UNIVERSITI TEKNOLOGI MARA

CHARACTERIZATION AND STABILITY EVALUATION OF VARIOUS EMULSION FORMULATIONS BY EMULSIFICATION TECHNIQUE

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ABSTRACT

Emulsion is a complex and unstable system in which a liquid is dispersed into another immiscible liquid phase. The objective of this study was to evaluate the particle size distribution and stability of emulsions with different formulations containing oil, olivem 1000 and at different time of homogenizing. The formulations were prepared with homogenization time of 5 minutes, 10 minutes and 15 minutes. All formulations were prepared by using hot mixing technique and characteristics of formulations were characterized. The particle size distribution and uniformity of nine formulations were measured by using Malvern MasterSizer 2000 (Malvern Instruments Co. Ltd.,Worcestershire, UK) while the stability analysis was performed using Lumifage stability analyzer (LUM Ltd., Berlin, Germany). Based on the result, the increment in homogenization time resulted in reduction of droplet size. In this study, most of the formulations showed uniformity value less than one. From this particle size distribution study, we found that formulation 6 with composition of oil, olivem 1000 and water of 10%, 7% and 83% respectively has small particles size distribution compared to other formulations. On the other hand, the stability study was carried out for one month to determine the stability of emulsion upon storage. We found out that most of the formulations were stable upon storage for one month. The most stable formulation that showed no separation upon storage for one month and one year was waglinol with homogenization time of 5 minutes in formulation 1 in which this formulation. In conclusion, formulation 6 with the presence of grape seed oil at 10 minutes homogenization time was the most preferable formulation due to its smallest droplets size and good stability with no separation upon storage for one month.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Emulsions are dispersed and multiphase systems consisting of at least two insoluble liquids in which the dispersed phase is present in the form of droplets in a continuous phase. The diameter of the droplets lies between 0.1 μm and 0.1 mm depending on the emulsification process (Van der Graaf *et al.*, 2005). An emulsion contains tiny particles of one liquid suspended in another. Emulsion can be classified into two basic types which are oil-in-water emulsion (O/W) and water-in-oil (W/O) emulsion. Oil-in-water emulsion is when the oil phase is dispersed as globules throughout an aqueous continuous phase. Water-in-oil emulsion is when the water is dispersed throughout the oil. Examples of oil-in-water emulsion and water-in-oil emulsions are milk and butter respectively (Aulton, 2002).

Emulsions can be classified into two groups which are simple emulsions and multiple emulsions. There are two classes of simple emulsions can be defined, namely oil-in-water (O/W), and water-in-oil (W/O). Multiple emulsions constitute a more sophisticated system. The simplest examples of multiple emulsions are oil-in-water-