



# GROWING TIMES



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Santa Clara County Division of Agriculture

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## Summer Reminder

*Avoid Heat Related Illnesses!*



Remember to drink fluids, even when you're not thirsty. For strenuous activity, you should drink 2 - 4 glasses of water / sports drink every hour!

Applicators have to wear protective equipment specified by pesticide labels and required by law. For those applicators having to wear layers of protective gear, be careful! Try and spray during the cooler parts of the day to mitigate problems with the heat.

To help protect against the sun, wear a wide brimmed hat and safety glasses that have been tinted. Also be sure to wear sunscreen to guard against sunburns. - Sunburns slow the skin's ability to release heat.

Take breaks whenever necessary to allow your body to cool down!

For information about heat stress, visit this website: <http://www.cdc.gov/nasd/docs/d001601-d001700/d001633/d001633.html>

## Defining "Physically Present"

*Enforcement Letter 04-21*

The Department of Pesticide Regulation published an enforcement letter modernizing their interpretation of "physically present". When a label or regulation requires a certified applicator be physically present during an application, the application can be performed by non-certified applicators if all of the following three items are met:

1. Two trained applicators are present at the handling site.
2. The certified applicator is physically present on the premises or contiguous parcel.
3. The certified applicator and handlers must have a method of voice communication throughout the application. (i.e., cell phones)

If there is only one non-certified handler at the handling site, the certified applicator must be in the line of site of the handler. Voice contact alone with just one applicator does not meet this standard.

If you would like to read the enforcement letter, you can find it at the following link:

<http://www.cdpr.ca.gov/docs/enfcmpli/penfltrs/penf2004/2004021.pdf>

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\* This newsletter is available on-line on our website: <http://www.sccagriculture.org>

# Pesticide Adjuvants

*What is an adjuvant?*



An adjuvant is a substance that is added to a pesticide formulation or tank mix to increase its efficacy or safety. Adjuvants can help keep a pesticide from foaming, help the stability, solubility, or the suspension of pesticide in the tank, or even help with characteristics seldom noticed by an applicator such as the rate of evaporation or degradation. Most pesticides already contain adjuvants within their formulation, but there are many adjuvants on the market designed to be added to the tank mix by the applicator.

It's important to note that even though most adjuvants do not have any pesticidal properties by themselves, they are included in the definition of the term "pesticide". California Food and Agricultural Code Section 12753(a) states:

"Pesticide" includes any of the following: (a) Any spray adjuvant".

Because adjuvants are included in the definition of a pesticide, training and safety requirements are the same as all other pesticides.

## Surfactants

The author of the old saying, "water and oil don't mix", probably never heard of the word "surfactant". Today, with the help of surfactants, water and oil can mix, and pesticide applicators do it on a regular basis. It's because of this and other helpful properties that make surfactants the most common adjuvant.

Surfactants are **surface-active** ingredients that affect the surface tension of spray droplets to improve the mixing or dispersal of pesticides. Surfactants can control the size of pesticide droplets, increase the bond between pesticides and their targets, or change the surface tension of pesticides to allow them to mix. By controlling the physical properties of pesticides, it is possible to mix water and oil, or multiple pesticides that would not otherwise bond together.

One of the common uses of surfactants is to increase the coverage onto a target. One example would be to use a surfactant to change the size of a pesticide spray droplet to cover plants with hairy leaves. Decreasing the size of pesticide droplets can help the spray cover the surface of the leaf instead of just hitting the hairs and rolling off.

Other surfactants such as "spreader stickers" will help create a bond between the pesticide and its target and in some cases will also help improve a pesticide's weather-ability.

Wetting agents are another type of surfactant that works by reducing the surface tension of both materials in a tank mix. For example, reducing the surface tension of a powder and a liquid allows the two previously incompatible materials to mix thoroughly.

Which adjuvant should you use?

Pesticide products will sometimes suggest the use of an adjuvant for certain applications. In many cases, there are adjuvants specifically designed for certain pesticides and these will be listed on a pesticide label, or on the adjuvant's label. Like all pesticides, it is important that adjuvants are mixed according to label directions. It is equally important to use the proper adjuvant for the job on hand. Using the wrong adjuvant could not only be a waste of money, but it could create a pesticide mixture that is ineffective or cause runoff problems.

Your pesticide dealer or pest control advisor should be able to answer many of your questions regarding adjuvants.

For more information about adjuvants, you can click on this helpful website at Montana State University:

<http://scarab.msu.montana.edu/extension/Agadjtoc.htm>

(Please note: this Montana State University webpage makes a comment about how the US EPA does not review adjuvant labels. That is not the case in California! Adjuvants are reviewed in this State by the California EPA and they will assign them a California EPA Registration Number. This is because adjuvants are a pesticide in the State of California.)

# Pesticide Interactions

## *Pesticide Tank Mixes*

Pesticide manufacturers are required by law to list the exact percentage of active ingredients in their pesticide mixtures. However, this requirement does not apply to "inert ingredients". When you consider that many of the ingredients in pesticides are unknown, mixing pesticides without any research of how they will react can be a big gamble.

## Pesticide Interactions

Pesticides are comprised of complex mixtures of chemicals. When you mix these chemicals, a number of things can happen. The best-case scenario is you will end up with a mixture that greatly enhances the spray application. However, undesirable outcomes can happen. Mixing pesticides together can cancel the pesticide's active ingredients and create a worthless mixture, the pesticides in the mixture can strengthen each other and increase the overall toxicity of the spray, the mixture can increase the phototoxicity to plants, or there are cases where mixtures turn into a gummy mess.

### Synergistic Responses:

Synergistic responses are pesticide interactions that react positively with one another to enhance the pesticide mixture. Sometimes these reactions can allow the applicator to significantly reduce the concentration of a pesticide in the mixture and still get the same control. This happens when the pesticides in the mixture attack the target pest in different ways, increasing the efficacy. However, sometimes synergistic responses can create pesticide mixtures where the pesticides combine with one another, increasing the toxicity. When the toxicity is increased, an applicator must be very careful about re-entry and pre-harvest intervals. The pesticide label will tell an applicator how long workers must stay out of the field and how long before the crop can be harvested after an application. This information can change if the pesticide is mixed with something that is not listed on the pesticide label. If you do not have experience with a particular pesticide mixture, be sure to research how the mixture will affect the crop before spraying. The last thing you want to hear after harvesting a crop is that it has illegal pesticide residues!

Some pesticide labels will list other pesticide products that can be safely mixed with their product. Many times they will also give you mixing instructions because, surprisingly enough, sometimes the difference between a synergistic and antagonistic response is how you combine the materials.

### Antagonistic Responses:

Antagonistic responses are pesticide interactions that create an undesirable mixture. This occurs when the pesticide's ingredients work against one another, reducing efficacy, or creating a mixture that burns desirable vegetation. Mixing pesticides can also create an antagonistic response when the pesticides don't bond properly, or they oppose one another and create a gel or pasty solution.

Many times manufacturers will list pesticides that should not be mixed with their pesticide product. So, be sure to read those labels!

When there is no guidance on a pesticide label regarding a tank mixture, care must be taken to research the effects of mixing the pesticides. Check with your crop advisor, pesticide dealership, or a licensed pest control advisor.

### Tank Mixes:

Pesticide tank mixtures can be beneficial not only to the spray efficacy, but also can reduce labor costs and the wear and tear on equipment associated with multiple applications. Thoroughly research the feasibility of combining two pesticide products. The active ingredients may work well with one another, but the inert ingredients could work against you when combined. Incompatible ingredients can react with one another creating a mixture that precipitates out of the solution, or turns into a gel, clogging and making a mess of your spray equipment.

For specific information about preparing pesticide tank mixes, you can visit this helpful website:

[http://www.pesticidesafety.uiuc.edu/facts/calibration/preparing\\_tank\\_mixes.pdf](http://www.pesticidesafety.uiuc.edu/facts/calibration/preparing_tank_mixes.pdf)

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