



**ANTIMICROBIAL STUDY
OF METHANOL CRUDE EXTRACT
OF *Pandanus amaryllifolius* LEAVES
AGAINST PATHOGENIC BACTERIA**

By

FATHIN NUR'EZZAH HISHAMUDDIN

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

2015

DECLARATION

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



(Fathin Nur Ezzah Hishamuddin)

TABLE OF CONTENTS

	PAGE
TITLE PAGE	
DECLARATION	ii
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENTS	iv
LIST OF TABLES	viii
LIST OF FIGURES	ix
LIST OF PLATES	xi
LIST OF ABBREVIATIONS	Xii
ABSTRACT	xiii
CHAPTER	
1. INTRODUCTION	1
1.1 Background study	1
1.2 Problem statements	3
1.3 Significance of study	4
1.4 Research objectives	5
1.4.1 General objectives	5
1.4.2 Specific objectives	5
1.5 Hypothesis	5
1.5.1 Null hypothesis	5
1.5.2 Alternative hypothesis	6
2 LITERATURE REVIEW	7
2.1 Extract of natural product	7
2.2 Introduction to <i>Pandanus amaryllifolius</i> Roxb	8
2.3 Biological compound of <i>Pandanus amaryllifolius</i> Roxb	10
2.4 Culinary and traditional use of <i>Pandanus amaryllifolius</i> Roxb	14
2.5 Medicinal use of <i>Pandanus amaryllifolius</i> Roxb	15
2.6 Antimicrobial activity of <i>Pandanus amaryllifolius</i> Roxb	16
2.7 Antimicrobial resistant	17
2.8 Tested bacteria	17
2.8.1 <i>S. aureus</i>	17
2.8.2 <i>E. coli</i>	17
2.8.3 <i>P. aeruginosa</i>	18
2.8.4 <i>P. mirabilis</i>	18
2.9 Antimicrobial Susceptibility Testing (AST)	19
2.10 Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC)	21
2.11 Preliminary Phytochemical Screening Test	22

ABSTRACT

ANTIMICROBIAL STUDY OF *Pandanus amaryllifolius* LEAVES AGAINST PATHOGENIC BACTERIA

Emergence and spread of antimicrobial resistant among pathogenic bacteria has become a global issue. Thus, to solve the problem, novel natural product as antimicrobial agents is required. Besides that, undesirable side effects of synthetic drugs also have changed the world attention to use natural product. *Pandanus amaryllifolius* Roxb is a fragrant plant that comes from a family of *Pandanacea*. Since ancient time, it has been used as traditional herb and also flavouring agents in cooking besides exhibit antioxidant, antiviral and anticancer abilities. However, limited antimicrobial study has done on the leaves. Therefore, this study was undertaken to investigate the antimicrobial activity of *Pandanus amaryllifolius* leaves against pathogenic bacteria and screening the presence of phytochemical compounds. 1000mg/ml concentration of leaves extract was tested against *S. aureus* (ATCC 43300), *E. coli* (ATCC 25922), *P. mirabilis* (ATCC 12453) and *P. aeruginosa* (ATCC 10145) by using disk diffusion method. Bacteria that show susceptible are subjected to MIC and MBC test. Result shows that leaves extract has antimicrobial activity against *S. aureus* (ATCC 43300) and *P. mirabilis* (ATCC 12453) but resistant against *E. coli* (ATCC 25922) and *P. aeruginosa* (ATCC 10145). In addition, *P. mirabilis* (ATCC 12453) has greatest antimicrobial effect with MBC value of 500 mg/ml compared to 1000mg/ml MBC value for *S. aureus* (ATCC 43300). The leaves extract also shown the presence of alkaloids, flavonoids, phenols, tannins, steroids, terpenoids, and carbohydrates compounds. Therefore, it can be concluded that, methanol extract of *P. amaryllifolius* leaves has potential as antimicrobial agent with the presence of phytochemical compound.

Keywords: *pandan* leaves, *Pandanus amaryllifolius*, antimicrobial activity, phytochemical compound, pathogenic bacteria

Chapter 1

Introduction

1.1 Background of study

The emergence and spread of antimicrobial resistant bacteria across both developing and developed countries (Sivasankar, Rajan, Maina, & Suvarna, 2013) has given a huge burden on the medical care setting. Lately, this problem become a global crisis (Farjana, Zerin, & Kabir, 2014) since the prevention methods still uncertain. In addition, the number of antimicrobial resistant bacteria retain increasing lately even there are persistent productions of new antibiotics since few decades ago (Nascimento, Locatelli, Freitas, & Silva, 2000). The bacteria also not only resistant to one type of antibiotic but several antibiotics especially drugs that have been used as antimicrobial agent for a longer period of time. According to Farjana et al., (2014), the increasing number of antimicrobial resistant bacteria may due to indiscriminate used of commercial antimicrobial drugs. Moreover, there are also study reported that the probability of inadequately new antibiotics to combat the aroused problem (Freire-moran et al., 2011).

Thus, development of antimicrobial drug from natural product should be emphasized as one of the strategy to solve the problem. World Health Organization (WHO) said that medicine plant can be the most suitable source of natural product to acquire a variety of drugs (Nascimento et al., 2000) for making antimicrobials. Moreover, since few decades ago, plants have been used as traditional medicine cross the world for therapeutic remedies of many types of diseases. In developed countries, about 80% of the people use traditional medicine (Nascimento et al., 2000) for treatment of pathological condition. In addition, there are numbers of studies have been done associated with screening of medicinal plant for it antimicrobial activity (Sivasankar et al., 2013).