

Type	Virucide, insecticide and miticide
Controls	Controls various types of soft-bodied insects like aphids, mites, whiteflies, thrips, mealybugs, etc. (see product labels).
Mode of Action	Oils kill insects on contact by interfering with respiration, cell membranes function or structure. As a virucide, oils seem to reduce the ability of aphids to transfer a virus from one plant to another (Reference 3).

Thurston County Review Summary:

Washington State Department of Agriculture (WSDA) registers the active ingredient "petroleum oil" as being synonymous with the following active ingredients; mineral oil, mineral seal oil, white mineral oil (EPA OPP Chemical Code 063502), BVA Spray 13, paraffin oil (EPA OPP Chemical Code 063503), aliphatic petroleum solvent, Amsco 140, natural gasoline, paraffinic hydrocarbons, petroleum distillate, oils, solvent, hydrocarbons, Sunspray 11N, Sunspray 6N, and Sunspray 8N. The EPA does not have any active ingredients registered under the name "petroleum oil" but does register the active ingredient "aliphatic solvent" to include; mineral oils (EPA OPP Chemical Code 063502) and aliphatic petroleum hydrocarbons (EPA OPP Chemical Code 063503). Chemicals included within the aliphatic solvents group (EPA OPP Chemical Code 063502) are; mineral oil (CAS# 8012-95-1), white mineral oil (petroleum - CAS# 8042-47-5), lubricating oils (petroleum C15-30, hydrotreated neutral oil - CAS#'s 72623-84-8 and 72623-86-0), lubricating oils (petroleum C20-50, hydrotreated neutral oil-based - CAS# 72623-87-1), distillates (petroleum, solvent refined light paraffinic - CAS# 64742-55-8), distillates (petroleum, solvent-dewaxed light paraffinic - CAS# 64742-56-9), and distillates (petroleum, solvent-dewaxed heavy paraffinic - CAS# 64742-65-0). Chemicals included in the aliphatic petroleum hydrocarbons (EPA OPP Chemical Code 063503) group are; mineral oil (hydrocarbon oils or paraffin liquid - CAS# 8020-83-5), distillates (petroleum, solvent refined light paraffinic - CAS# 64741-89-5), distillates (petroleum, solvent refined heavy paraffinic - CAS#'s 64741-88-4 and 64742-54-7), as well as CAS#'s 64742-55-8, 72623-84-8 and 8002-05-9 d (Reference 1). This review of petroleum oils encompasses those oils that are registered by the EPA under mineral oils (EPA OPP Chemical Code 063502) and aliphatic petroleum hydrocarbons (EPA OPP Chemical Code 063503). The chemicals registered by the WSDA under the name "petroleum oil" are assumed to be included within the EPA's list of mineral oils or aliphatic hydrocarbons.

Insecticides containing "petroleum oil" (as described above) as the sole active ingredient are rated conditional by Thurston County's pesticide review criteria because there are some registered applications to waterbodies that could adversely effect aquatic organisms and broadcast land applications that could smother bird eggs and effect hatching. However, all expected residential uses do not include these risks and are rated low in hazard.

MOBILITY

Property	Value	Reference	Value Rating
Water Solubility (mg/L)	0.001 to 0.6	1	Low
Soil Sorption (Kd=mL/g)	Value not found		
Organic Sorption (Koc=mL/g)	900 to 100,000 (10,000 average)	1	Low

Mobility Summary:

Because this review encompasses many different petroleum oils the physical and chemical properties are also different. But, these oils are all poorly soluble in water and are expected to bind well to soil and vegetation. The overall hazard for these oils to move off the site of application with rain or irrigation water is rated low.

PERSISTENCE

Property	Value	Reference	Value Rating
Vapor Pressure (mm Hg)	0.0001 to 0.00000000000001	1	Moderate to high
Biotic or Aerobic Half-life (days)	65	2	High
Abiotic Half-life (days)	Not degraded by sun or water	1	High
Terrestrial Field Test Half-life (days)	Value not found		
Hydrolysis Half-life (days)	Stable	1	High
Anaerobic Half-life (days)	Value not found		
Aquatic Field Test Half-life (days)	<2 - 3	1	Low

Persistence Summary:

The petroleum oils with higher vapor pressures (closer to 0.0001 mmHg) may dissipate slightly into the air after application but most of the oils won't. These oils are not susceptible to breakdown by sunlight or hydrolysis (interaction with water). In general, petroleum oils are likely to take over 60 days to biodegrade to half of the applied concentration and are rated high in hazard for chemical persistence.

BIOACCUMULATION

Property	Value	Reference	Value Rating
Bioaccumulation Factor	Value not found		
Bioconcentration Factor	Value not found		
Octanol/Water Partition Coefficient	log Kow = 5-20	1	High

Bioaccumulation Summary:

Testing with mineral oils and aliphatic petroleum hydrocarbons indicates that they are poorly absorbed when ingested, inhaled, or from skin contact. After ingestion these oils are quickly eliminated, unchanged and not metabolized, from the body (up to 98% within 4 days). Although the octanol/water partition coefficient for petroleum oils indicates that they would bind very well to fish or animal tissue, metabolism studies show that they do not get absorbed and accumulate. The hazard for bioaccumulation is rated low.

ACUTE WILDLIFE TOXICITY VALUES and Risk Assessment

Test Subject	Value	Reference	Value Rating
Mammalian (LD50)	>28,000 mg/kg	1	Low
Avian (LD50)	>2,250 mg/kg bw	1	Low
Honey bee or insect (LD50)	1,474 ug/bee	2	Low
Annelida -worms (LC50)	750 mg/kg	2	Moderate
Fish (LC50)	>500,000 mg/L	1	Low
Crustacean (LC50)	0.9 mg/L or >14 mg/L	1	Inconclusive
Mollusk (LC50)	6 mg/L (toxic - not lethal)	1	Moderate
Amphibian (LD50 or LC50)	Value not found		

Acute Toxicity Testing and Ecotoxicity Summary:

Single-dose toxicity testing with these petroleum oils indicates that they are low in toxicity to animals, birds, honeybees, fish but may be moderately toxic to worms and some aquatic organisms (Reference 1). Although low in oral toxicity to birds, the EPA stated that oils sprayed directly on bird egg shells can result in smothering the egg and can impair hatching ability (Reference 1). The EPA did not believe that oil landing on eggs from application spray drift would negatively effect hatching (presumably because the oil would not be expected to cover the entire egg). Broadcast applications to large natural areas with ground nesting birds are rated high in hazard (while eggs are present).

There is some ecological risk to aquatic invertebrates from direct water applications, overspray, or drift of these oils onto surface waterbodies. The risk to these aquatic organisms may not be from a toxic effect but from the physical properties of oil causing the small invertebrae to become trapped within the surface film. So, although the toxicity is uncertain, there is a potential to entrap small aquatic organisms when pesticidal oils are applied across a waterbody for mosquito larvae control. This hazard is rated moderate.

ACUTE HUMAN TOXICITY - Risk Assessment

Subject and Scenario	Route	Dose of Concern	Exposure	Margin of Safety	Reference	Value Rating
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						

Acute Toxicity Risk Assessment Summary:

Regarding the risk from oral exposures the EPA stated: "The overall dietary exposure, and the drinking water (only) dietary exposure, have also each been qualitatively assessed, based on the absence of acute and chronic oral effects from exposures to mineral oils and aliphatic petroleum hydrocarbons. These dietary exposures are not of concern to the Agency, nor does the Agency have concerns for the aggregate exposures to these chemicals." (Reference 1). Aggregate exposures include all potential oral, inhalation and skin contact exposures combined. Since the potential combined exposures (which includes all crop and residential exposures) are below the EPA's level of concern, then the risk without crop and drinking water inputs would be much smaller and rated low in hazard.

CHRONIC HUMAN TOXICITY HAZARDS

Property	Value	Adverse Effect	Reference	Rating
Carcinogenicity	Group 3	Not classifiable as to its carcinogenicity (human)	1	Low
Mutagenicity	es not reported	Non-mutagenic	1	Low
Neurotoxicity - (NOAEL)	Value not found			
Endocrine Disruption	Value not found			
Developmental Toxicity (NOAEL)	900-4,500 mg/kg bw	Fetal malformations	1	Moderate
Reproductive Toxicity (NOAEL)	900-4,500 mg/kg bw	Fetal malformations	1	Moderate
Chronic Toxicity (NOAEL)	900-4,500 mg/kg bw	Fetal malformations	1	Check risk

Chronic Toxicity Hazard Summary:

Various materials (oils) were tested and determined to be non-mutagenic (Reference 1). Highly refined oils are categorized as Group 3 - not classifiable as to their carcinogenic potential in humans (Reference 1). The EPA stated that they have no evidence that the aliphatic solvents are associated with endocrine disruption (Reference 1).

When evaluating petroleum oils for potential for reproductive and developmental toxicity, there were some effects that suggest that fetal toxicity can occur at doses without maternal toxicity. The EPA concluded that the very high doses used in the toxicity tests were so much higher than those expected from pesticidal uses that there are no concerns for potential sensitivity of infant and children to mineral oils and aliphatic petroleum hydrocarbons (Reference 1). Thurston County pesticide review system typically rates reproductive or developmental toxicity without maternal toxicity as high in hazard but since the EPA has determined that the concentrations that toxicity was observed was much greater than those expected from pesticidal use that the hazard is rated moderate.

CHRONIC HUMAN TOXICITY - Risk Assessment

Subject and Scenario	Route	Dose of Concern	Exposure	Margin of Safety	Reference	Value Rating
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						
EPA waived risk assessments for pesticide uses						

Chronic Toxicity Risk Assessment Summary:

The EPA determined that due to the low toxicity of aliphatic solvents (both mineral oils and aliphatic petroleum hydrocarbons) that there is no need to require a risk assessment for potential dermal, inhalation, indoor, outdoor, or occupational exposures (Reference 1). The hazard of human toxicity from potential long-term exposures to highly refined mineral oils and aliphatic petroleum hydrocarbons from pesticidal use is rated low.

Metabolites and Degradation Products:

Information about the degradation of the various petroleum oils could not be found.

Comments:

In a summary of toxicity studies with representative aliphatic solvents it was determined that they are potentially irritating to eyes (EPA Toxicity Category III), slightly irritating to skin (EPA Toxicity Category IV) but not skin sensitizers (Reference 1).

References

- USEPA. Office of Pesticide Programs, Special Review and Reregistration Division. Revised Reregistration Eligibility Decision, Exposure and Risk Assessment on Lower Risk Pesticide Chemicals. CASE: Aliphatic Solvents (3004). Active Ingredients: Mineral Oil (063502) & Aliphatic Petroleum Hydrocarbons (063503). Revised: November 29, 2007.
- International Union of Pure & Applied Chemistry. Pesticide Properties Database. Paraffin oil (C18-C30) [1, not ASU] (Ref: ASU 70 480 1). Data accessed 12/27/2012.
- Carlos E. Bográn, Scott Ludwig and Bradley Metz. Texas A&M University Department of Entomology. "Using Oils as Pesticides". November 2006.