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# FATS AND PROTEINS RESEARCH FOUNDATION, INC.

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"THE DIRECTOR'S DIGEST"  
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Technical Director

In "The Director's Digest" for March, 1966, reports presented at the seminar on fat-sugar complexes as surfactant adjuvants for agricultural sprays were reviewed briefly. We now have received detailed written reports from cooperating colleges and universities on their studies. Results presented in these reports are summarized below.

Professor F. W. <sup>3</sup>Flife, University of Illinois, found that ethoxylated tallow fatty acid sucrose esters greatly enhanced the activity of Lorox on broadleaf weeds at both 0.1% and 1.0% concentration of surfactant. The activity was greater with esters containing 30 ethylene oxide units per mole of sucrose than it was with esters containing more ethylene oxide. Sucrose esters or sucroglycerides did not show activity enhancement, probably because of lack of solubility in the spray solutions.

Professor G. E. Wilcox and Mr. Daniel Cantliffe, Purdue University, found in greenhouse studies that fat-sugar complexes used in foliar feeding as surfactant adjuvants definitely aided in the uptake of phosphorus. In their studies they used bean plants grown in phosphorus deficient soil, then dipped the center leaf of the oldest group of trifoliate leaves in a solution containing radioactive phosphorus ( $P^{32}$ ) and surfactant, then followed absorption and translocation of the phosphorus by making radioactive counts on leaf samples from different parts of the plant. Ethoxylated tallow sucroglyceride in the solution increased phosphorus uptake by the leaf more than 20-fold. Ethoxylated sucrose fatty acid esters containing three moles of fatty acid and 40 ethylene oxide units per sucrose molecule increased phosphorus absorption more than 10-fold at 0.5% concentration. Other fat-sugar complexes were not as effective but almost all of the ones tested were greatly superior to Duponol, X-77, Tween 20, Tween 80, the commercial surfactants tested. The plants showing high phosphorus absorption due to the action of surfactants showed almost complete translocation of the phosphorus to the growing tips. If larger amounts of phosphorus

can be absorbed by the plant through the use of fat-sugar complexes greater amounts will be made available for translocation to all parts of the plant.

Professor W. H. Daniel and Mr. Hyden Watkins, Purdue University, tested a series of ethoxylated tallow fatty acid esters of sucrose with a number of herbicides used in turfgrass management. In some cases enhanced activity of the herbicide was noted when surfactants at 0.5% concentration were used. No distinct differences in the effect of the different fat-sugar compounds were observed. The results were similar to those obtained with X-77, a commercial surfactant.

Professor Roy Sachs, University of California at Davis, tested a series of fat-sugar complexes and a number of commercial surfactants as adjuvants for growth-retarding sprays on ornamental shrubs and flowers. In Zinnia and Chrysanthemum the penetration of Alar was not significantly enhanced by any of the surfactants tested. All surfactants enhanced penetration of Alar into Cotoneaster with the more fat-soluble materials showing the greater activity. In these studies the main effect of the surfactant seems to be in wetting the plant surface although it is possible that specific combinations between surfactants and active ingredients may promote translocation as well as penetration.

These tests with fat-derived surfactants as adjuvants for agricultural sprays are all being continued. It is hoped that the results will continue to show promise and that sizeable quantities of animal fat will eventually be used in the manufacture of these surfactants.

#### PUBLICATIONS ON FPRF-SPONSORED RESEARCH

An article "Laundering Performance of Tallow Derived Surfactants" by C. A. Rader and A. M. Schwartz has just been published in the May ~~issue~~ issue of Detergent Age. This article gives the details of the detergency tests on tallow-derived materials which were made for FPRF by Harris Research Laboratories, Inc. (See "The Director's Digest", No. 15, September 21, 1965). If you wish a reprint of this article, please request it from the FPRF office.

The June, 1966, issue of Meat Processing carries an article by J. E. Burch, Battelle Memorial Institute, on the use of fat-derived compounds for waterproofing concrete. The results reported in the article are from research sponsored at Battelle by FPRF. These were reported by Dr. Burch at the 1965 NRA Annual Meeting.