“Organic” Adjuvant Sales Training

Tony Shepherd
Monterey AgResources
Technical Sales - PNW
Why Use Adjuvants?

- Increase Coverage and Penetration (Spreader)
- Slow Evaporation (Humectant)
- Breakdown Waxy Cuticle (Oil)
- Conditioning of Spray Water (pH)
- Reduce spray drift
- Reduce tank foaming
- Reduce wash off from rain or irrigation (Sticker)
What is an Adjuvant?

Definition:
Any product added to modify the characteristics of a pesticide or spray solution.
Adjuvant Types

- Spreaders
- Stickers
- Buffers / Water Conditioner
- Crop Oil Concentrates
- Deposition Aids
- Utility Products (Anti-foam, anti-drift, etc.)
- Compatibility agents
Adjuvants / Surfactant?

**Adjuvant** –
A material added to a tank mix solution to aid or modify the action of an agrichemical or the physical characteristics of the mixture. (ASTM)

**Surfactant** –
A material that when added to a liquid medium modifies the properties of the medium at a surface or interface. (ASTM)
Adjuvant Terms

- Surfactant/Wetting Agent
- Non-Ionic, Cationic, Anionic
- Surface Tension
- Humectants
- Contact Angle
Anionic Surfactants – Negatively Charge (-)

• Soaps are sodium salts of long-chain fatty acids with carboxylic acid groups

• Detergents are long-chain hydrocarbons with a sulfate or phosphate group

• Make **good wetting agents** and are usually added for this reason.

• Can also **react with metal cations** in solution to form "**scum**", which can be a problem in hard water.
Non-Ionic Surfactants (No charge)

Good emulsifiers, inexpensive, low toxicity. Non-ionizing.

Lipophilic portion of molecule is long-chain alkyl or aryl group.

Hydrophilic portion has the oxygen linkages.
Effects of Different Surfactants

Most surfactants reported phytotoxic in this order: cationic > anionic > non-ionic.

**Cationic surfactants** - almost all phytotoxic to some extent.

**Anionic surfactants** - toxicity increases as size of hydrophobic alkyl groups increases

**Non-ionic surfactants** - as EO chain length decreases, toxicity increases

**Phytotoxicity depends on surfactant concentration** (toxic range from 0.1 to 1%, w/v).
SURFACE TENSION

WATER MOLECULES ATTRACT EACH OTHER ELECTRICALLY...

THIS CAN BE MEASURED!

DYNES/CENTIMETER = SURFACE TENSION

UNTREATED = 55 - 70
PROPERLY TREATED = 24 - 30
Surface Tension and **SURFace ACTive AgENTS**

- Surface Tension occurs between the untreated spray water droplet and the leaf surface.

- The addition of a spreader adjuvant that contains a surfactant reduces surface tension allowing the droplets to flatten and spread over the leaf surface.
Surfactants/Wetting Agents

- Combine water solubility and oil solubility in the same molecule!
- Hydrophobic Head /Oil Soluble- Vegetable or Petroleum source
- Hydrophilic Tail/Water Soluble – EO
WETTING AGENTS/SURFACTANTS

LIPOPHILIC HYDROPHILIC

HIGH SURFACE TENSION

LOW SURFACE TENSION

LOW CONTACT ANGLE

HIGH CONTACT ANGLE

LOW COVERAGE

HIGH COVERAGE

SURface ACTive AgeNTS
General use non-ionic spreader.

- **Surfact 50** – OMRI, WSDA
  Spreader / activator. Good for foliar uptake of pesticides, foliar fertilizers and plant growth regulators.

- **Green Cypress AG Aide** – OMRI
  A non-ionic spreader which contains Yucca schidigera extract. Good for most pesticides and foliar fertilizers.
Super Spreader

- Super wetting surfactant
- Non-ionic organo-silicone surfactant
- Greatly reduces surface tension
- Improves the efficacy of foliar fungicides
- Use where extra spreading is desirable (i.e. – strawberries)
- Can be used to reduce spray volume due to increased spreading

Green Cypress EcoSpreader (OMRI)
Humectants
- Keep deposits in a liquid more bioavailable form.
- Pull water from the air
- Slows crystallization
Reduced surface tension so droplet doesn’t bounce off. Improved adherence to the leaf surface

- **Stick-it Organic** - WSDA
  Contains components of terpene polymers and emulsifiers, which provide an elastic film that protects from wash off. Also works as a humectant.

- **S-K-H Organic Adhesive Adjuvant** - OMRI
  Contains components of bentonite, lactose, casein to provide resistance to wash off from rain and irrigation fungicides like copper, sulfur and potassium bicarbonate (Kaligreen).
Buffer / Water Conditioner

- Treats water alkalinity
  pH of 5.5-6 Insecticides/Fungicides

- **Constant Buph-er** – OMRI, WSDA.
  Contains citric acid and vinegar and non-foaming agents.
Crop Oil Concentrate

- *CMR Organic Oil Adjuvant* – OMRI
  Contains cottonseed oil and emulsifiers.
Drip Irrigation Cleaner – Adjuvant?

- **Yeoman - In FuseO** – OMRI, WSDA
  Designed to keep drip irrigation systems clean and free of mineral deposits.
Questions?

Tony Shepherd
Silverton, Oregon
503-791-8517
tshepherd@montereyagresources.com

www.MontereyAgResources.com