

# Agricultural spray adjuvants

An agricultural adjuvant is broadly defined as any substance added to the spray tank, separate from the pesticide formulation, which will improve the performance of the pesticide being sprayed.

The adjuvants perform a variety of tasks, but their contribution to raising crop production performance can be summarised as helping to optimise the efficacy levels of agricultural chemicals.

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Different tasks require different adjuvants – once the circumstances requiring an adjuvant have been assessed, the most appropriate adjuvant can be selected.

There is a clear technical justification for using adjuvants when:

- The pesticide label specifies the need;
- you can clearly identify specific problems that will reduce pesticide efficacy; and
- there is reliable data showing an economic benefit;

The adjuvants therefore give more consistent performance and may make up for underperformance under certain conditions. Some of the more important and commonly used adjuvants include wetter-spreaders, stickers, buffers, foam retardants and drift retardants.

## Wetter-spreaders

A spray drop must be able to wet the foliage and spread out or cover an area of the leaf for the pesticide to perform its pest control function. In some cases, like very waxy or hairy leaves or insufficient surfactant in the pesticide concen-

trate formulation, additional adjuvant is needed for sufficient coverage.

The surfactant acts here by reducing the surface tension of the water on the surface of the spray drop and by reducing the interfacial tension between the spray drop and surface of the leaf, in effect giving a larger cover area per drop of the pesticide.

Always adhere to recommended dosages, as too much surfactant may cause runoff or loss of deposit rather than increasing coverage.

## Stickers

A general definition of a sticker is a substance added to a pesticide preparation to help it to stick to the sprayed surface. A sticker can perform three types of functions:

- It can increase the adhesion or “stickiness” of solid particles that otherwise might be easily dislodged from a leaf surface, sort of glueing those particles on.
- It can also reduce evaporation of the pesticide: if the dried residue from a spray drop consists of one-half pesticide and one-half of some other chemical, the vapor pressure on the drop will be reduced by one half and the evaporation rate will be accordingly diminished.
- The third function can be to provide a waterproof coating. If a pesticide is fairly water soluble, it may be washed off the leaf during heavy rainfalls that follow the spray. If the sticker is not water soluble, it can provide a degree of protection from this form of loss.

The last function mentioned will be provided by products containing latex, polyethylene, resins or other waterproofing agents.

## Buffers

Some water used for diluting pesticide formulations is alkaline (high pH). If the pH is sufficiently high and the pesticide is subject to degradation by alkaline hydrolyses, it may be necessary to lower the pH of the water mix.

Buffers contain organic acids, which will lower the pH or acidity

of the water and tend to stabilise the pH at an acceptable value. The more alkaline the water, the greater the amount of buffer that will be required.

Some buffers have sufficient surfactant present to also perform as wetter-spreaders, allowing for more economic sprays.

## Foam retardants

Some formulations of agricultural chemicals will create foam in some spray tanks, which is usually a result of both the surfactants used in the concentrate formulation and the type of spray tank agitation. The foam can influence the proper application of the chemical being sprayed, and is usually eliminated by a small amount of foam inhibitor.

## Drift retardants

Drift is a function of drop size. Drops with diameters of 100 microns (0,1 mm) or less, contribute to the bulk of the drift off site from the crops being sprayed.

Chemicals that increase the tensile strength of water will decrease the proportion of these smaller drops in a spray system. They will also increase the average drop size, resulting in fewer drops per cm<sup>2</sup> of a leaf surface, but it will still be the same rate of deposit of pesticide per hectare.

This may or may not affect the level of pest control and resulting crop yield. The need to reduce drift, particularly near sensitive sites, may very well take precedence over small reductions in efficacy. **ST**

