



FATS AND PROTEINS RESEARCH FOUNDATION, INC.

3150 DES PLAINES AVENUE • DES PLAINES, ILLINOIS 60018
(5 MINUTES FROM CHICAGO'S O'HARE AIRPORT)

TELEPHONE AREA CODE 312 827-0139

THE DIRECTOR'S DIGEST

D. M. DOTY

TECHNICAL DIRECTOR

September 21, 1965

No. 15

Until the end of World War II the biggest single use of inedible animal fat was for soap manufacture. Although sizable quantities of animal fat are still used in the soap and detergent industry, the major share of the laundry detergent market has been lost to petroleum based detergents. Recently the problem of biodegradability of detergents has caused the entire matter of detergent composition to be re-examined. The situation has been reviewed in two previous issues of "The Director's Digest" (Nos. 5 and 9). In the latter issue it was stated that FPRF would sponsor a testing program to evaluate the detergent quality of a number of fat based materials. These tests performed by the Harris Research Laboratories, Washington, D. C., have been completed and the following is a resume' of results presented in the final report on this study.

Three tallow derived detergents, polyoxyethylenated tallow sucroglyceride (S-18), tallow alcohol sulfate (TAS) and sucrose monotallowate (SET) were formulated into heavy-duty laundering compositions and compared with control formulations, based on LAS and ABS, for detergency and redeposition performance. Additionally, some formulations were tested for: (1) detergency performance on carbon soiled fabric, (2) foaming ability in a home-type washing machine (3) lime soap dispersing power, (4) tendency to leave absorbed organic residue on the laundered fabric, and (5) stability to crutching and spray drying.

In the soil accumulation tests the best overall performance was displayed by S-18. It was equal to or better than a commercial ABS detergent. SET performed well at low use concentration but was relatively less effective at higher concentrations. TAS was relatively effective at high test concentrations but less effective at low concentrations. In redeposition performance, formulations based on S-18 ranked first followed by SET.

Carbon soil detergency tests indicated that SET and S-18 should perform well at low concentrations, which correlates well with the soil accumulation tests.

TAS displayed foaming equal to the commercial high-foaming ABS detergent in the washing machine with a heavily soiled fabric load. S-18 gave essentially no foam and SET was intermediate in foam performance.

SET displayed excellent lime soap dispersing power. TAS had poor lime soap dispersing power and S-18 was intermediate.

The three tallow-derived detergents displayed about the same tendency as the commercial ABS control to build up organic residues on laundered fabric, all being much superior to soap in this respect.

TAS and S-18 were completely resistant to deterioration during crutching and spray drying; SET was about one third saponified by these operations.

Thus each of the three tallow-derived detergents was found to have practical utility, but also some limitation on possible commercial acceptability as indicated by the characteristics described above.

The results outlined above were obtained using 10% or less of the tallow-derived detergents in the final formulations. (The commercial ABS detergent used for comparison contained approximately 20% active ingredient). If one calculates the amount of tallow required to produce 100 pounds of the final detergent formulation containing 10% active ingredient the following figures are obtained.

Detergent containing TAS -- 5 lbs of tallow-derived alcohol
(plus 2⁺ lbs. of coco-derived alcohol).

Detergent containing SET -- 4.5 lbs. of tallow-derived fatty acid.

Detergent containing S-18 -- 2.5 lbs. of tallow.

It is noteworthy that all of the tallow-derived detergent formulations showed excellent overall performance in these tests. Each has certain limitations with respect to commercial acceptability. It is also of interest to renderers to note the relative amounts of tallow that would be required to produce final detergent formulations containing the various tallow-derived active ingredients.