potassium salt of fatty acids

Review Date: 7/20/2009

Type	Insecticide
Controls	Spider mites, whiteflies, aphids, squash bugs, flea beetles, green stink bugs, cabbageworms, leafhoppers, lace bugs, earwigs, grasshoppers, plant bugs, sawfly larvae, scales tent caterpillars, thrips, fleas, psyllids, sarcoptic mange mites, wasp, hornets and ants.
Mode of Action	Dissolves portions of the exoskeleton causing death.

Thurston County Review Summary:

Potassium salts of fatty acids are very prevalent in our environment and can be found in food, soil, plants, etc. Because these fatty acids and other fatty acids are so common the Food and Drug Administration has classified them as "Generally Regarded as Safe" (GRAS) chemicals and the EPA has waived the typical toxicity and environmental fate testing because exposures from pesticide use are not likely to exceed the amount in a typical diet.

Insecticide products containing potassium salt of fatty acid as the only active ingredient are considered low in hazard and pass the Thurston County review criteria.

MOBILITY

Property	Value	Reference	Rating
Solubility (mg/L)	0.011	6	Low
Soil Sorption (Kd=mL/g)	Not found		
Organic Sorption (Koc=mL/g)	11.670	6	Low

Mobility Summary:

Potassium salts of fatty acids are expected to break down in less than one day by microbial activity in the soil. When they break down, the chemical components become part of the natural soil matrix and are not expected to migrate off the application site to cause harm to non-target organisms. The mobility hazard of potassium salt of fatty acids is considered low.

PERSISTENCE

Property	Value	Reference	Rating
Vapor Pressure (mm Hg)	1.5	6	Low
Biotic or Aerobic Half-life (days)	<1	1	Low
Abiotic Half-life (days)	Not found		
Terrestrial Field Test Half-life (days)	<1	1	Low
Hydrolysis Half-life (days)	>43	1	Moderate
Anaerobic Half-life (days)	Not found		
Aquatic Field Test Half-life (days)	Not found		

Persistence Summary:

Potassium salts of fatty acids are expected to break down by microbial action within one day, so, the persistence hazard is considered low.

BIOACCUMULATION

Property	Value	Reference	Rating
Bioaccumulation Factor	Not found		
Bioconcentration Factor	Not found		
Octanol/Water Partition Coefficient	log Kow = 0.2 - 4.1	1	Low / Moderate

Bioaccumulation Summary:

Potassium salts are absorbed from the gastro-intestinal tract and the potassium is excreted by the kidneys. Because the kidneys retain potassium poorly, exposures to potassium salts of fatty acid from pesticides or cleaning products will not increase the body burden of potassium (Reference 2). The bioaccumulation hazard of potassium salts of fatty acids is considered low.

ACUTE TOXICITY

Test Subject	Value	Reference	Rating
Mammalian (LD50)	>5,000 mg/kg	6	Low
Avian (LD50)	>2,000 mg/kg	1	Low
Honey bee or insect (LD50)	>25 ug/bee	6	Low
Annelida -worms (LC50)	Not found		
Fish (LC50)	18 ppm	1	Moderate
Crustacean (LC50)	0.57 ppm	1	High
Mollusk (LC50)	Not found		
Amphibian (LD50 or LC50)	Not found		

Acute Toxicity Summary:

Single dose toxicity testing indicates that fatty acids (not specific to potassium salt) are considered low in toxicity to mammals, birds, bees, moderately toxic to fish, and highly toxic to aquatic invertebrates. Because these fatty acids and other fatty acids are so common the Food and Drug Administration has classified them as "Generally Regarded as Safe" (GRAS) chemicals and the EPA has waived the typical toxicity testing.

ACUTE TOXICITY - Risk Assessment

Subject and Scenario	Dose of Concern	Exposure	Margin of Safety	Route	Reference	Rating
Applicator/handler exposure assessment was waived						
Pesticide contact exposure assessments were waived						
Dietary exposure assessments were waived						
Combined exposure assessments were waived						

Acute Toxicity Risk Assessment Summary

Potassium salts of fatty acids are generally regarded as safe by the Food and Drug Association (FDA) because it is present in abundance in food products and additives. The average daily consumption of dietary lipids (fats), which contain fatty acids, is about 90,000 mg/kg/day - which greatly exceeds any expected exposures from pesticide residues.

European acute risk assessment for fatty acid salts for the use and handling of soap detergents showed a margin of safety of 258,000 between a dose of concern and potential exposures. This means the concentration that may cause an adverse health effect is more than 250,000 time greater than the expected exposure someone would likely get from the use of soap products.

The risk of toxicity from the use of products containing potassium salt of fatty acids, is considered low in hazard.

CHRONIC TOXICITY

Property	Value	Adverse Effect	Reference	Rating
Carcinogenicity	Not listed	- -	4, 5	Low
Mutagenicity	None with potassium salts		1	Low
Neurotoxicity - (NOAEL)	Not tested	- -	1	Low
Endocrine Disruption	Not listed	- -	5	Low
Developmental Toxicity (NOAEL)	Not tested	- -	1	Low
Reproductive Toxicity (NOAEL)	Not tested	- -	1	Low
Chronic Toxicity (NOAEL)	Not tested	- -	1	Low

Chronic Toxicity Summary:

Long-term exposures are not expected from insecticide use with products containing potassium salts of fatty acids because they break down in about a day and become part of the soil composition. The hazard for toxicity from a long-term exposure to potassium salts of fatty acids is considered low in hazard.

CHRONIC TOXICITY - Risk Assessment

Subject and Scenario	Dose of Concern	Exposure	Margin of Safety	Route	Reference	Rating
Pesticide contact exposure assessments were waived						
Combined exposure assessments were waived						
Drinking water exposure assessments were waived						
Dietary exposure assessments were waived						

Chronic Toxicity Risk Assessment Summary:

Potassium salt of fatty acids are generally regarded as safe by the Food and Drug Association (FDA) because it is present in many food products and additives.

Long-term exposures to this insecticide ingredient are not expected, and potassium salts of fatty acids are considered low in hazard for toxicity.

DegradationProducts:

Fatty acids are metabolized by cellular activity, where they are oxidized to compounds that are used as an energy source and structural cell components. Potassium, sodium and ammonium are normally part of the bodies metabolism and electrolytic balance (Reference 1).

Comments:

Mild to moderate skin irritant but not skin sensitizing, also an eye irritant (Reference 1).

References

1. USEPA. Office of Prevention, Pesticides and Toxic Substances. Reregistration Eligibility Decision (RED) - Soap Salts. LIST D Case 4083. September 1992.
2. HERA. Human & Environmental Risk Assessment on ingredients of European household cleaning products: Fatty Acid Salts. Human Health Risk Assessment Draft. June, 2002.
3. USEPA. Office of Pesticide Programs. "List of Inert Pesticide Ingredients". Updated August 2004.
4. USEPA. Science Information Management Branch, Health Effects Division, Office of Pesticide Programs. Chemicals Evaluated for Carcinogenic Potential. July 19, 2004.
5. S. Kegley, B. Hill, S. Orme, PAN Pesticide Database, Pesticide Action Network, North America (San Francisco, CA. 2007), http:www.pesticideinfo.org
6. Thompson, Watkins, et. al. Future Environmental Effects of Non-Synthetic Chemical Use (CTHS0306). Report to the Horizon Scanning Programme Manager. July 31, 2004.