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CHEMICAL LOG

Controlling Costs With Adjuvants

By Helen M. Stone

Adjuvants may not be the most glamorous topic in sports turf management, but getting to know these useful additions can add efficiency to your operation and hold down costs. Webster's Dictionary defines an adjuvant as "a substance added to a prescription to aid the operation of the principal ingredient." In simple words, adjuvants can make your "turf prescriptions" work better.

Surfactants, spreaders, stickers and wetting agents can be thought of as adjuvants. They are added to emulsifiable concentrates, flowables, wettable powders, soluble powders and other chemicals during the mixing process. They can extend, enhance, concentrate, reduce drift or disperse the liquid formulation to make it more effective. However, used incorrectly, they can cause phytotoxicity or even damage turf roots.

Water is a unique compound because of a phenomenon called hydrogen bonding. Basically, hydrogen atoms in the water molecule have a strong attraction to hydrogen atoms in other water molecules. However, these charged hydrogen atoms also tend to bond to other surfaces with an opposite charge. Organic matter and the minerals in soil cause the molecules to "attach" themselves, making them available to absorptive turf roots.

Surfactants are one of the largest groups of adjuvants. Surfactants reduce the surface tension of the water drops, causing them to flatten instead of beading up. This results in greater coverage. Spreaders and wetting agents are surfactants.

Nonionic surfactants have no electrical charge and are generally compatible with most pesticides and herbicides. They can make a water droplet "flatten" to cover six times the area of a droplet of plain water.

In addition to the component that causes the release of surface tension (alkyl polyoxylkanes or similar compounds), a nonionic surfactant also should contain fatty acids. Fatty acids cause the mixture to adhere to grass better. Alkyl polyoxylkanes will reactivate the first time the turf becomes wet from irrigation, rainfall or dew, causing the pesticide to wash off. Fatty acids keep the pesticide from washing away, so the compound will stay where it is put after it dries.

A new family of nonionic surfactants, the organosilicones, is the latest in adjuvant technology. Organosilicones were introduced about six years ago and caused a great deal of excitement because a water droplet could be dispersed to cover 15 to 16 times the area than without the surfactant.

Because the turf is thoroughly covered when spraying with organosilicones, pesticide action is enhanced. Where two sprays may have been necessary to achieve control, turf managers might be able to do the job with a single spray. In addition, since a drop of pesticide solution covers 16 times the area of a solution without an organosilicone surfactant, the total amount of spray solution to achieve complete coverage can be dramatically reduced. This can result in substantial savings when spraying acres of turf on athletic fields.

Organosilicones do not require fatty acids to adhere. The compound breaks down within 24 hours, so rewetting will not cause the pesticide to wash away. Some organosilicones even contain a ultraviolet light screen, so pesticide degradation due to sunlight is slowed.

Stickers cause the pesticide to adhere more firmly to the grass. They are primarily used if rain is expected after spraying. Spreader/sticker combinations are often sold together. In general the more a compound spreads, the less it will stick.

Drift-control agents keep spray droplets from breaking apart during application. The larger and heavier drops stay on target more consistently and are less likely to be blown away by light winds.

Buffering agents control the pH of the mixture. Many pesticides are designed to work at a pH of 7 (neutral). If your water is above or below that pH, the effectiveness of the formulation can be greatly reduced. Buffering agents will eliminate this problem.

Selecting for Success

Your first reference point in selecting the appropriate adjuvant is to read the label of the chemical you are applying. More than 200 chemicals have label requirements for some type of adjuvant. Considering the benefits, unless a label specifically states that an adjuvant should not be used, adding a surfactant (spreader/sticker) makes economic sense.

With more than 4,000 named adjuvants and about 300 manufacturers, the wide array of available adjuvants can make selection a confusing process. Unfortunately, studies have shown that many are not effective or do not live up to their claims. In fact, some materials touted as adjuvants are 92-percent water!

Unlike pesticides, adjuvants do not require EPA registration. A wide range of formulations can be labeled as adjuvants and be within legal limits. For example, alcohol can be legally called an adjuvant. Also called isopropanol (IPA), alcohol evaporates very quickly and is relatively ineffective as a spreader. However, alcohol can comprise up to 60 percent of the active ingredient in some adjuvants.

The best defense against an ineffective product is to educate yourself about adjuvants. Ask questions about alcohol percentage, fatty acids and the actual formulations of the adjuvants you are considering for purchase. Read label rates. A less expensive adjuvant that must be used at a much higher rate than a comparable product is no bargain. Since adjuvants are generally much less expensive than pesticides to begin with, price shopping usually doesn't pay.

Finally, ask about support materials from the manufacturers. A reputable manufacturer will be happy to provide you with literature that explains exact formulations and should be able to answer any questions to your satisfaction.

The right adjuvant can make your spray program more effective and less costly. Taking the time to learn about these valuable tools can be a valuable investment in the future of your turfgrass. ❑