

## CHAPTER I

### INTRODUCTION

In the past, and even today, in some part of the world people still clean their clothes by beating wet fabrics on rocks near a stream. As known, mechanical or shear force can facilitate the removal of solid soils, and water dissolves the hydrophilic stains such as sugar and salt. However oily soil is hard to remove by this way since oily substances do not dissolve in water and remain to attach in the fabric. In order to remove oily soil from fabric, soap or detergent is needed to add into washing solution.

Microemulsions exist in well-defined phase regions of multicomponent systems consisting of water, oil, surfactant, and electrolyte. They show ultralow interfacial tensions and a high solubilization power toward both hydrophilic and lipophilic substances. Because of these properties, microemulsions are interesting media in textile detergency (Dörfler, 1999).

From the previous work, the formulation of microemulsion by mixed surfactant system of sodium dioctyl sulfosuccinate (AOT), alkyldiphenyloxide disulfonate (Dowfax 8390), and sorbitan monooleate (Span 80) with motor oil was studied (Tongcumpou, 2002). In this work, it was reported that a very high salinity (16%w/v) was needed for this formulation to obtain the middle phase that is not practical for the real application.

In 2003, Korphol found out a mixed surfactant system of 1.5% Dowfax 8390, 5% AOT and 5% Span 80 that exhibited a Winsor type III microemulsion (middle phase) at a low salinity of 2.83 %. With this selected formulation, detergency performance increased with increasing active surfactant concentration and the maximum oily soil removal was found at around 0.115 % active surfactant. In addition, for the rinse step, twice rinses were found to be sufficient to obtain a maximum oil removal.

In this research, it is hypothesized that both ultra-low interfacial tension and high solubilization play important roles in governing the detergency performance.

The objectives of this research work are as follows:

1. To study the relationship between the phase diagram and the efficiency of detergency under microemulsion systems at low salinity. A mixed surfactant system of Dowfax 8390, AOT and Span 80 will be used to form microemulsions with motor oil.
2. To determine the detergency performance at the optimum salinity and the supersolubilization zones of the selected formulation as well as to compare with a commercial detergent.
3. To investigate the concentrations of surfactants during the rinse step in order to optimize the whole washing process.