



COLORADO ENVIRONMENTAL PESTICIDE EDUCATION PROGRAM

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TANK MIXING

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This fact sheet describes what tank mixing is and how to conduct compatibility testing to determine if multiple products can be tank mixed.

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Tank Mixing

Pesticide handlers often like to combine two or more pesticides and apply them at the same time. Such mixtures, often called **tank mixes**, can save time, labor, and fuel. Manufacturers sometimes combine pesticides for sale as a pre-mix. Sometimes pesticide handlers combine pesticides at application.

Under federal law, combining pesticides is legal unless the pesticide labeling of any of the pesticides involved instructs you not to combine them. However, not all pesticides work well when mixed together. They must be **compatible** - that is, mixing them together must not reduce their safety or effectiveness. The more pesticides you mix together, the greater the chance of undesirable effects.

Some pesticide mixtures that are physically incompatible make the mixture difficult or impossible to apply and may clog equipment, pumps, and tanks. These reactions sometimes cause the pesticide to form lumps or gels, to become solids that fall to the bottom of the mix tank, or to separate into layers that cannot be remixed.

Sometimes the combined pesticides create a chemical reaction that cannot be seen by looking at the mixture. However, the chemical change can result in:

- loss of effectiveness against the target pests
- increased toxicity to the pesticide handler
- injury to the treated surface

Some pesticide labeling lists pesticides (and other chemicals) known to be compatible with that formulation. Compatibility charts are available in some pest management recommendations, pesticide trade publications, and Cooperative Extension or industry recommendations. If you cannot find a chart that lists the compatibility of the two pesticides (or the pesticide and other chemical) that you wish to mix, test a small amount of the mixture before you mix large quantities.

Compatibility testing

First, put on personal protective equipment. Wear at least the equipment required by the labeling of any of the pesticides to be combined; protective eyewear; and chemical-resistant gloves and apron, both preferably made of foil laminate. Get a large, clean, clear glass container, such as a quart jar. Use the same water (or other diluent) that you will use when making up the larger mixture. Add the water and each of the products in the same proportions as you will mix them. Unless the pesticide labeling states otherwise, add pesticides to the diluent (usually

water) using the **"W-A-L-E" plan**:

1. Add some of the diluent first.
2. Add **W**ettable powders and other powders and **W**ater-dispersible granules.
3. **A**gitate thoroughly and add the remaining diluent.
4. Add the **L**iquid products, such as solutions, surfactants, and flowables.
5. Add **E**mulsifiable concentrates last.



Shake the jar vigorously. Feel the sides of the jar to determine if the mixture is giving off heat. If so, the mixture may be undergoing a chemical reaction and the pesticides should not be combined. Let the mixture stand for about 15 minutes and feel again for unusual heat.

If scum forms on the surface, if the mixture clumps, or if any solids settle to the bottom (except for wettable powders), the mixture probably is not compatible. Finally, if no signs of incompatibility appear, test the mixture on a small area of the surface where it is to be applied.

When preparing a tank mix, it is wise to take a few moments to prepare a record of the following items:

- The order in which to mix the products
- Prescribed rates per acre or square feet for each product
- Capacity of the spray tank
- Amount of mix to be applied per acre
- Types and rates of any additives
- Acres covered per tank
- Types of nozzle(s) to be used
- Nozzle pressure in pounds per square inch (psi)
- Applicator speed

This information, along with the application location, target area, and date of product application will help provide you with an important record as well as a handy reference.

References and Resources

Applying Pesticides Correctly. National Pesticide Applicator Training Core Manual. United States Department of Agriculture and Environmental Protection Agency.

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