



اَوْبُو تَيْكُو لُو كِن مَارَا  
UNIVERSITI  
TEKNOLOGI  
MARA

**EVALUATION OF ANTIMICROBIAL ACTIVITY OF *Andrographis paniculata* EXTRACT AGAINST *Staphylococcus aureus***

**By**

**ZAYAN NABILAH RASYIDAH BT ABD. RAZAK**


**Thesis Submitted in Partial Fulfilment of the Requirements for the Degree of  
Bachelor in Medical Laboratory Technology (Hons),  
Faculty of Health Sciences, Universiti Teknologi MARA**

**2015**

## DECLARATION

I declare that the work in the thesis was carried out in accordance to the regulations of Universiti Teknologi MARA (UiTM). It is original and the result obtained is from my own work, unless indicated or acknowledged as referred work. This thesis has not been submitted to any other academic or non-academic institutions for any other degree or qualification.

Name : Zayan Nabilah Rasyidah bt Abd. Razak  
Student's ID No. : 2012256104  
Programme : Bachelor in Medical Laboratory Technology (Hons)  
Faculty : Health Sciences, Puncak Alam Campus, UiTM  
Title of Thesis : Evaluation of Antimicrobial Activity of *Andrographis paniculata* Extract against *Staphylococcus aureus*

Signature of Student :  \_\_\_\_\_  
Date : July 2015

## TABLE OF CONTENTS

	<b>Page</b>
<b>TITLE PAGE</b>	i
<b>DECLARATION</b>	ii
<b>ACKNOWLEDGEMENT</b>	iii
<b>LIST OF TABLES</b>	viii
<b>LIST OF FIGURES</b>	ix
<b>LIST OF ABBREVIATIONS</b>	xi
<b>ABSTRACT</b>	xiii
<b>CHAPTER</b>	
<b>1 INTRODUCTION</b>	
1.1 Medicinal plant	1
1.2 <i>A.paniculata</i>	2
1.3 <i>S.aureus</i>	3
1.4 Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC)	4
1.5 Time-kill assay	4
1.6 Problem statement	5
1.7 Research objective	6
1.7.1 General objective	6
1.7.2 Specific objective	6
1.8 Research hypothesis	6
1.9 Scope and limitation of the study	7
1.10 Significance of the study	7
<b>2 LITERATURE REVIEW</b>	
2.1 <i>A.paniculata</i>	8
2.1.1 Taxonomic hierarchy	10
2.2 Therapeutic properties of <i>A.paniculata</i> extract	12
2.2.1 Antimicrobial effects	12
2.3 Staphylococci	13

## ABSTRACT

*A.paniculata* leaves are known to have antimicrobial activities and it is widely used as traditional medicine worldwide. This study investigated the antimicrobial activities of methanolic extract of *S.aureus* (ATCC 25923) by determining the Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC), time-kill assay and the effects of *A.paniculata* extract on *S.aureus* in SDS-PAGE analysis. Several concentration of the *A.paniculata* extracts were used to determine MIC value and the lowest concentration that can inhibit growth of *S.aureus* was further tested to obtain MBC value. Time-kill assay was performed in 24 hours to determine the incubation period needed for *A.paniculata* extract to completely kill *S.aureus*. The treated samples (*A.paniculata* extract and *S.aureus*) and untreated samples (*S.aureus* only) were compared in terms of appearance of cytoplasmic protein bands to determine the effect of treatment. *A.paniculata* extract showed high antimicrobial activity against *S.aureus* with MIC and MBC value was 0.06mg/ml. The MIC value was able to completely killed *S.aureus* in 24 hours incubation time. Lipase (76 kDa) was identified on SDS-PAGE analysis which was inhibited when treated with *A.paniculata* extract. The observation suggests that a possible mechanism by which methanolic extract of *A.paniculata* inhibits *S.aureus* by lowering production of an important protein, lipase. Future work which involves proteomics study on the effects of *A.paniculata* against *S.aureus* should be pursued.

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Medicinal Plants**

Medicinal plants have been widely used as healthcare therapies or products. Plants are usually used to treat common cold, fever, diarrhoea and act as antioxidant. It is estimated that more than 80 000 species of plants has been identified as medicinal plants and more than 1 300 species of plants have been used traditionally in Malaysia (Hossain et al., 2014). The knowledge on medicinal plants is being passed down from generation to generation. 80% of the world's population, especially for people in the vast rural areas of developing countries utilise medicinal plants to cure diseases (Lalagoud et al., 2013). Medicinal plants are the potential source of medicine to treat health ailments and have been used as bio-resource of drugs, food supplement, folk medicines, chemical entities for synthetic drugs and pharmaceutical intermediates (Deepak et al., 2014). The plants have medicinal properties ranges from the use of the leaves, roots, bark, wood and seeds that are implicated to cure diseases (Lalagoud et al., 2013).