

## ACKNOWLEDGEMENTS

The author would like to gratitude and praise Lord Jesus Christ for His blessings throughout the research and completion of this thesis. The compliance in the making of this thesis is aimed to fulfil the mandatory requirement as being a student in Universitas Pelita Harapan to obtain bachelor degree from Food Technology Department as *Sarjana Teknologi Pertanian Strata Satu*.

With grateful heart, the author would like to remember the person who had given help, support, prayer, and guidance from many during the internship period and the completion of the report. The author would like to express gratitude to:

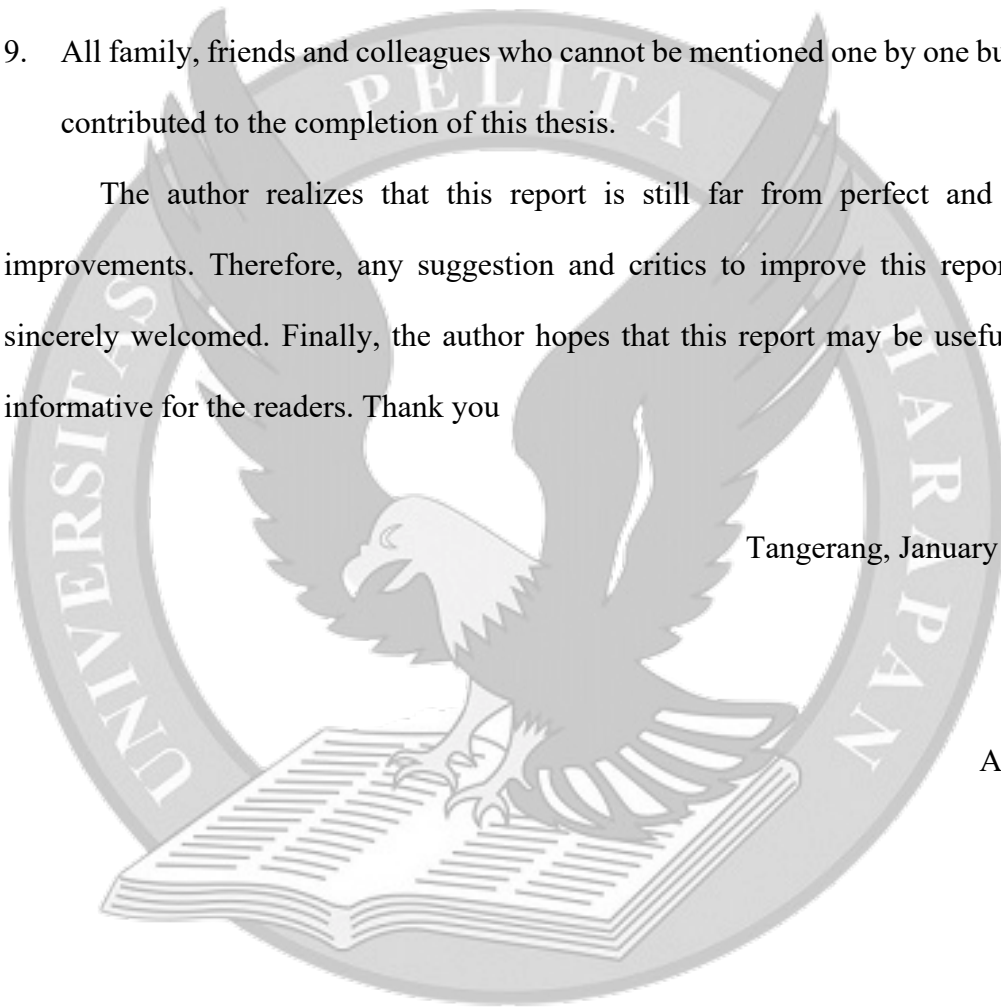
1. Ir. W. Donald R. Pokatong, M.Sc., Ph.D, as Head of Food Technology Study Program and thesis supervisor who had given supervisions, meaningful advices, and constructive suggestions for the author from the preparation of thesis proposal up to completion of the thesis.
2. Eric Jobiliong, Ph.D., Dean of Faculty of Science and Technology.
3. Dela Rosa, M.M., M.Sc., Apt., Vice Dean of Faculty of Science and Technology.
4. Laurence, M.T., Director of Finance and Student Affair of Faculty of Science and Technology.
5. Ratna Handayani, M.P. as the Vice Head of Food Technology Study Program.
6. Dr. Tagor M. Siregar, M.Si., Natania, M.Eng., and Yuniwaty Halim, M.Sc., as the Head of Chemistry, Food Processing, and Quality Control Laboratory who had given permission for the author to conduct research in the laboratories.

7. Beloved parents, Hariono Hanalim and Leni Kurniawan, for the care and unending support during the good and hard times.
8. Alvino Vio, Beny Prawira, Carinna Ruth, Felicia Agustin, Gracia Angelina, Jason Gouwandi, Jennifer Alvionita, and Joanina for the support and help throughout the research.
9. All family, friends and colleagues who cannot be mentioned one by one but had contributed to the completion of this thesis.

The author realizes that this report is still far from perfect and need improvements. Therefore, any suggestion and critics to improve this report are sincerely welcomed. Finally, the author hopes that this report may be useful and informative for the readers. Thank you

Tangerang, January 2019

Author



## TABLE OF CONTENTS

	Pages
COVER PAGE	
STATEMENT OF THESIS AUTHENTICITY	
APPROVAL BY THESIS SUPERVISOR	
APPROVAL BY THESIS EXAMINATION COMMITTEE	
ABSTRACT .....	v
<i>ABSTRAK</i> .....	vi
ACKNOWLEDGEMENTS .....	vii
TABLE OF CONTENTS .....	ix
LIST OF FIGURES .....	xiv
LIST OF TABLES .....	xvi
LIST OF APPENDICES .....	xvii
<b>CHAPTER I INTRODUCTION</b>	
1.1 Background .....	1
1.2 Research Problem.....	2
1.3 Objectives.....	3
1.3.1 General Objectives.....	3
1.3.2 Specific Objectives .....	3
<b>CHAPTER II LITERATURE REVIEW</b>	
2.1 Cake .....	4
2.1.1 Pound Cake .....	5
2.2 Avocado .....	6
2.3 Raw Materials .....	8
2.3.1 Wheat Flour.....	8
2.3.2 Sugar .....	9
2.3.3 Eggs.....	11
2.3.4 Baking Powder .....	11

2.3.5 Salt.....	11
2.3.6 Fats .....	12
2.3.6.1 Fat Replacer .....	13
2.4 Baking.....	14
2.4.1 Microwave Oven.....	15

### CHAPTER III RESEARCH METHODOLOGY

3.1 Materials and Equipment .....	16
3.2 Research Stages.....	16
3.2.1 Preliminary Stage.....	16
3.2.2 Main Research.....	17
3.3 Experimental Design.....	19
3.3.1 Preliminary Stage.....	19
3.3.2 Main Research.....	19
3.4 Analytical Procedures .....	22
3.4.1 Proximate Analysis of Avocado Puree .....	22
3.4.1.1 Moisture Content Analysis (AOAC, 2005).....	22
3.4.1.2 Protein Analysis (AOAC, 2005).....	22
3.4.1.3 Fat Analysis (AOAC, 2005).....	23
3.4.1.4 Ash Content Analysis (AOAC, 2005).....	24
3.4.1.5 Carbohydrate Analysis (AOAC, 2005).....	24
3.4.2 Physical Characterization of Pound Cake.....	25
3.4.2.1 Firmness.....	25
3.4.2.2 Volume Expansion.....	25
3.4.2.3 Color Measurement .....	25
3.4.3 Sensory Evaluation of Selected Pound Cake.....	26
3.4.3.1 Scoring Test.....	26
3.4.3.1 Hedonic Test.....	26

## CHAPTER IV RESULTS AND DISCUSSION

4.1 Chemical Composition of Avocado.....	27
4.2 Physical Characteristics of Pound Cakes.....	28
4.2.1 Oven Baked Pound Cake Prepared with All- purpose Flour .....	28
4.2.1.1 Firmness.....	28
4.2.1.2 Volume Expansion.....	29
4.2.1.3 L* Value and Hue .....	30
4.2.2 Oven Baked Pound Cake Prepared with Cake Flour.....	30
4.2.2.1 Firmness.....	30
4.2.2.2 Volume Expansion.....	31
4.2.2.3 L* Value and Hue .....	32
4.2.3 Oven Baked Pound Cake Prepared with Bread Flour.....	33
4.2.3.1 Firmness.....	33
4.2.3.2 Volume Expansion.....	34
4.2.3.3 L* Value and Hue .....	34
4.2.4 Microwave Oven Baked Pound Cake Prepared with All-purpose Flour Baked .....	35
4.2.4.1 Firmness.....	35
4.2.4.2 Volume Expansion.....	36
4.2.4.3 L* Value and Hue .....	37
4.2.5 Microwave Oven Baked Pound Cake Prepared with Cake Flour .....	37
4.2.5.1 Firmness.....	37
4.2.5.2 Volume Expansion.....	38
4.2.5.3 L* Value and Hue .....	39
4.2.6 Microwave Oven Baked Pound Cake Prepared with Bread Flour .....	40
4.2.6.1 Firmness.....	40

4.2.6.2	Volume Expansion.....	41
4.2.6.3	L* Value and Hue .....	42
4.3	Selection of Pound Cake Formulations Based on Physical Characteristics .....	42
4.3.1	Pound Cake Baked in Oven .....	42
4.3.2	Pound Cake Baked in Microwave Oven .....	43
4.4	Comparison of Baking Method Based on Physical Characteristics .....	44
4.5	Visual Appearance of Selected Pound Cakes.....	46
4.5.1	Oven Baked Pound Cake Prepared with All-purpose Flour.....	46
4.5.2	Oven Baked Pound Cake Prepared with Cake Flour.....	47
4.5.3	Oven Baked Pound Cake Prepared with Bread Flour.....	47
4.5.4	Microwave Oven Baked Pound Cake Prepared with All-purpose Flour .....	48
4.5.5	Microwave Oven Baked Pound Cake Prepared with Cake Flour .....	48
4.5.6	Microwave Oven Baked Pound Cake Prepared with Bread Flour .....	49
4.6	Sensory Characteristics of Selected Pound Cakes.....	49
4.6.1	Scoring Scores.....	49
4.6.1.1	Scoring Scores for Oven Baked Pound Cakes.....	49
4.6.1.2	Scoring Scored for Microwave Oven Baked Pound Cakes .....	50
4.6.2	Hedonic Test Scores.....	51
4.6.2.1	Hedonic Scores for Oven Baked Pound Cakes.....	51
4.6.2.2	Hedonic Scores for Microwave Oven Baked Pound Cakes .....	53
4.7	Selected Pound Cake Formulations Based on Sensory Characteristics .....	54
4.8	Chemical Composition of Selected Pound Cakes .....	55

CHAPTER V CONSLUSIONS AND SUGGESTIONS

5.1 Conclusions.....	58
5.2 Suggestions .....	59
BIBLIOGRAPHY .....	60
APPENDICES .....	64



## LIST OF FIGURES

	Page
Figure 2.1 Processing of pound cake.....	5
Figure 2.2 Monosaccharide and disaccharide .....	10
Figure 3.1 Avocado puree making procedure .....	17
Figure 3.2 Pound cake making procedure with modification.....	18
Figure 4.1 Firmness of oven baked pound cake prepared with all-purpose flour .....	28
Figure 4.2 Volume expansion of oven baked pound cake prepared with all-purpose flour.....	29
Figure 4.3 Firmness of oven baked pound cake prepared with cake flour.....	31
Figure 4.4 Volume expansion of oven baked pound cake prepared with cake flour .....	32
Figure 4.5 Firmness of oven baked pound cake prepared with bread flour .....	33
Figure 4.6 Volume expansion of oven baked pound cake prepared with bread flour .....	34
Figure 4.7 Firmness of microwave oven baked pound cake prepared with all-purpose flour.....	35
Figure 4.8 Volume expansion of microwave oven baked pound cake prepared with all-purpose flour.....	36
Figure 4.9 Firmness of microwave oven baked pound cake prepared with cake flour .....	38
Figure 4.10 Volume expansion of microwave oven baked pound cake prepared with cake flour .....	39
Figure 4.11 Firmness of microwave oven baked pound cake prepared with bread flour .....	40
Figure 4.12 Volume expansion of microwave oven baked pound cake prepared with bread flour .....	41
Figure 4.13 Oven baked pound cakes prepared with all-purpose flour.....	47
Figure 4.14 Oven baked pound cakes prepared with cake flour .....	47
Figure 4.15 Oven baked pound cakes prepared with bread flour.....	48
Figure 4.16 Microwave oven baked pound cakes prepared with all-purpose flour .....	48
Figure 4.17 Microwave oven baked pound cakes prepared with cake flour.....	49



Figure 4.18 Microwave oven baked pound cakes prepared with  
bread flour .....49

## LIST OF TABLES

	Page
Table 2.1 Nutritional composition of avocado .....	7
Table 3.1 Formulation of pound cakes .....	17
Table 3.2 Experimental design of main research .....	20
Table 3.3 Experimental design of main research of selected pound cakes .....	21
Table 3.4 °Hue interpretation.....	25
Table 3.5 Parameter for scoring test.....	26
Table 3.6 Parameter for hedonic test.....	26
Table 4.1 Chemical composition of avocado puree .....	27
Table 4.2 Selected pound cakes baked in oven .....	43
Table 4.3 Selected pound cakes baked in microwave oven.....	43
Table 4.4 Physical characteristics of pound cakes baked with oven and microwave oven method.....	45
Table 4.5 Scoring score of oven baked pound cakes.....	50
Table 4.6 Scoring score of microwave oven baked pound cakes.....	51
Table 4.7 Hedonic score of oven baked pound cakes.....	52
Table 4.8 Hedonic score of microwave oven baked pound cakes.....	53
Table 4.9 Chemical composition of selected pound cakes.....	55



## LIST OF APPENDICES

	Page
Appendix A	
Moisture Content.....	A-1
Protein Content.....	A-1
Fat Content .....	A-2
Ash Content.....	A-2
Carbohydrate Content .....	A-3
Appendix B	
Firmness .....	B-1
Volume Expansion .....	B-4
L*Value.....	B-6
°Hue.....	B-8
Appendix C	
Firmness .....	C-1
Volume Expansion .....	C-3
L*Value.....	C-6
°Hue.....	C-8
Appendix D	
Questionnaire for Scoring Test .....	D-1
Data for Scoring Test .....	D-2
Statistical Analysis for Scoring Test .....	D-15
Questionnaire for Hedonic Test .....	D-19
Data for Hedonic Test .....	D-20
Statistical Analysis for Hedonic Test .....	D-36
Appendix E	
Moisture Content.....	E-1

Protein Content.....	E-4
Fat Content .....	E-6
Ash Content.....	E-8
Carbohydrate Content .....	E-10