# UNIVERSITI TEKNOLOGI MARA

# EFFECT OF MEAN DROPLET SIZE DISTRIBUTION OF EMULSIONS ON STABILITY DURING STORAGE

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# ACKNOWLEDGEMENT

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# ABSTRACT

The mean droplet size of an emulsion plays a major role in determining the stability of an emulsion. Stability of an emulsion preparation is important to prolong its shelf life. The objectives of this study were to investigate the influence of droplet size distribution on the stability of an emulsion and to assess and evaluate the stability of emulsion by using accelerated stability study. Four oil-in-water (O/W) emulsions with different mean droplet sizes were prepared. These four emulsions are then tested for their stability using the LUMiFuge based on gravitation simulation by using mechanical centrifugal system. The LUMiFuge machine was used in the accelerated stability study to speed up the processes of instabilities. Stability analysis was carried out, relating the mean droplet size distribution of the emulsion to its stability. The transmission profiles that were obtained from the LUMiFuge can be used to study the kinetics of the droplets leading the phase separation and becoming instable. Results demonstrated that emulsion with smaller mean droplet size does have better stability as compared to emulsions with larger mean droplet size.

# CHAPTER 1

# INTRODUCTION

## 1.1    Background of study

Emulsions are used in our daily life. Milk, yogurt, ice-cream, creams, are all examples of emulsions (Robins & Wilde, 2003). Emulsions have been widely used in many industries for a very long time. In the pharmaceutical field, emulsion is one of the important dosage forms. Emulsions can be used both for internal and external preparations. There are many types of emulsions which include lotion, liniment, creams and ointment. Even though they are all different, their basic ingredients are water, oil, and the emulsifying agent. Emulsions may be used as a vehicle to transport the active ingredient or the active ingredient could be the oil phase itself (Aulton & Taylor, 2013).

There are many purpose why we produce emulsions. One advantage is that emulsions make it possible to prepare a mixture of oil and water that is relatively stable and homogenous. The emulsifier will emulsify the mixture and stabilize the two immiscible liquids. By administering emulsions, the liquid drug is being administered as small globules rather than in bulk. This will give rise to better absorption of the drug. Next, when emulsion is used to prepare an oil-in-water emulsion for oral preparation, the emulsion would make the oil more palatable. This is because, we would only taste the external phase, which is water. Oil can be easily administered.