CHAPTER I

INTRODUCTION

Ortho-dichlorobenzene (ODCB) is an aromatic substance that is broadly used in many industries and it can damage human's health for example its use can lead to depression of central nervous system, anesthesia and liver damage. It is also a representative of pollutants found in groundwater and rank twenty-fifth in the EPA list of organic priority pollutants (Wesley and Eckenfelder, 1989). Due to its highly toxic properties, its low effluent concentration of below 1 ppm required. Because it has a specific gravity greater than water, it trends to migrate to the bottom of aquifers. It also becomes a long termed source of contamination for the water. Because of low solubility in water and being trapped in the soil pores by capillary force which has high interfacial tension to make an extended retention. Hence, it is necessary to remove ODCB from wastewater before that is discharged into public water or reused in industrial processes.

Froth flotation is one of interesting separation methods which is a surfactant-based separation method. It is very interesting to point out that it requires relatively low energy as well as its simplicity in operation. It has been also widely used in mineral processing. In addition, it is now being developed to solve environmental problems and it has been recently applied for wastewater treatment such as the removal of dispersed oil from oily wastewater. Hence, in this work froth flotation was experimented remove ortho-dichlorobenzene from wastewater.

A formation of ortho-dichlorobenzene, water and surfactants in the form of microemulsion was prepared as a studied wastewater. Since microemulsion has special characteristics such as relatively large interfacial area, ultralow

interfacial tension and large solubilization capacity for both water-soluble and oil-soluble compounds as compared to many other colloidal systems. It is known that the lower the interfacial tension, the higher the efficiency of removal is which is related to froth flotation efficiency. These properties render microemulsion intriguing from a fundamental point of view and versatile for industrial applications. Therefore, microemulsion was used to apply in froth flotation method in this work. It is known that mixture of surfactants are more effective than single surfactant. Hence mixed surfactants were used to make microemulsion in this work. Ratanarojanatam (1997) conducted a study to remove ortho-dichlorobenzene by using froth flotation under microemulsion conditions. It was concluded that the Winsor type III system gave higher percentage of ortho-dichlorobenzene (ODCB) removal than the Winsor type II and I. The present work was a continuation of this work.

In this study, there were two parts which consisted of the study of microemulsion formation and the selection the best conditions for studying froth flotation, and to apply froth flotation in batch mode for removing oil or ortho-dichlorobenzene from wastewater. In the study of microemulsion formation, the effect of a single surfactant concentration, the effect of mixed surfactant concentrations and the effect of NaCl on microemulsion formation were studied. In the froth flotation part, the effect of weight ratio of mixed surfactants, the effect of mixed surfactant concentrations, the effect of NaCl concentrations and the effect of volume of each phase on the percentage of ortho-dichlorobenzene removal were also studied.