

This Final Year Project Report entitled "The secondary metabolites and antioxidant potential of selected terrestrial isolates of actinomycetes" was submitted in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons.) Biology, in the Faculty of Applied Sciences, and was approved by



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## TABLE OF CONTENTS

	<b>Page</b>
<b>CHAPTER 3 CONCLUSION AND RECOMMENDATIONS</b>	
3.1 Conclusion and recommendation	32
<b>ACKNOWLEDGEMENTS</b>	iii
<b>TABLE OF CONTENTS</b>	iv
<b>LIST OF TABLES</b>	vi
<b>LIST OF FIGURES</b>	vii
<b>LIST OF ABBREVIATIONS</b>	viii
<b>ABSTRACT</b>	ix
<b>ABSTRAK</b>	x
<b>CHAPTER 1 INTRODUCTION</b>	
1.1 Background of study	1
1.2 Problem of study	4
1.3 Significance of study	5
1.4 Objectives of study	5
<b>CHAPTER 2 LITERATURE REVIEW</b>	
2.1 Actinomycetes	6
2.2 Secondary metabolites	10
2.3 Antioxidant potential	12
<b>CHAPTER 3 METHODOLOGY</b>	
3.1 Materials	14
3.1.1 Raw materials	14
3.1.2 Chemicals	14
3.1.3 Apparatus	15
3.2 Methods	16
<b>CHAPTER 4 RESULTS AND DISCUSSION</b>	
4.1 Isolation and identification of actinomycetes isolates	25
4.1.1 The culture of actinomycetes isolates	28
4.1.2 Identification of actinomycetes isolates	30
4.1.2.1 Primary screening of the actinomycetes isolates for antibacterial activity	30
4.1.2.2 Gram staining	33
4.1.2.3 Non-staining KOH method	36
4.1.2.4 Morphological characteristics of actinomycetes	37
4.1.3 Fermentation and extraction of actinomycetes secondary metabolites	40
4.2 Secondary metabolites screening of actinomycetes isolates	41
4.3 Antioxidant potential determination using DPPH assay	44

## LIST OF FIGURES

Figure	Caption	Page
3.2	Flow charts of the study	16
4.1	The isolation of terrestrial actinomycetes soil samples A1	26
4.2	The isolation of terrestrial actinomycetes soil samples A2	26
4.3	The isolation of terrestrial actinomycetes soil samples A3	27
4.4	The isolation of terrestrial actinomycetes soil samples A4	27
4.5	The culture of selected actinomycetes isolates.	29
4.6	The inhibition growth was present against test bacterium of <i>Escherichia coli</i> .	31
4.7	The inhibition growth was present against test bacterium of <i>Pseudomonas aeruginosa</i> .	31
4.8	The inhibition growth was present against test bacterium of <i>Staphylococcus aureus</i> .	32
4.9	The gram staining for N1, N2, N3 and N4 isolates using 100x magnification.	34
5.0	The fermentation and extraction of actinomycetes secondary metabolites processes.	40
5.1	The percentage of inhibition of in-vitro antioxidant activity of ascorbic acid.	46
5.2	The percentage of inhibition of in-vitro antioxidant activity of crude extracts.	49

## ABSTRACT

### THE SECONDARY METABOLITES AND ANTIOXIDANT POTENTIAL OF SELECTED TERRESTRIAL ISOLATES OF ACTINOMYCETES

The purpose of this study is to isolate, detect secondary metabolites and to determine the antioxidant potential of selected terrestrial isolates of actinomycetes. The four antagonistic actinomycetes N1, N2, N3 and N4 were isolated and identified as a genus *Streptomyces* based on the primary screening of antibacterial potential, gram staining, KOH staining, morphological observation and colony morphology observation. The supernatants of crude extracts were extracted using ethyl acetate solvents and secondary metabolites screening for six compounds such as alkaloids, flavonoids, phenols, saponins, tannins and terpenoids were performed using the ethyl acetate crude extracts and all of the crude extracts showed a presence of different compounds of secondary metabolites. The crude extracts were then further investigated for its antioxidant activity using 1,1-diphenyl, 2 picryl hydrazyl (DPPH) radical scavenging activity. Based on the DPPH scavenging activity results it revealed that all crude extracts from strains N1, N2, N3 and N4 showed a significant potential of antioxidant properties. Besides that, the activity of the crude extracts with the highest inhibition percentage of 80.58% was belonged to N2 isolate. Therefore, the information from this current study can help to provide valuable insight of the terrestrial actinomycetes and also provide inventory data for further identification of potent compounds which might be developed as good antioxidant agent in the future.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of study

There a large number of microorganisms that exist in the soil due to the present of carbon that act as energy source for the microorganisms. The small size of the microorganisms show that they have a smaller biomass. Actinomycetes as one of the microorganisms inside the soil that are a smaller in terms of number but larger in terms of size. Microorganisms such as bacteria, actinomycetes and protozoa are withstanding and has a high tolerance towards soil disturbance (Hoorman, 2010). Moreover, soil microorganisms are the important key element in ecosystem includes nutrient acquisition, nitrogen and carbon cycling and as well as for the soil formation, they are comprised of a large portion of the diversity on earth (Marcel, 2008). Actinomycetes are single-celled organisms which belong to the phylum of actinobacteria and can be considered as an intermediate form between bacteria and fungi (Barka *et al.*, 2016). Actinomycetes's name was initially originated from greek word which is aktis (a ray) and mykes (fungus) (Hemashenpagam, 2011). Actinomycetes belongs to the order of actinomycetales and also strong antagonist microorganisms (Anitha and Sudha, 2014).