

# Using Pesticides Safely

## Learning Objectives:

After completion of the study of Using Pesticides Safely, the trainee should be able to:

- Discuss the uses and hazards of the materials to be used in general pest applications.
- Understand the importance of label information.
- Discuss the minimum safety requirements of pesticide application.

The pesticide applicator should be thoroughly trained in the uses and hazards of the materials being used. The applicator is responsible for preventing adverse effects to the public, to pets and domestic animals, to property, to the environment, and to themselves and other applicators. In addition, the application must achieve effective results on the pest problem being treated.

## Label Information

By definition, the label is the information printed on or attached to the pesticide container. Labeling includes the label and all other written, printed or graphic material accompanying the pesticide. It is a violation of federal law to use pesticides in a manner inconsistent with labeling.

The importance of reading the label cannot be over stressed. The information that appears on the label represents some of the most expensive literature available. The research and development that lead to the wording on a label frequently costs millions of dollars and takes many years to complete. The information on the label is the best literature available on the safe and proper use of the chemical. The most important few minutes in pest control is the time spent reading the label.

Please refer to the chapter on Labels and Labeling in the manual entitled Applying Pesticides Correctly for a discussion of the basic information that appears on every pesticide label. The following is a discussion of terms that are found on labels frequently used by the pest control industry.

Some information appears on the labels of insecticides used by pest control operators that is rather specific to the industry. This information is extremely important since the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) states it is illegal to use any pesticide in a manner inconsistent with its labeling. A specific example where this information is important to the pest control industry involves the use of pesticides in food-handling establishments. You may only use those insecticide formulations that bear directions on their labels for use in food-handling establishments. Typical labels have wording such as “Food Areas: limited to crack and crevice treatment only...application of this product in the food areas of food-handling establishments other than as a crack and crevice treatment is not permitted.” Some important definitions of terms that appear in labeling with respect to use in food-handling areas are discussed below.

## Definitions of Terms Found on the Label

**Tank mixing.** Many labels will permit tank mixing with other pesticides, unless the other pesticide label prohibits the mixing. Some pesticides will explicitly prohibit mixing certain pesticides. The applicator must be aware of such label directions.

**Treatment sites.** Many labels will list sites/areas that the pesticide can be applied. The applicator must be aware of these areas and the areas not listed. For example, if apartments or apartment buildings are not listed on the label, the product cannot be used in apartments.

**Food-handling establishments.** An area or place other than a private residence in which food is held, processed, prepared and/or served. (“Held” includes displayed for sale as well as stored.) Some places “other than a private residence” include: restaurants, lunchrooms, caterers, cafeterias, bars and taverns, private clubs, military messes, officers and NCO clubs, food contractors in plants and office buildings, mobile caterers, airlines, ships, drug stores, confectionery stores, dairy products stores, bakery product stores, drive-in movies, school lunch rooms, colleges and universities, hospitals, homes for aged, orphans, and handicapped, federal and state prisons and jails. Private

residences are excluded; however, you should be alert for any possible changes in the future that might place private residences under this definition.

**Non-food areas.** These include garbage rooms, lavatories, floor drains (to sewers), entries and vestibules, offices, locker rooms, machine rooms, boiler rooms, garages, mop closets and storage (after canning or bottling).

**Food areas.** These include areas for receiving, serving, storage, packaging (canning, bottling, wrapping, boxing), preparing (cleaning, slicing, cooking, grinding), edible waste storage and enclosed processing systems (oils, dairies, edible oils, syrups).

**Residual insecticides.** These include products applied to obtain insecticidal effects lasting several hours or longer and which are applied as general, spot or crack and crevice treatments. Residuals include insecticides that remain on the treated surface for days. These usually provide insecticidal effects lasting several hours or longer and are, therefore, considered residual by the EPA.

There are three types of residual applications recognized by the EPA: general, spot and crack and crevice. Each may be used in certain areas if specified on the label and are defined as follows:

*General.* This is application to broad expanses of surfaces such as walls, floors, and ceilings or as an outside treatment. This is permitted only in areas using only those insecticides so labeled.

*Spot.* This is application to limited areas on which insects are likely to occur and will not ordinarily be contacted by workers. These areas may occur on floors, walls, and bases or undersides of equipment. For this purpose, a "spot" will not exceed two square feet. In order for spot treatments to be justified, there must be a surface on which insects are likely to occur. A "spot" may be round or long and narrow. This indicates that a considerable area could be treated but in practice, the area must be limited to places where insects are present or are likely to occur.

*Crack and Crevice.* This is application of small amounts of insecticides into cracks and crevices in which insects hide or through which they

may enter a building. Such openings commonly occur at expansion joints between different elements of construction and between equipment and floors. These openings may lead to voids such as hollow walls, equipment legs and bases, conduits, motor housing and junction or switch boxes. The crack and crevice treatment includes the use of sprays, dusts or baits. It does not permit treatment of surfaces. In some cases, a pin-stream spray may be an acceptable application method, but a better approach may be to make application with an insertion tube directly into cracks and crevices.

**Directions for use.** The directions for use on a pesticide label include the site of application (crop, animal or surface) and the type of pests (insects, rodents, etc.) on which the product may be used. Methods of application and recommended dosage rates are also given. The label will normally give the concentration at which the pesticide is to be used. Dosage rates for pesticides used in general pest control are given as a certain percent concentration spray, such as 1/2 percent or 1 percent spray. The labeled products used for pest control provide dilution information to aid you in accurately preparing the volume of spray you need at label recommended strength. It is illegal to increase the concentration of any pesticide over the maximum application rate shown on the labeling. Also it is a conflict of usage to change the method, time of application or other conditions of use shown on the label (to reduce the concentration below labeled rates is also considered a conflict of usage unless prior written approval is given by the Arkansas State Plant Board). It is extremely important to note those areas listed on the label where the pesticide can be used. Specifically, pesticide labels will indicate either indoor or outdoor use.

## Safety Procedures

The hazards of a pesticide depend more on how it is used than how toxic the material is. Consider all pesticides as being toxic. Pesticides may enter the body through the mouth, skin or by breathing the vapors or dusts. Possibly the greatest hazard from pesticides is from skin absorption of pesticide concentrates due to the sheer volume the applicator handles. The inhalation of fumigants, dusts or vapors can be equally hazardous if proper protective measures are not observed.

## Storage

Insecticides in warehouses should be placed in well marked, well ventilated areas, away from other types of pesticides and kept at temperatures that are not extreme (40 to 100 degrees F.) The storage area should be locked to prevent unauthorized persons from entering. Warning signs such as "Toxic Chemicals" should be placed on doors of chemical storage areas to protect firemen from toxic fumes in case of fire.

Container lids should be securely tightened and the containers placed on storage shelves after use. Incoming pesticides should be inventoried, checked for damage and leaks and promptly placed in the proper storage location. Broken and leaking containers should be removed immediately and the faulty containers disposed of properly (see Container Disposal). Spilled pesticide should be cleaned up and the area decontaminated (see the section on "Decontamination"). Many pesticides have a shelf life of six months or less after the seal has been broken and should be used before that time. If the labeling information does not mention shelf life, check with your supplier.

Chemicals carried in vehicles should be kept in locked boxes or locked inside the vehicle. Containers should be stored in weatherproof boxes with separators to prevent spills or breakage. Pesticides carried inside of vehicles should be stored so that fumes are prevented from reaching the driver's compartment.

Pesticides should be kept in their original containers. Do not transfer pesticides into pop bottles, milk bottles, etc. When pesticides are transferred into service containers, the containers should be non-breakable and properly labeled.

It is recommended that the following clearly legible information be securely attached to the service container.

1. *Pesticide Concentrate.* If the service container holds a pesticide concentrate, the label should include:
  - a. The name, address and telephone number of the pest control firm.
  - b. Product name.
  - c. EPA registration number.
  - d. Name and percentage of active ingredient.
  - e. Signal word from registered label.

2. *Use-Dilution Preparation.* If the service container holds a use-dilution preparation the label should include:
  - a. The name, address and telephone number of the pest control firm,
  - b. Product name, preceded by the word "Diluted."
  - c. EPA registration number, preceded by the words "Derived from."
  - d. Name and percentage of active ingredients as diluted.
  - e. Signal word from the registered label.

Pesticides should not be given away or sold to customers unless they are in properly labeled containers and are registered products.

## Mixing, Measuring and Handling

Wear unlined neoprene gloves to handle pesticide concentrates, and use other protective clothing as needed. The pesticide label will frequently specify the type of protective clothing that should be worn. Pesticides should be handled in well-ventilated areas. The label may specify wearing a respirator to avoid breathing vapors or dust while measuring, mixing or applying the pesticide. Pouring of pesticides should be done below the genital region of the body since massive absorption of concentrates may occur if accidentally spilled on this region. Liquid-proof aprons can be worn to help prevent accidental exposures of this type. If concentrates are spilled on the skin or clothing, remove contaminated clothing at once, wash skin with cold water and shower with detergent and water. Wear safety glasses or goggles to prevent accidental contamination of the eyes. If pesticides are splashed into the eyes, rinse them with cold water for 10 minutes and see a physician.

Material placed in a hand sprayer should be mixed by turning the tank upside down at least 12 times to ensure a uniform mixing of concentrate with the carrier. Remember that wettable powders settle out of suspension rapidly when not constantly agitated. Power sprayers with mechanical agitators will keep powders well suspended, but roller pumps usually will not.

## Equipment Use and Maintenance

Only properly maintained equipment will perform satisfactorily. Sprayers, dusters and misters should be kept clean and in perfect mechanical

condition. Leaky hoses, valves, tanks, lids and fittings should be repaired immediately. Failure to promptly repair leaks may result in contamination to clothing, staining, and puddling or present a hazard to the technician, the public and the environment.

Provide anti-siphoning devices on filling hoses or leave a 4- to 6-inch air gap between filling and tank so that pesticides in the tank will not siphon back into the water system. Never place a filler hose in a spray tank.

## Application

Before applying any pesticide, read the label. Label information will frequently change; therefore, check the label on all the products for possible changes. Different manufacturers' labels for the same pesticide may vary; therefore, be certain the product you are using has the use registration for the particular pest that you are trying to control. The label will also give the approved application techniques to be used, i.e., general treatment, spot treatment or crack and crevice treatment.

Apply sprays, dusts, mists and vapors so the application has minimum contact with the product. Wear respirators approved by the Mining Safety and Health Administration (MSHA) or the National Institute of Occupational Safety and Health (NIOSH) when applying sprays, mists, aerosols or dusts under houses, in attics or in other confined spaces. Wash respirators thoroughly after each use and change the filters when they become depleted, or in accordance with label instructions. Clothing should be changed daily when using pesticides, and coveralls should be worn when treatment is made under houses. Wear unlined neoprene shoes or protectors over shoes when applying pesticides. Do not eat, drink or smoke while handling pesticides. Pesticides are readily taken into the body during these activities. After handling pesticides, wash your face and hands with soap and water before eating, drinking, smoking or using the bathroom.

You need to take every precaution to prevent pesticide drift from getting onto vegetable or flower gardens, clothes hanging on the line, cars, windows, dark painted surfaces that will spot, pet food and water containers, fish ponds, bird baths and outdoor furniture. Also remember that stains or discoloration can result from misapplication of pesticides to certain surfaces. Excessive dosages, over application, incompatible mixtures, solvent damage and spotting are some of the causes for staining.

Generally, the higher the dosage, the greater the risk for staining. Excessively heavy application is the main cause for staining problems that you would not ordinarily have with the correct quantity of chemical applied. Soiled and greasy surfaces, new paint, some types of wallpaper, paneling and fabrics, certain plastic, and floor tile may be subject to staining. Emulsifiable pesticide formulations may stain new paint, paneling, wallpaper and plastics. Wettable powders may also spot many surfaces. Surfaces, such as upholstery, furniture, drapes, lower wall surfaces and clothing are some examples of items that should not even be treated under ordinary circumstances. If there is doubt about staining, "test treat" an area in an inconspicuous place, like a closet, to determine if you will experience a problem. If there isn't a stain within six or eight hours, it is likely that staining will not be a problem.

Over-application, use of a high odor chemical or a treated surface that reacts chemically with the pesticide may result in an undesirable odor. Good judgment in making pesticide applications will help avoid odor problems.

## Incompatibility

Certain pesticides when mixed together in the same tank may form phytotoxic mixtures, fallout of suspension, neutralize each other, produce a more toxic mixture, stain or clog application equipment. Some materials will not mix together at all. If you do not know about the compatibility of chemicals you are considering mixing, it is advisable to check the labels and compatibility charts. Even if the materials are compatible, you should test for potential phytotoxic or staining effects.

## Chemical Failures

PCOs are occasionally confronted with callbacks that they believe to be due to chemical failure rather than improper application or reinfestation. Chemical failure may be caused by several factors:

- Research has shown that the physical and chemical natures of treated substrates can reduce the activity and residual life of pesticides.
- Age of the pesticide (how long you have had it on hand and has it been opened?) Some labels indicate how long the formulation remains effective after the container is opened; however, most do not. Check with

your supplier for this information.

- Light effects on certain pesticides (i.e., ultraviolet can cause degradation via chemical transformation).
- Soil effects (e.g., some organophosphates may undergo conversion in soil mainly due to solid and liquid phases in the soil. The soil components can influence reactions such as hydrolysis and phosphorylation).
- Temperature extremes can cause some pesticide products to break down in storage or after application.
- Moisture and humidity can also adversely affect pesticide activity.
- pH of water used in mixing and application (e.g., most carbamates and organophosphates undergo alkaline hydrolysis in alkaline water, thus the higher the pH the faster the decomposition of some pesticides).

## Fire – The Explosion Hazard

Turn off all fires and pilot lights before using foggers, oil-base materials through mist blowers, ULV formulations, certain oil sprays and other materials that may be explosive or present a fire hazard. By turning off the gas at the meter, you will extinguish all flames. If oil-base formulations are not practical, use water as the carrier. Oil, solvents and certain other materials form highly flammable or explosive mixtures.

## Electrical Safety

Water-base sprays used near electrical boxes and switches are hazardous since water is a good conductor of electricity. Kerosene is a poor conductor and is much safer to use around electrical connectors. When working inside or outside around transformers, be very careful not to spray into them or touch them. When working with electrically powered tools, avoid working on wet ground and use grounded equipment and rubber gloves. The safest measure is to check the circuit with a circuit tester and be sure of the ground before plugging in any power tool. Special care must be taken while working under or around houses when the soil is wet. Inspect electrical tools to be certain they are in proper working order. Some electrical circuits, such as those in older homes and buildings, are not adequate to carry the load of some electrically powered pumps and drills. Under such conditions, you may “knock out” a circuit or create a fire from overheated wiring. Considerable care should be

exercised when moving and working around refrigerators, freezers, ranges and other large appliances. Always double check to be certain that you have not accidentally unplugged electrical connections or broken gas lines to appliances.

## Customer Safety

When treating inside structures, use great care to avoid contaminating food, food surfaces, utensils, medicines, linens, bedding and other items that customers may contact. Try to avoid treating surfaces that children, workers or animals will contact frequently. Advise customers to keep children and pets off treated surfaces until the spray has dried for at least several hours. Where babies or small children live in the house, the customer should be advised to keep them off treated surfaces for at least two days and to thoroughly vacuum the carpet before allowing children on treated areas. When making outside treatments, advise customers to keep children and pets off treated areas until the spray has dried. Also read the label carefully for possible requirements to water turf before children are allowed on treated areas. Hospitals and nursing homes are sensitive areas where pesticides must be used according to labels and with great care. Consult special regulations and management personnel for accepted practices before treating these types of institutions.

Avoid getting vapors into air handling systems. Take special precautions when treating around babies, the sick, aged and people with allergies or respiratory problems. Do not apply any sprays, mists, aerosols or dusts around or near children. Asthmatics, alcoholics, diabetics and persons who have emphysema may be unusually sensitive to many pesticides. Do not apply sprays, dusts or mists while these individuals are in the room. Be certain that the room (or structure) treated is well ventilated before such persons are allowed to re-enter.

Before making an “initial” treatment, you should require the customer to make proper preparations when the procedure includes treatment of kitchen cabinets and food areas. Never treat over silverware, dishes, exposed food or food in containers that might become contaminated (such as flour sacks or cereal boxes) or under any other condition that might result in contamination or adversely affect the health of customers. Pesticide containers or equipment should not be left unattended in a home or building where children could get to them.

Provide good ventilation to remove pesticide vapors. It is advisable to have people leave the structure on initial heavy treatments, and re-entry time should be at least three to four hours.

Fish are highly sensitive to pesticides. Consequently, no dust, spray or vapors should be allowed to get into aquariums or outside fishponds. Before using spray materials where fish or other aquatic animals are present, either remove the tanks from the area to be treated to cover tanks with plastic or moistened paper. Also the circulating pump should be unplugged and the room adequately ventilated. The aquarium pump may need to be started within two hours to prevent the possibility of the fish dying from lack of oxygen. When treatment is made inside where fish cannot be removed or adequately protected, it is much safer to use baits.

When the water source is a well or a cistern, extreme care needs to be taken to prevent contamination of these water supplies. For perimeter treatments, consult the owner about the drinking water source before treatment is made, especially in rural areas. This is very important since pesticides can move laterally 25 to 30 feet or more in porous soil. Check the label and contact the health officials if there is any question about possible contamination of drinking water supplies.

Every effort must be made to avoid contaminating ponds, lakes, streams or runoff areas draining to waterways. Be careful and avoid spills and leaks near these areas and never empty excess spray or dump pesticide containers near these water sources.

Baits and powders used in homes and food-handling establishments must not be placed in exposed locations where they would be accessible to children and pets or where they could contaminate food. Do not place dusts under refrigerators or in situations where appliances, machinery or wind currents could cause the dust to become airborne.

Baits placed inside grain elevators and food warehouses should be inside metal bait boxes that are permanently secured so that baits cannot accidentally be spilled or otherwise contaminate food or feedstuffs.

When making pesticide applications in food-handling establishments and homes, be especially alert to any requirements for special application techniques and timing and placement of the pesticide.

## Decontamination

When accidental spillage of large amounts of pesticides occur, you may need to take quick action to reduce the contamination level of the immediate area. If the spill takes place on the street or highway, notify the Arkansas State Police and keep unauthorized personnel out of the area. Contact your pesticides dealer or supplier for information on clean-up procedures. The following information provides general procedures for cleaning up spills.

**Liquids.** Confine the spread of toxic materials by damming up with dirt the areas where the spill occurred. Absorb as much of the liquid spill as possible with dirt, cement or other absorptive materials. Place all wastes in barrels that are sealed and properly labeled; then take the material to an approved hazardous waste disposal site or contact a firm that specializes in hazardous waste disposal. Spray the contaminated area with a 50/50 solution of liquid bleach and water. Then spread hydrated lime over the area to absorb the liquid bleach solution. The lime should be left in place for at least one hour before cleaning it up.

**Powders and Granules.** Take all suitable precautions depending on toxicity of materials and extent of contamination. Sweep up all dusts and shovel into barrels, store, seal and dispose of as described above. Spray down containers and contaminated areas as above. Large or hazardous decontamination jobs should not be attempted without proper knowledge and safety equipment. Notify the Arkansas State Plant Board, the pesticide supplier or the Arkansas Department Health for advice and/or assistance in decontamination problems that you are not qualified to perform. Wear the proper safety equipment and clothing to prevent intoxication by the spilled pesticides.

**Contaminated Clothing.** Grossly contaminated clothing and shoes should be destroyed. Clothing with slight contaminations should be cleaned as follows: (1) wash alone, (2) use detergent and (3) hang in the sun to dry. If there is residual pesticide odor, repeat the process. Clothes worn for pest control service work should not be washed with family clothes. Babies are extremely sensitive to very small amounts of pesticides, and their clothing or bedding must not become contaminated.

## Container and Pesticide Disposal

Pressure or triple rinse empty pesticide containers with water. Pour rinsate into spray solution. Crush, puncture or break the containers. Properly decontaminated containers may be disposed of by recycling or burying in approved sanitary landfills after breaking or puncturing and crushing.

Since many pesticides create contamination problems if not disposed of properly, unused quantities of finished sprays must be placed where no pollution will result. If at all possible, use the pesticide for purposes listed on the label. Do not dispose of pesticides by pouring them down any drain or toilet. If there is doubt about the disposal of unused pesticides in spray tanks or containers, contact the Arkansas State Plant Board.

## Recordkeeping

It is essential that an accurate record of each pesticide application be kept. This information will be extremely important in case of poisoning or environmental contamination and is a good business practice. A record of the pesticide used will be helpful in situations where effective control was not achieved. Records should be kept in a field book or on work tickets filled out at the time of pesticide application. These should remain at the principal

business location for two (2) years. Information that should be recorded includes:

1. Name and address of applicator.
2. Customer's name and address.
3. Date and time of application.
4. Trade name and registration number of product.
5. Tank mix, dilution rate, and quantity of product.
6. Target pest and use site (e.g., cupboards, drawers, moldings or ornamental shrubs, etc.).
7. Environmental conditions when outside treatments are made (e.g., wind velocity, direction, temperature, etc.).

## Emergency Procedures

In case of accidental poisoning of humans or pets, call a physician or veterinarian immediately. Provide medical personnel with the label of the pesticide involved or relay complete information to them on the active ingredients or common name of the pesticide, and all information on first aid treatments as described on the label. Keep the address and phone number of the nearest Poison Control Center in each vehicle and in each office. In this state, contact Poison Hotline (Arkansas Poison Control Center) 1-800-376-4766.