

UNIVERSITI TEKNOLOGI MARA

**THE EFFECT OF HIGH TEMPERATURE AND pH
ON RADICAL SCAVENGING ANTIOXIDANT
ACTIVITY AND TOTAL PHENOLIC CONTENTS
IN TUALANG HONEY**

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In the name of Allah, the Most Beneficent, the Most Merciful

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ABSTRACT

Tualang honey has been selected for this study due to the health benefits and the possibility of it been added to foods and beverages. The objectives of this study are to determine the stability of antioxidant compounds in Tualang honey to high temperature and pH and to determine whether the phenolic compounds in Tualang honey contribute to antioxidant activity. Antioxidant activity of Tualang honey behaved varyingly after exposed to different temperature and pH. The stability of phenolic content at certain conditions leads to high antioxidant properties that give health beneficial to the consumer. Tualang honey has best antioxidant activity at neutral pH and at temperature 70 °C. The exposure of Tualang honey toward these two conditions elevated the radical scavenging activity and correlated to the stability of phenolic content in Tualang honey. At elevated temperature and pH exposure, the antioxidant activity started to decline due to the changes in antioxidant compound behavior that responsible for antioxidant activity in Tualang honey. Antioxidant activity in Tualang honey also declined over time after exposure to different temperature due to degradation of some compounds in Tualang honey that act as radical scavenger.

CHAPTER 1

INTRODUCTION

1.1 Background of research

Free radicals are chemical species with an unpaired electron and they are very reactive (Devasagayam et al., 2004; McCord, 2000). Free radicals can be formed during metabolization of oxygen (Alzahrani et al., 2012). There are several types of free radical which are superoxide radical, hydroxyl radical, and peroxy radical (Devasagayam et al., 2004).

The imbalance of free radicals production and antioxidants level will cause oxidative stress and lead to certain chronic diseases (Kishore et al., 2011; Mohamed et al., 2010). The examples of the chronic diseases are cardiovascular disease (Štajner et al., 2014), Alzheimer's disease (Wang et al., 2013) and diabetes (Saeidnia et al., 2013). Free radicals move through the cells and disrupted the structures of deoxyribonucleic acid (DNA). It also cause cross-linkage of proteins, formation of aging pigments, lipid peroxidation of the membrane cell and malfunction of mitochondria (Wickens, 2001).

The free radical effects can be neutralized by antioxidants. Antioxidant is the substance that capable to inhibit or delay the oxidation of the substrate (Tilak et al., 2004). Antioxidants occur naturally in human body (endogenous) or by consumed through diets