UNIVERSITI TEKNOLOGI MARA

RHEOLOGY & TENSILE STRENGTH OF NANOEMULSION HYDROGEL VS MACROEMULSION HYDROGEL

ROHAYU BINTI IBRAHIM

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Faculty of Pharmacy

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ABSTRACT

An emulsion is a system consisting of two immiscible liquid phase, one which is dispersed through-out the other in the form of fine droplets by the help of emulsifier. Emulsion hydrogel is the semisolid formed from incorporation of emulsion and Carbopol hydrogel. In this study, physical characteristic of both emulsion and semisolid dosage form been evaluated. There would be two different size of products been evaluated, nano size and macro size. Previous study mostly stated that nanoemulsion hydrogels have superior physical characteristic compare to macroemulsion hydrogel, the present study would proved the statement. The physical characteristics of products were evaluated based on four type of parameter analysis; size, zeta potential, texture analysis and rheological behavior. Size analysis of products was done by using both Laser Diffraction method and Photon Correlation Spectroscopy method. Zeta potential was evaluated based on electrophoresis measurement. Texture of products was analyzed based on their adhesiveness and hardness. The last physical characteristic evaluated was the rheological characteristic. The study was done in 3 month time. The consistency and changes of physical characteristic parameter is observed and plotted for the 3 month study. The result showed that nanoemulsion formulation showed slightly better physical characteristics in term of its texture but worse in their size analysis.

CHAPTER 1

INTRODUCTION

1.1 Background of study

An emulsion is a system consisting of two immiscible liquid phase (disperse phase and continuous phase), one which is dispersed through-out the other in the form of fine droplets. A third component, the emulsifying agent is necessary to stabilize the emulsion. In the present study, o/w emulsion will be formulated. There are two type of emulsion will be formulated; macroemulsion and nanoemulsion.

Macroemulsion also known coarse emulsion is an emulsion consist disperse phase (fine droplets) and continuous phase (phase which droplet suspended). The droplets diameters usually range from 0.1-100 μm and are inherently unstable systems; smaller globules exhibit colloidal behavior and the stability of a hydrophobic colloidal dispersion. (Aulton, 2002)

Unlike the coarse emulsion, nanoemulsion are homogenous, transparent systems that are thermodynamically stable. Moreover, they form spontaneously when the components are mixed in appropriate ratio. It also consists of fine droplet, surfactant, and continuous