Virginia Cooperative Extension
Knowledge for the CommonWealth

# Exposure, Toxicity, and Risk of Home Pesticide Use

Diane Relf, Extension Specialist, Environmental Horticulture

Many people ask the question, "What risk do I assume if I use pesticides around my home?" The risk of potential chemical injury is determined by exposure and toxicity. Without both factors there is no risk.

We handle many chemicals (other than pesticides) in our everyday lives. Gasoline is a good example. We know that it is toxic if ingested or inhaled, but if we take care to limit our exposure to it and handle it safely, we take little risk in using it. The same is true with pesticides.

**EXPOSURE:**

There are three types of exposure: dermal, inhalation, and ingestion. Dermal exposure is the most common type of exposure for the applicator since the skin is easily exposed when handling pesticides. Inhalation or breathing a pesticide into the lungs is less common, but is still a potential danger to the applicator. Ingestion occurs least frequently with careful applicators, but exposures do occur when users eat, smoke, or drink around pesticides or forget to wash after use. Even though hands and forearms are most subject to exposure, other parts of the body (eyes, abdomen, groin) absorb pesticides more quickly. The eyes and skin can also be badly damaged by the corrosive effects of many chemicals.

Exposure can be reduced significantly by following a few good work practices. Always wear unlined rubber gloves when handling and applying any pesticide. In addition, if spray mist is a hazard, the use of waterproof clothing may be necessary. At least, wear a long sleeved shirt and long trousers, unlined rubber boots and splash-proof goggles when handling any pesticide. The label may also require you to wear other pieces of protective equipment such as a chemical respirator. Remember, the greatest risk to the applicator occurs when handling concentrated chemicals (when mixing). Wearing a rubber apron in addition to the above protection is advised when handling concentrates.

**TOXICITY:**

To quote Dr. Alice Ottoboni, author of the book, The Dose Makes the Poison, "toxicity is the ability of a chemical to damage an organ system, such as the liver or kidneys, or to disrupt a biochemical process, such as the blood-forming mechanism, or to disturb an enzyme system at some site in the body." Simply stated, toxicity is the property of a chemical which causes damage to the body of a living organism.

There are two types of toxicity, acute and chronic. Acute toxicity refers to exposure to a single dose of a toxin which produces symptoms within a short period of time after the exposure. The pesticide label warns of the dangers of acute toxicity through various precautionary statements and signal words. Label signal words can be found prominently displayed on the front panels of all pesticide labels. They are based on a system which breaks pesticides into categories and specific ratings of toxicity. These specific ratings are described in terms of LD50, the lethal dosage of a compound necessary to kill 50 percent of a population of test organisms (rats, mice, etc.).

Every chemical you have in your home, whether it be in food or designed as a tool for use in and around the home, has some level of toxicity. Acute toxicity of various pesticides

and other chemicals commonly found around the home can be compared by use of the LD50 ratings of each when found in a concentrated form. These ratings change when materials are diluted by manufacturers to be sold as formulated products and are changed further when diluted by the user during mixing. The higher the LD50 rating, the lower the toxicity. In some cases, the acute oral LD50 is so high that the chemical is said to be practically non-toxic. Chemicals with very low LD50 ratings can be highly toxic.

Acute toxicity from pesticides may be expressed as flu-like symptoms or a nervous system disorder while symptoms of chronic toxicity may be expressed in other forms. Chronic toxicity is used to describe the potential long term effects which could result from exposure to small amounts of a toxin over time. Chronic toxicity may impact different parts of the body than acute toxicity.

Chemicals have long been feared as potential causes of forms of cancer, reproductive problems, and birth defects. There is little research to prove that these possible effects occur. Many critics point out that there is a definite correlation between chemicals and chronic effects, while there are just as many critics who argue the opposite.

**DO I TAKE THE RISK?**

The only way to resolve this argument at present is to recommend that pesticides and other chemicals be used as a last resort to other viable options. If you do choose to use a pesticide, use it very carefully and reduce risk by limiting your exposure to the chemical. Select the least toxic product that will control the problem. Investigate alternative pest control methods to use either in lieu of a pesticide or to integrate with a chemical control.

---

*(Originally published as "Exposure, Toxicity, and Risk of Home Pesticide Use," by M.J. Weaver, Assistant Professor, PPWS, and Extension Coordinator, Chemical, Drug and Pesticide Unit, Virginia Tech, in The Virginia Gardener Newsletter, Volume 7, Number 6.) August 1996*