

UNIVERSITI TEKNOLOGI MARA

**THE ANTIBACTERIAL ACTIVITY OF MALAYSIAN
MARINE ENDOPHYTIC FUNGI FRACTIONS AGAINST
GRAM NEGATIVE BACTERIA**

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TABLE OF CONTENTS

	PAGE
TITLE PAGE	
APPROVAL	
ACKNOWLEDGEMENT	i
TABLE OF CONTENTS	ii
LIST OF TABLES	iv
LIST OF FIGURES	v
LIST OF ABBREVIATIONS	vii
ABSTRACT	viii
CHAPTER ONE (INTRODUCTION)	1
CHAPTER TWO (LITERATURE REVIEW)	
2.1 Natural product	4
2.1.1 Antibacterial Resistance	5
2.2 Marine natural products	6
2.3 Seaweed	8
2.4 Endophytes	9
2.5 Active metabolites of marine endophytes	11
CHAPTER THREE (METHODOLOGY)	
3.1 Samples preparation	13
3.2 High Performance Liquid Chromatography (HPLC) Profiling	14
3.3 Bioassay guided fractionation	15
3.3.1 Antibacterial quick screening assay	16

ABSTRACT

Marine natural products reported to exhibit various bioactivity such as antimicrobial, anti-tuberculosis, antiviral, antiprotozoal, anti-oxidant, immunomodulatory, anti-diabetes, anti-inflammatory and anticancer. Biologically active metabolites obtained from marine endophytic fungi reported to have excellent sources for treatment of various diseases particularly against antibacterial resistance. In this study three marine endophytic fungi extracts *Gracilaria coronopifolia* (CN), *Gracilaria arcuata zanardin* (MV) and *Chaetomorpha minima* (UF) were used to investigate the antibacterial activity against three pathogenic gram-negative bacteria (*Pseudomonas aeruginosa*, *Escherichia coli* and *Salmonella typhimurium*). These three marine endophytic fungi extracts previously exhibited promising antibacterial activity. In order to verify the antibacterial component of these three marine endophytic fungi extracts, the antibacterial component was isolated by using bio-guided fractionation assay. Bioassay guided fractionation was performed on the ethyl acetate of marine endophytic fungi extracts to isolate the active fractions. The fractions of extracts (CN, MV, and UF) exhibited highest bacterial inhibition against *Pseudomonas aeruginosa* (82.1%). *Salmonella typhimurium* showed the least inhibition after being treated with fractions extracts (30.1%). Out of three extracts, MV fractions showed the highest activity against *Pseudomonas aeruginosa*. Therefore, these active identified fractions might have a great potential to be an alternate source as antibacterial agent against *Pseudomonas aeruginosa*. Further studies should be carried out to isolate the potential identified active fractions. In conclusion, the active fractions of three marine endophytic fungi extracts were successfully identified.

CHAPTER ONE

INTRODUCTION

Natural products play crucial role in healthcare especially plant-based products which comes from marine environment. Marine environments consist of various marine organisms which include marine invertebrates, marine plants and other associated microorganism, have been reported to have more than 4000 bioactive marine natural products, thus making it as one of the most valuable platform to discover new biologically active compound (El-Hossary et al., 2016). This marine natural products exhibit various bioactivity such as antimicrobial, anti-tuberculosis, antiviral, antiprotozoal, anti-oxidant, immunomodulatory, anti-diabetes, anti-inflammatory and anticancer (El-Hossary et al., 2016).

Seaweeds or macroalgae are marine organisms that have promising compound which can be used as source for antibiotic substances (El Shafay et al., 2016). Biologically active metabolites obtained from marine endophytic fungi were reported to have excellent sources for treatment of various disease (Gouda et al., 2016). Marine endophytes particularly is a strong candidate for drug compared to terrestrial endophytes because they face a huge challenge to survive under harsh environment (Pérez et al., 2016). Harsh biological, physical and chemical parameters of marine ecosystem will influence its organism and causes them to evolve and further develops adaptation by producing metabolites to defend themselves (Paliany et al., 2014).