

What Are Inert Ingredients?¹

Frederick M. Fishel²

This guide addresses inert ingredients that are contained in pesticide product formulations.

Pesticide products are manufactured in various formulations, and many are commercially available in several formulations. Regardless of formulation, all trade name pesticides are mixtures of chemicals that are used to kill, repel, or control one or more target pest(s). The portion of the formulation that is responsible for the killing, repelling, or controlling is known as the *active ingredient*, but there are other vital components of the formulation. These components are known as *inert ingredients* and may range from 0% to 99.99% of the total ingredients of the mixture.

Also known as “other ingredients,” inert ingredient percentages are listed on the front panel of the product label. Inert ingredients are included in the product for various reasons:

- To improve product activity
- For ease of application
- To assist in the dilution process when the product is added to water
- To aid in sticking or spreading the product on surfaces
- To help transport the product into the target pest
- For stability of the product during storage

Specific names of inert ingredients generally are not listed on the product’s ingredients statement on the label because:

- They are not required by law to be identified unless a certain inert ingredient has been determined to be highly toxic, in which case it must also show the percentage contained in the formulation.
- To a manufacturer, they may be considered “trade secrets” because they increase the competitiveness of the company within the pesticide market.

Although the inert ingredients are not directly responsible for the action of the pesticide, as is the active ingredient, they may be highly toxic. Inert ingredients range in their toxicity from non-toxic to highly toxic. Their toxicity also varies according to how they are taken into the human body. Some are toxic when they are swallowed or inhaled, others are toxic when absorbed into the skin. Like active ingredients, they may cause eye irritation. The Environmental Protection Agency (EPA) has an approved listing of all inert ingredients allowed in pesticide products and has also established a toxicity category list based on their relative toxicity. Some examples are listed in Table 1.

The toxicity category lists are defined as:

- Category 1: toxicological concern
- Category 2: potentially toxic inert ingredients/high priority for testing
- Category 3: unknown toxicity
- Category 4: minimal concern

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2. Frederick M. Fishel, professor, Agronomy Department, and director, Pesticide Information Office; UF/IFAS Extension, Gainesville, FL 32611.

Use pesticides safely. Read and follow directions on the manufacturer’s label.

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There are means to determine the inert ingredients contained in a pesticide product. Sometimes, manufacturers will release the inert ingredient's identity, although it is not specified on the product's ingredient statement on the label. Most manufacturers have telephone numbers listed for obtaining information on their products, and at times, an inert ingredient may be listed on their safety data sheets (SDS). The public may submit Freedom of Information Act (FOIA) requests to ask for information about inert ingredients from the EPA. Fees can be involved in FOIA requests; information can be obtained at <https://www.epa.gov/foia> to learn about these services. If there has been a pesticide exposure situation, a manufacturer will often disclose the product's inert ingredients to medical professionals for treatment purposes. The medical staff may be instructed by the manufacturer to sign a secrecy statement in such a situation.

The only inert ingredients that are required by EPA to be specifically identified on the label are those that have been determined to be Category 1 substances. Signal words on pesticide labels take into account the combination of all of the product's ingredients, both active and inert. For example, products that are low in overall toxicity carry the signal word of CAUTION; moderately toxic products show WARNING; highly toxic pesticides display DANGER as their signal word.

Evaluation of the risks associated with inert ingredients is an ongoing process; in fact, some inert ingredients are no longer used in pesticide products. The EPA encourages manufacturers to use the least toxic inert ingredients in their products whenever possible. Although the same active ingredient may be present in different products, each product may carry any one of the three signal words.

Additional Information

Fishel, F.M. 2010. *Pesticide Formulations*. Gainesville: University of Florida Institute of Food and Agricultural Sciences. <https://edis.ifas.ufl.edu/publication/pi231>

Nesheim, O.N., F.M. Fishel, and M. Mossler. 2002. *Toxicity of Pesticides*. Gainesville: University of Florida Institute of Food and Agricultural Sciences. <https://edis.ifas.ufl.edu/publication/pi008>

U.S. Environmental Protection Agency. *Inert (other) Pesticide Ingredients in Pesticide Products*. InertFinder. <https://iaspub.epa.gov/apex/pesticides/f?p=INERTFINDER:1:0::NO:1::> (Visited March 8, 2017)

Table 1. Inert ingredients listed by toxicity category.

Toxicity Category	Inert Ingredient
1	Diethyl phthalate
1	Formaldehyde
1	Hydroquinone
1	Isophorone
1	Nonylphenol
1	Phenol
1	Rhodamine B
2	o-Cresol
2	Fuel oil, No. 2
2	Isopropylphenol
2	Methyl isobutyl ketone
2	Nitroethane
2	Paraffins
2	Propylene glycol monobutyl ether
2	Toluene
2	Xylene
3	Agar
3	Avocado oil
3	Cod oil
3	Ethoxylated lanolin
3	Menthol
3	Pitch
3	Sodium nitrite
3	Turpentine
4	Carnauba wax
4	Diatomaceous earth
4	Ferric oxide
4	Limonene
4	Magnesium sulfate
4	Polypropylene glycol
4	Potassium salts of fatty acids (C12-C20)
4	Vermiculite