

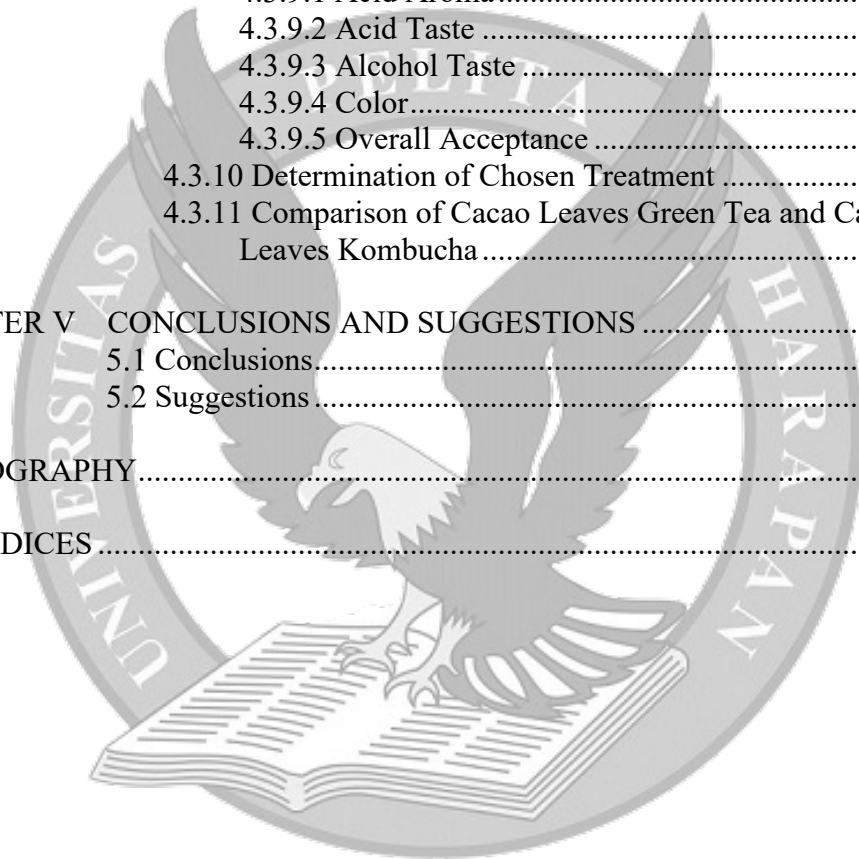
TABLE OF CONTENTS

page

COVER	
FINAL ASSIGNMENT STATEMENT AND UPLOAD AGREEMENT	
APPROVAL BY THESIS SUPERVISOR	
APPROVAL BY THESIS EXAMINATION COMMITTEE	
ABSTRACT	v
ACKNOWLEDGEMENTS.....	vi
TABLE OF CONTENTS	ix
LIST OF TABLES.....	xii
LIST OF FIGURES.....	xiii
LIST OF APPENDICES.....	xiv
CHAPTER I INTRODUCTION.....	1
1.1 Background.....	1
1.2 Research Problem	3
1.3 Objectives	4
1.3.1 General Objectives.....	4
1.3.2 Specific Objectives	4
CHAPTER II LITERATURE REVIEW	5
2.1 Kombucha.....	5
2.1.1 Green Tea.....	7
2.1.2 Black Tea	8
2.2 Cacao leaves (<i>Theobroma cacao</i> L.)	9
2.3 Antioxidant Activity	11
2.4 Kombucha Standards	12
CHAPTER III RESEARCH METHODOLOGY	13
3.1 Materials and Equipment.....	13
3.2 Research Method	14
3.2.1 Research Stage I	14
3.2.2 Research Stage II	16
3.3 Experimental Design	17
3.3.1 Research Stage I	17
3.3.2 Research Stage II	18
3.4 Analysis Procedure	20
3.4.1 Moisture Content (AOAC, 2005 with modifications).....	20
3.4.2 Total Soluble Solids (Jakubczyk <i>et al.</i> , 2020 with modifications).....	21
3.4.3 Colour (Arumsari <i>et al.</i> , 2019)	21
3.4.4 pH (Ahmed <i>et al.</i> , 2020).....	22
3.4.5 Total Titratable Acidity (Ozyurt <i>et al.</i> , 2020 and Rohman <i>et al.</i> , 2017).....	22

3.4.6 Total Phenolic Content (Ozyurt <i>et al.</i> , 2020 with modifications).....	22
3.4.7 Total Flavonoid Content (Sant'ana <i>et al.</i> 2011 with modifications).....	23
3.4.8 Total Condensed Tannin (Anris <i>et al.</i> , 2020 with modifications).....	23
3.4.9 Antioxidant Activity (Dwiputri and Feroniasanti, 2019)	23
3.4.10 Thickness of Pellicle.....	24
3.4.11 Sensory Analysis (Rohman <i>et al.</i> , 2017)	24
CHAPTER IV RESULTS AND DISCUSSIONS	26
4.1 Cacao Tea Leaves Moisture Content.....	26
4.2 First Research Stage	27
4.2.1 Effect of Tea Processing Method on Antioxidant Activity of Cacao Leaves Tea	27
4.2.2 Effect of Tea Processing Method on Total Phenolic Content of Cacao Leaves Tea.....	29
4.2.3 Effect of Tea Processing Method on Total Flavonoid Content of Cacao Leaves Tea.....	30
4.2.4 Effect of Tea Processing Method on Total Condensed Tannin of Cacao Leaves Tea	32
4.2.5 Effect of Tea Processing Method on Color of Cacao Leaves Tea.....	33
4.2.5.1 Lightness	34
4.2.5.2 °Hue	35
4.2.6 Effect of Tea Processing Method on pH of Cacao Leaves Tea.....	35
4.2.7 Effect of Tea Processing Methods on Physicochemical Properties of Cacao Leaves Tea. Error! Bookmark not defined.	
4.3 Second Research Stage	36
4.3.1 Effect of Fermentation Time and Ratio of Cacao Leaves Tea to Mother Tea on Antioxidant Activity of Cacao Leaves Kombucha	37
4.3.2 Effect of Fermentation Time and Ratio of Cacao Leaves Tea to Mother Tea on Total Phenolic Content of Cacao Leaves Kombucha	40
4.3.3 Effect of Fermentation Time and Ratio of Cacao Leaves Tea to Mother Tea on Total Flavonoid Content of Cacao Leaves Kombucha	42
4.3.4 Effect of Fermentation Time and Ratio of Cacao Leaves Tea to Mother Tea on Total Titratable Acidity of Cacao Leaves Kombucha	44
4.3.5 Effect of Fermentation Time and Tea Concentration on pH of Cacao Leaves Kombucha.....	46

4.3.6 Effect of Fermentation Time and Ratio of Cacao Leaves Tea to Mother Tea on Total Soluble Solids of Cacao Leaves Kombucha	48
4.3.7 Effect of Fermentation Time and Ratio of Cacao Leaves Tea to Mother Tea on Thickness of Pellicle of Cacao Leaves Kombucha	49
4.3.8 Effect of Fermentation Time and Ratio of Cacao Leaves Tea to Mother Tea towards on Lightness of Cacao Leaves Kombucha	51
4.3.9 Effect of Fermentation Time and Ratio of Cacao Leaves Tea to Mother Tea towards Sensory Evaluation of Cacao Leaves Kombucha	52
4.3.9.1 Acid Aroma	52
4.3.9.2 Acid Taste	54
4.3.9.3 Alcohol Taste	55
4.3.9.4 Color	57
4.3.9.5 Overall Acceptance	58
4.3.10 Determination of Chosen Treatment	59
4.3.11 Comparison of Cacao Leaves Green Tea and Cacao Leaves Kombucha	59
CHAPTER V CONCLUSIONS AND SUGGESTIONS	62
5.1 Conclusions	62
5.2 Suggestions	63
BIBLIOGRAPHY	64
APPENDICES	73



LIST OF TABLES

	page
Table 3.1 Formulation of cacao leaves kombucha	17
Table 3.2 Experimental Design Research Stage I.....	17
Table 3.3 Experimental Design Research Stage II	18
Table 3.4 Munsell color system.....	21
Table 3.5 6-Point Scoring Test Parameters	24
Table 3.6 7-Point Scale of Hedonic Test	25
Table 4.1 Effect of tea processing method on °Hue of cacao leaves tea	35
Table 4.2 Effect of ratio of cacao leaves tea to mother tea on lightness of cacao leaves kombucha	51
Table 4.3 Effect of ratio cacao leaves tea to mother tea and fermentation time towards acid aroma hedonic test cacao leaves kombucha.....	53
Table 4.4 Effect of ratio cacao leaves tea to mother tea and fermentation time towards acid taste hedonic test cacao leaves kombucha	55
Table 4.5 Effect of ratio cacao leaves tea to mother tea and fermentation time towards alcohol taste scoring test cacao leaves kombucha	56
Table 4.6 Effect of ratio cacao leaves tea to mother tea and fermentation time towards alcohol taste hedonic value cacao leaves kombucha	56
Table 4.7 Effect of ratio cacao leaves tea to mother tea and fermentation time towards color scoring test cacao leaves kombucha	57
Table 4.8 Effect of ratio cacao leaves tea to mother tea and fermentation time towards color hedonic test cacao leaves kombucha	57
Table 4.9 Effect of ratio cacao leaves tea to mother tea and fermentation time towards overall acceptance hedonic test cacao leaves kombucha.....	58
Table 4.10 Comparison of antioxidant activity, total phenolic content, total flavonoid content, pH and lightness of cacao leaves green tea and cacao leaves kombucha	60

LIST OF FIGURES

	page
Figure 3.1 Flowchart of making cacao leaves tea.....	15
Figure 3.2 Flowchart of making cacao leaves kombucha.....	16
Figure 4.1 Effect of tea processing method on antioxidant activity of cacao leaves tea.....	28
Figure 4.2 Effect of tea processing methods on total phenolic content of cacao leaves tea.....	29
Figure 4.3 Effect of tea processing method on total flavonoid content of cacao leaves tea.....	31
Figure 4.4 Effect of tea processing methods on total condensed tannin of cacao leaves tea.....	32
Figure 4.5 Effect of tea processing method on lightness of cacao leaves tea.....	34
Figure 4.6 Effect of tea processing method on pH of cacao leaves tea.....	36
Figure 4.7 Effect of fermentation time on antioxidant activity of cacao leaves kombucha.....	37
Figure 4.8 Effect of ratio of cacao leaves tea to mother tea concentration on antioxidant activity of cacao leaves kombucha.....	39
Figure 4.9 Effect of fermentation time on total phenolic content of cacao leaves kombucha.....	40
Figure 4.10 Effect of ratio of cacao leaves tea to mother tea towards total phenolic content of cacao leaves kombucha.....	41
Figure 4.11 Effect of fermentation time and ratio of cacao leaves tea to mother tea on total flavonoid content of cacao leaves kombucha.....	42
Figure 4.12 Effect of fermentation time on total titratable acidity of cacao leaves kombucha.....	44
Figure 4.13 Effect of ratio of cacao leaves tea to mother tea on total titratable acidity of cacao leaves kombucha.....	45
Figure 4.14 Effect of fermentation time on pH of cacao leaves kombucha.....	46
Figure 4.15 Effect of ratio cacao leaves tea to mother tea on pH of cacao leaves kombucha.....	47
Figure 4.16 Effect of fermentation time and ratio of cacao leaves tea and mother tea on total soluble solids of cacao leaves kombucha.....	48
Figure 4.17 Effect of fermentation time and ratio of cacao leaves tea and mother tea on growth of pellicle.....	50
Figure 4.18 Effect of fermentation time on lightness of cacao leaves kombucha.....	51
Figure 4.19 Effect of ratio cacao leaves tea to mother tea and fermentation time towards acid aroma scoring test cacao leaves kombucha.....	52
Figure 4.20 Effect of fermentation time and ratio of cacao leaves tea to mother tea towards acid taste scoring test of cacao leaves kombucha.....	54

LIST OF APPENDICES

	page
Appendix A. Moisture Content Data of Cacao Tea Leaves	A-1
Appendix B. Data and Statistical Analysis Antioxidant Activity of Cacao Leaves Tea Research Stage I.....	B-1
Appendix C. Data and Statistical Analysis Total Phenolic Content Cacao Leaves Tea Research Stage I.....	C-1
Appendix D. Data and Statistical Analysis Total Flavonoid Content Cacao Leaves Tea Research Stage I.....	D-1
Appendix E. Data and Statistical Analysis Total Condensed Tannin Cacao Leaves Tea Research Stage I.....	E-1
Appendix F. Data and Statistical Analysis Colour of Cacao Leaves Tea Research Stage I	F-1
Appendix G. Data and Statistical Analysis pH of Cacao Leaves Tea Research Stage I	G-1
Appendix H. Data and Statistical Analysis Antioxidant Activity of Cacao Leaves Kombucha Research Stage II.....	H-1
Appendix I. Data and Statistical Analysis Total Phenolic Content of Cacao Leaves Kombucha Research Stage II	I-1
Appendix J. Data and Statistical Analysis Total Flavonoid Content of Cacao Leaves Kombucha Research Stage II	J-1
Appendix K. Data and Statistical Analysis Total Titratable Acidity of Cacao Leaves Kombucha Research Stage II	K-1

Appendix L.	
Data and Statistical Analysis pH of Cacao Leaves Kombucha Research Stage II	L-1
Appendix M.	
Data and Statistical Analysis Total Soluble Solids of Cacao Leaves Kombucha Research Stage II	M-1
Appendix N.	
Data and Statistical Analysis Growth of Pellicle of Cacao Leaves Kombucha Research Stage II.....	N-1
Appendix O.	
Data and Statistical Analysis Lightness of Cacao Leaves Kombucha Research Stage II	O-1
Appendix P.	
Scoring and Hedonic Test Sensory Evaluation Questionnaire	P-1
Appendix Q.	
Statistical Analysis of Scoring Test.....	Q-1
Appendix R.	
Statistical Analysis of Hedonic Test.....	R-1
Appendix S.	
Documentation of the Research.....	S-1

