CONSTRUCTION OF BINARY PHASE DIAGRAM OF PALM KERNEL OIL BASED GLUCOSIDES

FAIZZA NUR ATIKA BINTI OSMAN

This report is submitted in partial fulfillment of the requirements needed for the award of Bachelor in Chemical Engineering (Hons)

FACULTY OF CHEMICAL ENGINEERING
UNIVERSITI TEKNOLOGI MARA
SHAH ALAM

JULY 2017

ACKNOWLEDGEMENT

First and foremost, I would like to express my sincere gratitude to my supervisor Dr Nurul Fadhilah Binti Kamalul Aripin for the continuous support of my degree research project, for her patience, motivation, enthusiasm, and immense knowledge help me to complete this research.

I also want to thank Marina which is my supervisor's assistant at the Universiti Malaya (UM) cause give me opportunity to use laboratory's equipment and also give limitless guidance.

Then, to fellow students in edible films' group research for sharing the knowledge and ideas about the research.

ABSTRACT

The purpose of this study is to prepare a series of glucosides sample in water with different concentrations and to construct the binary phase diagram from palm kernel oil based glucosides. Glucosides with an average alkyl chain length of 14 carbon atoms derived from fatty acid of palm kernel oil have been synthesized and their phase behavior has been studied. The phase diagram is a best way to show formation of different phases with a given temperature and concentration. With construct a phase diagram can know how to use it to predict behavior of materials which is glucosides. These phase diagrams provides boundaries of different phases. The binary phase diagrams of glucosides are constructed using cross polarizer films and optical polarizing microscopy (OPM). A rich phase behavior with lamellar, normal hexagonal, and bicontinuous cubic regions, as well as water-rich solutions, was observed.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 RESEARCH BACKGROUND

The purpose of this study was to construct the binary phase diagram from palm kernel oil based glucosides. The binary phase diagram is the temperature-composition diagram which is the temperature and composition is present in equilibrium phase. The Gibbs free energy can find the equilibrium state due to the composition and temperature. We have to study the mixtures of palm kernel oil, nonionic surfactant which is glucosides and their water phase behavior. The glucoside is one of the amphiphilic compounds. Amphiphilic molecules consist of at least two moieties of differing characteristics, for instance, hydrophilic and hydrophobic. Thus, surfactants are typical amphiphiles. The phase diagrams were constructed based on observation and microscopic identification of the dispersion type noted for the mixtures produced, using an aqueous titration method described elsewhere (Shafiq-un-Nabi S, 2007), with slight modification, at ambient temperature. Before observe the different phase, the sample were centrifuged and left for equilibrium for at least one day and several weeks due to the concentration of glucosides. (Johan Reimer, 1 July 2005) The binary phase diagram was constructed in order to identify the types of dispersion systems formed by the mixtures at different concentrations of their components.