

**SCREENING FOR ANTIBACTERIAL ACTIVITIES OF
Melastoma malabathricum LEAVES EXTRACT
AGAINST SELECTED MICROORGANISM**

WAN NOR HAMIZAH BT WAN ISMAIL

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

JANUARY 2017

ABSTRACT

SCREENING FOR ANTIBACTERIAL ACTIVITIES OF *Melastoma malabathricum* LEAVES EXTRACTS AGAINST SELECTED MICROORGANISM

Melastoma malabathricum is a plant that has benefits in medicine. All parts of *M. malabathricum* from root to shoot have potential to treat the diseases. The objectives of the study are to perform sequential extraction, to identify the secondary metabolites and to determine the antimicrobial activities against two bacteria which are *Staphylococcus aureus* and *Pseudomonas aeruginosa*. The solvents used for phytochemical screening test were hexane and methanol. Antimicrobial activity was investigated using disk diffusion method. The extracts were test with different concentration which 100 mg/ml, 80 mg/ml, 60 mg/ml, 40 mg/ml, and 20 mg/ml. The phytochemical analysis of hexane extracts showed the presence of flavonoid, phenol and tannins, while methanol extracts showed the presence of glycoside and tannins. Different concentrations of crude extract show significant difference ($P \leq 0.05$). Methanol leaves extract at concentration of 100 mg/ml showed the highest antibacterial activity against *S. aureus* and *P. aeruginosa* with zone of inhibition of 16 mm and 26 mm respectively. Thus, it indicate that methanol leaves extract contain high components related to antibacterial activity. As a conclusion *M. malabathricum* methanol leaves extract potentially can be used against gram positive and negative bacteria.

TABLE OF CONTENTS

| | PAGE |
|---|-------------|
| ACKNOWLEDGEMENTS | iii |
| TABLE OF CONTENTS | iv |
| LIST OF TABLES | vi |
| LIST OF FIGURES | vii |
| LIST OF ABBREVIATIONS | viii |
| ABSTRACT | ix |
| ABSTRAK | x |
| | |
| CHAPTER 1 : INTRODUCTION | |
| 1.1 Background Study | 1 |
| 1.2 Problem Statement | 2 |
| 1.3 Significance of Study | 3 |
| 1.4 Objectives of the Study | 4 |
| | |
| CHAPTER 2 : LITERATURE REVIEW | |
| 2.1 <i>Melastoma malabathricum</i> | 5 |
| 2.2 Bacteria | |
| 2.2.1 <i>Staphylococcus aureus</i> | 7 |
| 2.2.2 <i>Pseudomonas aeruginosa</i> | 8 |
| 2.3 Drug use for the Treatment of the Diseases | 9 |
| 2.3.1 <i>Staphylococcus aureus</i> | 9 |
| 2.3.2 <i>Pseudomonas aeruginosa</i> | 10 |
| 2.4 Methods of Study | 10 |
| 2.4.1 Types of extraction | 11 |
| 2.4.2 Solvent extraction | 11 |
| 2.5 Phytochemical Constituents and Leaves of <i>Melastoma malabathricum</i> | 12 |
| | |
| CHAPTER 3 : METHODOLOGY | |
| 3.1 Materials | |
| 3.1.1 Raw materials | 13 |
| 3.1.2 Chemical | 13 |
| 3.1.3 Apparatus and equipment | 14 |
| 3.2 Preparation of Extract | |
| 3.2.1 collection of plant materials | 14 |
| 3.2.2 Plant extraction for crude extract | 15 |
| 3.3 Phytochemical Screening | 15 |
| 3.3.1 Flavonoid test | 15 |
| 3.3.2 Phenol test | 16 |
| 3.3.3 Tannins test | 16 |

| | |
|---|----|
| 3.3.4 Alkaloid test | 16 |
| 3.3.5 Glycoside test | 16 |
| 3.4 Preparation for 1% HCl | 17 |
| 3.5 Preparation for 2% NaOH | 17 |
| 3.6 Preparation for 5% FeCl ₃ | 17 |
| 3.7 Preparation for Mayer's test | 17 |
| 3.8 Preparation for Glacial Acetic Acid with 1% FeCl ₃ | 18 |
| 3.9 Media Preparation | |
| 3.9.1 Nutrient agar | 18 |
| 3.9.2 Nutrient broth | 18 |
| 3.9.3 Antibacterial activity | 18 |
| 3.9.4 Preparation of standard inoculum | 19 |
| 3.9.5 Disk diffusion method | 20 |
| 3.10 Statistical Analysis | 20 |
| | |
| CHAPTER 4 : RESULTS AND DISCUSSION | |
| 4.1 Percentage Yield | 21 |
| 4.2 Phytochemical Screening Test | 22 |
| 4.3 Antimicrobial Activity | 26 |
| | |
| CHAPTER 5 : CONCLUSION AND RECOMMENDATIONS | 33 |
| | |
| CITED REFERENCES | 35 |
| APPENDICES | 39 |
| CURRICULUM VITAE | 58 |

LIST OF FIGURES

| FIGURE | TITLE | PAGE |
|--------|--|------|
| 2.1 | <i>M. malabathricum</i> plant or pokok senduduk | 7 |
| 4.1 | Phytochemical screening test for Hexane extract | 25 |
| 4.2 | Phytochemical screening test for Methanol extract | 26 |
| 4.3 | Inhibition zone of <i>M. malabathricum</i> leaf extract against <i>S. aureus</i> | 29 |
| 4.4 | Inhibition zone of <i>M. malabathricum</i> leaf extract against <i>P. aeruginosa</i> | 29 |
| 4.5 | Positive and negative control for methanol solvent: (A) <i>S. aureus</i> ; (B) <i>P. aeruginosa</i> . | 30 |
| 4.6 | Positive and negative control for hexane solvent: (A) <i>S. aureus</i> ; (B) <i>P. aeruginosa</i> | 30 |
| 4.7 | Zone of inhibition with different concentration hexane extract against <i>S. aureus</i> | 31 |
| 4.8 | Zone of inhibition with different concentration of methanol leaves extract against (A) <i>S. aureus</i> ; (B) <i>P. aeruginosa</i> | 32 |