Facts to Consider when Purchasing Adjuvants for Use with Herbicides

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Adjuvants (surfactants and crop oils) are used with herbicides to increase the wettability of spray solutions to obtain better coverage and increased penetration of the spray solution into the plant. By getting more of the herbicide into the plant, you essentially increase the activity of the herbicide; this is the reason for adding an adjuvant to a herbicide solution.

Manufacturers of herbicides use many different adjuvants in formulating the product. These adjuvants are added to stabilize the pure chemical in the formulation sold to the farmer. On-farm use of adjuvants should be only for increased wetting and penetration of foliar herbicides. Contact herbicides such as Paraquat and dinitro (DNBP) need an adjuvant to help moisten foliage and increase herbicide coverage and penetration for maximum weed control. This is also true for residual herbicides such as Lorox and atrazine when used as a postemergence application. Even translocatable herbicides like 2,4-D, Banvel, and dalapon, can be more effective when applied with an adjuvant. Label restrictions prohibit the use of adjuvants with certain applications; thus, the herbicide label should be consulted before an adjuvant is added to a herbicide solution.

Adjuvants are marketed under many different trade names. These may be products from parent chemical companies and marketed under trade names such as X-77, Surfactant WK, Cittowett Plus, or these may be products owned by co-ops and distributors who have bought from parent companies and use their own trade names. Most crop oils are sold as a crop oil concentrate. This is usually a mixture of 80 percent crop oil plus 20 percent surfactant. Crop oils are usually preferred over surfactants, especially in corn, because they not only penetrate and spread the herbicide solution, but they also keep the foliage moist longer than do surfactants. Crop oils are usually added to the spray solution at the rate of 1 to 2 gallons per acre and crop oil concentrate at 1 to 2 quarts per acre, whereas surfactants are usually recommended as a percentage of the volume of spray being applied (1/4 to 1/2% by volume). If 20 gallons of spray solutions were being applied per acre, then 1 gallon of surfactant would be used on 10 to 20 acres. The recommendation of 1/4 to 1/2% by volume surfactant is based on the use of surfactants that have 85 percent (+10%) active surfactant in the formulation. Surfactants with lower levels of activity may have
to be used at proportionately higher rates to obtain the same results.

Confusion frequently occurs concerning the proper use of surfactants with a herbicide. When purchasing a suitable surfactant for herbicide use, follow these suggestions:

1. Purchase a surfactant that is especially manufactured and marketed for use with herbicides. Do not purchase products made for household use. Many of these detergents are more expensive and less active than agricultural surfactants. They may be mixed or combined with products that interact with herbicides to reduce the level of weed control or can cause foaming or equipment malfunction.

2. Purchase on the basis of percentage active ingredient. It is less profitable to buy a product with 25% active ingredient selling for $4.00 per gallon than to buy one with 80% active ingredient for $8.50. Do not consider isopropyl alcohol (isopropanol) or water as active ingredients. Many products list these solvents as part of the active ingredient or as a functioning agent. Most spray adjuvants will have clearly marked on the label active ingredients and inactive ingredient percentages and the percentage of the principal functioning agent. Other adjuvants such as some by Rohm & Haas will list only the percentage of the constituents ineffective as spray adjuvants. In this case, subtract the percentage listed, e.g., 20% from 100% to obtain the percentage active ingredient of that product, i.e., 80% active. Read the label carefully to determine the active ingredients listed.

3. Be wary of the claims that even though a surfactant may cost much more, it can be used at lower concentrations than other surfactants on the market. Many of these surfactants have had limited field testing. Little evidence exists that any surfactant is so effective that greatly reducing its concentration over other suitable surfactants will result in equal or better weed control.

4. Purchase a surfactant to increase herbicide coverage and penetration of foliage. Ignore claims such as: "This surfactant has certain properties which will keep the spray equipment clean"; or "The surfactant will increase water penetration into the soil"; or "It will increase root penetration and nutrient uptake."

There are no "miracle" surfactants. Most surfactants are good products and will increase the performance of foliar-applied herbicides when used at 1/4 to 1/2 percent volume per volume with the spray solution. No surfactant used with a herbicide solution can justify a greatly increased price per unit, and none is so effective that the use rates can be lowered below those recommended for herbicides in Indiana.

Soil-applied herbicides do not need additional adjuvants. Maximum weed control from soil-applied (preplant incorporated or preemergence) herbicides can best be obtained by applying the proper use rates of the chemicals.