

UNIVERSITI TEKNOLOGI MARA

INVESTIGATION OF SECONDARY METABOLOMIC PROFILE OF FUNGI  
ISOLATED FROM MALAYSIAN AQUATIC BIOSPHERE

HUSIN BIN ZAINAL ABIDIN

Dissertation submitted in partial fulfillment of the requirements for the degree of  
Bachelor of Pharmacy (Hons.)

FACULTY OF PHARMACY

2013

## ACKNOWLEDGEMENTS

I am very thankful and grateful that I have finished my thesis writing. First and foremost I would like to thank to Allah s.w.t for all his Blessing and guidance at every stage of my life and for giving me the strength to complete this research.

I wish to express gratitude and appreciation to my research supervisor Dr. Syed Adnan Ali Shah for his guidance, valuable advices, constructive comments and patience in helping this research for me. He always had time for questions and discussions. I am very lucky being one of his students.

I also would like to express my highly gratitude to master student, Normahanim Binti Hassan as well as staffs of RIND laboratory for providing me with help, opinion and guidance.

I would like to acknowledge Universiti Teknologi Mara (UiTM) for their help as they will supply the sample of fungi to be used in the research.

I wish to appreciate and thanks to Prof. Dr. Jean-Frederic Faizal Weber for his advice, guidance and suggestions to complete this work successfully.

I also would like to extend my appreciation and thanks to Dr. Nurhuda Manshoor for her critics during research presentation in order to guide and support me in completing this writing.

Finally, I would like to express a special thanks to my parents and my groupmates for each suggestion and encouragement to work harder in completing this thesis project.

## TABLE OF CONTENTS

	Page
TITLE PAGE	
APPROVAL SHEET	
ACKNOWLEDGEMENTS	2
TABLE OF CONTENTS	3
LIST OF TABLES	5
LIST OF FIGURES	6
LIST OF ABBREVIATION	8
ABSTRACT	9
CHAPTER ONE (INTRODUCTION)	
1.1 Introduction of aquatic microorganisms	10
1.2 Introduction of marine fungi	11
1.3 Secondary metabolite of algae-derived fungi	13
1.4 Secondary metabolite of sponge-derived fungi	14
1.5 Objectives	17
1.6 Significance of the study	17
1.7 Limitation of study	17
1.8 Problem statement	18
CHAPTER TWO (LITERATURE REVIEW)	
2.1 Description of aquatic fungi	19
2.2 Pharmacology of isolated metabolites	21
2.3 Secondary metabolite from marine fungi	24
2.4 Potential anti-cancer agents	27
CHAPTER THREE (MATERIALS AND METHODS)	
3.1 General procedures	31
3.2 Fungal collection	31
3.3 Chemicals	32
3.4 Preparation of media	32
3.5 Inoculation of fungi	33
3.6 Extraction of fungal metabolomes	35
3.7 Investigation through HPLC	37

## **ABSTRACT**

The investigation of secondary metabolites of selected fungi which is isolated from fresh water marine biosphere were done and studied since years ago. Some bioactive secondary metabolite show some interesting properties such as antibacterial, antiviral and anticancer. But recently, the effect of fungal media upon metabolites production has less been studied on fungi. In this sample, the sample was collected from Selat Melaka sea. To identify the secondary metabolites, the sample was inoculated in the media consisting of PDA and MEA. After several weeks, the growing fungi were then extracted and subjected to HPLC chromatography. Through the analysis of the result, different media gave different density of secondary metabolites.

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction of aquatic microorganisms

Aquatic microorganisms, particularly fungi and bacteria, have provided new incentives for marine natural products research over the past 15 years, and also continue to be the subject of vigorous chemical investigation (Blunt *et al.*, 2003). The diversity of secondary metabolites reported during the recent decade is fascinating. This highlights the importance of aquatic microorganisms as a source of natural products (Faulkner *et al.*, 2000).

The aquatic environment comprises nearly three quarters of the earth's surface, and can be considered a soup of essentially all imaginable types of microbes (Wright *et al.*, 1999). They may occur suspended, on living or inanimate surfaces as epibionts, or as symbionts. Microorganisms play important roles in all the major elemental cycles in the oceans (Hawksworth *et al.*, 1991), and are intimately involved in ecological phenomena, e.g. biofouling, settlement, and metamorphosis. The aquatic environment is unique in terms of its specific composition in both organic and inorganic substances, as well as temperature ranges, and pressure conditions. Ecological niches e.g. deep-sea hydrothermal vents, mangrove forests, algae, sponge, and fish provide habitats for the evaluation of specific microorganisms (Kohlmeyer *et al.*, 1979). The difficulties associated with the collection of aquatic macroorganisms as well as the inadequate amount of the bioactive substance