

Checking for Compatibility of Herbicide-Fertilizer Combinations (Jar Test)

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A "Jar Test" should always be used to test the compatibility of herbicides with fertilizers.

Herbicides and fertilizers are normally tank mixed to save time and application costs. However, some herbicides may not be compatible with fertilizers or may be affected by the spraying water. The product label may state if it can be mixed with a fertilizer or not; it may also include specific instructions for mixing that need to be followed. If the label does not state any recommendations, you must perform your own compatibility test (Jar Test) before large batches are mixed. Also, on the chemical label there is a telephone number for technical support and safety concerns. Contacting the pesticide/fertilizer dealer is probably always a good idea since they usually know their products the best and have experience with a wide range of mixtures.

Incompatibility can be both chemical and physical. Chemical incompatibility may result in a herbicide changing properties, and this may not be very obvious. Physical incompatibility, on the other hand, can cause the formation of lumps, precipitates, gels or foams. The result may be total loss of the products and use of the tank and/or sprayer. Incompatibility also can reduce effectiveness or cause crop injury.

Surfactants and compatibility agents may be added to help maintain component dispersion and improve mixing. Chemical and fertilizer companies spend considerable amounts of money researching and developing their products, and specific information on mixing and compatibility are often included on the label. The water source is very important because it may be more difficult to mix with water that is hard and contains large amounts of minerals compared to water with fewer minerals. Fertilizers can influence the pH of the mixture (some raise the pH, and some lower the pH) and thus the suitability of a herbicide with a fertilizer. Avoid letting herbicide/fertilizer mixtures sit overnight because the pH of the mixture can change and cause precipitation.

Because of the aforementioned, it is always prudent to conduct a "Jar Test" before mixing any herbicide with a fertilizer to ensure compatibility. This can save time, money and the spray equipment. The following "Jar Test" should be used to test the physical compatibility of herbicides with fertilizers.

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Jar Test Instructions

Add the required amount of herbicide and fertilizer in the order suggested by the label or dealer. If there are no instructions for tank mixing the products, always go from dilute to concentrate, not vice versa.

1. Add 1 pint of carrier (water, liquid fertilizer) to each of 2 one-quart jars.
2. To **one** of the jars add 1/4 teaspoon or 1.2 milliliters of a compatibility agent approved for this use, such as Compex or Unite (1/4 teaspoon is equivalent to 2 pints per 100 gallons of spray). Shake or stir gently to mix.
3. Add each product to the jar in the ratio and order that you will add them to the spray tank. Use the **W-A-L-E-S** sequence when tank-mixing herbicides:

Wettable powders or water dispersible granules

Agitate then add adjuvants such as anti-foaming compounds, buffers

Liquids (flowable liquids)

Emulsi-fiable concentrates

Surfactants

- For dry herbicides: For each pound to be applied per acre, add 1.5 level teaspoons to each jar.
 - For liquid herbicides: For each pint to be applied per acre, add 0.5 teaspoon or 2.5 milliliters to each jar.
4. Invert the jar 10 times after each addition to simulate continuous agitation.
 5. When all ingredients have been added, invert the jar 10 times and let stand for 30 minutes or so. Then, inspect the mixture for precipitates, sludges or separations of liquid phases, all of which may indicate incompatibility.
 6. If, after standing for 30 minutes, the components in the jar are dispersed, the herbicide and fertilizer are compatible. If the components are not dispersed in the jar, the herbicide-fertilizer mixture is not compatible and should not be used. One should always keep in mind that there are certain herbicides that require constant agitation, particularly the Wettable Powders and Dry Flowables such as Atrazine.
 7. Determine if the compatibility agent is needed in the spray mixture by comparing the two jars. If either mixture separates but can be remixed readily, the mixture can be sprayed as long as good agitation is used. If the mixtures are incompatible, test the following methods of improving compatibility: (A) slurry the dry herbicide(s) in water before addition, or (B) add 1/2 of the compatibility agent to the fertilizer and the other 1/2 to the emulsifiable concentrate or flowable herbicide before addition to the mixture.
 8. ***It is important to note: a jar test only tests physical incompatibilities, not chemical incompatibilities.*** The best way to test for **chemical incompatibility** is to spray the mixture in a small area and check for crop damage or reduced performance.

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