

UNIVERSITI TEKNOLOGI MARA

**STUDY OF BEHAVIOR AND MECHANISM
OF WATER-IN-OIL-IN-WATER
EMULSION INSTABILITY IN
EMULSION LIQUID MEMBRANE:
MEMBRANE BREAKAGE**

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ABSTRACT

In this study, Emulsion Liquid Membrane (ELM) consist of three main phases which are membrane phase, internal phase and external phase. However, ELM performance is heavily affected by the emulsion stability, where one of it is the membrane breakage. Emulsions are metastable colloids that are made of two immiscible liquids, where one being dispersed in the other within the sight of a surface-active agent. This research work aims to investigate the occurrence of water-in-oil-in-water (W/O/W) emulsion instability in ELM. To identify the best operating parameters to achieve minimal water-in-oil-water emulsion instability to allow high copper removal efficiency. Parameter involves in this study are homogenization time and speed, carrier concentration and surfactant concentration. Data recorded shows that 8000rpm, 15 min of homogenization, 4 wt% of carrier and 4 wt% of surfactant resulted in the minimum membrane breakage. At this condition, 0.14% of breakage was recorded .

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CHAPTER 1

INTRODUCTION

1.1 Research Background

Emulsion liquid membrane (ELM) is a liquid membrane based on process initially proposed by Norman Li (Li, 1989) where a primary emulsion is dispersed in the feed phase to be treated. It is one of a way that very useful and alternative for the recovery of different compound contained in wastewater. Basically, ELM comprises of three phases as shown in Figure 1, consisting of membrane phase, internal phase and external phase (Othman et al. 2017).

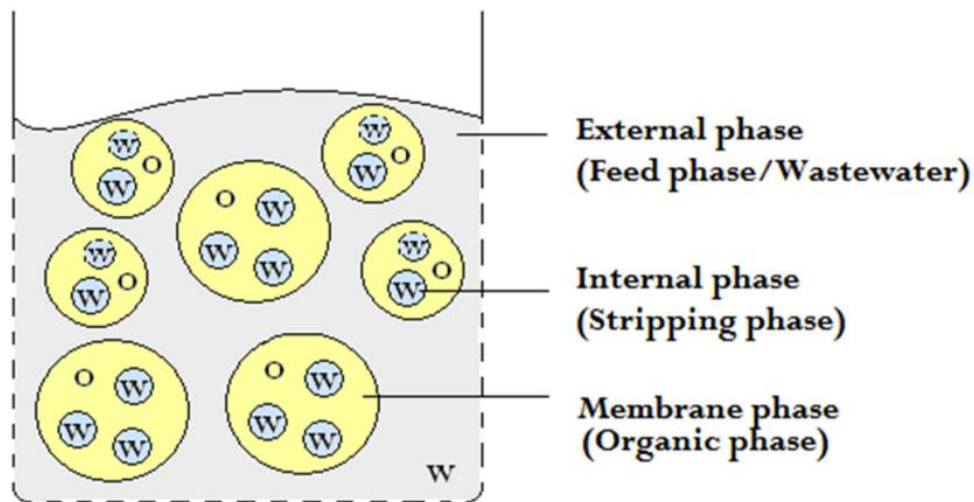


Figure 1.0: The phase presence in a water-in-oil-in-water emulsion (w/o.w). where O = Oil (Yellow) and W = Water. (Martinelli et al, 2015).