

Content

Title Page.....	i
Approval Page.....	ii
Statement.....	iii
Content.....	iv
List of Figures.....	vi
List of Tables.....	vii
List of Appendixes.....	viii
Abstract.....	ix
Intisari.....	x
Chapter I – INTRODUCTION.....	1
A. Research Background.....	1
B. Problem Statements.....	4
C. Research Originality.....	5
D. Research Outcome.....	6
E. Research Objective.....	6
Chapter II – LITERATURE STUDY.....	7
A. Literature Review.....	7
1. <i>Sida rhombifolia</i>	7
a. Secondary metabolites found in <i>Sidaguri</i>	9
b. Antioxidant activity of <i>Sidaguri</i>	12
2. Ultrasound-assisted extraction (UAE).....	15
a. Mechanism of UAE.....	16
b. The comparison of UAE to other novel extraction techniques.....	18
c. UAE for bioactive compound extraction.....	19
3. Box-Behnken designs (BBD).....	26
4. FT-IR Spectroscopy.....	27
a. FTIR-ATR spectroscopy for metabolomic fingerprinting.....	29
5. Chemometrics for classification.....	30
a. Principal component analysis (PCA).....	31
b. Partial least square (PLS).....	32
B. Theoretical Framework.....	32
C. Conceptual Framework.....	34
D. Hypothesis.....	35
Chapter III – RESEARCH METHODOLOGY.....	36
A. Research Design.....	36
B. Materials.....	36
C. Variable Identification.....	36
D. Instrumentation.....	37

E. Methods	37
1. Plant identification	37
2. Drying size reduction and homogenization	37
3. Optimization of ultrasound-assisted extraction (UAE)	38
4. Experimental design	39
5. Analysis of FT-IR spectra	41
6. Antioxidant activity using <i>in vitro</i> assay	41
7. Total phenolic content assay	42
F. Flowchart research	44
G. Data analysis	44
CHAPTER IV - RESULTS AND DISCUSSION	45
A. Preliminary study to select the suitable solvent for optimization variable	45
B. Model fitting	46
C. The effect of those significant variables to the response	50
1. Sample to solvent ratio	50
2. Extraction temperature	51
3. Methanol concentration	51
4. Power Sonication	52
D. Extraction time optimization	52
E. Precision	53
F. Antioxidant activities of Sidaguri from 8 regions	53
G. Classification of Sidaguri based on FTIR spectra	57
H. Partial least square for radical scavenging activity prediction in Sidaguri	61
CHAPTER V - CONCLUSIONS AND SUGGESTIONS	64
A. Conclusions	64
B. Suggestions	65
References	66
Appendixes	72