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SOAP-BASED DETERGENT FORMULATIONS COMPARE
FAVORABLY WITH PHOSPHATE BUILT DETERGENTS

As the result of recent emphasis on the desirability of detergents that are biodegradable and phosphate-free, the Eastern Regional Research Laboratory, USDA, has been investigating soap formulations as possible replacements for synthetic detergents containing phosphates. Findings from these studies were presented at the American Oil Chemists Society meeting in October, 1971 and has been published in the Journal of the American Oil Chemists' Society 49, 63-69 (1972). A summary and abstract of this report follows.

Soap is an excellent detergent in soft water but functions poorly in hard water because the lime soap curd precipitates and deposits on the cloth. The purpose of the study by researchers at Eastern Regional was to compare soap-lime soap dispersing agent (l.s.d.a.) formulations with phosphate built detergents.

The soap was prepared from tallow fatty acids. Six different lime soap dispersing agents, all derived from tallow, were tested. Detergency was measured by the increase in reflectance after washing under standard conditions using three different standard cotton test cloths.

The detergency effectiveness of soap, as measured by the increase in reflectance, was improved by the addition of each of the lime soap dispersing agents tested, using 80% soap and 20% l.s.d.a. at 0.2% concentration in wash water of 300 ppm hardness at 60°C. Detergency was further improved when small amounts of builders (sodium tripolyphosphate, sodium silicate, sodium citrate or sodium oxydiacetate) were added to the soap-l.s.d.a. systems. Neither sodium carbonate nor sodium sulfate were effective builders in this ternary system.

One of the most effective ternary systems (soap-sodium methyl sulfotallowate - sodium silicate) was compared in washing ability to a well known commercial heavy duty granular detergent at 0.2% concentration in 50, 150, and 300 ppm hard water on three soiled cloths (Testfabrics, U.S. Testing Co. and EMPA). The soap-l.s.d.a.-builder system was equal to or better than the commercial detergent except for one formulation (70% soap, 10% l.s.d.a., 20% builder) and for all formulations at 300 ppm hardness using Testfabrics cloth where the commercial detergent was superior to the soap formulations.

The most promising soap-l.s.d.a. formulations were compared with a phosphate built LAS detergent in multiwash tests to evaluate both detergency and soil redeposition effectiveness. All the soap-l.s.d.a. formulations tested were superior to soap alone and to the LAS-phosphate detergent in both detergency and redeposition effectiveness.

The following conclusion was reached: "Although it is difficult to extrapolate from laboratory detergency data to actual home washing conditions, the results ---- indicate that some soap-l.s.d.a.-builder systems can be effective detergents in hard or soft water."