CHAPTER I
INTRODUCTION

A surfactant is one of the most versatile chemicals used these days. It has been used as detergent, flotation agent, and emulsifier. One of important properties of the surfactant is diffusivity in a solution. The diffusivity controls the kinetics of detergency in cleaning processes. Furthermore, it also plays an important role on the rate of wetting of surfaces in determining the suitability of a wetting agent for textile industries (Rosen, 1988).

Presently, there are several techniques available for the determination of the surfactant diffusivity such as Taylor dispersion (peak-broadening) method (Pratt and Wakeham, 1974). Although accurate results can be obtained, the expensive equipment and complex analysis have been major disadvantages of this technique. In this work, a new method, transient capillary rise, is proposed as an alternative to the Taylor dispersion method, in which commonly available equipment is needed to obtain accurate experimental data. A simple mathematical model is then used to fit the experimental data to obtain the surfactant diffusivity.

The proposed method is based on a simple set-up of a capillary tube in a surfactant solution. Then, the water is used to flush the surfactant solution out. As a result, the height of the solution in the capillary tube changes. The change can then be measured as a function of time. A model used for determination of surfactant diffusivity is developed from a capillary force, Gibbs plot (surface tension versus concentration) and mass transport of a surfactant in the tube. In this work, sodium dodecyl sulfate (SDS) was chosen due to its wild range of applications. The validity of this method was tested by comparing the obtained diffusivity to literature values.