietary (food and/or drinking water) or residential (dermal and inhalation) routes of exposure. Such products may include herbicides, fungicides, and insecticides. Exposure may also occur as a result of its FDA-approved use as a direct food additive. The FDA allows for propylene glycol alginate to be added to food as an emulsifier, flavoring adjuvant, formulation aid, stabilizer, surfactant, or thickener. It should also be noted that the WHO's Committee on Food Additives (Series 32, 1993) has allocated an acceptable daily intake for propylene glycol alginate of up to 70 mg/kg body weight.

Propylene glycol alginate's low toxicity, combined with the fact that it biodegrades readily and is not likely to bioaccumulate in the environment, will limit the potential for

risk to human health. Should propylene glycol alginate be ingested by the human body, it will either be absorbed and hydrolyzed via a known metabolic pathway to form acetate, lactate, or glycogen, or excreted as the parent compound. Therefore, any risks to human health as a result of the consumption of residues of propylene glycol are likely to be low.

Some dermal exposure may occur as a result of the residential use of pesticide products containing propylene glycol alginate as an inert ingredient. While an acute dermal study is not available, it is non-irritating to the eyes and skin of rabbits. Because propylene glycol alginate is non-volatile, inhalation exposure and risk is also expected to be minimal.

Taking into consideration all available information on propylene glycol alginate, it has been determined that there is a reasonable certainty that no harm to any population subgroup will result from aggregate exposure to propylene glycol alginate when considering exposure through dietary exposure and all other non-occupational sources for which there is reliable information. Therefore, it is recommended that the exemption from the requirement of a tolerance established for residues of propylene glycol alginate when used as a defoaming agent in pesticide products can be considered reassessed as safe under section 408(q) of the FFDCA.

X. Ecotoxicity and Ecological Risk Characterization

Very little data are available on the effects of propylene glycol alginate to non-target organisms. Effects data on propylene glycol alginate is mostly limited to mammalian data. Structure Activity Relationships (SARs) were not conducted due to the variable nature of the compound. There are no effects data in the Agency's Ecotox Database (http://www.epa.gov/ecotox).

Considering the physical properties of the compound, aquatic exposures are possible; however, as propylene glycol alginate, it is unlikely to cross the fish gill membrane due to its formula weight (>10,000). Effects on other aquatic invertebrates are also expected to be low. Effects due to degradates of propylene glycol alginate are unknown. Terrestrial risks are likely to be low, based on the available mammalian data used as a surrogate for other terrestrial phase animals. There are no data on the effects of propylene glycol alginate on plants; therefore, potential risks to plants cannot be ruled out.

REFERENCES:

TOXNET. Toxicology Data Network. United States National Library of Medicine, National Institutes of Health. http://toxnet.nlm.nih.gov.

US EPA Substance Registry System (SRS). SRS Version 2003. http://www.epa.gov/srs.

US FDA (1972). GRAS (Generally Recognized as Safe) Food Ingredients – Alginates.

US FDA (1973). Evaluation of the Health Aspects of Alginates as Food Ingredients.

US FDA (1974). Teratologic Evaluation of Compound. FDA 71-18. Propylene Glycol Alginate in Rabbits.

World Health Organization (1993). Propylene Glycol Alginate. WHO Food Additive Series: 32, 159-169