

## TABLE OF CONTENT

TITLE PAGE .....	i
LEGALIZATION SHEET .....	ii
FOREWORD .....	iv
LIST OF PUBLICATION.....	viii
TABLE OF CONTENT .....	ix
LIST OF TABLES .....	xi
LIST OF FIGURES .....	xii
LIST OF APPENDICES .....	xiv
ABREBIVATION.....	xv
ABSTRACT.....	xvi
INTISARI.....	xvii
CHAPTER I INTRODUCTION .....	1
1.1 Background.....	1
1.2 Problem statement .....	8
1.3 Research Objectives .....	8
1.4 Benefits.....	9
1.5. Research Gap.....	10
CHAPTER II LITERATUR REVIEW .....	13
2.1 Coconut Fruit .....	13
2.2 Phenolic Compounds .....	16
2.3. Oxidation Mechanism .....	18
2.4. Antioxidant: Types, Requirements, and Its Evaluation .....	21
2.4.1. Type of Antioxidant .....	21
2.4.1.1. Primary Antioxidant.....	21
2.4.1.2. Secondary Antioxidant.....	22
2.4.2. Antioxidant Requirements.....	22
2.4.3. Evaluation of Antioxidant Activity .....	22
2.5. Phenolic Compounds as Natural Antioxidant and Its Mechanism on Oxidation.....	26
2.6. Ultrasonic-assisted Extraction .....	29
2.7. Coconut By-products Extraction .....	36
2.8. Cookies: Ingredients and Studies Related Incorporation of By-products .....	39
2.8.1. Ingredients of Cookies .....	39
2.8.2. Incorporation of Agrifood Waste into Cookies.....	40
CHAPTER III THEORETICAL BASIS AND HYPOTHESIS .....	46
3.1. Theoretical Basis .....	46
3.2. Hypothesis .....	51
CHAPTER IV MATERIALS AND METHODS .....	52
4.1. Time and Place of Research .....	52
4.2. Research Material, Chemicals and Reagents.....	52
4.2.1. Plants Material and Raw Material Preparation .....	52

4.2.2. Chemicals and Reagents.....	53
4.3. Instrumentation.....	54
4.4. Research Design .....	55
4.4.1. Exploration of The Antioxidant Activity of The Mesocarp and Endocarp (stage 1) .....	57
4.4.2. Optimization of Ultrasound-assisted Extraction/UAE (stage 2).....	62
4.4.3. Application of Young Coconut Mesocarp into Cookies (stage 3) .....	69
CHAPTER V RESULT AND DISCUSSION .....	80
5.1. Exploration of Antioxidant from Meso- and Endocarp of Two Maturation Stage.....	80
5.1.1. The Extraction Yield of Coconut Meso- and Edocarp.....	80
5.1.2. The Antioxidant Activity of Coconut Meso- and Endocarp .....	82
5.1.3. The Total Phenolic Content of Coconut Meso- and Endocarp .....	88
5.1.4. Identification of Phenolic Compounds using HPLC-DAD.....	89
5.1.5. Correlation Between Total Phenolic Content and Antioxidant Activities ..	90
5.2. Optimization of Ultrasound-assisted Extraction (UAE).....	92
5.2.1. Effects of Extraction Variables .....	93
5.2.2. Polynomial Models for The Response Surface.....	95
5.2.3. Multi-response Optimization.....	96
5.2.4. Identification of Phenolic Compounds.....	98
5.2.5. The Determination of Optimum Extraction Time.....	101
5.2.6. Precisions of UAE Process.....	103
5.3. Incorporation of Young Mesocarp (YM) Powder into Cookies.....	104
5.3.1. Chemical Composition of Cookies .....	104
5.3.2. Texture of Cookies.....	107
5.3.3. Color Measurement of Cookies.....	109
5.3.4. Antioxidant Activity of Cookies .....	111
5.3.5. Individual Phenolic Compounds of Cookies and Its Stability .....	112
5.3.6. Oxidative Stability During Storage .....	116
5.3.7. General Discussion.....	120
CHAPTER VI CONCLUSION AND SUGGESTIONS.....	126
6.1. Conclusion .....	126
6.2. Suggestion .....	127
REFERENCES.....	129
APPENDICES .....	146