

NON-TRADITIONAL ACTIVATOR ADJUVANTS. Patrick M. McMullan, Manager – Agronomic Research, agroTECHNOLOGY Research, Inc., Memphis, TN 38120.

The activator adjuvants traditionally used by producers are either nonionic surfactants/wetting agents (NIS), crop oil concentrates (COC), or methylated seed oil concentrates (MSOC). However, several new adjuvant types have been introduced to the marketplace which do not fit the traditional definition of the afore-mentioned adjuvants. Methylated seed oil/organosilicone blend adjuvants have been available in the marketplace for about 10 years now. These adjuvants are typically used at 0.5% v/v or 1 quart/acre, which is one-half the typical use rate of a MSOC. The organosilicone surfactant contained in the formulation improves the wetting ability of the adjuvant and helps to account for the lower use rate of the adjuvant. High surfactant oil concentrates (HSOC) are similar to COC and MSO adjuvants in terms of composition but the ratio of oil: emulsifier is changed, which allows for a use rate of ½ that of their traditional counterparts. The decreased oil: emulsifier ratio (going from 83:17 to 60:40 in the case of crop oil adjuvants) creates smaller oil droplets in the spray solution (the emulsion often changes from a milky white to a bluish-white color). The smaller oil droplets can create a more uniform coverage on target surfaces and increase in herbicide uptake. The lower use rate of HSOCs has several advantages including potential lower cost to the producer, less adjuvant required by the producer, and lower storage and shipping charges to the adjuvant formulator/distributor. High fructose corn syrup can increase herbicide efficacy. When applied alone it is less effective than all other adjuvant types available to the producer. However, when applied in combination with conventional adjuvants, efficacy of many herbicides can be increased, especially on grass species. Polyacrylamide polymers have traditionally been used in drift control adjuvants to reduce drift potential of sprays. However, research with polyacrylamides has shown that polyacrylamides are also effective in increasing herbicide efficacy. Molecular weight of the polymers does not appear to influence the efficacy. Possible reasons for the increased efficacy may be due to reduced bounce of spray droplets, improved adhesion of droplets to leaf surfaces, and increased cuticle penetration. Ethoxylated triglycerides (ETG) are a new adjuvant type, introduced to the marketplace in 2006. These adjuvants are seed oil based (canola, soybean, cotton) and are used at rates much lower than traditional oil-based adjuvants (around 0.25% v/v). ETGs enhance herbicide efficacy similar to that of traditional COCs. Due to the ethoxylation of the triglyceride, ETGs can reduce surface tension. However, the surface tension is higher than to that of traditional NIS and are poor wetters. ETGs are poor solvents and not overly effective in disruption of the plant cuticle. A possible mode of action for enhancing herbicide efficacy is excess surface concentration (more of the ETG on the leaf surface edge of the spray droplet).