CHAPTER I
INTRODUCTION

In ancient societies, and even today, people clean their clothes by beating the wet fabrics on the rocks near a stream. As known, this is a reasonable practice because the mechanical agitation facilitates the removal of solid soil, and the water dissolves the hydrophilic stain composed of, for example, sugar, salt and certain dyes.

Detergency can be defined as the removal of unwanted substances (soil) from a solid surface brought into contact with a surfactant-containing liquid. It is a complex process that depends on several factors such as the nature and concentration of the washing solution, additives (builders, enzymes, antiredeposition agents), nature of the solid surface, hydrodynamic conditions, mechanical action during washing, water hardness, temperature, and electrolyte level (Azemar, 1997).

The soils present on the fabric may be classified as particulates (solids, usually inorganic), oils (usually organic and liquid; sometimes also waxy solids) and stains (unwanted dyestuffs) (Carroll, 1995).

Particulate soils found on textiles have a multitude of properties that affect soiling and detergency: chemical composition, surface characteristics, size, shape, and hardness of the particles, and particle size distribution, among others. The adhesion of a soil on a fiber surface depends on the chemical nature of the surface, the size, the shape, and the surface geometry of the soil particle. The probability that soil particles will be removed from the fiber surface during the washing process depending on the strength of the adhesive bond. However, the particulate soil removal also depends on the size, shape, and surface properties of the soil particle, which govern adsorption of ions and surfactants and the wettability of the particle and the fabric surface. Since the detergency of particulate soil is affected by several factors, the particulate soil detergency is a complicated process. The removal of particulate soil is based on the DLVO theory. The potential energy must be overcome in order to remove the particulate soil from the clothing fiber.

In this study, a cloth fiber (cotton, polyester) and two types of surfactant of, cetryltrimethylammonium bromide (CTAB), cationic surfactant and sodium dodecyl

sulphate (SDS), anionic surfactant were employed in an attempt to elucidate the fundamental mechanism of the detergency process of particulate soil. Zeta potential, Contact angle, Surface tension and adsorption isotherm were measured and used to gain a better understanding about the particulate soil detergency.

In this thesis, study the behavior of single surfactant on fiber and carbon black surface investigate by correlates the relation of adsorption isotherm, Zeta potential and contact angle and to determine the efficiency in removing carbon black under highest potential charge system by varying pH condition. Finally to study the surfactant concentration in rinsing system by correlates with the surface tension and % detergency for maximum of % detergency.

The adsorption isotherm, contact angle and zeta potential studied as the analytical method for support to detergency performance because the mechanism of removal of particulate soils depend on the adsorption of similarly charged surfactant or inorganic ions from the bath onto the detached soil particulates increases their electrical potential at the stern layer causing mutual repulsions.