UNIVERSITI TEKNOLOGI MARA

EFFECT OF HIGH TEMPERATURE AND pH ON RADICAL SCAVENGING ACTIVITY AND TOTAL PHENOLIC CONTENTS IN *Trigona sp.* HONEY

HAFIZAH BT AB. AZIZ

Dissertation submitted in partial fulfillment of the requirements for the

Bachelor of Pharmacy (Hons)

Faculty of Pharmacy

June 2014

ACKNOWLEDGEMENT

Praise to Allah S.W.T. for His Blessings that allows the completion of this thesis. I am grateful that I was able to successfully finish this coursework on time.

From the bottom of my heart I would like to express my deepest gratitude to my supervisor, Dr. Syaliza Omar who has been very patient and supportive. She has been so helpful and instrumental in guiding me to finish this work. Her kindness and sacrifice are very much appreciated and will be remembered for a long time to come.

I also would like to thanks my partners, Noor Marinah Shari, the laboratory's assistance and my friends that have been directly or indirectly assisting my works. Their contribution helps me in finishing my work successfully.

Finally, I would like to extend my thanks to my family for giving their moral support and motivation. All the little encouragement and supports were very helpful for me, especially when trying to finish this thesis and facing a quite challenging semester at the same time. To all of you, thank you very much. I have learnt a lot.

TABLE OF CONTENT

ABSTRACT

The effect of high temperature and pH were studied on antioxidant activity and total phenolic content of *Trigona sp.* honey. There are two methods to measure total phenolic content and antioxidant activity which were Folin-Ciocalteu test and 1,1-diphenyl-2-picrylhydrazyl (DPPH) assay. The total phenolic content and antioxidant activity exhibit divergent trends based on heat or pH exposure. The highest total phenolic content and antioxidant activity were at 100°C (1.243 GAE in mg/g, 61.32%). The highest total phenolic content was at control (pH 3.55) with 1.067 GAE in mg/g whereas the highest antioxidant activity was at pH 7.4 with value 74.4% activity of DPPH inhibition. After exposure to high temperature or pH, the total phenolic content and antioxidant activity increased or decreased depending on the heat or pH treatment.

CHAPTER 1

INTRODUCTION

1.1 Background of study

Any molecular species that hold an unpaired electron in an atomic orbital are identify as free radical that cause them to be very unstable and highly reactive molecules (Fang et al., 2002). Besides that, free radical also behaves as oxidant or reductant. This is because it has tendency to receive from or give an electron to another molecules (Lobo et al., 2010).

Free radicals formed through either normal essential metabolic process in human body or from external sources. Examples of external sources are X-rays, ozone and cigarette smoking (Pham-Huy et al., 2008). Free radicals have high tendency to attack the stable molecule to get electron in order for them to get stable. Thus, this will lead to the generation of another unstable molecule due to loss of its electron. The unstable molecule will turn to free radical. The process will continue and generate more free radicals which lead to destruction of the living cells. Hydroxyl radical, superoxide anion radical, hydrogen peroxide and hypochlorite are the most significant oxygen-containing free radicals that presence (Imlay et al., 2003).