

## CHAPTER I

### INTRODUCTION

One of the most common problems found during crude oil transportation is wax deposition. The presented wax will be coated in a pipeline, deposited in a wagon as a remaining on board (ROB), and sedimented in crude oil storage tank. The waxes, a solid crystalline mixture of hydrocarbon ranging from C<sub>20</sub> to higher carbon number, presented in crude oil are classified into paraffin wax, which is derived from petroleum distillate, and microcrystalline wax from petroleum residue. When temperature decreases, those waxes will change the state into a solid crystal.

Traditionally, the undesired wax needs to be disposed of. So, the main problem is an ineffective use of various fractions of crude oil. Generally, paraffin wax is widely used in many applications, such as treatment of paper and cardboard, printing ink, as well as food, cosmetic, and pharmaceutical industries. In order to make it useful, the wax purification process is investigated. Degree of purification is depended on the intended applications of a wax. The wax will be deoiled and fractionated to enable the value addition and ensured that the properties of the wax are tailored for further particular application.

There are several techniques developed to purify wax for deoiling purpose. In the present work, a solvent extraction was performed as a preliminary study by using crystallization process, with different solvent types, solvent amounts (solvent/wax ratio), and solvent composition (ratio of mixed solvent) to determine the appropriate solvent to extract sludge wax. Furthermore, for the ultimate objective of this study, the wax purification by supercritical fluid (CO<sub>2</sub>) extraction was studied with co-solvent obtained from crystallization process. The effects of some important extraction parameters, such as extraction time, pressure, and CO<sub>2</sub> flow rate on the wax purification was also be investigated.

Based on this premise, the purpose of this work are to study the purification of Phet wax by using solvent extraction crystallization process and supercritical fluid (CO<sub>2</sub>) extraction. Sludge wax was first characterized for its composition and oil content, and after the purification, the oil content and its composition were again be comparatively analyzed as a validated method for purification.