CHAPTER I
INTRODUCTION

The problem of cleaning process or detergency—removal of unwanted material—is the difficulty in getting rid of undesirable substances. The types of undesirable substances, so-called soils, in detergency can be classified into three categories: (1) liquid (oily) soils (water-insoluble liquid soils) including hydrocarbons, saturated or unsaturated fatty acids, esters of fatty acids, and alcohols such as skin fats (sebum), vegetable oils, and motor oil, (2) particulate soil, such as clay, carbon, dust, and iron oxide, and (3) stains, intensively colored substances, are egg, coffee, tea, chocolate, mustard, wine, milk, blood, lipstick, ink, and natural organic colorants in general. (Carroll, 1996; Kissa et al., 1987)

To remove these soils, there are several processes. First, macroscopic physical processes which remove soils by mechanical work (e.g. abrasion by scrubbing, hydrodynamic flow, flexing or swelling of fiber). Second, chemical processes (e.g. bleaching) and biological processes (enzymatic reaction) are used to remove soils which form covalent bond, chemical adsorption, by destroying those bonds. Finally, microscopic physical processes—surfactants play an important role—are used when the soils make physical adsorption (Van der Waals forces, dipole interaction) or electrostatic forces with substrate, the surface that is to be cleaned (Rosen,2004).

Removal of oily soils via surfactant is the most difficult process since the substrates and oily soils have the great variabilities. Moreover, several factors—the interfacial tension (IFT), solubility, time and temperature of washing, surfactant type and fabric type, and etc.—also affect this process. There are three main mechanisms for oily soil removal. The primary mechanism is roll-up mechanism. Necking or emulsification is the second mechanism. The third mechanism is solubilization. However, the high detergency efficiency of oily soil removal can be acheived when microemulsions are formed by surfactants. (Verma et al., 1998; Rosen, 2004)

Linear alkylbenzene sulfonate (LAS) is a major component in most house hold washing formulations. However, it causes environmental problems because of the benzene rings in its chemical structure. Methyl ester sulfonate (MES), which can be synthesized from renewable resources and can be biodegraded better than LAS, is considerate to be a good candidate to replace LAS. Therefore, the objective of this work was to study basic properties of MES and its detergency application.