

UNIVERSITI TEKNOLOGI MARA

**FORMULATION AND OPTIMIZATION OF
MEDIUM-CHAIN FATTY ACID NANO-EMULSION**

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TABLE OF CONTENT

TITLE PAGE	
APPROVAL SHEET	
ACKNOWLEDGEMENT	ii
TABLES OF CONTENTS	iii
LIST OF FIGURES	vi
LIST OF TABLES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	x
CHAPTER ONE (INTRODUCTION)	
1.1 Introduction	1
1.2 Significance of study	4
1.3 Objectives	5
CHAPTER TWO (LITERATURE REVIEW)	
2.1 Emulsion	6
2.2 Nano and Micro Emulsion Study	7
2.2.1 Advantages of Nano-emulsions	8
2.3 Medium Chain Fatty Acid	9
2.3.1 Virgin Coconut Oil	10
2.3.2 Advantages of Virgin Coconut Oil	10

ABSTRACT

The aim of this study is to optimize the virgin coconut oil in formulation of nano-emulsion. In this study we prepare various formulations of emulsion consist of virgin coconut oil as disperse phase. From the formulations we prepare, we investigate the influences of Tween 80 as surfactant and Span 80 as co-surfactant in term of make the virgin coconut oil emulsion in nano range of size droplet. The result shows in ratio of 2:1 between virgin coconut oil and surfactant and ration 2:1 also between Tween 80 and Span 80 give us the smallest mean droplet size which is 0.186 μm . Moreover, we also investigate the nano-emulsion produced stability which we leave the nano-emulsion for one week in laboratory and measure the size particle again after that. The result was not significance change from 0.186 μm to 0.194 μm . As the conclusion, this research is really beneficial to optimize and find out the best possible formulation and production of the Virgin Coconut Oil nano-emulsion by self-emulsifying agent.

CHAPTER 1

INTRODUCTION

1.1 Introduction

An emulsions had been defined by the Internationally Union of Pure and Applied Chemistry (IUPAC) is “liquid droplets and/or liquid crystals are dispersed in a liquid” (Gutiérrez et al., 2008). Besides that, an emulsion also can be simply defined as “a system comprised of two immiscible liquids, one of which is dispersed as droplets (the dispersed or internal phase) throughout the other (the continuous or external phase)” (Jafari et al., 2007). Usually the dispersed and continuous phases are mixed together by surfactant or emulsifying agent. Classification of emulsions can be based on morphology. Emulsions those have water as a continuous phase and oil as a dispersed phase are called ‘direct, water-based, and oil/water’ emulsions. By contrast, ‘inverse, oil-based, and water/oil’ emulsions which are emulsions that have oil as a continuous phase and water as dispersed phase. For water as continuous phase emulsions usually use surfactant that generally soluble in the aqueous phase and provides more stability of water films and vice versa for oil as continuous phase emulsions (Mason et al., 2006). In this research, the oil/water (O/W) emulsion type had been chosen to study.

Nano-emulsions is an emulsions that consist of fine oil-in-water dispersions, having droplets covering the size range of 100–600 nm (Bouchemal et al., 2004). Nano-