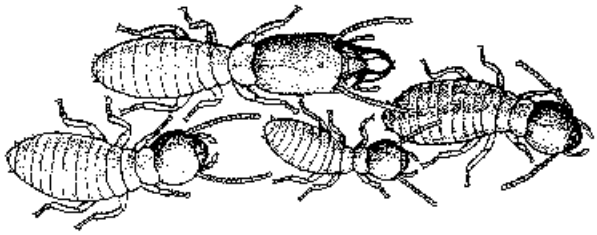

Chapter 9

Are Termiticides Dangerous?

Since termiticides are used to *kill* living termites, they are hazardous to termites and closely related organisms. The toxicity of each termiticide is different and related to its unique chemical structure. Some termiticides can be very toxic to humans, but others are not very toxic at all. Most termiticides are considered to have low to moderate toxicity. Care must be taken to avoid exposure to you, your family, and your pets. It is best for the termiticide applicator to strategically place termiticides to reduce risk to you and your family.

What is Toxicity?

To do its job, a termiticide must control the termite. By their nature, most termiticides are toxic and must be handled with care. You can tell the toxicity of a product by reading the signal word (**Table 9-1**) and looking at the symbol on the label. Termiticides can enter the human body three ways: 1) through the mouth (*orally*); 2) by absorption through the skin or eyes (*dermally*); and 3) by breathing into the lungs (*inhalation*).

Danger/Poison and a skull-and-cross-bones symbol appear on the labels of all products that are highly toxic orally, dermally, or by inhalation. There are only a few products approved for termite control that have this signal word on their label.

Warning is the signal word required on the labels of all products that are moderately toxic orally, dermally, or by inhalation, or that cause moderate eye and skin irritation.

Caution is the signal word required on the labels of all products considered slightly toxic to relatively nontoxic orally, dermally, or by inhalation, or that cause slight eye and skin irritation. All labels must bear the statement, *"Keep out of reach of children."*

Signal word: DANGER. If the termiticide label contains the **DANGER** signal word, the applicator is required to wear long-sleeved coveralls over a long-sleeved shirt and long pants, socks, chemical-resistant footwear and gloves, a respirator, and protective eyewear.

Signal word: WARNING. If the termiticide label contains the **WARNING** signal word, the applicator is required to wear long-sleeved coveralls over at least a short-sleeved shirt and short pants, socks, chemical-resistant footwear and gloves, and protective eyewear. A respirator is also required when handling termiticide concentrate or when working in a non-ventilated space.

Table 9-1. Termiticide label signal words and relative toxicities.

Signal Word	Toxicity	Oral Lethal Dose (Ave. Adult Human)
Danger/Poison	Highly Toxic	Few drops to 1 teaspoon
Warning	Moderately Toxic	1 teaspoon to 1 tablespoon
Caution	Low Toxicity	1 ounce to more than a pint

Signal word: CAUTION. If the termiticide label contains the **CAUTION** signal word, the applicator is required to wear a long-sleeved shirt and long pants, socks, shoes, and chemical-resistant gloves. A respirator is also required when working in a non-ventilated space. Protective eyewear must be worn when working in a non-ventilated area or when rodding or sub-slab injecting termiticides.

The idea of managing risk is expressed by the *Risk Formula*:

Risk = Toxicity X Exposure

Having an understanding of the toxicity of a product and the potential for personal exposure allows risk to be lowered. No matter how toxic a termiticide is, if the amount of exposure is kept low, risk can be held at an acceptably low level. The toxicity of a termiticide can't be changed, but risk can be managed, and you can help manage your risk.

Relative Termiticide Toxicities

There are other ways that allow you to compare termiticide toxicities. In the process of getting a label approved by the EPA, a pesticide manufacturer must determine the mammalian toxicity of the pesticide. Since companies cannot experiment on human beings, they use laboratory rodents to determine the lethal dose (LD) of the pesticide.

An oral LD_{50} is the amount of *pure active ingredient* (in milligrams/kilogram of the animal's body weight) that results in 50 percent mortality to laboratory rodents when administered orally. From the results of many experiments, we can compare the LD_{50} of insecticides and other chemicals. Understanding what an LD_{50} means can be initially confusing. A *highly toxic* substance has a *low* LD_{50} because is takes a small amount of the substance to kill the test animal. Conversely, a less toxic compound has a higher LD_{50}. The LD_{50} of each product is one piece of information that can be found on its Material Safety Data Sheet (MSDS). Unfortunately, there is no standardization in the chemical industry. Some MSDS sheets show the LD_{50} of the formulated product; others may give the LD_{50} of the pure active ingredient.

Table 9-2. The LD50 (mg/kg of a body weight) of some substances found around the home. (The Merck Index, 12th edition, 1996.)

Substance	LD50	Use
absolute alcohol	10,600	beverage, preservative
acetone	10.7	fingernail polish remover
aspirin	1,000	drug, pain
caffeine	355	ingredient in coffee, colas
ethylene glycol	8,540	antifreeze
ibuprofen	626	drug, pain
nicotine	0.3	constituent in tobacco
salt	3,750	food additive
vitamin A	7,910	vitamin
warfarin	323	rodenticide, anticoagulant

Tables 9-2 and **9-3** can be used to compare the relative toxicities of some termiticides and other substances commonly found around the home. Please note the low LD_{50} of acetone (fingernail polish remover), one of the most dangerous products in the home. Remember that a low LD_{50} means high toxicity.

Table 9-3. LD50 (mg/kg of a body weight) of some termiticide active ingredients used in termite control, classes, and toxicity categories. (The Pesticide Book, 5th ed. Ware, 2002.)

Active ingredient	Oral LD50	Class	Toxicity category
diatomaceous earth	nontoxic	desiccant	5
M. anisopliae	>5,000	biological agent	4
hexaflumuron	>5,000	insect growth regulator	4
Sulfuramid	>5,000	fluoroaliphatic sulfonamide	4
imidacloprid	2,590	chloronicotinyl	3
sodium borate (borax)	3,000	mineral	3
permethrin	3,070	synthetic pyrethroid	2
bifenthrin	375	synthetic pyrethroid	2
cypermethrin	247	synthetic pyrethroid	2
chlorpyrifos	135	organophosphate	2

Cancer

The World Health Organization estimates that 75-85 percent of all cancers are related to environmental exposure to pollutants, smoking, and diet. It is understandable that many people are concerned about cancer risks of chemicals used inside the home. **Tables 9-2** and **9-3** do not address cancer risks, but the results of carcinogenicity tests can sometimes be found on MSDS sheets. MSDS sheets are readily available for professional-use pesticides. Ask your pest control representative for a copy.

What to do if a Termiticide Poisoning Occurs

Get medical advice quickly if unusual or unexplained symptoms appear during the application or later the same day. Insecticide poisoning symptoms are often similar to flu symptoms (headache, fatigue, dizziness, nausea, stomach cramps and diarrhea). A person who may have been poisoned should not be left alone. Do not let anyone get dangerously sick before calling a physician or going to a hospital. It is better to be too cautious than too late. Take the insecticide container (or the label) to the physician. The key is *rapid* treatment; as time continues to elapse after exposure, the chances for survival decrease.

If the common emergency telephone number is available in your area, immediately call 911 whenever an insecticide poisoning is suspected. Concurrently, the call may be connected to The Poison Center at Children's Memorial Hospital in Omaha. They will be able to provide specific directions on procedures to follow until emergency personnel arrive. If the common emergency telephone number is *not* available in your area, contact:

1. **The Poison Center, 1-800-222-1222**
2. **The nearest hospital**
3. **A physician**

Always wash exposed skin of the victim with a detergent and plenty of water. Skin irritation can result from continuous exposure if not treated. If clothing has been contaminated, particularly by an insecticide that is readily absorbed dermally, remove it immediately.

Even though termiticides are usually carefully applied, accidents can happen. Be prepared. Get a *Hotlines Card* (available from University of Nebraska Cooperative Extension, EC-2501) and keep it with you at all times. Do not hesitate to contact medical authorities if any symptoms of termiticide poisoning occur. It is better to be safe than sorry.

Most of the chemicals used to control termites are much less toxic than some other insecticides used for other applications. When applied properly, they are unlikely to cause any problem for the homeowner.

Always Wear the Right Stuff!

Even though homeowners don't apply termiticides themselves, they do sometimes apply pesticides to their lawns, gardens, and inside their homes. For that reason, the information in this appendix has been included.

It is important for homeowners to protect themselves when applying pesticides. Minimizing exposure is an important first step toward reducing the risk of pesticide poisoning. The type of personal protective equipment or PPE needed depends on the toxicity of the pesticide being used and the formulation (i.e., liquid, wettable powder, etc.). Some labels specifically state that certain items of clothing, equipment, eye wear, footgear and gloves, must be used. Others carry no statement at all. In general, the more toxic the pesticide, the greater the need to use PPE.

Which PPE is Right?

Reasonable precautions should always be taken. Remember that liquid pesticides are often more hazardous to use than dry formulations and that extra protection is warranted while mixing or loading pesticides. Recognize that in cases where there will be prolonged exposure to the spray or where the application is being made indoors, you should use extra protection.

Protective Clothing. Any time you are using pesticides, you should wear at least a long-sleeved shirt and long-legged pants or coveralls (woven fabric) that fully cover your arms and legs. Select garments made of cotton instead of cotton/polyester blends. Shoes and socks should also be worn. Avoid sandals, thongs, and cloth or canvas shoes to minimize exposure of the feet to liquid pesticides. Leather shoes are suitable while using most pesticides.

Protect Your Head, Eyes & Hands. Protection for your head is advisable, especially if you will be applying pesticides over your head. In general, a wide-brimmed, easily cleaned hat that will keep pesticides away from the neck, eyes, mouth and face is adequate. Avoid hats with cloth or leather sweat bands as these will absorb pesticides. Baseball-style caps have hatbands that absorb and retain pesticides.

Pesticides are readily absorbed through the eyes and can cause eye damage. Use goggles or a face shield whenever such a statement is found on the label. Gloves are often needed for mixing, loading, and applying pesticides. Unlined, liquid-proof neoprene, butyl, PVC or nitrile gloves with tops that extend well up on the forearm are the best. Avoid lined gloves because the lining can absorb the chemicals and is hard to clean. Latex gloves, commonly used by medical personnel, do not provide adequate protection. Avoid cotton and leather gloves because they can also absorb pesticides. In most cases, wear gloves under the sleeves to keep the pesticide from running down the sleeves and into the glove. When working with hands over your head, roll glove tops into a cuff, to deter pesticide from running down the gloves to your forearms.

Protect Your Lungs. The lungs and lining of the respiratory system readily absorb pesticide dusts and vapors from the air. Respiratory protection, therefore, is essential whenever the label calls for it. Respiratory protection is recommended during mixing and loading, even if not required by the label. A cartridge respirator is suitable when exposure will be intermittent.

Respirators used while applying pesticides should be approved by the National Institute of Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA). Be sure to read and follow the manufacturer's instructions for use and care of the respirator. Filters, cartridges, and canisters must be approved for pesticide use (those designated as removing and trapping organic vapors) and must be replaced at proper intervals. Inspect and test respirators before use, to insure a snug fit against the face. Exposed parts of the mask must be cleaned after each use, and the cartridges should be stored in an airtight container.

Protective Clothing Care

When working with pesticides, you should wear clean clothing daily. It is best to reserve one set of clothing for pesticide work if possible. Launder and store pesticide contaminated clothing separately. Clothing that becomes wet from pesticides should be removed immediately! Fast action will reduce your exposure to the pesticide. Destroy clothing (including shoes and boots) saturated with concentrated pesticides. Waterproof and chemical-resistant hats, gloves, boots, and goggles should also be washed daily and hung to dry. Test gloves for leaks by filling them with water and gently squeezing.

Wash Up!

Good personal hygiene is essential. Soap and water is cheap insurance against pesticide contamination. Wash your hands and face often when working with pesticides. Never smoke, eat, drink, or use the toilet after handling pesticides without first washing your hands! Shower immediately after using pesticides and before changing into clean clothes.

Pesticide Handling, Storage and Disposal

Pesticides are valuable pest management tools, and like any tool, they must be used carefully and responsibly. Read the label to determine the best way to handle pesticides.

Even when proper procedures are followed, pesticide spills can occur. Knowing what steps to take in the event of an pesticide spill will allow you to respond quickly and properly. Once the spill has been cleaned up, you should read the label for additional directions. Remember, always wear proper protective clothing when dealing with pesticide spills and to clean up your equipment and clothing when you are finished.

As soon as pesticides arrive on your property, store them in a locked and posted cabinet where children cannot get to them. Pesticides should never be stored in a garage, basement, or other unlocked locations in your home. Read the label for correct storage procedures.

Proper rinsing of pesticide containers reduces a potential source of pollution of soil, surface and ground water. When pollution occurs, plants and animals may be harmed and water supplies affected. Prevention of environmental pollution is always better and less expensive than cleanup.

When an empty liquid pesticide container is disposed of according to label directions, it must be properly rinsed. We recommend triple-rinsing plastic and non-pressurized metal containers that have contained liquid or wettable powder formulations. For empty aerosol, bait or dust containers, follow label directions for proper disposal.