

CHAPTER I

INTRODUCTION

1.1 The Purpose of the Investigation

Wax emulsion is a stabilized dispersion of wax mutual in water, that is one type of oil-in-water (O/W) emulsion, which wax particles is dispersed phase and water is continuous phase. The dispersion is stabilized by the use of special chemicals know as emulsifiers. The wax emulsion used in particles board manufacturing, the wax and resin are invariably applied to the wood chips, either mixed together or separately in a blender. The process of wax emulsion generated emulsified wastewater from the pre-emulsion tank flushing, truck tank cleaning, and the equipment cleaning. The emulsified wastewater consisted of approximately 95 % water and 5 % emulsified oil.

The emulsified oil wastewater have been long problem to environmentally, its effluents from household activities, cold-rolling mills steel industry, hot milling industry, wax emulsion process, and another's industry which the effluents are emulsified wastewater form. The emulsified wastewater consists of hydrocarbon or oil droplet, which stabilized dispersion in aqueous solution. The oil droplet size is 2 to 3 μm in diameter dispersed by uniform electronegative charge on the surface of each oil droplet. The surface charge on the oil droplet produces a force of mutual electrostatic repulsion between adjacent droplets. If the charge is high enough, the oil droplets will remain discrete, dispersed, and in suspension. The flocculation, and coalescence of the oil droplets has occurred, consequently the phase separation has occurred.

The destabilization of emulsified oil by reducing or eliminating the charge has the opposite effect, consequently the oil droplet will agglomerate and rise to the wastewater surface. The emulsion stability and phase behavior of microemulsion

changed from Winsor I to Winsor III, and II, which are changed O/W to W/O emulsion has been studied [1, 2, 3]. The process of emulsified oil removal has been reported such as physical treatment [4], chemical adding-gravity separation, froth flotation, and foam flotation.

1.2 Purpose of Research

The objectives of this research were to remove emulsified wax from wastewater and to characterize the wastewater qualities.

1.3 Scope of Research

Study simulated wastewater prepared from anionic wax emulsion and actual emulsified wastewater from Mobil plant. Two types of electrolyte were used, sodium chloride (NaCl) and aluminium ammonium sulfate or alum ($\text{AlNH}_4(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$). The effects of temperature and stirring rate on phase separation were studied in a batch mode at the prescribed condition. The optimized conditions for phase separation obtained from the simulated wastewater study were applied to actual wastewater. Water qualities of both the simulated and actual emulsified wastewater i.e. pH, total dissolved solids (TDS), suspended solids (SS), oil and grease (O/G), chemical oxygen demand (COD), salinity, and turbidity were studied after the wax particles have been removed.

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