

Introduction

Broadcast pesticide applications are commonly used in a wide range of settings, from agricultural and rangeland to urban settings. Precise application of pesticides is critical to maximize their performance. Over-application wastes money and can result in undesirable crop or plant injury. Applications below labeled rates generally reduce pesticide performance. To avoid misapplications, proper calibration of your sprayer and accurate measurement of the treated area are critical; for more on these topics, see NMSU Extension Guide A-613, *Extension Pesticide Applicator Training Series #4: Sprayer Calibration* (http://aces.nmsu.edu/pubs/_a/A613.pdf), and Guide A-612, *Extension Pesticide Applicator Training Series #3: Treatment Area Measurements* (http://aces.nmsu.edu/pubs/_a/A612.pdf). The amount of pesticide needed can then be determined, assuming the appropriate rate is known.

Always consult and follow the product label when mixing and applying pesticides. The label is a legal document that contains specific instructions, application rates, and restrictions for the product.

Mixing Pesticides

When mixing pesticides, several factors need to be considered, including:

1. Calibrated output of the sprayer (Guide A-613)
2. Amount of surface area to be treated (Guide A-612)
3. Size of the spray tank
4. Amount of product and water to add

Items 3 and 4 will be addressed here. When the area to be treated and the sprayer output volume are known, you can calculate the amount of total spray solution necessary for the application. Several tank mixes may be necessary with large acreage.

Broadcast pesticides are produced in a variety of solid and liquid formulations. Rates of application are provided on the label. Rates may be listed for the formulated product as purchased, or expressed in terms of amount of active ingredient. The active ingredient is the chemical that exerts the desired effect on the target

pest (e.g., weed, insect, fungus), while the formulated commercial product also includes inert ingredients that do not affect the target pest directly.

All labels list the amount of active ingredient. Providing rates of applications in terms of active ingredients allows applicators the flexibility to accurately apply different commercial products with the same active ingredient that may have different concentrations. In general, solid formulations list the active ingredient as a percentage by weight while liquid formulations express the active ingredient in weight per volume (e.g., lb/gal).

NOTE: Some products refer to acid equivalent (ae) rather than active ingredient (ai). Acid equivalent is used when the active ingredient is an acid. The active ingredient is more accurately represented in this form without the inert salt as part of the active ingredient weight.

Important points:

- The following calculations use formulated product, not active ingredients.
- Make sure to account for extra spray solution needed to fill lines and pumps of the sprayer.
- Follow mixing and application methods as outlined on the product label.

Tank Mixing Two Or More Products

When tank mixing two or more pesticides, the same equations are used. Calculations are identical for both dry and liquid products. However, when calculating the amount of water to add to liquid products, subtract the volume of all the liquid products in the tank mix. For dry products, less water will be necessary, but it may not be equivalent to the volume of solid product. We recommend adding the dry product to a partially filled tank, agitating the solution, and then filling up the tank to a mark that indicates the proper overall spray volume. Always consult the label before tank mixing products since some products may be incompatible when mixed together.

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Calculating Amount of Product and Water Needed for Tank Mixes

When making calculations, it is critical to make the appropriate conversions.

Equation for Calculating Amount of Product Needed:

Area to be treated \times Volume or weight of product per area = Weight or volume of product needed

Equation for Calculating Amount of Water Needed:

(Output per area \times Area to be treated) – Volume of product = Volume of water to add

Example: Apply 4 pints/acre of Trimec Classic to 10,000 ft² with 10 gal/acre of spray solution. How much Trimec Classic and water are needed?

Convert units from ft² to acres and pints to gallons to calculate rates in the appropriate units (gal/acre):

10,000 ft² \times (1 acre / 43,560 ft²) = 0.2296 acres,
4 pints/acre \times (1 gal / 8 pints) = 0.5 gallons/acre

Then use the equations above to calculate the exact amount of product and water needed.

0.2296 acres \times 0.5 gal Trimec Classic per acre =
0.115 gal Trimec Classic

(10 gal solution per acre \times 0.2296 acres) –
0.115 gal of Trimec Classic = 2.18 gal water

Calculating the Rate of Active Ingredient Needed

Liquid products

The following is an equation and example of how to calculate the rate of active ingredient being applied for a broadcasted application from a liquid product:

Volume of product per acre / Weight of active ingredient per volume of product = Weight of active ingredient per area

Example: Apply Weedar 64 (3.8 lb ai/gal) at a rate of 0.5 gal/acre.

How much active ingredient of Weedar 64 (2,4-D) is needed?

0.5 gal Weedar 64 per acre \times 3.8 lb ai per gal of Weedar 64 = 1.9 lb ai/acre

Solid products

The following is an equation and example of how to calculate the rate of active ingredient being applied for a broadcasted application from a solid product.

Weight of product to apply per area \times % active ingredient in product = Weight of active ingredient per area

Example: Apply Telar (75% chlorsulfuron) at 1.5 oz/acre. How much of the active ingredient of Telar (chlorsulfuron) is needed?

1.5 oz Telar per acre \times 0.75 active ingredient in product = 1.125 oz ai/acre

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The pesticide recommendations in this publication are provided only as a guide. The authors and New Mexico State University assume no liability resulting from their use. Please be aware that pesticide labels and registration can change at any time; by law, it is the applicator's responsibility to use pesticides ONLY according to the directions on the current label. Use pesticides selectively and carefully and follow recommended procedures for the safe storage and disposal of surplus pesticides and containers.

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