



الجامعة الإسلامية
UNIVERSITI
TEKNOLOGI
MARA

**ASSESSMENT ON THE EFFICACY OF *PARKIA SPECIOSA* HASSK.
PERICARPS METHANOL EXTRACT AS A POTENTIAL
ANTIMICROBIAL AGENT**

By

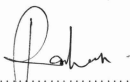
RAIHAN ZAFIRAH BINTI AFFENDI

**Thesis Submitted in Partial Fulfillment for the Degree of Bachelor of Medical
Laboratory Technology (Hons), Faculty of Health Sciences; UniversitiTeknologi
MARA**

2016

DECLARATION

“I hereby declare that this thesis is based on my original work and has not has been submitted previously or currently for any other degree at UiTM or any other institutions.”



.....
RAIHAN ZAFIRAH BINTI AFFENDI

911023-13-5766

2012666626

TABLE OF CONTENTS

DECLARATION	ii
INTELLECTUAL PROPERTIES	iii
ACKNOWLEDGEMENT	v
TABLE OF CONTENTS	vi
CHAPTER 1: INTRODUCTION	1
1.1 Background of study	1
1.2 Problem Statement	2
1.3 Objectives of the study	3
1.3.1 General Objective	3
1.3.2 Specific objective	3
1.4 Significance of the study	3
1.5 Research hypothesis	3
CHAPTER 2: LITERATURE REVIEW	4
2.1 Medicinal plants	4
2.2 <i>Parkia speciosa</i> Hassk.	5
2.2.1 Medicinal benefits of <i>P. speciosa</i> Hassk	10
2.2.2 Phytochemical compound of <i>P. speciosa</i> Hassk.	12
2.3 Qualitative Phytochemical screening	12
2.4 Methanol as an extraction solvent	13
2.5 Food-borne pathogens	14
2.5.1 <i>Staphylococcus aureus</i>	15
2.5.2 <i>Bacillus cereus</i>	15
2.5.3 <i>Salmonella typhimurium</i>	16
2.5.4 <i>Escherichia coli</i>	16
2.6 Antimicrobial assay	17
2.7 Antibiotic resistance	18

ABSTRACT

Assessment on The Efficacy of *Parkia speciosa* Hassk. Pericarp Methanol Extract as a Potential Antimicrobial Agent

The persistent development of resistant strains of bacteria which resulted in a condition known as antibiotic resistance is an alarming situation. Therefore, the need for development of novel antimicrobial agent such as by using herbal medicine is in great demand. *Parkia speciosa* Hassk. (*P. speciosa* Hassk.), known as bitter beans, is commonly eaten among Malaysian and known to have medicinal properties. The present study was conducted to evaluate the potential of methanol extract of pericarp from *P. speciosa* as an antimicrobial agent. Thus, the extract of pericarp of *P. speciosa* Hassk. prepared using methanol as an extraction solvent were screened for its antimicrobial activities and phytochemical composition. The pericarps were left to dry and transformed into powder form before being soaked in methanol for about 24 days using the exhaustive extraction method. The extract was tested against food-poisoning causative agents which were *Staphylococcus aureus*, *Bacillus cereus*, *Salmonella typhimurium* and *Escherichia coli*. The antimicrobial activities were evaluated by using the technique of agar diffusion and broth microdilution method. Both techniques were used to screen antimicrobial susceptibility (AST), minimal inhibitory concentration (MIC) and minimal bactericidal concentration (MBC) at concentrations of 1000, 500, 250, 125, 62.5, 31.25, 15.62, 7.81, 3.90, 1.90 and 0.9 mg/ml. Best inhibitory effects were shown against *S. aureus* and *B. cereus* compared to *S. typhimurium* and *E. coli* which showed no inhibitory effects. The MIC and MBC of the methanol extract *P. speciosa* Hassk. pericarp against *S. aureus* was found to be 7.8 mg/ml while MIC and MBC of *B. cereus* were quite impressive which was found to be 1.9 mg/ml. Phytochemical analysis revealed presence of alkaloids, carbohydrates, flavonoids, tannins and amino acid. The study managed to prove that methanol extract of *P. speciosa* pericarp has potential to be used as an antimicrobial agent. The preliminary testing on antimicrobial activity conducted clearly revealed that *S. aureus* and *B. cereus* were more susceptible compared to *S. typhimurium* and *E. coli*. The medicinal activities may be attributed by the existence of one or more of the detected phytochemical compounds within the extract.

KEYWORDS:

Parkia speciosa Hassk. Antibacterial activity, Phytochemical compound, Exhaustive extraction method

CHAPTER 1

INTRODUCTION

1.1 Background of study

Herbal plants seem to play a vital role in human life. Each part of the plant from its seeds, pods, leaves, flowers, bark and root have been a significant source of treatment for thousands of symptoms and diseases. Recently, a major interest has been in assessing various plant extracts for their antimicrobial properties against bacteria causing infections since it was apparent that several plants may generate products that contain powerful phytochemical constituents against bacteria (Cowan, 1999). These phytochemical constituents of plants such as alkaloids, flavonoids, tannins, phenolic compounds, steroids, resins, fatty acids and gums perhaps are capable of producing certain physiological actions towards bacteria (Dahiya, 2012).

The persistent development of resistant strains of bacteria which resulted in a condition known as antibiotic resistance increases the need to find alternative antimicrobial agents. Resistant bacteria may cause various contagious diseases which may result in high rates of morbidity and mortality, high costs for hospital bills and medicines and prolonged hospitalizations. Methicillin-resistant *Staphylococcus aureus* (MRSA), Vancomycin-resistant *enterococci* (VRE), and Multi-Drug-Resistant Gram-negative bacteria are the most problematic healthcare-associated infections to control and treat (Dahiya, 2012). Therefore, the need for development of novel antimicrobial agents such as by using herbal medicine is in great demand.

Malaysia is enriched with various beneficial plants that have been used as traditional remedies against numerous human ailments. *P. speciosa* Hassk. which is natively known as 'petai' among Malaysians is one of the most famous plants that can be easily found in Malaysia (Lim, 2012). It belongs to the family Fabaceae and grows wild in the lowland forests especially in the Orang Asli settlements. The *P. speciosa* Hassk. tree is recognized by its physical characteristics such as 15 to 40 m in height with a 50 to 100 cm diameter stem. It has 2 to 6 cm long alternate