#### ACKNOWLEDGEMENTS

By the mercy of Jesus Christ and His never-ending blessings this thesis entitled "UTILIZATION OF UNRIPE BANANA FLOUR (*Musa* sp.) AND TARO (*Colocasia esculenta*) IN PREPARATION OF ANALOGUE RICE NOODLE "KWETIAU"" had reached its complete form.

This thesis was written based on the research which started on January 2020 until June 2020. This thesis was written as partial fulfillment of the academic requirement to obtain the degree of *Sarjana Teknologi Pertanian Strata Satu*, Food Technology Study Program, Faculty of Science and Technology, Universitas Pelita Harapan, Tangerang.

The author realizes that this thesis could not be successfully completed by the author alone without the support, encouragement and prayers from many parties. Therefore, the author would like to express a huge gratitude to those parties, including:

- 1. Ir. W. Donald R. Pokatong, M.Sc., Ph.D., Head of Food Technology Study Program, as thesis supervisor who had given supervision, constructive advices, and creative suggestions during the whole thesis project period.
- 2. Eric Jobiliong, Ph.D. as Dean of Faculty of Science and Technology, Universitas Pelita Harapan.
- 3. Dela Rosa, M.M., M.Sc., Apt. as Vice Dean of Faculty of Science and Technology, Universitas Pelita Harapan.
- 4. Laurence, S.T., M.T. as Director of Administration and Student Affair of Faculty of Science and Technology, Universitas Pelita Harapan.
- 5. Ratna Handayani, M.P. as Deputy Head of Food Technology Study Program for the guidance throughout the thesis project period.
- 6. Yuniwaty Halim, M.Sc. as the Head of Quality Control and Research Laboratory, Natania, M.Eng. as the Head of Food Processing Laboratory and Dr. Tagor M. Siregar, M.Si. as the Head of Chemistry Laboratory, where the author conducted the project.

- 7. Alexander Kevin, S.T.P., Bryan Anders, S.T.P., Aileen Neysha Widyapranata, S.T.P., Regy Tahapary, Darius Wulakada, Ahmad Fauzi Ridwan and Adih for the help given during the research in the laboratory.
- 8. All other lecturers, lecturer assistants and staffs of Food Technology Study Program which have not been mentioned for the help during the thesis project period.
- 9. Beloved parents, Silwanus Liman and Roesmiati Harnadi along with beloved siblings Lidya Ekaputri Liman and Febe Dwi Putri Liman, for the love, support, prayers and time given to the author during the thesis completion.
- 10. Armand Yahyapermana, Priscilia, Alvin Pangjaya and Patricia Tandjono as partners of the same team, for the support and help during the thesis period.
- 11. Artiar Secakusuma, Andrian Timothius Hasan, Christian Hubert, Delvin Kho, Issachar Matthathias Chow, Ivan Budianto, Marco Marcello, Raphael Dimas Tri Nugroho, Steven Fausta, and Saverius Chandra as author's friends who gave endless help, support and prayers for the author during the thesis period.
- 12. All friends and relatives who had not been mentioned but also took part in supporting the author during the thesis period.

The author realized that this report is still far from perfect. Thus, the author would like to apologize in advance for any mistake made in the report and would appreciate any criticisms and suggestions given to this report. The author also does hope that the report will be beneficial and useful for the readers. Thank you.

Tangerang, 13 August 2020

(Ghaius Ekaputra)

#### **TABLE OF CONTENTS**

	Page
COVER	
FINAL ASSIGNMENT STATEMENT AND UPLOAD AGREEMENT	
APPROVAL BY THESIS SUPERVISOR	
APPROVAL BY THESIS EXAMINATION COMMITTEE	
ABSTRACT	
ACKNOWLEDGEMENTS	
TABLE OF CONTENTS	
LIST OF FIGURES	
LIST OF TABLES	xi
LIST OF APPENDICES	xii
CHAPTER I INTRODUCTION	
1.1 Background	
1.2 Research Problem	
1.3 Objectives	
1.3.1 General Objectives	3
1.3.2 Specific Objectives	3
	1
CHAPTER II_LITERATUREREVIEW	4
2.1 Banana ( <i>Musa</i> sp.)	4
2.2 Taro (Colocasia esculenta)	
2.3 Rice Noodle	
2.3.1 Ingredients of Rice Noodle "Kwetiau"	9
2.3.2 Process of Making Rice Noodle "Kwetiau"	13
2.4 Rice Noodle "Kwetiau" Analogue	15
CHAPTER III RESEARCH METHODOLOGY	
3.1 Materials and Equipment	16
3.2 Research Method	
3.2.1 Preliminary Stage Research	
3.2.2 Main Stage Research	
3.3 Experimental Design	
3.3.1 Preliminary Stage Research	
3.3.2 Main Stage Research	
3.4 Procedure Analysis	
3.4.1 Proximate Analysis	
3.4.2 Color Measurements (Tiboonbun et.al, 2011)	25
3.4.3 Texture Analysis (Mohapatra et.al, 2016)	
3.4.4 Sensory Evaluation	26
CHAPTER IV RESULTS AND DISCUSSIONS	
4.1 Ripeness Degree of The Unripe Banana	28

4.2	Effect of Drying Temperature and Drying Time on Chemica	ıl
	Properties of Unripe Banana	29
	4.2.1 Musa acuminata (Ambon Kuning)	29
	4.2.2 Musa x paradisiaca	31
4.3	Selection of Best Banana Flour Based on Protein and Resist	
	Starch Content	
4.4	Theoretical Discussion	34
	4.4.1 Effect of Taro to Unripe Banana Flour Ratio on	
	Chemical Properties of Analogue Rice Noodle	
	"Kwetiau"	
	4.4.2 Texture Analysis	
	4.4.3 Sensory Analysis	.45
4.5	Selection of Best Analogue Rice Noodle "Kwetiau" with	
	Different Taro to Banana Flour Ratio Based on Resistant	
	Starch Content and Sensory Quality	.47
CHAPTER V COI	NCLUSIONS AND SUGGESTIONS	<b>∆</b> C
	Conclusions	
5.2	Suggestions	40
BIBLIOGRAPHY		. 51
A DDENIDICEC		
APPENDICES		. 5/
1000		
	34 34 3 15	
West and the second		
100		

## LIST OF FIGURES

Figure 2.1 Unripe banana (Musa acuminata)	4
Figure 2.2 Unripe banana ( <i>Musa x paradisiaca</i> )	
Figure 2.3 Colocasia esculenta	
Figure 2.4 Rice noodle kwetiau processing steps	13
Figure 3.1 Unripe banana flour processing steps	17
Figure 3.2 Processing steps of unripe banana flour and taro puree analogue	
"kwetiau"	18



## LIST OF TABLES

Table 2.1 Standard of wet noodle by BSN	9
Table 3.1 Formulation of main stage research for each banana type	. 19
Table 3.2 Experimental design of preliminary stage for each banana type	. 20
Table 3.3 Experimental design for main stage research for each banana type	. 21
Table 3.4 Sensory parameter for scoring test	. 27
Table 3.5 Seven-point hedonic test scale	. 27
Table 4.1 Hardness of unripe banana	. 28
Table 4.2 Protein content of unripe Musa acuminata flour made using different	
treatments	. 29
Table 4.3 Resistant starch content of unripe Musa acuminata flour made using	
different treatments	. 30
Table 4.4 Protein content of unripe Musa x paradisiaca flour made using	
different treatments	. 31
Table 4.5 Resistant starch content of unripe <i>Musa x paradisiaca</i> flour made	
using different treatments	. 32

# LIST OF APPENDICES

Appendix A. Hardness of Unripe Banana	<b>A</b> -1
Appendix B. Chemical Characteristic of Banana Flour Made Using Musa acuminata	<b>B</b> -1
Appendix C. Chemical Characteristic of Banana Flour Made Using <i>Musa x</i> paradisiaca	<b>C</b> -1
Appendix D. Research Documentation	<b>D-</b> 1
Appendix E. Resistant Content Result from Chem-Mix Pratama Lab	E-1

