

UNIVERSITI TEKNOLOGI MARA

**ANTIOXIDANT ACTIVITY AND TOTAL
PHENOLIC CONTENT FROM LIQUID-LIQUID
EXTRACTION OF MANUKA, KELULUT AND
PINEAPPLE HONEY**

MUHAMMAD HANIF ADLI B MOHD ASRI

Dissertation submitted in partial fulfillment of the requirement for the

degree of

Bachelor of Pharmacy (Hons)

Faculty of Pharmacy

2014

ACKNOWLEDGEMENT

All commendations to Almighty Allah, who imparted me resoluteness and fortitude for accomplishment of this work successfully.

I would like to express my deep gratitude to my supervisor, Dr. Salfarina bt Ramli for all her thought, guidance, encouragement, and continuous help given to me along the way in completing this research.

I also appreciated the help from laboratory assistants and post-graduate students in doing my lab work, handling equipment and their willingness in sharing their knowledge with me.

I am indebted to my family members whose endless prayers and continuous moral support enabled me to get through the period of my academic journey. My special thanks also to my research partner, Siti Nur Afiqah bt Zolkepli for her support and cooperation during my research project.

TABLE OF CONTENT

CHAPTER 1: INTRODUCTION

1.1 Introduction of honey.....	1
1.2 Objective of study.....	5

CHAPTER 2 : LITERATURE REVIEW

2.1 Composition of Honey.....	6
2.2 Honey Background.....	6
2.3 Extraction of phenolic compound.....	8
2.3.1 Phenolic compounds.....	10
2.3.2 Total Phenolic Content.....	15
2.4 Antioxidant capacity of Phenolic compound.....	16
2.4.1 DPPH Assay for Antioxidant Activity.....	17

CHAPTER 3 : METHODOLOGY

3.1 Sources of honey.....	20
3.2 Extraction of phenolic compound from honey.....	20

CHAPTER ONE

1.1 Introduction

Honey is known for various resources by numbers of societies in the world. The benefits and uses of honey have been studied for many centuries. For instance, ancient physicians of Greeks, Assyrians, Chinese, Roman and Egyptians have discovered combined honey with herbs are used to treat wounds and gut diseases (Peter C. Molan, 1999). Although there are arguments among medical professional toward the uses and effectiveness of honey, a number of studies reported honey are effective in reducing the risk of getting cancer, heart disease, declined of immune system and some inflammations (Alvarez-Suarez et al., 2010).

Basically honey is a natural sweet substance produced by bees using nectar derived from different types of flower. Honey bees transform nectar into honey by a process of regurgitation and evaporation. The bees store honey as a primary food source in wax honeycombs inside the beehive. Nectar is a sugary liquid produced by flowers and used to attract bees to feed on the liquid. At the same time the bees pick up pollen on their bodies and move from flower to flower thus help pollination. Honey comes in light color up to dark color and it represents the phenolic content in the honey and consequently its antioxidant capacity (Iurlina, Saiz, Fritz, & Manrique, 2009; Taormina, Niemira, & Beuchat, 2001). Honey also comes in many different aromas and tastes. All this variation is caused by the floral

source of the nectar that the bees gathered. Honey produced by different type of bees and may have different physicoproperties.

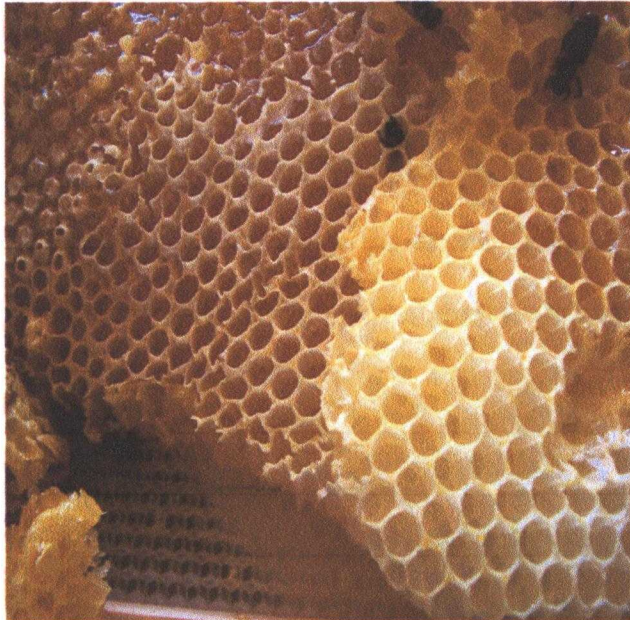


Figure 1.1: Honey comb

Source: http://en.wikipedia.org/wiki/File:Honey_comb.jpg

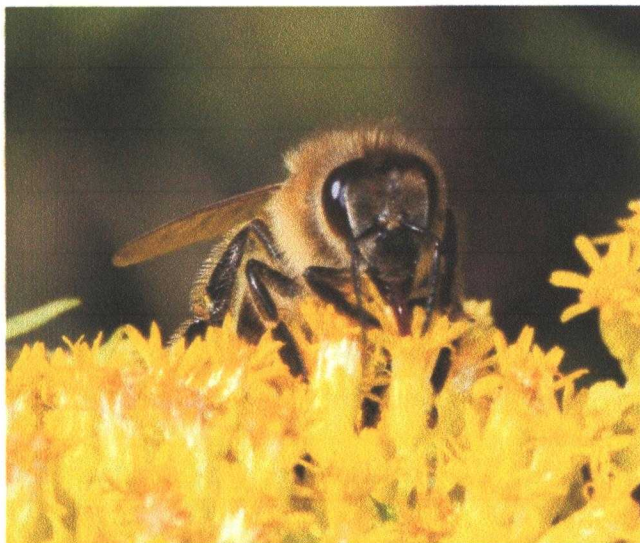


Figure 1.2: Bee collects nectar from flowers

Source: http://en.wikipedia.org/wiki/File:Bee_on_-calyx_935.jpg