



Tip of the Month

May 2018

NON-IONIC SURFACTANTS – A DIVERSE GROUP OF ADJUVANTS!

Surfactants are water-soluble adjuvants that are used widely with many pesticides in South Africa. They are also used in certain pesticides as emulsifiers for oil formulations. The tank-mix surfactant products are used to increase the retention of spray droplets on leaves, increase the spreading ability of spray droplets and to increase the absorption of certain pesticides.

Surfactants can be divided into four main groups, namely non-ionic, cationic, anionic and amphoteric. The non-ionic surfactants (NIS) are the most widely used tank-mix surfactant group in the agrochemical industry by far. The use rates of these surfactants in South Africa range from 0.003% for certain products on citrus up to a 0.25% rate with certain herbicides. NIS are often regarded as a single type of surfactant, but the truth is that they comprise multiple chemical groupings and have many other differences.

Two of the critical differences between different NIS surfactant products will be discussed in more detail below.

Retention (coverage) and spreading ability

The retention of spray droplets and the spreading of individual spray droplets on the leaf, are functions of the surface tension of the NIS. Surfactants are made up of a lipophilic (oil-soluble) and a hydrophilic (water-soluble) portion. Depending on the chemistry and ratio of these two parts, the surfactant surface tension will differ drastically.

Therefore, it will be possible for two alcohol ethoxylate surfactants to have totally different retention and spreading properties. Yes, both products are NIS, and both products belong to the same group of surfactant chemistry, but their physical properties may be totally different.

This is the reason why it is so extremely dangerous to replace the registered surfactant with another, even if they belong to the same chemistry of surfactant, as the retention and droplet spreading may differ drastically.

Surfactant chemistry

The NIS group is made up of multiple surfactant

chemistries. The alcohol ethoxylates are the NIS group that is used most extensively in South Africa. Therefore, it is often believed that all the products in this group are exactly the same.

As discussed above, the spreading and retention ability differs vastly, but it is important to note that their chemistry may also be different. The alcohol ethoxylate group includes, linear, secondary, tertiary and even branched alcohol ethoxylates!

Each of these subgroups will have their own properties and will be more effective with certain types of pesticides. It has been proved in research that glyphosate weed control may vary considerably, just by replacing one type of surfactant with another. This probably also applies to the vast majority of pesticides that are applied with a surfactant.

Villa's stance

If one replaces the registered surfactant with another, multiple factors come into play. Firstly, the retention and spreading ability of the pesticide spray may be changed. Certain pesticides that are very reliant on retention may be antagonized and the absorption of certain pesticides may be reduced because of droplets that are spread out too much or too little.

Secondly, the surfactant chemistry will most probably be changed. This could reduce the pesticide absorption rate and amount. This is the reason why it is so critically important to use the correct surfactant as pesticide activity will differ vastly with different products.

Please don't regard the NIS as one type of product as the group contains a multitude of different properties. This is the reason why Villa is so adamant that the Villa pesticides are applied with Villa adjuvants.

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