

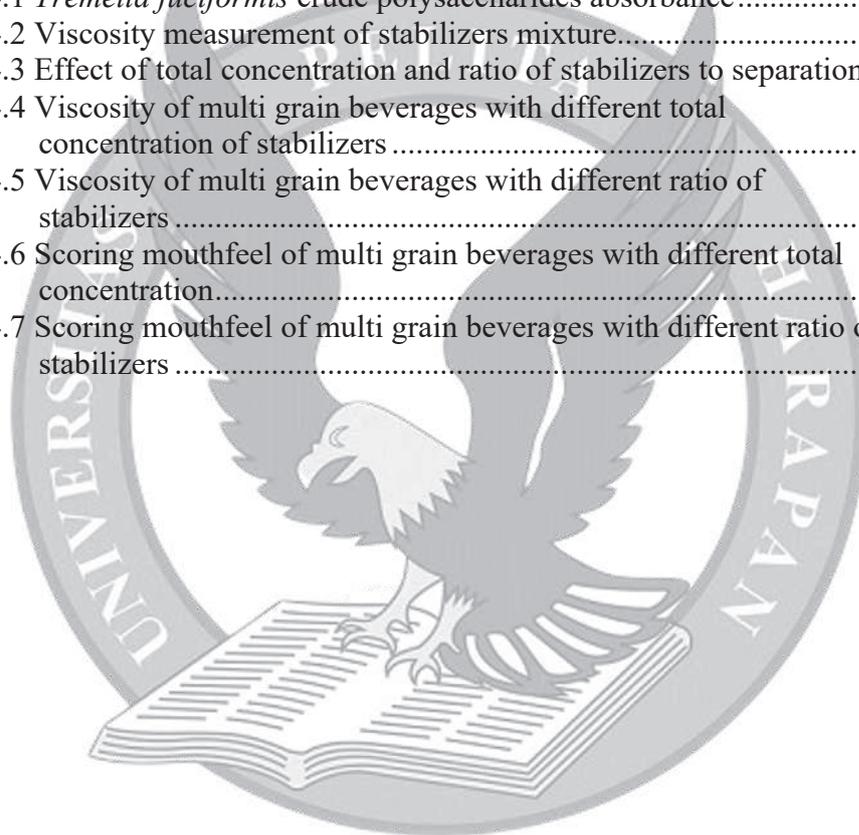
## TABLE OF CONTENTS

	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 FIGURES .....	xi
LIST OF TABLES.....	xii
LIST OF APPENDICES.....	xiii
CHAPTER I INTRODUCTION	
1.1 Background .....	1
1.2 Research Problem.....	2
1.3 Objectives.....	3
1.3.1 General Objective.....	3
1.3.2 Specific Objectives.....	3
CHAPTER II LITERATURE REVIEW	
2.1 Multi Grain Beverages .....	5
2.2 Barley .....	6
2.3 Oat .....	7
2.4 Buckwheat.....	8
2.5 Red Rice .....	9
2.6 Stabilizers.....	10
2.6.1 Xanthan Gum .....	10
2.6.2 Guar Gum.....	12
2.6.3 Carrageenan.....	13
2.7 Tremella fuciformis.....	14
2.7.1 Tremella fuciformis Polysaccharides Extraction .....	15
2.7.2 Tremella fuciformis Polysaccharides Composition .....	18
CHAPTER III RESEARCH METHODOLOGY	
3.1 Materials and Equipment .....	19
3.2 Research Method.....	19
3.2.1 Preliminary Research I.....	20
3.2.2 Preliminary Research II.....	21
3.2.3 Main Research.....	23
3.3 Experimental Design .....	25
3.3.1 Preliminary Research II.....	25
3.3.2 Main Research.....	27

3.4 Method of Analysis .....	29
3.4.1 Crude Polysaccharides Yield (Wang et al., 2020) .....	29
3.4.2 Ultraviolet-vis Analysis (Wang et al., 2020).....	29
3.4.3 Dietary Fiber (AOAC, 2005) .....	29
3.4.4 Viscosity (Wang et al., 2020).....	30
3.4.5 Suspension Stability (Fernandes et al., 2019) .....	31
3.4.6 pH (AOAC, 2005) .....	31
3.4.7 Color (Fernandes et al., 2019).....	31
3.4.8 Sensory Evaluation (Fernandes et al., 2019).....	32
 CHAPTER IV RESULTS AND DISCUSSION	
4.1 Identity of Tremella fuciformis .....	33
4.2 Tremella fuciformis Polysaccharide Yield.....	33
4.3 Tremella fuciformis crude polysaccharides purity.....	34
4.4 Dietary Fiber of Tremella fuciformis Crude Polysaccharides .....	35
4.5 Compatibility of Tremella fuciformis with Commercial Stabilizers .....	36
4.6 Effect of Ratio and Total Concentration of Stabilizers on Multi Grain Beverages .....	39
4.6.1 Suspension Stability (Separation Percentage).....	39
4.6.2 Viscosity.....	42
4.6.3 Lightness .....	44
4.6.4 pH.....	45
4.6.5 Sensory Evaluation.....	47
4.7 Selected Multi Grain Beverages Formulation.....	51
4.8 Dietary Fiber Content of Selected Multi Grain Beverages ....	51
 CHAPTER V CONCLUSIONS AND SUGGESTIONS	
5.1 Conclusions .....	53
5.2 Suggestions.....	54
 BIBLIOGRAPHY .....	55
 APPENDICES .....	58

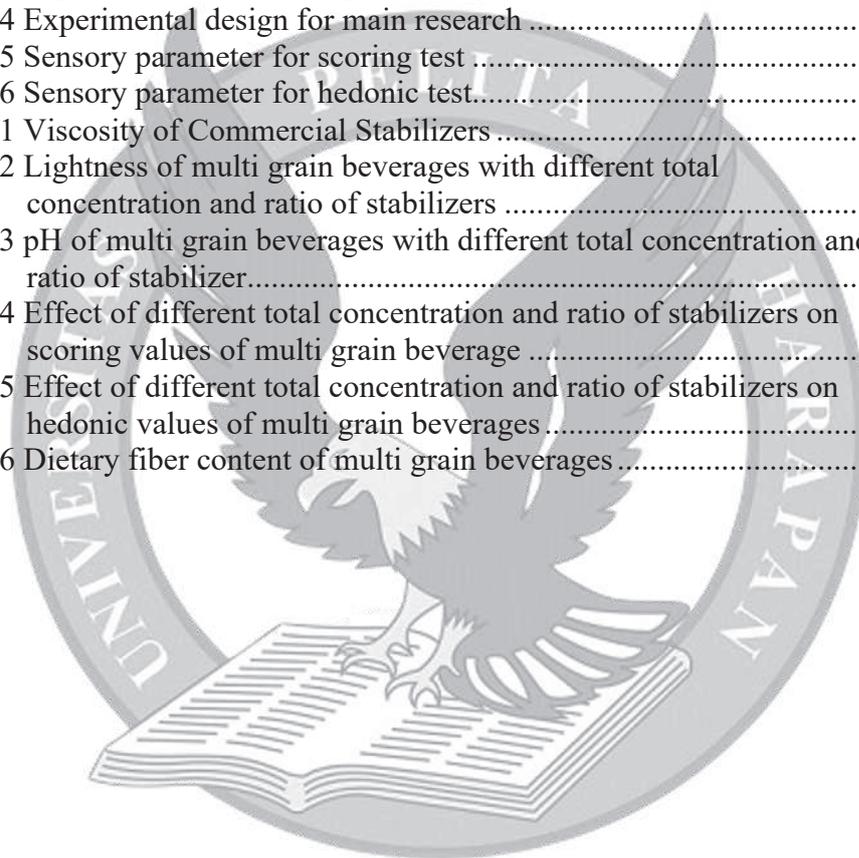
## LIST OF FIGURES

	Page
Figure 2.1 Molecule structure of Xanthan Gum.....	12
Figure 2.2 Molecule Structure of guar gum.....	13
Figure 2.3 Molecule structure of carrageenan .....	14
Figure 2.4 Molecular structure of <i>Tremella fuciformis</i> .....	15
Figure 3.1 Flowchart of crude polysaccharides extraction from <i>Tremella fuciformis</i> .....	20
Figure 3.2 Flowchart of making multi grain beverage .....	25
Figure 4.1 <i>Tremella fuciformis</i> crude polysaccharides absorbance.....	34
Figure 4.2 Viscosity measurement of stabilizers mixture.....	37
Figure 4.3 Effect of total concentration and ratio of stabilizers to separation.....	40
Figure 4.4 Viscosity of multi grain beverages with different total concentration of stabilizers .....	42
Figure 4.5 Viscosity of multi grain beverages with different ratio of stabilizers .....	43
Figure 4.6 Scoring mouthfeel of multi grain beverages with different total concentration.....	48
Figure 4.7 Scoring mouthfeel of multi grain beverages with different ratio of stabilizers .....	49



## LIST OF TABLES

	Page
Table 2.1 Nutritional composition of barley grains.....	7
Table 2.2 Nutritional composition of oat grains.....	8
Table 2.3 Nutritional composition of buckwheat grains.....	9
Table 2.4 Nutritional composition of red rice.....	10
Table 3.1 Formulation of multi grain beverages.....	24
Table 3.2 Formulation of stabilizers.....	24
Table 3.3 Experimental design for preliminary research II.....	26
Table 3.4 Experimental design for main research.....	27
Table 3.5 Sensory parameter for scoring test.....	32
Table 3.6 Sensory parameter for hedonic test.....	32
Table 4.1 Viscosity of Commercial Stabilizers.....	36
Table 4.2 Lightness of multi grain beverages with different total concentration and ratio of stabilizers.....	45
Table 4.3 pH of multi grain beverages with different total concentration and ratio of stabilizer.....	46
Table 4.4 Effect of different total concentration and ratio of stabilizers on scoring values of multi grain beverage.....	47
Table 4.5 Effect of different total concentration and ratio of stabilizers on hedonic values of multi grain beverages.....	50
Table 4.6 Dietary fiber content of multi grain beverages.....	51



## LIST OF APPENDICES

Appendix A.	
<i>Tremella Fuciformis</i> Identification .....	A-1
Appendix B.	
Polysaccharides Yield .....	B-1
Appendix C.	
UV-Vis Spectrophotometer Analysis.....	C-1
Appendix D.	
Dietary Fiber Content of <i>Tremella Fuciformis</i> Crude Polysaccharides .....	D-1
Appendix E.	
Compatibility of <i>Tremella Fuciformis</i> with Other Stabilizers .....	E-1
Appendix F.	
Suspension Stability .....	F-1
Appendix G.	
Viscosity.....	G-1
Appendix H.	
Color Lightness .....	H-1
Appendix I.	
pH.....	I-1
Appendix J.	
Scoring and Hedonic Questionnaire .....	J-1
Appendix K.	
Scoring Data of Multi Grain Beverages .....	K-1
Appendix L	
Statistic data for Scoring Test .....	L-1
Appendix M.	
Hedonic Data of Multi Grain Beverages.....	M-1

Appendix N.  
Statistic data for Hedonic Data.....N-1

Appendix O.  
Control Multi Grain Beverages Dietary Fiber Analysis.....O-1

Appendix P.  
Best Treatment Multi Grain Dietary Fiber Analysis ..... P-1

Appendix Q.  
Documentation .....Q-1

