CHAPTER I
INTRODUCTION

Nowadays, surfactants was used in many processes for example separation, agriculture, the pharmaceutical industry, and detergency processes. Detergency is a process to removal oily soils from fabrics is of interest since the mechanisms of oil removal were very complicated. Surfactant formulation in cleaning products for textiles depends on the kinetics of solubilization or wetting as well as surfactant adsorptions. A complex dynamic process that depends on several factors, such as the nature and composition of the washing solution, salinity, temperature, surfactant concentration, washing time, agitation speed, water hardness, and hydrodynamic conditions (Germain 2002; Linfiled *et al.* 1962; Webb et al. 1988).

The soil present may be classified as oily soils, particulate soils (organic and inorganic), and stains. Oily soils or water-soluble liquid soils mainly compose of nonpolar hydrocarbon saturate and unsaturated fatty acids. However oily soils have a problem; it is difficult to remove from fabric because oil is hydrophobic part. It cannot mix with water, which is hydrophilic part. The current level of understanding of oily soil removal mechanisms is only qualitatively adequate. It is well accepted that there was three primary mechanism of oily soil removal. Oily soil can be defined as oil detachment from substrate increase the contact angle between oil and the substrate, reducing the interfacial tension (IFT) between oil (soil) and water. Second mechanism is Emulsification or snap-off. The oil takes off from substrate by hydrodynamic forces. And Solublilization mechanism occurred when oil is adsorbed inside the core of the surfactant micelles. An important mechanism to remove oily soil is the Roll-up mechanism which is facilitated by increasing the contact angle of the oil droplet and decrease interfacial tension (IFT).

In this study, the effects of oil loading and the surfactant adsorption on the detergency performance of oily soil removal was investigated. A mixed surfactant system of 0.1wt.% branched alcohol propoxylate sulfate sodium salt (Alfoterra 145-3PO) and 5wt.% secondary alcohol ethoxylate (Tergitol 15-S-5) were used to form microemulsions with motor oil. They are commercial surfactant used in laundry application and friendly to the environment. A blend of polyester and cotton [65/35]

has been selected to use as a testing fabric. Moreover, detergency experiments were conducted to observe the effects of oil loading and fabric weight on the oil removal efficiency by reflectance measurement of pre-wash and post-wash swatches to determine the percentage of detergency (%D). To determine the percent of oil removal. Moreover in this work studied the contact angle, interfacial tension and The phenomena of oil detachment from the fabric surface was investigated also.