

**UNIVERSITI TEKNOLOGI MARA**

**STUDY ON THE EFFECT OF LONG CHAIN,  
MEDIUM CHAIN AND COMBINATION BETWEEN  
LONG CHAIN AND SHORT CHAIN OIL WITH  
DIFFERENT CONCENTRATION ON RHEOLOGY  
AND TEXTURE PROFILE**

**SHAHRIZAL BIN SAAD**

**Bachelor of Pharmacy**

**2008**

## **ACKNOWLEDGEMENTS**

In the name of Allah with most precious and most merciful,

First of all I want to express my thankful to Allah for giving me the encouragement to face all barriers and shortcoming while completing this thesis. It will be my honored to say thank you with sincere appreciation to all that contributed until my thesis successfully completed.

I want to take this opportunity to thank all who have assisted with the preparation of this thesis.

It wills my pleasure to express my salute and appreciation to Mr. Tommy Julianto as supervisor and Miss Suci Amelya Reza for all of the knowledge, guidance, comments and patience throughout the progress of this thesis. I are awfully appreciated it.

Last but not lest, I wish to thank our family especially my parent Hj Saad bin Hj Abdul Razak and and our friends for their support, encouragement, understanding and financing that give me strength and spirits to complete this thesis. Also to all that I may not list it here. Thank you very much.

## TABLE OF CONTENTS

<b>ACKNOWLEDGEMENTS</b>	<b>ii</b>
<b>ABSTRACT</b>	<b>iii</b>
<b>TABLE OF CONTENTS</b>	<b>iv</b>
<b>LIST OF FIGURE</b>	<b>viii</b>
<b>LIST OF ABBREVIATIONS</b>	<b>xi</b>
<b>CHAPTER ONE: INTRODUCTION</b>	<b>1</b>
<b>CHAPTER TWO: LITERATURE REVIEW</b>	
<b>2.1 Nano and Micro Emulsion Study</b>	<b>4</b>
<b>2.2 Long Chain and Medium Chain Fatty Acid</b>	<b>5</b>
<b>2.2.1 Soybean Oil</b>	<b>6</b>
<b>2.2.2 Waglinol Oil</b>	<b>7</b>
<b>2.3 Surfactant</b>	<b>7</b>
<b>2.3.1 Tween 80</b>	<b>8</b>
<b>2.3.2 Span 80</b>	<b>9</b>
<b>2.3.3 Sucrose Fatty Acid Ester M-1695</b>	<b>10</b>
<b>2.4 Carbopol</b>	<b>11</b>
<b>2.5 Instrumentation Analysis</b>	
<b>2.5.1 Texture Analyser</b>	<b>12</b>
<b>2.5.2 Rheology Analysis</b>	<b>13</b>
<b>2.6 Hydrophilic Lipophilic Balance</b>	<b>13</b>
<b>CHAPTER THREE: MATERIALS AND METHODS</b>	
<b>3.1 Materials And Instrumentation</b>	
<b>3.1.1 Materials</b>	<b>15</b>
<b>3.1.2 Instrumentation</b>	<b>15</b>

## ABSTRACT

This study investigated the effects of the combination of oil containing short chain and long chain fatty acids in emulsion formulations on the droplet size properties. Soybean oil was used in containing long chain fatty acids while oil that contain medium chain fatty acid was wagninol oil. Emulsions were produced in the form of macroemulsion and nanoemulsion. The emulsions containing different concentration of oils were incorporated with different concentration of hydrogel thickening agent which is carbopol 934. This study is conducted based on droplet size distribution, rheology behavior and semisolid texture properties. The semisolid texture properties evaluated in this study were the firmness, consistency and cohesiveness while the rheology properties were evaluated on viscosity and yield stress.

# CHAPTER ONE

## INTRODUCTION

In last few years, hydrogels and gels was generally use in pharmaceutical formulation for treating oral, rectal, ocular, coetaneous and subcutaneous because they can spread as a thin pellicle over a large portion. Moreover, as a result of their soft structure, they are more able to undergo the stretching and contraction strains of the underlying mucosa than tablets and patches (Jacques et al., 1997). In addition, gel posses a higher biocompatibility, ideal placement characteristics and bioadhesivity allowing adhesion to the mucosa in the dental pocket (in case of periodontitis) and can be rapidly eliminated through normal catabolic pathways (Esposito et al., 1996; Jacques et al., 1997). Gels dosage form are successfully use in formulation due to the ability to control drug release and to protect medicament from an hostile environment (Bonacucina G. et al. 2006).

Most journals and references were defined gel and cream in different ways and different understanding. According to “Taber’s Cyclopedic Medical Dictionary, 18 editions, 1997”: gel can be defined as a semisolid condition of a precipitated or coagulated colloid; jelly; a jelly-like colloid. It contains a large amount of water. Based on the “Encyclopeadia of Polymer Science and Engineering”: a gel is cross-linked polymer network swollen in a liquid medium. Its properties depend strongly on the interaction of these two components (Tanaka, 1987). Gel also can be describe as soft, solid or solid like material consisting two or more components, one of which is liquid, presenting in substantial quantity ( Almdal et al., 1993).