CHAPTER III

STATEMENT OF PROBLEM

The performance of soaps and of synthetic detergents in home washing of fabrics is of a specific interest to both : the manufacturers as well as the consumers. Not only should the laundered fabrics be clean, but they should also retain as much as possible, their original colour or whiteness, firmness, strength and other desirable properties. The efficiency in laundering would thus depend on the selection of the detergent and its correct use in relation to the fabric and the type of soil and stain to be removed.

Anionic and nonionic detergents have been studied for their cleaning efficiency by several researchers. Bower's and Chantrey (11), Fort et al, Ulman et al (56) and Lewis (40) have reported that a nonionic detergent was effective in removing fatty soil from a polyester substrate. Falsuni and Tsiji have found that on a polyproplene fabric a nonionic detergent gave better detergency than an anionic detergent. Fort et al and Lewis (40) reported that an anionic detergent was quite effective in the removal of fatty soil from a cellulose substrate.

Ulman et al (56) found that blending of a nonionic and an anionic detergent, 1:1 ratio, resulted in performance close to or even better than that of the nonionic detergent alone. With

cotton fabrics, an increase in water hardness or a decrease in detergent concentration (from 5 g/l to .5 g/l) reduced detergency. The nonionic formulations were less affected than the anionic formulation. The blend, 1:1 nonionic : anionic, retained most of the insensitivity to low concentration of the nonionic formulation.

Combination of soap with synthetic detergents have received attention of several researchers. Some of the synthetic detergents such as the fatty alkyloamide have been proposed as additives to upgrade the performance characteristics of liquid soaps, particularly the hard water foaming and detergency. The wetting power of soap which is generally poorer than that of the synthetic detergent is greatly improved by the addition of a relatively small proportion of lauryl sulphate, alkylaryl sulphonate or other strongly wetting synthetics. Mixture of soap with alkylaryl sulphonates have been extensively studied by Hett, Morgan, Hoyt and coworkers (47). These mixtures appear to retain many of the desirable properties of each component and therefore are more versatile than either component taken separately.

It was seen in an earlier research by Sharma (49) that soaking of soiled samples in anionic detergents is helpful, but the nonionic detergents did not give the expected efficiency inspite of having a good wetting ability and low surface tension.

Therefore a research was planned to study the optimum combinations of a soap with a synthetic detergent on soiled fabrics for understanding the cleaning efficiency.

3.1 Basis of the work

In a great variety of cleaning and other operations, the surfactants are used in conjunction with non-surfaceactive materials. These materials are referred to as builders or additives to serve a specific purpose in the composition. They more often constitute the major portion of the composition.

The builders fall into two classes : organic and inorganic. The builders like soda ash with soap are added simply to ensure effective alkalinity. Builders like silica (sodium sulphate and sodium phosphate) are for corrosion protection. Some have a side effect. The fabric is weakened because of harshness and a high alkali content, which causes the fabric to swell excessively and thus making it susceptible to damage. It was thus thought to use an unbuilt cleaning composition having a lower and lower surface tension which can penetrate the fabric and thereby help in removing the soil. Its higher concentration with little builders can give better cleaning efficiency.

A combination of a soap and a synthetic detergent could be better for emulsification of both oily as well as non-oily soil. And by varying their composition it could be suitable for different fibers. It has been seen (27) that nonionic anionic blend detergents were more effective than the anionic detergent in removing oily soil from acetate fabrics. Therefore advantages of both anionic and nonionic detergents could give better cleaning efficiency when combined. Wetting power of anionic/

nonionic synthetic detergents and the gel tendency of anionic soaps could supplement.

3.2 Objectives of the study

3.2.1 To study the general characteristics of soaps and synthetic detergents individually and in combination, for properties like surface tension, wettability, foaming power, and emulsification.

3.2.2 To study the cleaning efficiency (per cent soil removed) of soaps and synthetic detergents individually and in combination.

3.2.3 To study the effect of the general properties of soaps and synthetic detergents on the per cent soil removed.

3.2.4 To determine the optimum combination at varying ratios and concentration for different fabrics.

3.2.5 To study the applications of the soaps and synthetic detergents in combination (analysed as above) for the washing efficiency of soiled samples on a small washing machine.