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FAT DERIVED SURFACTANTS IN AGRICULTURAL SPRAYS

You will recall that FPRF has been supporting work at a number of colleges and universities on the use of various fat-sugar complexes as surfactants in agricultural sprays. Results from this research were summarized in "The Director's Digest", No. 25, July 19, 1966. Up-to-date reports in this research area have been received recently and some of the important findings are summarized below.

Professor F. W. Slife, University of Illinois, found that a number of fat-sugar complexes enhanced the activity of atrazine, Lorox and Tenoran applied as post emergence sprays to broadleaf and grass weeds (Table 1). It is apparent from these data that some of the

Table 1. Effect of Surfactant Additives on Activity of Herbicide Sprays

Chemical	Rate per Acre (lb.)	Additive (1% concn.)	Weed Kill %
Atrazine	1	0	33
"	1	DuPont WK	80
"	1	Atlox 109	80
"	1	30-13	100
"	1	40-13	90
"	1	20-115	50
"	1	T-110	70
Lorox	1	0	80
"	1	DuPont WK	85
"	1	Atlox 109	85
"	1	30-13	100
"	1	40-13	90
"	1	20-115	85
"	1	T-110	90
Tenoran	2	0	10
"	2	DuPont WK	40
"	2	Atlox 109	40
"	2	30-13	60
"	2	40-13	60
"	2	20-115	30
"	2	T-110	50

fat-derived surfactants are superior in activity enhancement to some of the commonly used commercial surfactants. In accordance with results reported last year, the fat-derived surfactants vary in their ability to enhance activity depending on the active ingredient present. For example, 30-13, an ethoxylated tallow fatty acid sucrose ester from Colonial Sugars, showed outstanding activity enhancement with all three of the herbicides tested while T-110, a sucroglyceride from Ledoga, was not as effective, particularly with atrazine.

Professor W. H. Daniel and Hayden Watkins, Purdue University, found that some of the fat-derived surfactants were equivalent to some of the commercial surfactants in activity enhancement when used with Dicamba or 2,4-D on soybean as a test plant. There were no uniform significant differences in activity enhancement among the several fat-sugar complexes tested.

Professor G. E. Wilcox and Daniel Cantliffe, Purdue University, confirmed results reported last year in that the use of the various fat-sugar complexes aided in the absorption and translocation of phosphorus applied as a foliar nutrient spray. These fat-derived materials also aided in the absorption and translocation of iron when applied as a nutrient spray to beans and pin oak seedlings. Some of the fat-sugar surfactants were far superior to commercial surfactants in increasing the absorption of manganese from foliar sprays by tomato plants. The quantitive effect of the various surfactants varied with the element studies, the concentration of surfactant, and the specific surfactant tested.

Professor Roy M. Sachs, University of California, found that one of the ethoxylated tallow fatty acid sucrose esters from Colonial Sugars (20-115) when used alone greatly enhanced the growth of shrubs, but also enhanced the growth retarding effect of maleic hydrazide. He suggests that these effects may be related to the influence of the surfactant on evaporation transpiration from the leaf surface.

These results are most encouraging. They demonstrate clearly that these biodegradable fat-derived surfactants are equivalent or superior to the commercial surfactants now used in herbicide, nutritional, and hormone sprays. The experiments indicate further that these fat-sugar complexes are most effective if they are specifically "tailored" for use with each individual spray ingredient. If the companies that manufacture and formulate agricultural sprays can be "sold" on the value of these fat-sugar complexes as surfactants, there is in this area alone a potential market for at least 50 million pounds of tallow annually. This is another example of how research can expand the market for your products.