THE STUDY OF BINARY PHASE DIAGRAM OF PALM-OIL BASED MALTOSIDES (MPO)

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ABSTRACT

The objectives of this research project are to prepare the sample of palm-oil based maltosides (MPO) and to observe the sample by using thin cross polarizer at four different temperature which is the room temperature, 30℃, 40℃, 50℃ and 60℃. The results are two phases are probably formed within this phase diagram which is the viscous isotropic phase and viscous isotropic plus water phase. The anisotropic is probably not exist in MPO liquid crystalline since no birefringence phase observe during the experiment. Another objective is to analyze the phases of lyotropic liquid crystals appear in MPO using Optical Polarizing Microscope (OPM). The temperature used to analyze this substance is 30℃, 40℃, 50℃ and 60℃. Each sample is needed to go through heating process until isotropic phase appear and for MPO, the temperature for isotropic phase is 280℃. The sample is left for cooling process back to its initial temperature and observation is recorded each 5 minute once the process of heating-cooling started. Based on this analysis, it is observe that there might be two isotropic phases appear with MPO which is the micellar isotropic phase and lamellar isotropic phase.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND REVIEW

Liquid crystals are everywhere seen in our daily life: from laptops to lipsticks to laundry detergent and high-strength plastics. Liquid crystals are known for decades and its first observation was made by George-Loius Leclerc, Comte de Buffon (1707-88). According to (Palffy-Muharay, 2007), cylindrical phospholipid bilayers of lecithin in water was compared to myelin figures which was the first liquid crystal that lines nerve fiber but this figure was unknown to Leclerc until Rudolf Virchow in 1850 identified it.

Real discovery of liquid crystal (Kelker, 1973) credit to an Australian botanist named Friedrich Reinitzer in 1888 when he extracted cholesterol benzoate from a plant that turned into a cloudy liquid fluid at 145.5℃ and completely clear liquid at 178.5℃. Later in 1890, a physicist named Otto Lehmann verified Reinitzer's observation and came out with a "crystalline liquid" term (Lehmann, 1890). In 1990 to 1920, experiments were done to prove and to support the liquid crystal concept and finally determination of liquid crystalline states of order was successful but no applications were made by this time (Hans Kelker, 1989)