

MEASURING TOXICITY OF PESTICIDES

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In the next month or so spraying of toxic materials will begin again. Why are some insecticides more toxic than others? How is toxicity measured?

Let's look at a few of the insecticides that are used and find the how and why of toxic insecticides.

The University of Illinois recommends five basic insecticides. These chemicals will control just about all insect problems. They are:

- Sevin (carbaryl) LD-50
 - acute oral 500-850 mg/kg
 - acute dermal 4,000 +
- Chlordane LD-50
 - acute oral 335-430 mg/kg
 - acute dermal 690-840
- Diazinon LD-50
 - acute oral 76-108 mg/kg
 - acute dermal 455-900
- Malathion LD-50
 - acute oral 1000-1375 mg/kg
 - acute dermal 4444 +
- Pyrethrin LD-50
 - acute oral 820-1870 mg/kg
 - acute dermal 1880 +

The simplest way of expressing the toxicity of a compound is by means of an LD-50 value. Such a value is a statistical estimate of the lethal dosage (LD) necessary to kill 50% of a very large population of test animals. Acute oral toxicity ratings are usually obtained by feeding white rats and acute dermal ratings by skin absorption tests in rats or rabbits. LD-50 is expressed in terms of mg/kg. This is the number of milligrams of actual insecticide per kilogram of body weight of the test animal.

To express toxicity in practical terms the factor 0.003 times the LD-50 value will give the ounces of actual insecticide required to be lethal to one of every two 187 pound man or other warm-blooded animals. As an example, the oral LD-50 value for malathion is 1200 mg/kg, therefore, if a group of men each weighing 187 pounds at 3.6 ounces (1200 x 0.003) of actual malathion per man 50% of them would die. The dermal toxicity LD-50 value of malathion is approximately 4000 mg/kg or for a 187 pound man (4000 x 0.003), 12 ounces.

By comparison, the oral LD-50 value of aspirin is 1200 mg/kg or (1200 x 0.003) 3.6 ounces per 187 pound man, the equivalent of malathion. To give a further comparison, the oral LD-50 value of ethyl alcohol (95% or 190 proof) is 450 mg/kg or (4500 x 0.003) 13.5 ounces. If a group of 187 pound men each consumed somewhat more than one quart of 80 proof whiskey in 45 minutes they would not only be intoxicated but 50% of them might die.

Toxicity varies with sex, age, weight, health, etc. Therefore, the LD-50 values presented here must be applied with caution. However, LD-50 values are useful in making an objective comparison.

A good general guide to follow:

acute oral LD-50	LD-50 for a human adult
50-500	1 tsp. to 2 tbsp.
500-5000	1 oz to 1 pint
5000-15000	1 pint to 1 qt.

Let us not lose the proper perspective. These LD-50 values are for 100% strength materials. The LD-50 values for the commercial products can be anywhere

from 3/4 as toxic to almost 100 times less toxic. For example, chlordane is sold anywhere from 10% dust to a 74% emulsifiable concentrate. Sevin is available as a 50% or 80% wettable powder, diazinon is a 25% emulsifiable concentrate, malathion as a 50-57% emulsifiable concentrate and pyrethrin as a 1/3% space spray.

Let's take Sevin sold as 50% wettable powder. The acute oral LD-50 for the 100% strength material is 500-850 mg/kg. As a 50% wettable powder the acute oral LD-50 would then be 1000-1700 mg/kg or 1/2 as toxic and require twice as much material to cause concern.

Think Pesticide Safety

1. Read the label. The most important 4 minutes in pest control is the time it takes you to read the label.
2. Do not smoke while handling pesticides. Some are quite flammable.
3. Apply correctly to label specifications and only when necessary. Don't over apply.
4. Avoid inhaling fumes, mists, dusts.
5. Wash off contaminated skin with soap and water. Many insecticides are contact poisons and can be easily absorbed through the skin, especially the eyes.
6. Store pesticides in the original containers and under lock and key. It is better to be safe than sorry especially with all the children roaming around.
7. Destroy empty containers. Break bottles and punch holes in cans to prevent reuse. Paper containers should be burned, being careful not to inhale the fumes while doing so.



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