

**EVALUATION ON ANTIBACTERIAL ACTIVITY OF MALAYSIAN
TRIGONA HONEY AGAINST *Bacillus licheniformis* AND *Escherichia coli***

NAFISA ILANI BINTI ZU

**BACHELOR OF SCIENCE (Hons.) BIOLOGY
IN THE FACULTY OF APPLIED SCIENCES
UNIVERSITI TEKNOLOGI MARA**

JULY 2022

**EVALUATION ON ANTIBACTERIAL ACTIVITY OF MALAYSIAN
TRIGONA HONEY AGAINST *Bacillus licheniformis* AND *Escherichia coli***

NAFISA ILANI BINTI ZU

**Final Year Project Report Submitted in
Partial Fulfilment of the requirements for the
Degree of Bachelor of Science (Hons.) Biology
in the Faculty of Applied Sciences
Universiti Teknologi MARA**

JULY 2022

This Final Year Project Report entitled "**Evaluation on Antibacterial Activity of Malaysian Trigona Honey Against *Bacillus Licheniformis* and *Escherichia Coli***" was submitted by Nafisa Ilani Binti Zu in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Biology, in the Faculty of Applied Sciences, and was approved by

En. Muhammad Syukri Bin Noor Azman
Supervisor
Senior Lecturer
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau, Perlis

Muhammad Syukri Bin Noor Azman
Project Coordinator
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau, Perlis

Zalina Zainal Abidin
Head of Programme
Faculty of Applied Sciences
Universiti Teknologi MARA
02600 Arau, Perlis

Date:

TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS	i-ii
TABLE OF CONTENTS	iii-iv
LIST OF TABLES	v
LIST OF FIGURES	vi
LIST OF SYMBOLS	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	ix-x
ABSTRAK	xi-xii
CHAPTER 1: INTRODUCTION	
1.1 Background of the study	1-3
1.2 Problem statement	3-4
1.3 Significance of the study	4-5
1.4 Objectives of the study	5
1.5 Research questions	6
CHAPTER 2: LITERATURE REVIEW	
2.1 Stingless Bee	
2.1.1 Taxonomy, Morphology and Distribution	7-9
2.1.2 Trigona Honey	9-10
2.2 Honey	
2.2.1 Antibacterial properties of honey	10-11
2.2.2 Benefits of honey for human health	12-13
2.2.3 Commercial values of honey	13-15
2.3 Microorganisms	
2.3.1 <i>Escherichia coli</i>	15
2.3.2 <i>Bacillus licheniformis</i>	15-16
CHAPTER 3: RESEARCH METHODOLOGY	
3.1 Place of experimental work	17
3.2 Materials	
3.2.1 Honey samples	17
3.2.2 Bacterial sample	18
3.2.3 Chemicals and Media	
3.2.4 Equipments and Labwares	18-19
3.3 Methodology	
3.3.1 Experimental design	20
3.3.2 Preparation of Media and Solution	
3.3.2.1 Preparation of Honey Samples	21
3.3.2.2 Preparation of Nutrient Broth	21

ABSTRACT

Despite the availability of many antibacterial medicines, antibacterial resistance is regularly reported. Finding a substance with comparable antibacterial characteristics is an alternative solution. Honey made by stingless bees appears to meet the criteria mentioned above. A little stingless bee from the tribe *Meliponini*, *Trigona spp.* was known as ‘*Kelulut*’ in Malaysia. This stingless bee produced honey that was used to heal wounds, boost immunity, destroy bacteria, treat bronchial phlegm, and relieve sore throat, cough, and cold symptoms. The aim of the current study is to investigate the antibacterial activity of Malaysian Trigona Honey against *Bacillus licheniformis* and *Escherichia coli*. In this study, the antibacterial activity of *Trigona spp.* honeys were tested towards *Bacillus licheniformis* and *Escherichia coli* by using disc diffusion method and determination of minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) using broth microdilution method. Disc diffusion method results showed that the inhibition zone was proportional to the concentration of the honey for honey Brand 1 and 2. As the concentration increases, the inhibition zone also increases. Furthermore, results shows that honey Brand 2 exhibited slightly greater inhibition zone compared to Brand 1 towards *B.licheniformis* whereas towards *E.coli* honey Brand 1 showed slightly greater inhibition zone than Brand 2. For this method, one-way ANOVA analysis was carried out for statistical analysis ($p < 0.05$). Then, MIC and MBC against *Bacillus licheniformis* and *Escherichia coli* were determined by broth microdilution method.