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READ THE ENTIRE LABEL BEFORE USING THIS PRODUCT.

USE ONLY IN ACCORDANCE WITH INSTRUCTIONS.

KEEP OUT OF REACH OF CHILDREN

## SWEEP 570 EC

### INGREDIENTS

Malathion.....57%  
Other ingredients .....43%

SWEEP 570 EC is a organophosphate insecticide. It contains as its active ingredient, Malathion.

SWEEP 570 EC is a nonsystemic, wide-spectrum organophosphate insecticide. It was one of the earliest organophosphate insecticides developed (introduced in 1950). Malathion is suited for the control of sucking and chewing insects on fruits and vegetables, and is also used to control mosquitoes, flies, household insects, animal parasites (ectoparasites), and head and body lice. Malathion may also be found in formulations with many other pesticides.

Malathion is a slightly toxic compound in EPA toxicity class III. Labels for products containing it must carry the Signal Word CAUTION. Malathion is a General Use Pesticide (GUP). It is available in emulsifiable concentrate, wettable powder, dustable powder, and ultra low volume liquid formulations.

Trade Names Of Other Firms: Trade names for products containing malathion include Celthion, Cythion, Dielathion, EI 4049, Emmaton, Exathios, Fyfanon and Hilthion, Karbofos and Maltox.

### What is SWEEP 570 EC and how does it work?

SWEEP 570 EC is a organophosphate insecticide. It is a slightly toxic compound, which poisons the insect's nervous system. They block the breakdown of the nervous system messenger chemical, acetylcholine, thereby interfering with the transmission of nerve signals in the brain.

### Key Benefits of SWEEP 570 EC

1. Broad use including mosquito larva and flies.

2. Quick knockdown effect.
3. Environment friendly because of quick breakdown.

### PRECAUTIONS

Harmful if swallowed, inhaled or absorbed through skin. Causes moderate eye irritation. Avoid contact with skin, eyes or clothing. Avoid breathing spray mist. Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco. Remove contaminated clothing and wash before reuse. Keep children or pets away from treated area until dry.

### SYMPTOMS OF POISONING

Irritation on skin or eyes.

### MEDICAL TREATMENT

No specific antidote is available. Treatment is symptomatic.

### FIRST AID

If on skin, remove contaminated clothes. Rinse and then rinse skin immediately with plenty of water and soap for 15-20 minutes. Call a poison control centre or doctor for treatment advice.

If inhaled, move person for fresh air. If person is not breathing, call for an ambulance, then give artificial respiration, preferably mouth-to-mouth if possible. Call a poison control centre or doctor for further treatment advice.

If in eyes, first hold eye open and rinse with plenty of water for 15-20 minutes (remove contact lenses if easily possible). Call poison control center or doctor for treatment advice. If ingested, call a poison control centre or doctor immediately for treatment advice. Have person sip a glass of water if able to swallow. Do NOT induce vomiting unless told to do so by poison control center or doctor. Do not give anything to an unconscious person.

### DIRECTIONS OF USE

**MOSQUITOES (OUTDOOR ADULT MOSQUITO CONTROL):** For control of mosquitoes outdoors, use a 2% to 5% Malathion area or fog spray. For a 2% spray, dilute 1 part of **SWEEP 570 EC** with 28 parts of water; for 5%, dilute 1 to 11. Repeat as necessary. Treat shrubbery and vegetation where mosquitoes may rest. Shrubby and vegetation around stagnant pools, marshy areas, ponds, and shore lines may be treated.

**MOSQUITO LARVAE CONTROL:** For control of mosquito larvae in standing water, intermittently flooded areas, stagnant water, and temporary rain pools, apply 13 ounces of **SWEEP 570 EC** per acre. Mix in sufficient water or oil to obtain even coverage when applied by air or ground equipment. **NOTE: BROADCAST USE ONLY OVER INTERMITTENTLY FLOODED AREAS.**

APPLICATION MAY NOT BE MADE AROUND BODIES OF WATER WHERE FISH OR SHELLFISH ARE GROWN AND/OR HARVESTED COMMERCIALY. CONTAMINATION OF SHALLOW, FISH-BEARING WATERS MAY KILL FISH.

**FLIES:** For the control of flies around buildings which house domestic animals, around yards and around homes, apply a spray containing 2 gallons of **SWEEP 570 EC** in 100 gallons of water. Apply the spray at the rate of one gallon per 1,000 square feet on painted surfaces and two gallons per 1,000 square feet on unpainted surfaces where flies alight or congregate, such as outside walls, stanchions, windows outside dairy barns, fences, around garbage cans, etc. Repeat applications as necessary. For a bait spray, use 2 gallons of **SWEEP 570 EC** with two gallons of unsulfurized molasses or corn syrup, or 20 pounds of sugar per 100 gallons of water. Use 3 gallons of this product with 40 pounds of sugar per 100 gallons if the fly population is severe. Repeat applications as necessary. Do not use inside buildings.

**BEANS (Lima, Green, Snap, Navy, Red Kidney, Wax, Cowpeas, Blackeyed Peas):** **Mexican Bean Beetle**—11/2 pts. **Spider Mites**—11/2 pts. **Japanese Beetle\***—11/2-2 pts. **Aphids, Cucumber Beetle, Potato Leafhoppers, Lygus Bugs**—2 pts. \*Make 2 or more applications as needed. Do not apply within 1 day of harvest. **Note:** Do not graze or feed treated crop foliage to livestock.

**DRY BEANS (California and Northwestern U.S.):** **Lygus Bugs**—11/2-2 pts. Do not apply within 1 day of harvest. **Note:** Do not graze or feed treated crop foliage to livestock.

**COLE CROPS AND LEAFY VEGETABLES:** [**Broccoli, Turnips** (Do not apply within 3 days of harvest), **Brussels Sprouts, Cabbage, Collards, Dandelions, Kale, Kohlrabi, Mustard Greens, Swiss Chard, Watercress** (Do not apply within 7 days of harvest), **Parsley** (Do not apply within 21 days of harvest)], **Harlequin, Cabbage Bug (on Collards only)**—1 pt. **Imported Cabbage Worm, Cabbage Looper, and Diamondback Moth**—For control of cabbage loopers, worms, and diamondback moths, **SWEEP 570 EC** should be used in combination with other recommended insecticides.

**CELERY (Sweet Anise\* and Fresh Leaves and Stalks Only):** **Aphids, Spider Mites**—11/2 pts. \*Not for use on seed and oil crop. Do not apply within 7 days of harvest.

**LETTUCE:** **Leafhoppers, Aphids, Spider**

**Mites**—2 pts. **Cabbage Looper**—3 pts. Do not apply to leaf lettuce within 14 days of harvest; do not apply to head lettuce within 7 days of harvest.

**SPINACH:** **Aphids**—2 pts. Do not apply within 7 days of harvest.

**CORN (Sweet):** **Japanese Beetle**—2 pts. Do not apply within 5 days of harvest. Injury may occur in the whorl or to the silks.

**CORN (Grain or Forage):** **Aphids, Corn Earworm, Corn Rootworm Adults, Grasshoppers, Sap Beetle, Thrips**—11/2 pts. For control of corn earworm and sap beetles, begin treatments when 10% of the ears show silk. Repeat applications at 3-5 day intervals until 4-5 applications have been made. Do not apply within 5 days of harvest or forage use. **Armyworms**—11/2-2 pts. Injury may occur in the whorl and silk stages with **SWEEP 570 EC**.

**CUCURBITS (Cucumbers):** **Aphids, Spider Mites, Pickleworm**—11/2 pts. **Cucumber Beetle, Leafminer**—2 pts. **Squashvine Borer**—3 pts. Do not apply unless plants are dry. Apply uniformly over soil around base of plants. Do not apply within 1 day of harvest.

**ENDIVE:** **Cowpea Aphid, Pea Aphid**—11/2-2 pts. Do not apply within 7 days of harvest.

**SQUASH:** **Alfalfa Loopers**—For control of loopers, **SWEEP 570 EC** should be used in combination with other recommended insecticides. **Aphids, Spider Mites**—11/2 pts. **Pickleworm**—2 pts. **Squash Vine Borers, Cucumber Beetles**—3 pts. Do not apply unless plants are dry. Do not apply within 1 day of harvest.

**EGGPLANT:** **Aphids, Spider Mites**—1 pt. **Lace Bug**—3 pts. Apply uniformly over soil around base of plant. Do not apply within 3 days of harvest.

**COTTON:** **Brown Cotton Leafworm, Cotton Aphid, Cotton Leafworm, Cotton Leaf Perforators, Desert Spider Mite, Leafhoppers, Lygus Bugs, Thrips, Whiteflies**—1/2-2 pts. **Boll Weevil**—2-4 pts. **Cotton Fleahoppers**—1-11/2 pts. May be applied on the day of harvest. Consult local agricultural authorities for exact time of application. **Fall Armyworms, Garden Webworms, Grasshoppers**—11/2-3 pts. May be applied on the day of harvest. **Lygus Bugs, Thrips**—1-4 pts. **Note:** Do not graze or feed treated crop foliage to livestock.

**MINT:** **Aphids, Spider Mites, Leafhopper, Adult Flea Beetles, Caterpillars**—11/2 pts. Do not apply within 7 days of harvest.

**RICE: Rice Leaf Miner**—21/2 pts. Make first application shortly after the first rice blades appear on the surface of the water and repeat if necessary. Do not apply within 7 days of harvest. **Rice Stink Bug**—1-11/2 pts. Do not apply within 7 days of harvest. Broadcast use only over intermittently flooded areas. Application may not be made around bodies of water where fish or shellfish are grown and/or harvested commercially.

**TOMATOES (outdoor): Spider Mites**—11/2 pts. Do not apply within 1 day of harvest. **Aphids**—1 pt. Do not apply within 1 day of harvest. **Drosophila**—21/2 pts. Do not apply within 1 day of harvest. **Armyworm, Fruit worms (California only)**—23/4 qts. Do not apply within 3 days of harvest. **VETCH: Pea Aphid, Vetch Bruchid**—11/2-2 pts. Do not apply within 7 days of harvest or pasturing.

**ALFALFA: Aphids, Potato Leafhopper, Spider Mites, Alfalfa Weevil Larvae, Spittlebug, Grasshoppers, Lygus Bug, Spotted Alfalfa Aphid, Stink Bugs**—11/2-2 pts. **Clover Leaf Weevil**—11/2 pts. **Pea Aphid**—1 pt. **Armyworms**—2 pts. **Vetch Bruchid**—2-21/2 pts. Apply to alfalfa in bloom only in the evening or early morning when bees are not working in the field or are not hanging on outside of hives. May be applied on the day of harvest.

**CLOVER: Alfalfa Weevil Larvae, Aphids, Spider Mites, Lygus Bugs, Grasshoppers, Potato Leafhoppers, Spittlebugs**—11/2-2 pts. **Clover Leaf Weevil**—11/2 pts. **Armyworms**—2 pts. Do not apply to clover in bloom. May be applied on day of harvest.

**SORGHUM: Greenbugs**—11/2 pts. Do not apply within 7 days of harvest. **Note:** Do not graze or feed treated crop foliage to livestock.

#### **GRASS CROPS**

**Grass & Grass Hay: Grasshoppers, Aphids, Leafhoppers**—11/2-2 pts. or 11/2 pts. in 1 gal. diesel fuel oil\*. **Armyworms**—2 pts. OR 11/2 pts. in 1 gal. diesel fuel oil\*. \*Apply by aircraft or turbine-blower sprayer.

**Pasture & Range Grass: Grasshoppers, Aphids, Leafhoppers**—11/2-2 pts. OR 11/2 pts. in 1 gal. diesel fuel oil\*. \*Apply by aircraft or turbine-blower sprayers.

**Barn Grass, Canary Grass, Fescue, Orchard Grass, Red Top, Timothy, Yellow Foxtail: Cereal Leaf Beetle**—1-11/2 pts. May be applied on day of harvest or grazing.

**NON-AGRICULTURAL LANDS (Wasteland, Roadsides, Soil Bank, Land not to be Grazed):**

**Grasshoppers**—11/2-3 pts. OR 11/2-3 pts. in 1 gal. diesel fuel oil\*. \*Apply by aircraft or turbine-blower sprayer. Repeat applications may be needed after hatching and before movements to crops take place.

#### **GRAIN CROPS**

**Barley, Corn, Wheat: Cereal Leaf Beetle**—11/2 pts. **Barley, Rye, Wheat, Oats: English Grain Aphid, Greenbugs, Grasshoppers**\*—11/2 pts. \*Make full coverage to hatching areas when nymphs are young. **Armyworms**—2 pts.

**GRAINS (Corn, Barley, Oats, Rye, & Wheat)—RESIDUAL SPRAY BEFORE STORING:** For walls, floors, and machinery in grain elevators, in treating truck beds, box cars, and ship holds before loading grain, use 1 gallon per 25 gallons of water. Make thorough application. Before applying spray, clean elevators, boxcars, truck beds, etc. thoroughly. Remove and burn all sweepings and debris.

**GARLIC, LEEKS, SHALLOTS: Aphids, Thrips**—11/2-2 pts. Apply uniformly over soil around base of plant. Do not apply within 3 days of harvest.

**LENTILS: Cowpea Aphid, Pea Aphid**—11/2 pts. Do not apply within 3 days of harvest. **Note:** Do not graze or feed treated crop foliage to livestock.

**MUSHROOMS: Mites**—21/2 pts. per 130 gals. OR 1 tbs. per 100 sq. ft. of bed. **Phorid and Sciarid Flies**—21/2 pts. per 130 gals. or 1 tbs. per 100 sq. ft. of bed. Make thorough application as soon as possible after picking. Repeat applications as necessary, usually twice a week. Do not apply within 1 day of harvest.

**ONION: Thrips**—11/2 pts. **Onion Maggots**—21/2 pts. Do not apply within 3 days on Green Onions.

**PEAS: Alfalfa Loopers, Celery Loopers**—For Control of Loopers, **SWEEP 570 EC** should be used in combination with other recommended insecticides. Do not apply within 3 days of harvest. **Note:** Do not graze or feed treated crop foliage to livestock.

**OKRA: Aphids**—11/2 pts. **Japanese Beetle**—2 pts. Do not apply within 1 day of harvest.

**PEPPERS: Aphids**—1 pt. **Pepper Maggots**—21/2 pts. Do not apply within 3 days of harvest.

**POTATOES: Aphids, Mealybugs, Leafhoppers**—2 pts. **False Chinch Bugs**—11/2 pts. **Mealybugs**—2-21/2 pts. May be applied on the day of harvest.

**BEETS (Table & Garden): Aphids**—11/2 pts.-2 pts. If tops are to be used as feed, do not apply within 7 days of harvest.

**HORSERADISH, PARSNIPS: Aphids**—11/2-2 pts. Apply uniformly over soil around base of plants.

**RADISH, SALSIFY: Aphids**—11/2-2 pts. Do not apply within 7 days of harvest.

**RUTABAGAS: Aphids**—11/2 pts. Do not apply within 3 days of harvest.

**SWEET POTATOES: Leafhoppers**—11/2-2 pts. **Morninglory leafminers**—21/2- 3 pts. Do not apply within 3 days of harvest.

**APRICOTS: CodlingMoth, Orange tortrix, Terrapin Scale, Soft Brown Scale, Aphids**—11/2-2 pts. Do not apply within 7 days of harvest.

**AVOCADOS: Latania Scale, Greenhouse Thrips, Omnivorous Looper, Orange Tortrix, Soft Brown Scale**—11/2 pts. Do not apply within 7 days of harvest.

**CHERRIES: Black Cherry Aphids, Fruit Tree Leaf Roller**—11/2 pts. **Cherry Fruit Fly, Bud Moth**—1 pt. Injury may occur on certain varieties of sweet cherries particularly in the northwest. Do not apply within 3 days of harvest. May injure foliage on some varieties.

**CITRUS—(CONSULT LOCAL SPRAY SCHEDULES FOR RECOMMENDED VOLUMES OF SPRAY PER ACRE.) Grapefruit, Lemons, Limes, Oranges, Tangerines, Tangelos, Kumquats: California Red Scale, Yellow Scale, Purple Scale, Black Scale (single and off brooded), Soft Scale, Citricola Scale**—1-11/2 pts. Do not apply within 7 days of harvest.

**FIGS: Dried Fruit Beetles, Vinegar Beetles**—2 qts. plus 1-2 gals. Unsulfurized molasses per acre. Do not apply within 3 days of harvest.

**NURSERY STOCK, GRAPE VINES: Overwintering Grape Phylloxera.** For the control of overwintering grape phylloxera on nursery stock grape vines, remove excess soil from the roots and dip in a solution made up of 1 to 11/2 pts. Of **SWEEP 570 EC** emulsifiable liquid in 50 gallons of water. Submerge the entire root system in the solution for 5 minutes. Keep the solution agitated at all times. Fifty gallons of solution will treat approximately 500 nursery stock grape vines. Do not apply within 3 days of harvest. Emulsion may cause injury to foliage on some varieties.

**NECTARINES: Plum Curculio**—2 pts. **Mites** 1-2 pts. Application of this mixture should be made only in the petal fall period. Do not apply within 7 days of harvest.

**PEACHES: Oriental Fruit Moth, Plum Curculio, Terrapin Scale, Cottony Peach Scale**—2 pts. **Green Peach Aphid, Black Cherry Aphid, Black Peach Aphid, Rusty Plum Aphid, Japanese Beetle**—1 pt. Do not apply within 7 days of harvest.

**BLACKBERRIES, BOYSENBERRIES, DEWBERRIES, LOGANBERRIES, RASPBERRIES: Mites, Thrips, Leafhoppers, Japanese Beetle**—11/2 pts. **Aphids, Rose Scale**—3 pts. Do not apply within 1 day of harvest.

**RASPBERRIES: Sap Beetle**—11/2-2 pts. Do not apply within 1 day of harvest.

**BLUEBERRIES: Blueberry Maggots in the Northeast**—1 pt. of **SWEEP 570 EC** plus 11/2 qts. of Staley's Sauce Base #7 in 100 gals. of water per acre and apply by ground or air equipment. Preharvest interval—8 hours. **Japanese Beetle**—11/2 pts.

**STRAWBERRIES: Aphids, Spider Mites, Strawberry Root Weevil**—11/2 pts. **Lygus Bugs, Spittlebugs, Field Crickets, Thrips**—11/2-3 pts. **Potato Leafhopper, Strawberry Leafroller, Whiteflies**—11/2-21/2 pts. Do not apply within 3 days of harvest.

**PECANS: Spider Mites, Aphids, Pecan Nut Casebearer, Pecan Phylloxera, Pecan Bud Moth**—1-2 pts.

**ORNAMENTALS (Ornamental Flowering Plants, Ornamental Nursery Stock, Ornamental Woody Plants, Pine Seed Orchards, Uncultivated Non- Agricultural Areas, Christmas Tree Plantations): Oyster Shell Scale, Lace Bug**—1 pt. **Euonymus Scale**—1-11/2 pts. **Aphids, Mealy Bugs, Spider Mites, Whitefly, Fourlined Leaf Bug, Japanese Beetle Adult, Potato Leafhopper, Tarnished Plant Bug, Thrips, Rose Leafhopper, European Pine Shoot Moth, Scurfy Scale**—11/2 pts. Apply sufficient amount for good coverage. **Birch Leaf Miner, Boxweed Leaf Miner, Bagworms, Tent Caterpillars, Azalea Scale, Oak Kermes, Pine Leaf Scale, Magnolia Scale, Fletcher Scale, Florida Red Scale**—2 pts. Apply when scale crawlers have settled on foliage. **Black Scale Crawlers, Monterey Pine Scale, Soft Scale**—21/2 pts. **Pine Needle Scale**—4 pts. **Wax Scale**—2 qts. Apply in spring when crawlers

are active. Repeat 1 or 2 full coverage applications at 10 days intervals. **NOTE:** Apply sufficient amount for good coverage.

**GREENHOUSE (Around Greenhouses and Gardens): Millipedes, Springtails, Sowbugs—**Mix 1 teaspoonful of **SWEEP 570 EC** in 1 gal. of water and apply to 150 square feet of soil surface or where insects congregate. Repeat at 7 to 10 day intervals as needed.

**SLASH PINE (Ornamental Nursery Stock, Pine Seed Orchards, Christmas Tree Plantations): Slash Pine Flower Thrips—**Apply 1 1/4 gallons **SWEEP 570 EC** per 100 gallons of water. Apply at a minimum rate of 3/4 gallon per tree on the smallest flowering trees. Mist blowers or airblast sprays may be used.

**Aerial Application—**Mix 2 1/2 quarts of **SWEEP 570 EC** in at least 5 gallons of water; apply at a minimum rate of 5 gallons per acre. Make two applications, the first when female flowers are twig bug stage; the second one week prior to maximum flower receptivity to pollen. Do not allow workers to reenter fields to engage in any activity requiring substantial contact with treated foliage for one day (24 hours) following application. Do not harvest trees within 24 hours of application.

#### DISPOSAL METHODS

Do not dispose of undiluted chemicals on site. If recycling, replace cap and return clean containers to recycler or designated collection point. If not recycling, break, crush, or puncture and bury empty containers in a local authority landfill. If no landfill is available, bury the containers below 500 mm in a disposal pit specifically marked and set up for this purpose clear of waterways, desirable vegetation and tree roots. Empty containers and product should not be burnt.

#### STORAGE CONDITION

Store in the closed, original container in a cool, well-ventilated area. Do not store for prolonged periods in direct sunlight. Store in a locked room or place away from children, animals, food, feedstuffs, seed and fertilizers. Triple or preferably pressure rinse containers before disposal. Add rinsing to spray tank.

For More Details including effects on environment email [contact@ivorychem.com](mailto:contact@ivorychem.com) with Subject "SWEEP 570 EC DETAILS"

More Details:

#### TOXICOLOGICAL EFFECTS

- **Acute toxicity:** Malathion is slightly toxic via the oral route, with reported oral LD50 values of 1000 mg/kg to greater than 10,000 mg/kg in the rat, and 400 mg/kg to greater than 4000 mg/kg in the mouse [2,13]. It is also slightly toxic via the dermal route, with reported dermal LD50 values of greater than 4000 mg/kg in rats [2,13]. Effects of malathion are similar to those observed with other organophosphates, except that larger doses are required to produce them [2,8]. It has been reported that single doses of malathion may affect immune system response [2]. Symptoms of acute exposure to organophosphate or cholinesterase-inhibiting compounds may include the following: numbness, tingling sensations, incoordination, headache, dizziness, tremor, nausea, abdominal cramps, sweating, blurred vision, difficulty breathing or respiratory depression, and slow heartbeat. Very high doses may result in unconsciousness, incontinence, and convulsions or fatality. The acute effects of malathion depend on product purity and the route of exposure [33]. Other factors which may influence the observed toxicity of malathion include the amount of protein in the diet and gender. As protein intake decreased, malathion was increasingly toxic to the rats [78]. Malathion has been shown to have different toxicities in male and female rats and humans due to metabolism, storage, and excretion differences between the sexes, with females being much more susceptible than males [79]. Numerous malathion poisoning incidents have occurred among pesticide workers and small children through accidental exposure. In one reported case of malathion poisoning, an infant exhibited severe signs of cholinesterase inhibition after exposure to an aerosol bomb containing 0.5% malathion [44].
- **Chronic toxicity:** Human volunteers fed very low doses of malathion for 1 1/2 months showed no significant effects on blood cholinesterase activity. Rats fed dietary doses of 5 mg/kg/day to 25 mg/kg/day over 2 years showed no symptoms apart from depressed cholinesterase activity. When small amounts of the compound were administered for 8 weeks, rats showed

no adverse effects on whole-blood cholinesterase activity [2]. Weanling male rats were twice as susceptible to malathion as adults.

- **Reproductive effects:** Several studies have documented developmental and reproductive effects due to high doses of malathion in test animals [2]. Rats fed high doses of 240 mg/kg/day during pregnancy showed an increased rate of newborn mortality. However, malathion fed to rats at low dosages caused no reproductive effects [8]. It is not likely that malathion will cause reproductive effects in humans under normal circumstances.
- **Teratogenic effects:** Rats fed high doses (240 mg/kg/day) showed no teratogenic effects. Malathion and its metabolites can cross the placenta of the goat and depress cholinesterase activity of the fetus [8]. Chickens fed diets at low doses for 2 years showed no adverse effects on egg hatching [8]. Current evidence indicates that malathion is not teratogenic.
- **Mutagenic effects:** Malathion produced detectable mutations in three different types of cultured human cells, including white blood cells and lymph cells [2,8]. It is not clear what the implications of these results are for humans.
- **Carcinogenic effects:** Female rats on dietary doses of approximately 500 mg/kg/day of malathion for 2 years did not develop tumors [2]. Adrenal tumors developed in the males at low doses, but not at the high doses [80], suggesting that malathion was not the cause. Three of five studies that have investigated the carcinogenicity of malathion have found that the compound does not produce tumors in the test animals. The two other studies have been determined to be unacceptable studies and the results discounted [2,8,80]. Available evidence suggests that malathion is not carcinogenic but the data are not conclusive.
- **Organ toxicity:** The pesticide has been shown in animal testing and from use experience to affect the central nervous system, immune system, adrenal glands, liver, and blood.
- **Fate in humans and animals:** Malathion is rapidly and effectively absorbed by practically all routes including the gastrointestinal tract, skin, mucous membranes, and lungs. Malathion undergoes similar detoxification mechanisms to other

organophosphates, but it can also be rendered nontoxic via another simple mechanism, splitting of either of the carboxy ester linkages. Animal studies indicate it is very rapidly eliminated through urine, feces and expired air with a reported half-life of approximately 8 hours in rats and approximately 2 days in cows [2]. Autopsy samples from one individual who had ingested large amounts of malathion showed a substantial portion in the stomach and intestines, a small amount in fat tissue, and no detectable levels in the liver. Malathion requires conversion to malaoxon to become an active anticholinesterase agent. Most of the occupational evidence indicates a low chronic toxicity for malathion. One important exception to this was traced to impurities in the formulation of the pesticide [2].

#### ECOLOGICAL EFFECTS

- **Effects on birds:** Malathion is moderately toxic to birds. The reported acute oral LD50 values are: in mallards, 1485 mg/kg; in pheasants, 167 mg/kg; in blackbirds and starlings, over 100 mg/kg; and in chickens, 525 mg/kg [2,6]. The reported 5- to 8-day dietary LC50 is over 3000 ppm in Japanese quail, mallard, and northern bobwhite, and is 2639 ppm in ring-neck pheasants [6]. Furthermore, 90% of the dose to birds was metabolized and excreted in 24 hours via urine [79].
- **Effects on aquatic organisms:** Malathion has a wide range of toxicities in fish, extending from very highly toxic in the walleye (96-hour LC50 of 0.06 mg/L) to highly toxic in brown trout (0.1 mg/L) and the cutthroat trout (0.28 mg/L), moderately toxic in fathead minnows (8.6 mg/L) and slightly toxic in goldfish (10.7 mg/L) [13,8,16]. Various aquatic invertebrates are extremely sensitive, with EC50 values from 1 ug/L to 1 mg/L [28]. Malathion is highly toxic to aquatic invertebrates and to the aquatic stages of amphibians. Because of its very short half-life, malathion is not expected to bioconcentrate in aquatic organisms. However, brown shrimp showed an average concentration of 869 and 959 times the ambient water concentration in two separate samples [12].
- **Effects on other organisms:** The compound is highly toxic to honeybees [13].

#### ENVIRONMENTAL FATE:

- **Breakdown in soil and groundwater:** Malathion is of low persistence in soil with reported field half-lives of 1 to 25 days [19]. Degradation in soil is rapid and related to the degree of soil binding [12]. Breakdown occurs by a combination of biological degradation and nonbiological reaction with water [12]. If released to the atmosphere, malathion will break down rapidly in sunlight, with a reported half-life in air of about 1.5 days [12]. It is moderately bound to soils, and is soluble in water, so it may pose a risk of groundwater or surface water contamination in situations which may be less conducive to breakdown. The compound was detected in 12 of 3252 different groundwater sources in two different states, and in small concentrations in several wells in California, with a highest concentration of 6.17 ug/L [33].
- **Breakdown in water:** In raw river water, the half-life is less than 1 week, whereas malathion remained stable in distilled water for 3 weeks [12]. Applied at 1 to 6 lb/acre in log ponds for mosquito control, it was effective for 2.5 to 6 weeks [12]. In sterile seawater, the degradation increases with increased salinity. The breakdown products in water are mono- and dicarboxylic acids [12].
- **Breakdown in vegetation:** Residues were found mainly associated with areas of high lipid content in the plant. Increased moisture content increased degradation [33].

- **PEL:** 15 mg/m<sup>3</sup> (8-hour) (dust) [39]
- **HA:** 0.2 mg/L (lifetime) [53]
- **TLV:** Not Available



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#### PHYSICAL PROPERTIES

- **Appearance:** Technical malathion is a clear, amber liquid at room temperature [13].
- **Chemical Name:** diethyl (dimethoxy thiophosphorylthio) succinate [13]
- **CAS Number:** 121-75-5
- **Molecular Weight:** 330.36
- **Water Solubility:** 130 mg/L [13]
- **Solubility in Other Solvents:** v.s. in most organic solvents [13]
- **Melting Point:** 2.85 C [13]
- **Vapor Pressure:** 5.3 mPa @ 30 C [13]
- **Partition Coefficient:** 2.7482 [13]
- **Adsorption Coefficient:** 1800 [19]

#### EXPOSURE GUIDELINES

- **ADI:** 0.02 mg/kg/day [38]
- **MCL:** Not Available
- **RfD:** 0.02 mg/kg/day [53]