

TABLE OF CONTENTS

	Page
COVER	
FINAL ASSIGNMENT STATEMENT AND UPLOAD AGREEMENT	
APPROVAL BY THESIS SUPERVISOR	
APPROVAL BY THESIS EXAMINATION COMMITTEE	
ABSTRACT	vi
ACKNOWLEDGEMENT	vii
TABLE OF CONTENTS	ix
LIST OF FIGURES	xi
LIST OF TABLES	xii
LIST OF APPENDICES	xiii
CHAPTER I INTRODUCTION	1
1.1 Background	1
1.2 Research Problem	4
1.3 Objectives	4
1.3.1 General Objectives	4
1.3.2 Specific Objectives	4
CHAPTER II LITERATURE REVIEW	6
2.1 Food fortification	6
2.2 <i>Moringa oleifera</i> Lam	6
2.3 Rice Milk	8
2.4 Dates	9
2.5 Phytic Acid	10
2.6 Calcium	12
CHAPTER III RESEARCH METHODOLOGY	14
3.1 Materials and Equipment	14
3.2 Research Method	14
3.2.1 Preliminary Stage	15
3.2.2 Research Stage I	16
3.2.3 Research Stage II	17
3.3 Experimental Design	20
3.3.1 Research Stage I	21
3.3.2 Research Stage II	22
3.4 Analysis Procedure	24
3.4.1 Yield (Buzera <i>et al.</i> , 2021)	24
3.4.2 Moisture Content (AOAC, 2005)	24
3.4.3 Phytic Acid (Makkar <i>et al.</i> , 2007)	25
3.4.4 Ash Content (AOAC, 2005)	26
3.4.5 Calcium Analysis	26
3.4.6 Total Soluble Solids (Rincon <i>et al.</i> , 2020; Jafari <i>et al.</i> , 2017)	27
3.4.7 Insoluble Solids (Kizzie-Hayford <i>et al.</i> , 2014)	27

3.4.8 Viscosity (Plengsaengsri <i>et al.</i> , 2019)	28
3.4.9 Sensory Evaluation (Khanifah <i>et al.</i> , 2017)	28
CHAPTER IV RESULTS AND DISCUSSION	30
4.1 Effect of Boiling Towards Phytic Acid Content of Moringa Leaf	30
4.2 Effect of Drying Time Towards Chemical Characteristics of Moringa Leaf Flour	31
4.2.1 Yield	31
4.2.2 Moisture Content.....	33
4.2.3 Ash Content.....	35
4.2.4 Calcium Content.....	36
4.3 Effect of Addition of Moringa Leaf Flour and Date Syrup Towards Characteristics of Rice Milk	37
4.3.1 Insoluble Solids	37
4.3.2 Viscosity	39
4.3.3 Total Soluble Solids	41
4.4 Effect of Addition of Moringa Leaf Flour and Date Syrup Towards Organoleptic Characteristics	42
4.4.1 Bitterness	42
4.4.2 Sweetness	44
4.4.3 Aroma	46
4.4.4 Mouthfeel	49
4.4.5 Overall Acceptance	52
4.5 Determination of Preferred Rice Milk Formulation	53
CHAPTER V CONCLUSION AND SUGGESTIONS	55
5.1 Conclusion	55
5.2 Suggestion.....	55

BIBLIOGRAPHY

APPENDIX

LIST OF FIGURES

	Page
Figure 2.1 Moringa leaves.....	7
Figure 2.2 Sukkari dates.....	9
Figure 3.1 Procedure of phytic acid reduction	15
Figure 3.2 Procedure of date syrup production.....	16
Figure 3.3 Procedure of moringa leaf powder production	17
Figure 3.4 Procedure of moringa rice milk production.....	18
Figure 4.1 Effect of drying time towards moisture content of moringa leaf flour	33
Figure 4.2 Effect of drying time towards calcium content of moringa leaf flour .	36
Figure 4.3 Effect of date syrup towards insoluble solids of rice milk	38
Figure 4.4 Effect of formulation of rice milk towards viscosity.....	40
Figure 4.5 Effect of rice milk formulation towards total soluble solids	41
Figure 4.6 Effect of date syrup towards bitterness scoring test	43
Figure 4.7 Effect of date syrup towards bitterness hedonic test	43
Figure 4.8 Effect of date syrup towards sweetness scoring test.....	45
Figure 4.9 Effect of date syrup towards sweetness hedonic test.....	46
Figure 4.10 Effect of date syrup towards aroma hedonic test.....	48
Figure 4.11 Effect of moringa leaf flour towards mouthfeel scoring test.....	49
Figure 4.12 Effect of date syrup towards mouthfeel hedonic test	50
Figure 4.13 Effect of moringa leaf flour towards mouthfeel hedonic test.....	51
Figure 4.14 Effect of date syrup towards overall acceptance of rice milk.....	52



LIST OF TABLES

	Page
Table 3.1 Moringa rice milk formulation.....	19
Table 3.2 Experimental design of research stage I	21
Table 3.3 Experimental design of research stage II	22
Table 3.4 7-point hedonic scale	29
Table 3.5 Scoring test parameters	29
Table 4.1 Phytic acid content in moringa leaves.....	30
Table 4.2 Effect of drying time towards yield of moringa leaf flour.....	31
Table 4.3 Effect of drying time towards ash content of moringa leaf flour.....	35
Table 4.4 Effect of moringa leaf flour towards the aroma scoring test of rice milk	47
Table 4.5 Effect of date syrup towards aroma scoring test of rice milk	47



LIST OF APPENDICES

	Page
Appendix A. Production of Moringa Leaf Flour	A-1
Appendix B. Analysis Results for Phytic Acid from UGM Laboratory	B-1
Appendix C. Statistical Analysis Results for Phytic Acid	C-1
Appendix D. Yield of Moringa Leaf Flour Production	D-1
Appendix E. Moisture Content of Moringa Leaf Flour	E-1
Appendix F. Ash Content of Moringa Leaf Flour.....	F-1
Appendix G. Calcium Content of Moringa Leaf Flour.....	G-1
Appendix H. Statistical Analysis Results for Yield, Moisture, Ash, and Calcium Content of Moringa Leaf Flour	H-1
Appendix I. Production of Moringa Rice Milk.....	I-1
Appendix J. Sample Code and Corresponding Rice Milk Formulations	J-1
Appendix K. Insoluble Solids of Moringa Rice Milk	K-1
Appendix L. Viscosity of Moringa Rice Milk	L-1
Appendix M. Total Soluble Solids of Moringa Rice Milk	M-1
Appendix N. Statistical Analysis Results for Bitterness Scoring Test.....	N-1
Appendix O. Statistical Analysis Results for Bitterness Hedonic Test	O-1
Appendix P. Statistical Analysis Results for Sweetness Scoring Test	P-1
Appendix Q. Statistical Analysis Results for Sweetness Hedonic Test.....	Q-1
Appendix R. Statistical Analysis Results for Aroma Scoring Test.....	R-1
Appendix S. Statistical Analysis Results for Aroma Hedonic Test	S-1
Appendix T. Statistical Analysis Results for Mouthfeel Scoring Test	T-1
Appendix U. Statistical Analysis Results for Mouthfeel Hedonic Test.....	U-1
Appendix V. Statistical Analysis Results for Overall Acceptance Hedonic Test	V-1
Appendix W. Sensory Evaluation Form	W-1
Appendix X. Analysis Results for Calcium Content from SIG Laboratory	X-1