UNIVERSITI TEKNOLOGI MARA

WOUND HEALING PROPERTY OF *HIBISCUS ROSA-SINENSIS*-PECTIN HYDROGEL

AIMAN HANANI BINTI MOKTHAR

Dissertation submitted in partial fulfillment of the requirements for the Bachelor of Pharmacy (Hons.)

Faculty of Pharmacy

July 2017

ACKNOWLEDGEMENTS

My deepest gratitude goes first to Dr. Nor Khaizan Anuar, who expertly guided me through my final year project. Without her thoughtful encouragement and careful supervision, this dissertation would never have taken shape.

I would like to express my deepest thanks and sincere appreciation to Nur Karimah Aziz, postgraduate student, Universiti Teknologi Mara, for her encouragement and comprehensive advise until this work completely done.

My thanks also goes to Fitriyah Amira Abd Halim, my teammate, for her kind endless help, generous advice and support during the study.

Finally, I extend my deepest thanks to my family, whose value to me only grow with age.

TABLE OF CONTENTS

APPROVAL

TITLE PAGE

ACKNOWLEDGEMENTS v

TABLE OF CONTENTS vi

LIST OF TABLES v

LIST OF FIGURES vi

LIST OF ABBREVIATIONS vii

ABSTRACT viii

CHAPTER ONE: INTRODUCTION 1

1.1 BACKGROUND 1

1.2 PROBLEM STATEMENT 5

1.3 OBJECTIVES 5

1.4 HYPOTHESIS 5

CHAPTER TWO: LITERATURE REVIEW 6

2.1 SKIN ANATOMY 6

2.2 WOUND 8

2.2.1 NORMAL WOUND HEALING PROCESS 8

2.2.1.1 HAEMOSTASIS 9

2.2.1.2 INFLAMMATION PHASE 11

2.2.1.3 PROLIFERATION PHASE 12

2.2.1.4 REMODELLING PHASE 13

2.2.2 WOUND DRESSING 14

2.3 MUCILAGE 17

2.4 HIBISCUS ROSA-SINENSIS 20

ABSTRACT

The potential of *Hibiscus rosa-sinensis* (HRS)-pectin hydrogels as a wound dressing for partial thickness thermal burn wounds was investigated. The experiment was conducted using male Sprague Dawley rats, which were divided into three groups with different types of treatment; group A (gauze), group B (pectin hydrogel) and group C (HRS-pectin hydrogel). The wound healing property was assessed by percentage of wound closure, wound images and histology assessment. The results showed that the HRS-pectin hydrogels can promote the healing process of partial thickness thermal burn wound in rats within 21 days. Histological study showed that group treated with HRS-pectin hydrogel promoted excellent collagen deposition and complete re-epithelization when compared to control and rats treated with pectin hydrogel, thus confirming its potential as a wound dressing in promoting partial thickness wound healing.

CHAPTER ONE: INTRODUCTION

1.1 BACKGROUND

Skin is categorized under integumentary systems which plays important role against invading microorganisms [1]. When the skin is exposed to any injury, our body will regulate a complex physiology process which known as wound healing process [2]. Natural product is one of the alternatives used to obtain an effective wound healing process [3]. The healing of wound using natural products offered a few advantages in comparison to the synthetic materials such as carboxymethyl-chitosan and polyvinylpyrrolidone–alginate hydrogel [4].

Hibiscus rosa-sinensis (HRS) belongs to the family of Malvaceae which is also known as China rose [3, 5]. Table 1.1 shows the physical properties of HRS.

Table 1.1: Physical properties of HRS in powdered form [5].

Physical Properties	Observation
Appearance	Greenish powder
Solubility	Slowly soluble in water produces huge viscous solution
Average particle size (μm)	159.32 ± 9.54
Swelling index (%)	47.0 ± 2.6
Density of liquid (1.0 % w/v)	1.058 ± 0.018
pH	7.1 ± 0.1

Extract of different parts of *Hibiscus rosa-sinensis* shows various metabolites [6]. Table 1.2 shows the phytochemical review in different parts of *Hibiscus rosa-sinensis.*