A Self-Learning Resource From MSU Extension

Safe Handling of Pesticides - Mixing

by Reeves Petroff, Extension Pesticide Education Specialist

MONTANA STATE UNIVERSITY EXTENSION
MontGuide

The safe handling of open containers of concentrated pesticides requires familiarity with the compound, preparation of the work site, appropriate barriers to limit exposure, and observance of proper procedures for mixing, loading and cleanup, and for dealing with spills.

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PESTICIDES ARE CHEMICALS THAT ARE USED to control or repel pests. There are several kinds. Herbicides are used to control unwanted plants or weeds. Insecticides are used to control harmful insects. Rodenticides are used to control mice, ground squirrels and pocket gophers. Fungicides are used to control certain plant diseases.

Chemicals used to control pests can also harm people, livestock, pets, fish and wildlife. As a pesticide user, you have a legal responsibility to use pesticides according to the product label to reduce these risks.

Pesticide injuries are most likely to occur while the chemicals are being mixed. Pesticide containers are opened during mixing, and pesticide formulations are usually concentrated – the pesticide has yet to be diluted.

People who work with pesticides tend to be less safety-conscious when they're mixing pesticides than when they're actually spraying them. They climb with, lift and pour open containers of pesticide, and they often work alone, which can be dangerous.

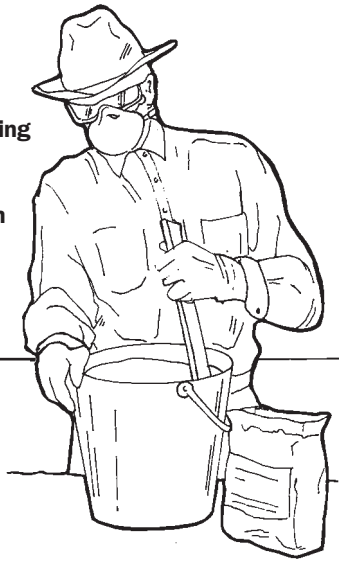

FIGURE 1. Hallmarks of safe mixing: This applicator is wearing personal protective equipment (PPE) including gloves, a long-sleeved shirt, a face mask with respirator, goggles and a hat. He's stirring the mixture with a stick, not by hand.

The first step in the safe mixing of pesticides, always, is to read the pesticide label. Make special note of –

- The relative toxicity of the pesticide. This will be stated on the label as "highly toxic" (danger–poison or danger), "moderately toxic" (warning) or "least toxic" (caution).
- The statement of practical treatment (first aid)
- Emergency telephone numbers
- Precautionary statements
- Required personal protective equipment
- Instructions regarding mixing, application, use rates and labeled sites
- Storage information

Inform yourself

You should always be familiar with the formulation of the pesticide you're using – that is, with how it's packaged.

The type of formulation is determined by the chemical properties of the pesticide's active ingredient – the part of the pesticide formulation that actually controls the pest. Other, inert (nonactive) ingredients are used as filler and to improve the storage and dispersal properties of the pesticide.

There are two kinds of formulation, dry and liquid. Dry formulations include wettable powders, dry flowables and granular or pelleted. Liquid formulations include emulsifiable concentrates and soluble liquids.

When you're mixing dry formulations, you're particularly at risk of inhaling particles. Because of this, be sure to wear a respirator or dust mask when mixing or handling dry formulations. Read the pesticide label to find out just what safety gear is required.

When you're mixing and applying liquid formulations, you're particularly at risk of absorbing the pesticide through your skin. Some liquid formulations – the

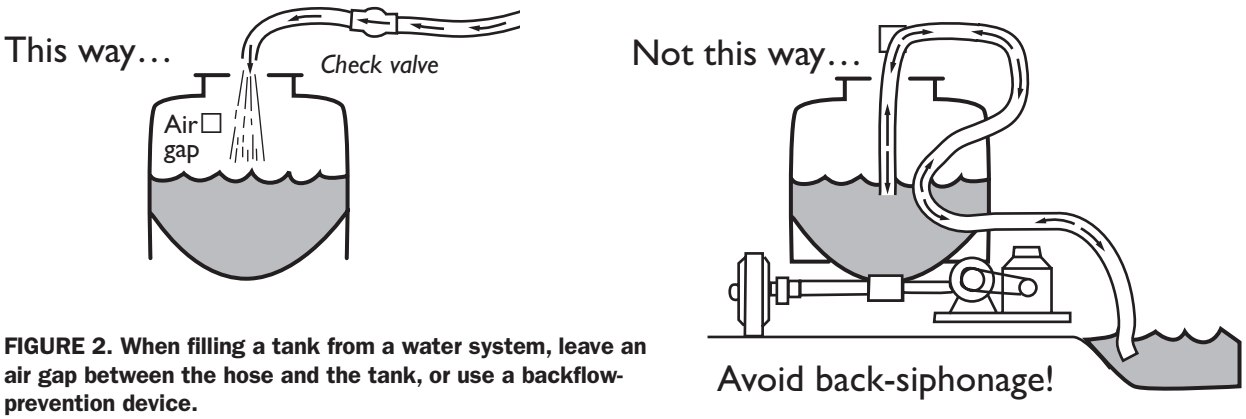

FIGURE 2. When filling a tank from a water system, leave an air gap between the hose and the tank, or use a backflow-prevention device.

emulsifiable concentrates – contain solvents. These solvents make pesticides readily absorbable through the skin. Some liquid formulations are irritants that can cause rashes and cracking of the skin, further increasing the chance of the pesticide's being absorbed into the body. It is in your best interest to use personal protective equipment when using liquid formulations, especially when mixing them.

Again, read the pesticide label to determine what personal protective equipment (PPE) is needed. And keep in mind that once dry formulations have been mixed with water, their active ingredients can readily be absorbed through the skin.

Before you mix

Before you begin to mix, load and apply pesticides, and after you've read and understood the label directions, take the following precautions:

- Have detergent or soap and an adequate supply of water available.
- Learn the early symptoms of poisoning for the pesticide you're using.
- Learn the first aid procedures for the pesticide you're using, and make certain that the right first aid supplies are close by.
- Be certain that spill cleanup materials are on hand.
- Make certain that all the equipment you're working with is functioning properly. Check hoses, fittings, valves and tanks on sprayer equipment for leaks or signs of failure. It's a good idea to do a quick daily inspection. Develop and run through a written or at least mental inspection list of sprayer equipment.
- Do not work alone. Be sure that help is available nearby in case you get into trouble.
- Use all recommended protective clothing and equipment. Double-check that your respirator fits properly and that the kind of canister cartridge recommended on the product label is attached to it.
- When working with pesticides, never eat, drink, smoke or go to the bathroom without first washing your hands.
- Never mix or transfer pesticides near a well or other water source. If you're mixing pesticide in the field, do so at various locations. Over time, small quantities of pesticide spilled in one area may accumulate and cause serious contamination.
- When filling a tank from a water system, leave an air gap between the hose and the tank, or use a backflowprevention device. (See Figure 2, above.) Don't insert the filler hose into the pesticide mixture. These measures will prevent pesticide from siphoning out of the tank.
- Consider using a portable water supply tank, which allows mixing in the field and speeds the refilling of pesticide tanks.

Safety after you mix

After mixing and loading the pesticide, you should:

- Return any unused pesticide to its proper container. Securely close pesticide containers immediately after use. Repair or replace torn labels. Never store pesticides in containers used for food or beverages.
- Clean up all spills, no matter how small.
- Wash mixing and loading pails, measuring devices, stirring equipment and tools in strong detergent water. Rinse this equipment in clear water, then let it air-dry and store it.
- Wash your personal protective equipment (PPE) with detergent. Rinse it and hang it to air-dry.
- The wash and rinse water can best be disposed of by pouring it into the spray tank and applying it over a site allowed by the pesticide label. Remember to leave room for this rinse water – don't overfill the spray tank.

- Wash your clothing with heavy-duty liquid detergent and hot water. Do not use bleach, which can cause a dangerous chemical reaction when mixed with ammonia. Line-dry the clothing where it will be exposed to sunlight. Take a hot shower using detergent-type soap, and don't forget to wash your hair. Put on clean clothing.

Cleaning equipment and containers

Rinse pesticide residues from application equipment before storage and before undertaking extensive repair. Rinse equipment at different approved sites in the field.

Triple-rinse or pressure-rinse empty pesticide containers at the mixing site before you recycle them or dispose of them. Do this as soon after emptying the containers as possible. Add the rinse water to the sprayer tank and spray it out over an approved site, or use it to mix the next batch.

Storing pesticides safely

The first step in preventing pesticide spills is to evaluate your pesticide storage area.

Store pesticides in a locked storage area. The storage facility should have an impervious floor, such as concrete, to help contain leaks or spills. If this isn't feasible, store your pesticide containers within other, larger containers.

Locate this area away from other activities, and use it only for pesticide storage. Locking the storage area reduces the risk to children and limits potential misuse or theft.

Inventory stored pesticides and keep the inventory current. An up-to-date inventory may be invaluable during an emergency. (It can help people manage a fire or clean up after a natural disaster.) Since pesticide products degrade over time, date them. Use the oldest ones first.

Preparing for spills

Consider putting together a "spill response kit," and keep it handy. This kit might contain:

- duct or electrician's tape, for sealing cracks
- washer-headed screws, for sealing holes
- caulking or sealant, to temporarily patch containers and spray tanks
- absorbent materials such as kitty litter or sawdust, to absorb spilled material and also to construct berms
- extra hoses and extra hose clamps
- plastic tarps or bags, to hold pesticide and contaminated materials during cleanup
- a shovel, to form a berm for containing spills and keeping pesticide from running into drainage areas. Keep several empty drums or other containers on hand in case a sprayer tank needs to be drained.

Responding to spills

When a spill occurs, follow this procedure:

- First, stop or sufficiently slow the leak to allow it to be contained.
- Mark the area to show its location and size. If the spill is not within a pesticide containment area (for example, a mixing/loading pad), contaminated soil generally will need to be removed and, depending upon how much there is, stored for testing and later disposal.
- In a small spill, shoveling the contaminated material into heavy plastic bags may be sufficient. In a large spill, a loader or backhoe may be needed to remove contaminated dirt. Find out beforehand where such equipment is readily available. The sooner the spill is cleaned up, the less soil may need to be removed.

Regulations may allow contaminated material to be disposed of by spreading it on a labeled site at no more than the approved rate. Check with the Montana Department of Agriculture for specifics. The Department's telephone number is (406) 444-5400.

IMPORTANT TELEPHONE NUMBERS

Emergency

For aid in human poisoning cases:
Rocky Mountain Poison and Drug Center
(800) 525-5042 (Montana only)

For help involving spills, leaks and fires:
Pesticide Accident Hotline (CHEMTREC)
(800) 424-9300

Non-emergency

For medical and consumer information:
National Pesticide Telecommunications Network
(800) 858-7378

Montana Pesticide Education Program

Cecil Tharp, Pesticide Education Specialist
103 Animal Bioscience
Montana State University
Bozeman, MT 59717-3020
Phone: (406) 994-5067
ctharp@montana.edu
http://pesticides.montana.edu

Guidelines for safely mixing and loading pesticides

- Only authorized pesticide handlers or supervisors should be in the mixing and loading area. All handlers should be wearing proper personal protective equipment (PPE). No other persons, and no animals, should be present.
- To prevent spills, place pesticide containers in a secure position when you're opening and handling them.
- Read and follow label directions. Pay special attention to warnings and precautions.
- Work only in a well-ventilated, well-lighted area.
- Never stir pesticides with your hands. Use a stir-stick.
- Use a catch basin – a container within a container – to prevent inadvertent spills. For example, a measuring jar can be placed inside a plastic tub. If the measuring jar happened to tip over, the spill would be confined to the tub.
- Never pour pesticides at eye level. In fact, never lift any open pesticide container higher than your chest. Mix and pour concentrated pesticides no higher than waist level. A spill or splash could be disastrous.
- If pesticides are spilled or splashed on you, remove your clothing immediately and wash yourself thoroughly – within two minutes. Then wash your clothing.
- Protect your eyes with splash-proof goggles.
- Stand with your back to the wind so that any fumes or dusts are blown away from you.
- Never pour pesticide directly into a spray tank. Always mix and dilute the pesticide in a small container.
- Pour the pesticide into water. Never pour water into the pesticide.
- When pouring, keep your head well above and to one side of the spray tank opening. This will reduce the chance of your being splashed in the face.
- Mix and load on a concrete slab where spills can be contained, or, if no slab is available, use a catch basin.
- Avoid mixing or loading near surface water or a well head.
- Do not leave a pesticide tank you're filling unattended.
- Never allow a spray tank to overflow. The cleanup could be a costly and dangerous all-day, all-night task.

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