

TABLE OF CONTENTS

COVER	i
TITLE PAGE	ii
APPROVAL SHEET	iii
PERNYATAAN BEBAS PLAGIASI	iv
Acknowledgements	v
PREFACE	vi
TABLE OF CONTENTS	viii
LIST OF FIGURES	x
LIST OF TABLES	xi
LIST OF APPENDICES	xii
ABBREVIATIONS	xiii
ABSTRACT	xiv
CHAPTER I INTRODUCTION	1
A. Background	1
B. Problem Statement	3
C. Urgency of Research	3
D. Objectives	4
E. Literature Review	4
1. Free Radicals and Oxidative Stress	4
2. Oxidative Stress and Skin Aging	8
3. Antioxidants	10
4. Marine Sponge <i>Suberea</i> sp.	15
5. Isolation and Chemical Characterization of Marine Organism	19
F. Theoretical Review	21
G. Hypothesis	22
CHAPTER II METHODS	23
A. Research Design	23
1. Research Design	23
2. Operational Variables	23
B. Equipment and Materials	23
1. Maceration	23
2. Partition	24

3. Solid Phase Extraction (SPE)	24
4. High Performance Liquid Chromatography (HPLC)	24
5. Liquid Chromatography Mass Spectrometry (LCMS)	25
6. Fourier Transform Infrared (FTIR)	25
7. DPPH Assay	25
8. ABTS Assay	25
C. Research Location	26
D. Research Procedures	26
1. Sponge Material	26
2. Maceration	26
3. Fractionation (Partition and Solid Phase Extraction)	27
4. Isolation and Phytochemical Analysis Using High Performance Liquid Chromatography (HPLC)	27
5. Liquid Chromatography-Mass Spectroscopy (LCMS)	28
6. Fourier Transform Infrared (FTIR)	29
7. DPPH Assay	30
8. ABTS Assay	30
E. Data Analysis	30
1. Maceration	30
2. DPPH and ABTS Assays	31
3. Liquid Chromatography-Mass Spectrometry (LCMS)	31
4. Fourier Transform Infrared (FTIR)	32
F. Research Framework	32
CHAPTER III RESULTS AND DISCUSSION	33
A. Sampling and Identification of Marine Sponge <i>Suberea</i> sp.	33
B. Isolation and radical scavenging activity of Marine Sponge <i>Suberea</i> sp.	35
C. Chemical Identification	43
CHAPTER IV CONCLUSION AND RECOMMENDATION	52
A. Conclusion	52
B. Recommendation	52
ACKNOWLEDGEMENTS	52
REFERENCES	54
APPENDICES	59