



The IPM in Health Care Facilities Project Least-Toxic Pesticide Product Use for Health Care Facilities

Definition: A least-toxic pesticide is a pesticide that has low human and environmental health hazards. Many least-toxic pesticides are botanicals, essential oils or derived from other plant or natural mineral sources. The use of least-toxic pesticides should only be considered after cultural, mechanical, and biological controls have been attempted and proven ineffective

The term '*least toxic pesticides*' does not include a pesticide that is:

- determined by EPA to be a possible, probable, or known carcinogen, mutagen, teratogen, reproductive toxin, developmental neurotoxin, endocrine disruptor, or immune system toxin;
- a pesticide in EPA's toxicity category I or II; and
- any application of the pesticide using a broadcast spray, dust, tenting, fogging, or baseboard spray application.

Least toxic pesticides generally include those that 1) are EPA-classified minimum risk pesticides And 2) have been reviewed by the National Organic Standards Board for their health and environmental impact, and compatibility with an organic system a

Least toxic pesticides are any pesticide or pesticide product ingredients, which, at a minimum, have not been classified as or found to have any of the following characteristics:

(1) Toxicity Category I or II by the United States Environmental Protection Agency (EPA). These pesticides are identified by the words "DANGER" or "WARNING" on the label.
(2) A developmental or reproductive toxicant as defined by the State of California Proposition 65 Chemicals Known to Developmental or Reproductive Harm.
(3) A carcinogen, as designated by EPA's List of Chemicals Evaluated for Carcinogenic Potential (chemicals classified as a human carcinogen, likely to be carcinogenic to humans, a known/likely carcinogen, a probable human carcinogen, or a possible human carcinogen), the International Agency for Research on Cancer (IARC), U.S. National Toxicology Program (NTP), and the state of California's Proposition 65 list. Any of the following classifications shall deem the chemical a carcinogen and unacceptable:

- Known to the State of California to Cause Cancer (California)
- Group A: Human Carcinogen (US EPA 986 category)
- Group B: Probably Human Carcinogen (US EPA 986 category) • Group C: Possible Human Carcinogen (US EPA 986 category) • Known Carcinogen (US EPA 996 category)
- Likely Carcinogen (US EPA 996 category)
- Carcinogenic to Humans (US EPA 999 category)
- Likely to be Carcinogenic to Humans (US EPA 999 category)
- Suggestive Evidence of Carcinogenicity (US EPA 999 category) • Known to be Human Carcinogens (NTP)
- Reasonably Anticipated to be Human Carcinogens (NTP)
- Group : Carcinogenic to Humans (IARC)
- Group A: Probably Carcinogenic to Humans (IARC)
- Group B: Possibly Carcinogenic to Humans (IARC)

- (4) Neurotoxic cholinesterase inhibitors, as designated by California Department of Pesticide Regulation or the Materials Safety Data Sheet (MSDS) for the particular chemical,
- (5) Known groundwater contaminants, as designated by the state of California (for actively registered pesticides) or from historic groundwater monitoring records (for banned pesticides).
- (6) Pesticides formulated as dusts, powder or aerosols, unless used in a way that virtually eliminates inhalation hazard (for example, applied to cracks or crevices and sealed after the application, or as a directed spray into the entrance of an insect nest).
- (7) Nervous system toxicants, including chemicals such as cholinesterase inhibitors or chemicals associated with neurotoxicity by a mechanism other than cholinesterase inhibition, or listed on:
- Toxics Release Inventory (TRI), EPA EPCRA Section 33 (Identified as "NEUR" on Table)
 - EPA Reregistration Eligibility Decisions (RED)
 - Insecticide Resistance Action Committee (IRAC) Mode of Action Classification:
 - Acetylcholine esterase inhibitors;
 - GABA-gated chloride channel antagonists;
 - Sodium channel modulators;
 - Nicotinic Acetylcholine receptor agonists /antagonists]
 - Nicotinic Acetylcholine receptor agonists;
 - Chloride channel activators;
 - Octopaminergic agonists;
 - Voltage-dependent sodium channel blockers; or
 - Neuronal inhibitors (unknown mode of action).
- (8) Endocrine disruptors, which include chemicals that are known to or likely to interfere with the endocrine system in humans or wildlife, based on the European Commission (EC) List of 46 substances with endocrine disruption classifications, Annex 3 (and/or any subsequent lists issued as follow-up, revisions, or extensions).
- (9) (Regarding outdoor use) Adversely affects the environment/wildlife, based on:
- Label precautionary statements including "toxic" or "extremely toxic" to bees, birds, fish, aquatic invertebrates, wildlife or other non-target organisms, unless these organisms are the target pest and/or environmental exposure can be virtually eliminated.
 - Pesticides with ingredients with moderate or high mobility in soil, according to the Groundwater Ubiquity Score (GUS), or with a soil half-life of 30 days or more (except for mineral products). Persistence and Soil Mobility procedures appear below.
- If GUS (Groundwater Ubiquity Score) cannot be found, we search for the aerobic soil half-life and soil-binding coefficient Koc. GUS is then calculated from the formula: $GUS = \log_0(\text{half-life}) * (4 - \log_0(Koc))$.
- (10) Has data gap or missing information in EPA registration documents, including pesticide fact sheets, or EPA reregistration eligibility decisions, which EPA is requiring the registrant to fulfill.
- (11) Contaminants and metabolites recognized by EPA that violate any of the above criteria.
- (12) Inert or active ingredients that are Chemicals Included on EPA's List (Inerts of Toxicological Concern) or EPA List : (Potentially Toxic, High Priority for Testing).

Least-Toxic Products

Insecticides:

Powdered Insecticides: Diatomaceous earth and silica gels free of selective chemicals provide an excellent alternative for lawn and garden use. They are effective against fleas, ticks, and beetles with a light coating on the lawn.

Boric acid, although generally used indoors, are available in numerous forms, including dusts, liquids, granules, pellets, tablets, wettable powders, rods, or baits.

Insecticidal Soaps: These products use potassium salts of fatty acids to suffocate and kill insects that come into direct contact with the spray. Avoid spraying these contact killers when beneficial insects, such as bees and butterflies, are in the area.

Neem Oil and other Botanicals: Concentrated neem oil, known as azadirachtin, for control of problem pests. It works by interrupting a pest's growth and depressing its feeding, leading to starvation. The product controls a wide variety of insects, and possesses a very low toxicity to humans, but its impact to beneficials remains murky. Other botanical products are generally derived from essential oils, and work by desiccating insects, drying out their waxy outer layer; active ingredients such as rosemary, peppermint, thyme, and clove oil.

Pheromones: These products often go hand-in-hand with insect traps. A number of products are on the market to either attract or repel pests or beneficial insects to one's landscape.

Fungicides: Active ingredients in organic fungicides are generally quite similar to those in insecticides. Many organic fungicides, such as [Monteray's 70% Neem Oil](#) and [Safer 3 in 1 Spray](#), are also marketed as insecticides.

Herbicides: Least toxic herbicides are best used on young weeds, as larger plants may take more than one pass to kill. They are contact killers, so the entire plant must be sprayed, and these products are usually most effective when sprayed on a bright day. As of now, these pesticides are non-selective, meaning that they have the potential to burn grass if improperly applied.

Herbicidal Soaps: Herbicides containing some form of fatty acids work by penetrating the waxy coating of plant leaves to dry them out.

Botanicals: are an alternative to Roundup and 2,4-D. [Avenger Organics Weed Killer](#) is an herbicide that uses concentrated citrus oil in the form of d-limonene to strip the waxy outer layer of plants and dry them out. [Soiltech](#) produces Phydura, an herbicide with clove oil as the active ingredient.

Vinegars: Horticultural vinegars are a popular mainstay of least-toxic alternative herbicides. They work in a similar way to the other herbicides above, but are quite harsh, and acutely toxic to weeds. It's important that customers follow the label and any protective equipment prescribed therein. Look for horticultural vinegars with at least 15% acetic acid, as any less will be much less effective.

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