INERT OR "OTHER" INGREDIENTS

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What are inert or other ingredients?

Pesticide products contain both active ingredients and inert ingredients. Inert ingredients are also called other ingredients.[1] Active ingredients are the chemicals in the product that are actually meant to kill or repel the pest. The other ingredients in the product play some other role besides controlling the pest.[2] Although other ingredients are sometimes called "inert" the name does not mean that they are non-toxic.[1] See the text box about **Pesticide Products.**

Active and other ingredients together make up a formulated pesticide product. Manufacturers must list the names of all active ingredients and the percentage of the product that is made up of other ingredients on the product label, but they do not usually have to list the names of other ingredients.[3]

Why are other ingredients used in pesticide products?

Other ingredients are used in pesticide products for a variety of reasons, including:[2]

- To stabilize the product and extend shelf-life
- To help the pesticide stick to surfaces like leaves and soil
- To help the pesticide spread over surfaces
- To help the pesticide dissolve in water
- To prevent caking or foaming
- Ease of application (prevent clogging, product uniformity)
- To make ingredients compatible
- Drift control

Pesticide products: A pesticide product is a commercially available mixture of chemicals used to kill, repel, or otherwise control one or more specific pest. The product consists of the active ingredient(s) and the inert ingredient(s). Active ingredients are the chemicals that are actually effective against the pest. The rest of the product is composed of an inert ingredient(s). The percentage of total inert ingredient(s) (which can range from 0 to 99.9%) is listed on the product label.

Why are the other ingredients not listed on the product label?

Other ingredients are not required by law to be specifically listed on the label. Full pesticide product formulations must be provided to the EPA, but they are considered trade secrets or confidential business information.[3] Therefore, the manufacturers do not have to list them.

There are some exceptions. For example, products that contain greater than 0.1% sodium nitrate or greater than 10% xylene range aromatic solvents, xylene, or petroleum distillates must list these ingredients on the label.[2]

If a pesticide product contains only ingredients from a special list maintained by the U.S. EPA and its labeling meets certain requirements, manufacturers do not have to register that product with the U.S. EPA.[4] They may have to register it with individual states, however. These products must list all active and other ingredients on their labels.[4]

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How toxic are other ingredients?

Other ingredients range from low in toxicity to highly toxic. See the text box on **Dose Response**. The toxicity of formulated pesticide products depends on both the active and other ingredients. The U.S. EPA evaluates product toxicity during registration and displays the toxicity on the label in the form of a signal word.[6] See the fact sheet about Signal Words. See the text boxes on **Toxicity Category** and **LD_{50}/LC_{50}**.

Dose response: Effects of inert ingredients on human health and the environment depend on how much chemical is present, the length and frequency of exposure, and route of exposure. Effects also depend on the health of a person and/or certain environmental factors.

TOXICITY CLASSIFICATION (Signal Word)[5]

	High Toxicity (DANGER/Danger-Poison) Category I	Moderate Toxicity (WARNING) Category II	Low Toxicity (CAUTION) Category III	Very Low Toxicity (Optional Signal Word = CAUTION) Category IV
Acute Oral LD_{50}	≤ 50 mg/kg[2]	> 50 – 500 mg/kg	> 500 – 5000 mg/kg	> 5000 mg/kg
Inhalation LC_{50}	≤ 0.05 mg/L	> 0.05 – 0.5 mg/L	> 0.5 – 2.0 mg/L	> 2.0 mg/L
Dermal LD_{50}	≤ 200 mg/kg	> 200 - 2000 mg/kg	> 2000 – 5000 mg/kg	> 5000 mg/kg
Primary Eye Irritation	Corrosive (irreversible destruction of ocular tissue) or corneal involvement or irritation persisting for more than 21 days	Corneal involvement or other eye irritation clearing in 8 - 21 days	Corneal involvement or other eye irritation clearing in 7 days or less	Minimal effects clearing in less than 24 hours
Primary Skin Irritation	Corrosive (tissue destruction into the dermis and/or scarring)	Severe irritation at 72 hours (severe erythema or edema)	Moderate irritation at 72 hours (moderate erythema)	Mild or slight irritation at 72 hours (no irritation or erythema)

You may be wondering why the "High Toxicity" column has smaller numbers than the "Low Toxicity" column. This is because if a smaller amount of the pesticide caused a health effect, it's more toxic. If it takes a larger amount of the pesticide to cause a health effect, it's less toxic.

Modeled after the U.S. Environmental Protection Agency, Office of Pesticide Programs, Label Review Manual, Chapter 7: Precautionary Statements. epa.gov/sites/default/files/2018-04/documents/chap-07-mar-2018.pdf.

LD_{50}/LC_{50}: A common measure of acute toxicity is the lethal dose (LD50) or lethal concentration (LC_{50}) that causes death (resulting from a single or limited exposure) in 50 percent of the treated animals. LD_{50} is generally expressed as the dose in milligrams (mg) of chemical per kilogram (kg) of body weight. LC_{50} is often expressed as mg of chemical per volume (e.g., liter (L)) of medium (i.e., air or water) the organism is exposed to. Chemicals are considered highly toxic when the LD_{50}/LC_{50} is small and practically non-toxic when the value is large. However, the LD_{50}/LC_{50} does not reflect any effects from long-term exposure (i.e., cancer, birth defects or reproductive toxicity) that may occur at levels below those that cause death.

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Where can I find a list of approved other ingredients?

The U.S. EPA maintains several lists of inert ingredients. There are separate lists for non-food uses and food uses. The most up-to-date list of other ingredients that can be used in pesticides with food uses can be found in the Electronic Code of Federal Regulations, Title 40 Part 180, Tolerances and Exemptions for Pesticide Chemical Residues in Food. Any other ingredient approved for food use can be used in a non-food pesticide product.[6]

Minimum-risk pesticide ingredients are found in the FIFRA Section 25(b) list and an additional list, the 4(a) list. Some other ingredients can be used as active ingredients but in order for the product to qualify as a minimum-risk product, the other ingredients must also be listed in the FIFRA Section 25(b) List.[4]

Other ingredients that may be used in products for organic agriculture can be found on the U.S. Department of Agriculture's National Organic Program Inert Ingredients List.

The U.S. EPA also provides guidance on the registration pages of Office of Pesticide Programs website for manufacturers wishing to add a new other ingredient to any of these lists.

How can I find out what other ingredients are in my pesticide product?

Manufacturers will sometimes provide some information on other ingredients on the product Safety Data Sheet (SDS). Freedom of Information Act (FOIA) requests can be submitted to the U.S. EPA for information on other ingredients. The U.S. EPA may consult with the manufacturer before deciding whether to provide the information.[3]

Pesticide companies may disclose the other ingredients in their products to medical professionals needing the information to treat pesticide poisoning cases. Medical staff may be asked to sign a statement that the information will be kept confidential.

Where can I get more information?

For more detailed information about inert ingredients please visit the list of referenced resources below, call NPIC between 8:00 AM and 12:00 PM Pacific Time (11:00 AM to 3:00 PM Eastern Time), Monday - Friday, at 800-858-7378, or visit us on the web at npic.orst.edu. NPIC provides objective, science-based answers to questions about pesticides.

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References:

1. *Pesticide Registration (PR) Notice 97-6: Use of Term "Inert" in the Label Ingredients Statement*; U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, U.S. Government Printing Office: Washington, DC, 1997.

2. *Label Review Manual, Chapter 5: Ingredient Statement*; U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, U.S. Government Printing Office: Washington, DC, 2007.
3. *The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and Federal Food, Drug, and Cosmetic Act (FFDCA) as amended by the Food Quality Protection Act (FQPA) of August 3, 1996*; U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, U.S. Government Printing Office: Washington, DC, 1996.
4. *Pesticide Registration (PR) Notice 2000-6: Minimum Risk Pesticides Exempted under FIFRA Section 25(b)*; U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, U.S. Government Printing Office: Washington, DC, 2000.
5. *Label Review Manual, Chapter 7: Precautionary Labeling*; U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs, U.S. Government Printing Office: Washington, DC, 2007.
6. *Inert ingredients: Frequently asked questions*; U.S. Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances, Office of Pesticide Programs. U.S. Government Printing Office: Washington, DC, 2010.