

# Training Module - Adjuvants 1

No continuing education credits are available for this training module, it is purely for training purposes.

## Adjuvants



Fine tuning the mix

Adjuvants are an important component to our spray mixes



They do not directly affect the plant but they change the physical characteristics of the applied solutions.

# Training Module - Adjuvants 2

Proper use of adjuvants can help us to use the lowest rates of herbicides to achieve our management goals.



This is important to meet NPDES requirements and to improve our bottom line.

## Adjuvant categories

- Wetter/spreaders – help leaf coverage
- Penetrants – help in herbicide uptake
- Sinkers – confine and sink submersed treatments
- Stickers – resist herbicide wash-off and run-off
- Drift Controlers – reduce off target damage

# Training Module - Adjuvants 3

## Surface Tension



Liquids have a surface tension caused by cohesive forces between molecules. This causes droplets to “bead” on certain surfaces

## Surface Tension



Characteristics such as fine hairs and waxy coatings can reduce the even coverage of the leaf surfaces

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## Surfactants



Surfactants are a type of adjuvant that affects the surface tension of a liquid. They can act as wetting agents, emulsifiers, or dispersants

## Wetters/Spreaders



Wetters and spreaders are surfactant type adjuvants that reduce surface tension of spray droplets and promote total, even coverage of leaf surfaces.

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## Non-ionic Surfactants

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- ❖ Non-ionic surfactants are wetter/spreaders typically made up of fatty acids and glycols or alcohols.
- ❖ Often referred to by the ratio of active to inactive ingredients (80/20s or 90/10s).
- ❖ Reduce surface tension of droplets and helps to evenly coat the leaf surface.
- ❖ Rates usually vary between 0.125% and 0.5%.
- ❖ Brand names include: Induce, Activate Plus & Red River 90

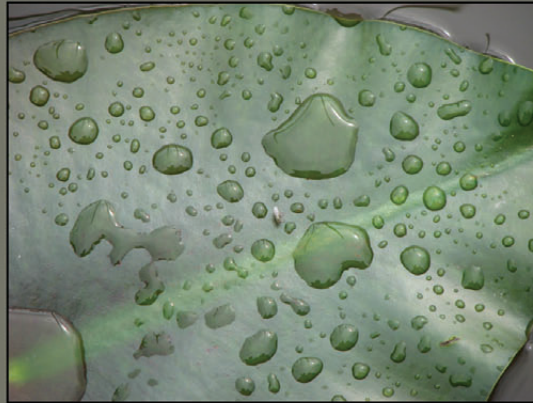
## Organosilicones

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- ❖ Organosilicones are wetter/spreaders that greatly reduce surface tension of liquids. (Sometimes referred to as “superwettters”.)
- ❖ They spread the spray solution so well that it encourages entry through leaf openings (stomata).
- ❖ Rates are between 0.125% to 0.25% (Use caution, too much will cause the herbicide to run right off the leaf.)
- ❖ Agitation in tank can cause foaming. Use of a defoamer may be necessary.
- ❖ Brand names include: Kinetic, Sil-energy, & Sun Spreader .

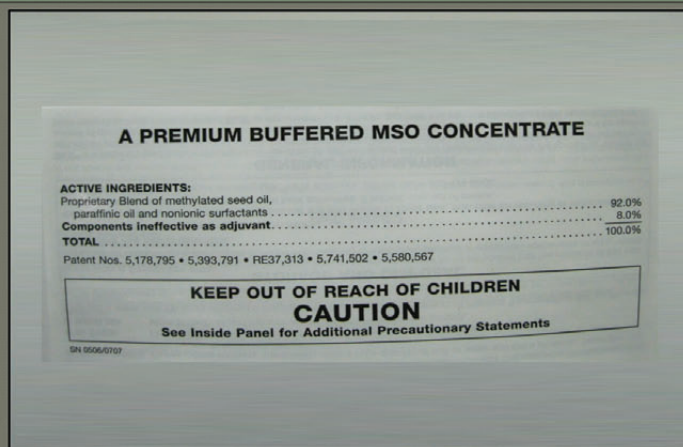
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## Penetrants



Penetrants are typically emulsifiable oils that break down the waxy cuticle on leaf surfaces and increase the uptake of a spray mix. Some common brands include Cide-Kick, Kammo Plus and DLZ and Atmos.

## Oil chemistry



Oil based compounds easily penetrate leaves and bark. They are also useful in hot, dry climates to prevent drying too quickly on plant surfaces. Use caution that the product is labeled for aquatic use.

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## Sinkers and Drift Control



Sinkers and drift control adjuvants increase the viscosity of the spray mix, making larger, heavier spray droplets. This improves confinement of the herbicide and reduces off target drift by wind and current.

## Stickers



Stickers increase the adhesion of the spray droplets to the leaves. Stickers can help prevent wash-off from rain and wave action.

## Additional adjuvant types

- Markers – Dyes that visually show application coverage.
- De-foamers – Reduce excessive foam caused by some surfactants.
- Water conditioners – Used to adjust various characteristics of water used in spray mixes. (pH, hardness, etc...)

## Tailoring the mix



Knowledge of basic adjuvant chemistry and herbicide modes of action can help you to apply the most effective mix in various situations.