

CHAPTER I

INTRODUCTION



Palm oil plays an important role for biodiesel production, it is an alternative fuel. Various parts of the palm fruits can be utilized for oil production for human consumption and industrial applications. Palm oil mill is the major agro-industries in the South of Thailand. The process of palm oil production is started from unloaded palm fresh fruit bunches on a ramp and put into containers for stabilization. The sterilized bunches are put into a rotary drum threshers where the fruits are separated from the bunch stalk. The separated fruits are discharged into vertical steam jacketed drum (digesters). Hot water is added to the digester to facilitate homogenization. Extraction of palm oil is done by continuous screw press system. The screw press produces crude oil, which contains high concentration of suspended matter. The wastewater from this procedure is oil – in – water emulsions. The emulsions are difficult to separate palm oil because the emulsions are quite stable. The wastewater is polluted underground water. The conventional procedure for separation of oil from water and suspended solids is the “settling tank” method. This procedure has low separation efficiency. The demulsification of emulsions by low electric field is one way to improve overall of oil yield. Demulsification of emulsions by low electric field can be reduced of the height of energy barrier for coalescence of the droplets. Demulsification of emulsions under a low electric field has been considered to be a slow process that is induced by the electrophoresis of the droplets toward an electrode, reduction of the surface charge of oil droplets by electrolysis on an electrode. The demulsification took place not near on of the electrodes but over the entire space between the electrodes. Larger oil droplets generated by the coalescence of emulsion droplets went up vigorously into the oil layer.

In this research, coalescence of palm oil emulsions by electric fields in continuous flow process was examined under several of conditions. The equipment used for the measurement of the demulsification was composed of acrylic vessel in size 3.0 cm x 8.0 cm x 2.5 cm with two 2.5 cm x 12 cm rectangular stainless steel plates are electrodes and micro pump. The distance between electrodes is 2.0 cm. Using the direct current (DC) electric fields, applications are low electric fields of the

order of 2 – 10 V/cm. The emulsions was flowed by micro pump at flow rate 3, 5.4, 11, 16, and 20 ml/min. The emulsion used in this study is crude palm oil at concentration of emulsion 2 %wt. Sodium sulfate as electrolytes was added at concentration 3 mmol/l. Effect of voltage and flow rate on demulsification of crude palm oil emulsions by electric fields are the objectives of this research. The results of study are used to develop the efficiency of extraction process in the palm oil mill.