Maine Farm Safety Program

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Pesticides and Their Toxicity

Agricultural chemicals have helped provide an abundance of high-quality, low-cost food products. They must be applied with informed care and concern for the safety of users and consumers, and to protect the environment.

Laws

The Occupational Safety and Health Administration (OSHA) regulations and EPA's worker protection standards emphasize that those who handle or apply pesticides must be properly equipped with and properly trained in the use of personal protective equipment. Employers must also label pesticide and chemical containers and discuss the hazards listed on the Material Safety Data Sheets. Dressing for the job and understanding the potential risks of pesticide exposure are a must for anyone who handles, mixes, loads or applies agricultural chemicals.

Know the Chemicals Used on the Farm

Become familiar with the types and formulations of pesticides you and your workers use on a regular basis. This will help to determine the protective clothing and equipment necessary. Consider the nature of the performed work and the proximity of the chemical to points of entry on your body—through the skin (dermal), the mouth (oral), eyes or lungs. Save and

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- **Know the laws pertaining to handling pesticides.**
- **Know the pesticides used, their toxicity and their points of entry on your body.**
- **Know the acute toxicity levels associated with the signal words DANGER, WARNING and CAUTION.**

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file a copy of the labels of pesticides used. This will make them available for future reference.

Toxicity

Toxicity is the measure of the capacity of a pesticide to cause injury. Subjecting test animals to different dosages of the active ingredient through the skin (dermal), breathing (inhalation), or mouth (oral) determines the toxicity of a pesticide. The acute toxicity of a pesticide is the amount which kills 50 percent of the test population in a short period of time. This value is the LD50 (lethal dose 50) or LC50 (lethal concentration 50). Toxicity increases as the LD50 or LC50 decreases. Toxicity times exposure is the equation used to determine the risk involved when using a pesticide. The risks can be minor or deadly depending on the toxicity of the pesticide used.

Acute Toxicity

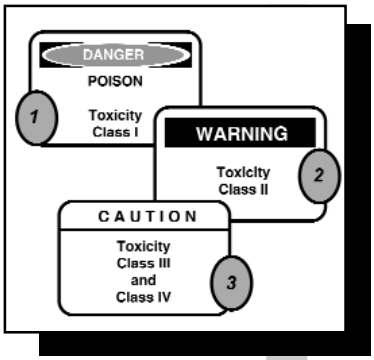
The acute toxicity of a pesticide is the basis for pesticide classifications on product labels. This serves to inform users of the potential hazards associated with the use of a particular pesticide. Acute toxicity means there will be immediate effects to an exposure in a short period of time. A different signal word identifies each toxicity classification.

DANGER—POISON (in red letters): Toxicity Class I. A skull and crossbones is on the package. These are highly toxic pesticides. (The signal word DANGER without a skull and crossbones symbol shows the pesticide is a potent skin or eye irritant.) Specific safety measures must be taken. A taste to a teaspoon can kill a person.

WARNING: Toxicity Class II. These pesticides are moderately toxic. Specific safety measures must be taken. A teaspoon to a tablespoon can kill a person.

CAUTION: Toxicity Class III and IV. These pesticides are slightly toxic or relatively nontoxic. Basic safety precautions should be taken. An ounce to more than a pint can kill a person.

Chronic Toxicity



It is also important to be aware of chronic toxicity. Chronic toxicity is the amount of a pesticide that will cause injury during repeated exposure over a period of time. The type of effects associated with chronic toxicity include birth defects, nervous disorders and benign or malignant (cancerous) tumors. Chronic toxicity warnings are required on the labels of some pesticides.

One of the most widely occurring types of chronic toxicity is cholinesterase inhibition. Cholinesterase is a chemical produced by the body which controls nerve impulse transmission. If cholinesterase were not present, impulses from one nerve to the next would flow continuously. Prolonged exposure to organophosphates and carbamates inhibits cholinesterase from controlling the impulses described above. Cholinesterase inhibition is the result of prolonged exposure to pesticides known as organophosphates and carbamates. There are tests available to measure the effects of exposure to cholinesterase inhibitors. Examples of organophosphate products include parathion and malathion. Sevin™, Furadan™ and Lannate™ are examples of carbamates. These compounds are commonly called cholinesterase inhibitors.

This Maine Farm Safety fact sheet is part of an educational fact sheet series produced by University of Maine Cooperative Extension. For more information on farm safety, contact your county Extension office.

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