Is there a way to beat the high cost of detergent feedstock? With the increase in crude oil prices and the resultant rise in the cost of petrochemicals, methyl ester sulfonates (MES) derived from palm and coconut are gaining a great deal of attention.

Linear alkyl benzene (LAB) produced from petrochemical raw materials is under severe price pressure from its key ingredient inputs, i.e., benzene and olefins. Other alternate petrochemical-based feedstocks such as synthetic alcohols and alpha olefins have also seen significant price escalation in the past year and will no doubt continue their upward climb.

World production of palm oil since 1995 has increased to 33,326,000 metric tons, up 119% for the decade. The rising price of petroleum ensures that the market for much of this growth will now be earmarked for biodiesel production, where the saturated C16 fraction is an undesirable element that must be reduced in motor fuels. Fortuitously, this biodiesel by-product is an ideal methyl ester (ME) feed for the manufacture of MES. Refined, bleached, deodorized (RBD) palm stearin at its current price provides MES with a cost to market that is approximately US$400/metric ton less than the cost of linear alkyl benzene sulfonate (LABS). The strength of the palm-based biodiesel market will ensure that sulfonation-grade ME will continue to be readily available at a price comparable to its fuel value. Thus MES offers a viable cost alternative to the LABS currently used by detergent producers. Additionally, its origin from a renewable oleo-based raw material, its excellent biodegradability, improved calcium hardness tolerance, and excellent detergency are also credited with its rapidly expanding acceptance and use.

The challenges for MES in detergent use include low foam characteristics and formulation constraints when using MES in a high pH liquid form. The issue of low foam can be addressed by inclusion of cosurfactants, such as a lauric chain length or the addition of foam boosters such as alpha olefin sulfonates (AOS). The availability of MES in recent years as a dry, free flowing powder or in flaked form has overcome most of the manufacturing issues as the product can be directly added to the detergent formulation in a post-addition step. Lion Corporation, Stepan Company and Chemithon Corporation have commercialized acid bleaching technologies for manufacturing MES. MES is produced in Japan by Lion (40,000 metric tons/year) and in the USA by Stepan (50,000 metric tons/year) and Huish Detergents (80,000 metric tons/year). The Huish facility, which began commercial operation in 2002, uses the patented Chemithon Acid Bleaching technology for manufacture of MES. Huish produces MES in a free flowing powder form while both Lion and Stepan produce liquid MES forms. These powder and liquid MES products are being formulated into liquid and powder consumer products that are widely sold throughout North America and Japan. Today MES is used in dozens of commercial detergent formulations and as a co-surfactant premium combination soap bar.

The traditional workhorse surfactant LABS now has a viable challenger. Thanks to its economical manufacture, the increasing supply of feedstock, and high detergency in hard water, the leading position may soon be occupied by the environmentally friendly MES.