

**ANTIBACTERIAL ACTIVITY ON STEM AND LEAF OF  
*Neptunia natans* EXTRACT**

**NUR NAZIHANI BINTI MUHAMAD NAZIR**

**Final Year Project Report Submitted in  
Partial Fulfillment of the Requirement for the  
Degree of Bachelor Science (Hons.) Biology  
in the Faculty of Applied Sciences  
University Teknologi MARA**

**JULY 2018**

This Final Year Project Report entitled “**Antibacterial Activity on Stem and Leaf of *Neptunia natans* Extract**” was submitted by Nur Nazihani binti Muhamad Nazir, in partial fulfillment of the requirement for the Degree of Bachelor Science (Hons.) Biology, in the Faculty of Applied Sciences, and was approved by

---

Mohd Syahril bin Mohd Zan  
Supervisor  
Faculty of Applied Sciences  
University Teknologi MARA (UiTM)  
Negeri Sembilan, Kampus Kuala Pilah,  
Pekan Parit Tinggi, 72000 Kuala Pilah  
Negeri Sembilan

---

Lily Syahani binti Rusli  
Coordinator FSG661 AS201  
Faculty of Applied Sciences  
Universiti Teknologi MARA (UiTM)  
Negeri Sembilan, Kampus Kuala Pilah,  
Pekan Parit Tinggi, 72000 Kuala Pilah  
Negeri Sembilan

---

Dr Aslizah binti Mohd. Aris  
Head of Biology School  
Faculty of Applied Sciences  
Universiti Teknologi MARA (UiTM)  
Negeri Sembilan, Kampus Kuala Pilah,  
Pekan Parit Tinggi, 72000 Kuala Pilah  
Negeri Sembilan

Date: \_\_\_\_\_

## TABLE OF CONTENTS

	<b>Page</b>
<b>ACKNOWLEDGEMENT</b>	<b>iii</b>
<b>TABLE OF CONTENT</b>	<b>iv</b>
<b>LIST OF TABLES</b>	<b>vi</b>
<b>LIST OF FIGURES</b>	<b>vii</b>
<b>LIST OF ABBREVIATIONS</b>	<b>viii</b>
<b>ABSTRACT</b>	<b>ix</b>
<b>ABSTRAK</b>	<b>x</b>
<b>CHAPTER 1: INTRODUCTION</b>	
1.1 Background study	1
1.2 Problem Statement	3
1.3 Significance of the Study	4
1.4 Objectives of the Study	5
<b>CHAPTER 2: LITERATURE REVIEW</b>	
2.1 Medicinal plants and herbs	6
2.2 <i>Neptunia natans</i>	8
2.2.1 Properties of <i>Neptunia natans</i>	8
2.2.2 Medicinal Value of <i>Neptunia natans</i>	10
2.3 Disc and Agar Well Diffusion Technique	12
2.4 Minimum Inhibitory Concentration (MIC)	14
2.5 Microbial Metabolites	15
<b>CHAPTER 3: METHODOLOGY</b>	
3.1 Materials	17
3.1.1 Raw materials	17
3.1.2 Chemicals and reagents	17
3.1.3 Apparatus	17
3.2 Methods	18
3.2.1 Samples preparation and extraction	18
3.2.2 Antibacterial assay	19
3.2.2.1 Bacteria preparation	19
3.2.2.2 Disc diffusion	20
3.2.2.3 Agar Well Diffusion	21
3.2.2.4 Minimum Inhibitory Concentration (MIC)	21
3.3 Statistical Analysis	22

<b>CHAPTER 4: RESULTS AND DISCUSSION</b>	
4.1 Extraction of <i>Neptunia natans</i>	24
4.2 Antibacterial assay	26
4.3 Statistical Analysis	33
4.4 Minimum Inhibitory Concentration (MIC)	34
<b>CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS</b>	
5.1 Conclusions	35
5.2 Recommendations	36
<b>CITED RERENCES</b>	<b>37</b>
<b>APPENDICES</b>	<b>41</b>
<b>CURRICULUM VITAE</b>	<b>45</b>

## ABSTRACT

### ANTIBACTERIAL ACTIVITY ON STEM AND LEAF OF *Neptunia natans* EXTRACT

The leaf and stem of methanolic extraction of *Neptunia natans* were investigated for their antibacterial activity against *Salmonella* spp. (Gram negative bacteria) and *Staphylococcus* spp. (Gram positive bacteria). The tests were conducted in vitro and two different methods, which were disc diffusion and agar well diffusion method, were used to evaluate this study. Both of the methods have almost similar technique but it differs in term of sensitivity towards the metabolites compound in the plant. Three different dose of concentration were used to measure the antibacterial activity against selected bacteria which were 500mg/ml, 700mg/ml and 1000mg/ml. The inhibition zones for both samples of leaf and stem of *Neptunia natans* were measured and compared. Streptomycin and dimethyl sulfoxide (DMSO) act as positive and negative control respectively. Leaves extract from methanol demonstrate a relatively higher inhibition zones of compared to stem. Leaves exhibit  $15.07 \pm 2.30$ mm zone of inhibition against *Staphylococcus* spp. using agar well diffusion method meanwhile, stem showed  $11.50 \pm 1.06$ mm zones of inhibition against the same bacteria by using the same method. However, the value of significance difference in statistical analysis were all  $p > 0.05$ . This indicate that the result showed no significance difference between all the three different concentrations of the extracts used. The minimum inhibitory concentration (MIC) for leaves against both of the bacteria was 62.5mg/ml. Concurrently, 125mg/ml were regarded as MIC for stem methanolic extract. Thus, it can be concluded that the leaves have a better potential to become an antibacterial agent compared to the stem.