



**ANTIMICROBIAL ACTIVITY OF MALAYSIAN HONEY
AGAINST FOODBORNE PATHOGEN**

By

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CONTENTS

DECLARATION	ii
INTELLECTUAL PROPERTIES.....	iii
ACKNOWLEDGEMENT	vi
LIST OF TABLES	x
LIST OF FIGURES.....	xi
LIST OF PLATES.....	xii
LIST OF ABBREVIATION	xiii
ABSTRACT.....	xiv
CHAPTER 1.....	1
INTRODUCTION.....	1
1.1 Background of study.....	1
1.2 Problem Statement.....	2
1.3 Significance of study	3
1.4 Research objectives	3
1.4.1 General objective	3
1.4.2 Specific objectives	3
1.5 Hypothesis	4
1.5.1 Null hypothesis	4
1.5.2 Alternative hypothesis	4
CHAPTER 2.....	5
LITERATURE REVIEW.....	5
2.1 Introduction to gelam and tualang honey	5
2.2 Physical properties of honey.....	5
2.3 Chemical composition of honey	6
2.4 Medical use of honey.....	6
2.5 Antimicrobial activity of honey.....	7
2.6 Non-peroxide properties of gelam and tualang honey.....	7
2.7 Foodborne pathogen	8
2.8 Tested bacteria.....	8
2.8.1 <i>Staphylococcus aureus</i>	8
2.8.2 <i>Escherichia coli</i>	9

ABSTRACT

Antimicrobial Activity of Malaysian Honey against Foodborne Pathogen

Emergence of food borne disease that increases year by year has become worrisome nowadays. It became troublesome at all developed, in developing and less developed country. Indeed, high mortality rate were recorded at less developing country every year. This problem become worst as the emergence of antibiotic resistance is in alert situation too. Meanwhile, therapeutic use of natural product including honey becomes awareness these days. The therapeutic use of honey has been use since ancient time. In Malaysia, various honeys have been found such as tualang, gelam, kelulut, acasia, hutan and pucuk daun honey. Among of these honey, tualang and gelam honey are known as their antioxidant, anti-inflammatory and antibacterial agent. However, there was limited study of these honeys against foodborne pathogen. Thus, this study is done to determine antimicrobial activity of tualang and gelam honey against foodborne pathogen which are *S.aureus*, *E.coli* and *S.typhimurium*. Antimicrobial Susceptibility Test (AST) is done to determine the antimicrobial activity of honey by disc diffusion assay. Concentration of honey at 80%, 60%, 40% and 20% were tested against those bacteria. Then, proceed with Minimum Inhibitory Concentration test by broth microdilution method. Two fold dilutions were prepared and producing 9 dilutions. Mueller Hinton broth is used as a medium and the test was performed triplicate to get a reliable result. Positive results of MIC were preceded with Minimum Bactericidal Concentration (MBC) by sub-culture on Mueller Hinton agar. The growth of organism was observed on the agar after 18 hours of incubation. The AST of this study showing all bacteria are resistance towards tualang and gelam honey. MIC test were precede and it show an inhibition of growth of tested bacteria. The MIC value of gelam honey is 37.5% while MIC value for tualang honey is 75.0% for all tested bacteria. MBC test result show gelam honey can kill bacteria at concentration of 37.5% for *S.aureus* and *E.coli* while for *S.typhimurium* at 75.0%. However, for tualang honey, it only shows MBC value for *S.typhimurium* at 75.0%. From the result, it can be seen gelam honey has better antimicrobial activity against tested bacteria than tualang honey. As a conclusion, gelam and tualang honey has antimicrobial activity against *S.aureus*, *E.coli* and *S.typhimurium*.

Keywords: tualang honey, gelam honey, antimicrobial activity, foodborne pathogen, antibiotic resistance

CHAPTER 1

INTRODUCTION

1.1 Background of study

Foodborne outbreaks had been a serious problem worldwide as it causes significant morbidity and mortality in developed and developing country causing this outbreak give risk on human population (J. Schlundt, 2004). In less developed country, foodborne disease had killed almost 1.9 million people every year which most of the patient are children (World Health Organization, 2003). While in United State of America, each year, foodborne disease is estimated to cause more than 76 million illnesses, 325,000 hospitalisations and 1,800 deaths (Paul S. Mead, 1999). But, in Malaysia, according to the report in 2010 by Ministry of Health Malaysia, the incident rate for food and water borne disease such as cholera, typhoid and dysentery that were recorded are ranging from 1.56 to 0.14 cases per 100,000 populations. While, for food poisoning cases, the incident rate are 36.17 in 2009 and 44.18 in 2010 per 100,000 populations. These numbers of cases are lower compared to other countries as most of the foodborne disease cases are unreported because of chain of events that need to be performed before reporting to authorize person (J.M. Soona, 2011).

In India, more than 7500 species of medicinal plants flora are found and 4635 species from them are used commercially at a large scale. Besides, more than 50% of all modern clinical drugs are from natural product base. Thus, this showing in pharmaceutical industry natural product is vital in drug development. The phytochemical compounds in plant are important in treatment of the disease and give a positive effect on health but these compounds are not needed in a normal functioning of body as the body system can work properly (R. Preethi, 2010). Besides, according to Hassawi D and Kharma A (2006), in developed country, at estimation 80% of people use traditional medicine which has compounds from medicinal plants origin. These proving that natural product can be used as medicinal