

# FABRIC SOFTENER FROM PALM-BASED MATERIAL

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**A**s detergents clean and strip natural oils out of fabric, clothes become scratchy and often develop a negative ionic charges (static cling), especially when they are dried in a dryer. In the early 1950s, when synthetic laundry detergents became popular, fabric softeners were introduced. The first softeners were liquids to be added to laundry during the rinse cycle. In the 1970s, fabric softeners for use in dryers were developed. All-in-one detergents containing fabric softeners for use during the wash cycle were introduced in the 1980s. At present, there are several types of fabric softeners but the liquids applied during the rinse cycle are still preferred because they are more effective.

In the formulating of fabric softener, surfactants play an important role by imparting a softening and lubricating action on the fabrics being treated. The most common surfactant used is cationic with a hydrophobic chain of at least 16 carbon atoms.

## PALM-BASED FABRIC SOFTENERS

MPOB has produced an esterquat [quaternized fatty acid triethanolamine (TEA) esters] which is a cationic surfactant for use in fabric softeners. Two formulations (1A1 and 1A2) have been developed using the esterquat. Incorporating another surfactant improved the properties of the fabric softeners. The study showed that palm-based fabric softeners are stable in storage, non-irritant and biodegradable.

The storage study was conducted under three different conditions: freeze/thaw (three cycles) at room temperature and 45°C for three months. After three months storage at 45°C, the softeners still remained in one phase as in the initial stage. They also remained creamy without any colour change (Figure 1).



a (Stable - no separation) b (Not stable - separation)

Figure 1. Storage study on product stability.

The irritancy test of the formulated products were evaluated using *in vitro* Dermal Irritation Assay test. The tests were carried out at four different concentrations (50 ml, 75 ml, 100 ml and 125 ml). From the test, all products were classified as non-irritant (Figure 2). A product is classified as non-irritant when the HIE score is below 0.9.

Besides stability and non-irritancy, a fabric softener should also possess a good biodegradability. The biodegradability study showed that the products biodegraded effectively, where it reached the pass level of 60% biodegradation after 16 days (Table 1).

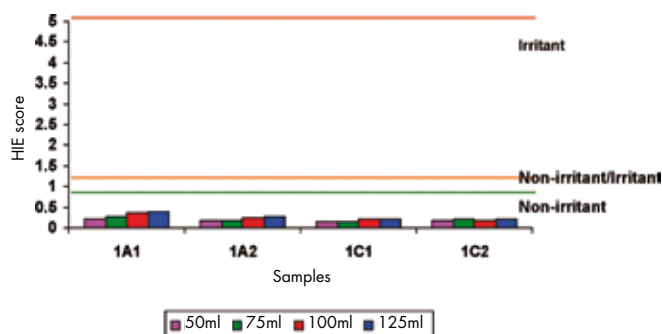


Figure 2. Irritation study of fabric softener.

Notes: 1A1 & 1A2 = palm-based fabric softeners.  
1C1 & 1C2 = tallow-based fabric softeners.  
HIE = Human Irritancy Equivalent.



**TABLE 1. BIODEGRADATION OF FABRIC SOFTENERS**

<b>Fabric softener</b>	<b>Palm-based</b>	<b>Tallow-based</b>
Pass level of 60% biodegradation	≥ 16 days	≥ 16 days



*Figure 3. Palm-based fabric softener.*

### **ECONOMIC ANALYSIS**

- Payback period - 3.3 years.
- Return on investment (ROI) - 30%.

### **CONCLUSION**

Fabric softeners containing palm-based esterquat biodegrade effectively and thus are more environment-friendly. These fabric softeners are good replacements for the existing tallow-based formulations. With the renewable and abundant availability of palm-based materials in the country, fabric softeners formulated with palm-based esterquat can be another avenue for value addition for oleochemicals downstream activities.

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