

UNIVERSITI TEKNOLOGI MARA

**FREE RADICAL AND NITRIC OXIDE INHIBITION
OF TRIGONA HONEY**

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requirements for the Bachelor of Pharmacy (Hons.)**

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Table of Contents

APPROVAL SHEET	i
ACKNOWLEDGEMENT.....	ii
LIST OF FIGURES.....	v
LIST OF TABLE.....	vi
ABSTRACT	vii
CHAPTER 1	1
INTRODUCTION.....	1
1.1 BACKGROUND OF STUDY	1
1.2 PROBLEM STATEMENT	3
1.3 SIGNIFICANCE OF STUDY	3
1.4 RESEARCH HYPOTHESIS	3
1.5 SCOPE AND LIMITATIONS.....	4
CHAPTER 2.....	5
LITERATURE REVIEW	5
2.1 HONEY	5
2.2 TYPES OF HONEY.....	6
2.3 STINGLESS BEE	8
2.4 TRIGONA HONEY	9
2.5 COMPOSITION OF HONEY.....	10
2.6 ANTIOXIDANT PROPERTIES OF HONEY.....	12
2.7 NITRIC OXIDE	13
CHAPTER 3.....	16
METHODOLOGY	16
3.1 MATERIAL AND CHEMICALS.....	16

ABSTRACT

In this study, trigona honey sample was tested to evaluate the free radical scavenging activity and the nitric oxide inhibition activity. The activity was compared with α -tocopherol. The α -tocopherol is a well-known antioxidant substance. The IC_{50} for DPPH free radical scavenging activity and nitric oxide inhibition activity for trigona honey were not determined. The IC_{50} for DPPH free radical scavenging activity and the nitric oxide inhibition activity for α -tocopherol were $47.45 \mu\text{g mL}^{-1}$ and $78.74 \mu\text{g mL}^{-1}$ respectively. These results indicate that Trigona honey does not exhibit potent free radical scavenging and nitric oxide inhibition activity in contrast to α -tocopherol.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

Honey is a natural sweet substance that is manufactured by honey bees from the nectar of the plant or the excretion of insects from *Rhynchota* genus that pierce the plants cell and ingest the sap then secrete it again. The bees will then transform by joining with specific substances of their own, deposit, dehydrate, store and keep in the honey comb, where it is left to be ripened and matured. There are few types of honey which are blossom honey, honeydew honey, monofloral honey and multifloral honey (Alvarez-Suarez, Gasparrini, Forbes-Hernández, Mazzoni, & Giampieri, 2014; Codex Alimentarius Commission, 2001). Honey is mainly produced by honey bees, stingless bees, bumblebees and also from hymenopteran insects such as honey wasps.

Honey consists of fructose and glucose (80-85%), water (15-17%), ash (0.2%), proteins and amino acids (0.1-0.4%) and trace amounts of enzymes, vitamins and other substances, such as phenolic compounds (Rao, Krishnan, Salleh, & Gan, 2016). Stingless bees are from the *Meliponini* tribe and have more than one type of genera that include *Trigona*. The *Trigona* spp. which is commonly known as 'Kelulut' is the stingless bees that is found in Malaysia (Kek, Siok Peng Chin, Nyuk Ling Yusof, Yus AnizaTan, Sheau Wei Chua, 2014). *Trigona* species are stingless bees that yield a special honey with a strong acidic taste and the honey is less viscous and darker than

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***Lansium domesticum* COMPONENTS PROFILING
BY USING LIQUID CHROMATOGRAPHY –
MASS SPECTROMETRY**

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TABLE OF CONTENT

	Page
TITLE PAGE	
ACKNOWLEDGEMENT	vi
TABLE OF CONTENTS	vii
LIST OF FIGURES	x
LIST OF TABLES	xii
ABSTRACT	xiii
 CHAPTER ONE (INTRODUCTION)	 1
1.1 Background of Study	1
1.2 Problem Statement	2
1.3 Research Objective	3
1.4 Hypothesis	3
1.5 Significance of Study	3
 CHAPTER TWO (LITERATURE REVIEW)	 4
2.1 <i>Lansium domesticum</i>	4
2.1.1 Intorduction to <i>Lansium domesticum</i>	4
2.1.2 Description of <i>Lansium domesticum</i>	4
2.1.3 Cultivation of <i>Lansium domesticum</i>	8
2.1.4 Nutritional facts of <i>Lansium domesticum</i>	9
2.1.5 Uses of <i>Lansium domesticum</i>	10
2.2 <i>Mitragyna speciosa</i>	11
2.2.1 Introduction to <i>Mitragyna speciosa</i>	11
2.2.2 Description of <i>Mitragyna speciosa</i>	11
2.2.3 Uses of <i>Mitragyna speciosa</i>	13
2.2.4 Effects of <i>Mitragyna speciosa</i>	13
2.2.5 Compounds in <i>Mitragyna speciosa</i>	14

ABSTRACT

Lansium domesticum, locally known as “Dokong”, found in the tropics regions of the world, predominantly in Thailand, Malaysia, Indonesia, Philippines and Vietnam. It is also used to alleviate some medial conditions as it possess antidiarrheal, antispasmodic, antipyretic, antimalarial and anti-inflammatory properties. In 2015, Agensi Antidadah Kebangsaan (AADK) Perlis discovered that the “Ketum” addicts are taking *Lansium domesticum* leaves extract as an alternative to “Ketum” extract due to “Ketum” scarcity after it is banned because of misuse and abuse. “Ketum” addicts claimed that both of the extracts have similar euphoric effect. However, there is insufficient information regarding compounds that may contribute to the euphoric effect in *Lansium domesticum* leaves extract. The objective of this study is to detect presence of mitragynine in *Lansium domesticum* leaves extract. *Lansium domesticum* leaves was extracted by using ethanol solvent (95% ethanol) and aqueous solvent (distilled water). Extracts were prepared using condensation method by rotary evaporator for ethanol extraction and lyophilisation method for aqueous extraction. Both extracts undergone chromatographic analysis by Liquid Chromatography – Mass Spectrometry Quadrupole – Time of Flight (LC-MS QTOF) system. The parameters tested were retention time, m/z value (mass-to-charge ratio) and predicted structure. The results were compared with *Mitragyna speciosa* chromatographic analysis result. The results showed that mitragynine was absent in *Lansium domesticum* leaves extracts. The euphoric effect claimed may be due to other compounds present in the leaves extract.

Keywords : *Lansium domesticum*, *Mitragyna speciosa*, mitragynine, euphoric effect, misuse and abuse, Ketum, Dokong, Liquid Chromatography – Mass Spectrometry Quadrupole – Time of Flight (LC-MS QTOF) system.

CHAPTER ONE

INTRODUCTION

1.1 Background of study

Addiction is a medical condition of uncontrollable and irresistible engagement to stimuli although there are unfavourable after-effects (Nestler, 2013). It is due to intake of licit (e.g. alcohol) and illicit drugs (e.g. marijuana). In a study done in United States, 73% of drug users were employed, with highest licit drugs usage in construction, entertainment and recreation, while highest illicit drugs usage are in food services and construction (Hanson, Venturelli & Fleckenstein, 2012). People abuse drug usually because they want to deal with spiritual, psychological, physical destruction or just for pleasure-seeking purpose (Koob & Moal, 2001). In Malaysia, substance abuse of herbal medicine is increasing (Aziz & Tey, 2009). *Mitragyna speciosa*, also known as “Ketum”, is used in treating diabetes, to increase endurance in strenuous activities and many more. However, its’ usage has been banned by the government because of misuse and abuse (Chan, Pakiam & Rahim, 2005). The “Ketum” addicts successfully discovered that “Dokong” leaves extract can replace “Ketum”, and claimed to have similar sedative effect as “Ketum” extract (Rahim, 2015). *Lansium domesticum*, or “Dokong”, have some useful uses. Its’ resin have anti-spasmolytic properties, and used to treat intestinal spasms and diarrhoea. The product of *Lansium domesticum*’s bark decoction has been used as anti-malarial (Omar, 2003) and to deal with dysentery. Its’ leaves juice is able to eliminate