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Pesticide Safety 2012 - How To Do a Jar Test

Item Type	article;article
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Download date	2024-06-30 17:23:16
Link to Item	https://hdl.handle.net/20.500.14394/8772

How To Do A Jar Test

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Insecticides, fungicides, plant growth regulators, foliar fertilizers, and adjuvants — all can have a place in spray applications. But do they all have a place in the same spray tank?

Getting sludge from an incompatible mix out of a spray tank and hoses can be a dangerous, time-consuming, and expensive process. Worse than that is a complex tank mix that sprays out, but doesn't do the job because of physical or chemical interactions in the tank that have changed the pesticide product in such a way that performance is compromised.

Will a convenient tank mix save you the time and cost of a second application? Or will it be a clumpy disaster in the tank? Do a jar test to find out before you spray. Most labels call for a jar test if there are compatibility questions with the mix, but many give limited instructions. If a detailed jar test is described on the label, follow those instructions. However, if the label says something vague like "add the proportionate amounts to a quart of water," follow the guidelines presented here.

The basic strategy for a jar test is to add ingredients in the order of most difficult to disperse first, stir/shake vigorously, and see what the mixture looks like. The following is a starting point, and not the only way to perform a jar test. This information comes from page 94 of the University of California's ANR Publication 3324 and input from scientists at Syngenta Crop Protection. Always wear label-required personal protective equipment when pouring or mixing pesticides. Do a jar test in a safe work space.

STEP 1. Add a pint of spray water — from the water source you will use to fill the tank — to a clean, one-quart glass jar.

STEP 2. Check spray water pH. If needed, adjust the spray water pH to the range required by pesticide label(s).

STEP 3. Add the materials to the jar you plan to use in the order listed in the chart. After adding each ingredient, stir or shake and observe the results. Do not add all materials and then shake. Shaking gives the best test as certain incompatibilities don't appear until a lot of energy is added.

If the label calls for 2 pounds of wettable powder (WP) per acre and you will be spraying at 100 gallons of spray per acre, add 2 tablespoons of the WP to the jar. If the label calls for less than a pound WP per acre at 100 gallons per acre (gpa), add a tablespoon to the jar — even though this makes a very concentrated solution that may not match the final concentration if you end up putting it in the spray tank.

Even if you are using less than 100 gpa of spray volume, add the same amount of pesticide to the jar as if you were using 100 gpa. Why? This is a simple, conservative jar test intended to work in most situations. If the mix is compatible under the concentrated conditions of this test, then it should work without a hitch under more dilute, field conditions.

STEP 4. Stir the entire mixture. Feel the sides. A warm mixture suggests a chemical reaction occurred, which could degrade the pesticide(s) and potentially reduce pest control. If the mixture is smooth and free of visible clumps or particles, then the ingredients are physically compatible and can be mixed and applied. If you can see any clumping after stirring and shaking, then you probably have a problem.

The order of listing in the chart is a general approach that should work in most cases — but not all. If the mixture doesn't work following the chart order, and you really want to make the mixture work and the label offers no specific advice on mixing, change the mixing order and try again.

STEP 5. Triple-rinse and discard the jar when the test is finished.

Tested Cranberry Pesticides:

We tested all 2-way combinations except:

• Devrinol + any adjuvant (preemergence herbicide, adjuvants not recommended)
• Bravo products + any adjuvant (not recommended)
• Avaunt and Delegate + any adjuvant (not recommended)
• Intrepid and Confirm + adjuvants (they are recommended, so assumed good compatibility)
• Poast + any adjuvant (all NIS; COC recommended)
• Adjuvant combinations with each other

Bravo Ultrex	WDG	3.8-6 lb
Bravo WeatherStik	SC	4-6.5 pt
Callisto	SC	4-8 oz
Poast	EC	2 oz/gal
QuinStar	L	up to 12.5 oz
Devrinol	DF	8-12 lb
Avaunt	DG	6 oz
Intrepid	F	10-16 oz
Delegate	WG	3-6 oz
Confirm	F	16 oz
Activator 90		0.25% v:v
Exit		0.25% v:v
Induce		0.50% v:v

RESULTS:

Separation of Pesticides and Precipitate on bottom –Avoid these combinations!

Delegate + Callisto
Delegate + QuinStar
Devrinol + Bravo Ultrex
Devrinol + Bravo Weatherstik

Some Precipitate on bottom, but agitation kept pesticides in solution

Ultrex + Avaunt
Ultrex + Delegate
Weatherstik + Avaunt
Weatherstilk + Delegate
Delegate + Avaunt
Devrinol + Avaunt
QuinStar + Callisto

Other

QuinStar + Exit formed some discoloration on the surface.

Jar Test Strategy		
Combine the ingredients listed here to determine if a tank mix will save you the time and cost of a second application of a pesticide.		
Material	**Order of mixing**	**Material amount to add to jar***
Water Soluble Pouches	1	1 tablespoon (Tbs) per pound
Wettable Powders	2	1 Tbs per pound
Dry flowables/water-dispersible granules	3	1 Tbs per pound
Suspension concentrates/Flowables Capsule suspensions	4	1 teaspoon (tsp) per pint
Emulsifiable concentrates	5	1 tsp per pint
Soluble Liquids	6	1 tsp per pint
Soluble Powders	7	1 tsp per pound
Surfactants, oils, remaining adjuvants	8	1 tsp per pint
Fertilizers	9	1.1 grams** per pound
*Equivalent to underlined unit of pesticide or fertilizer per 100 gallons of final spray solution. **Use an inexpensive postal scale to measure this amount		