

ACKNOWLEDGEMENTS

Deepest gratitude is upheld to God, who has granted the author blessings from the beginning of the thesis research until the finishing of this report which entitled “EFFECT OF THICKENING AGENTS ON PHYSICOCHEMICAL AND SENSORY CHARACTERISTICS OF CHILI SAUCE PROCESSED IN A SELECTED COOKING METHOD”. Only by Himself alone, the author was able to get an opportunity to learn new things through this research process. Moreover, gratitude would also like to be given for PT Arum Mas Jaya for the cooperation which the author see as a willingness to be an extension of His hands. The author feels very grateful for gaining knowledges along with fulfilling the requirement to obtain *Sarjana Teknologi Pertanian Strata Satu* from Food Technology Study Program of Universitas Pelita Harapan.

On this occasion, the author would like to express another gratitude towards people whom give help and support during thesis research and finishing of the report:

1. Ir. W. Donald R. Pokatong, M.Sc., Ph.D. as Head of Food Technology Study Program UPH and thesis supervisor for the opportunity, guidance, and blessings from writing of thesis proposal up to completion of the thesis.
2. Eric Jobiliong, Ph.D. as the Dean of Faculty of Science and Technology UPH.
3. Dela Rosa, S.Si, M.M., M.Sc., Apt., as the Vice Dean of Faculty of Science and Technology UPH.
4. Laurence, M.T. as the Director Administration and Student Affair of Faculty of Science and Technology UPH.
5. Ratna Handayani, MP. as the Vice Head of Food Technology Study Program UPH for guiding the author throughout completion of the thesis, also be the extension of God’s hand to bless the author.
6. Mr. Li Gwan Tian as the owner of PT Arum Mas Jaya for the trust in the author to conduct this research.

7. Adolf J. Parhusip, Dr. Tagor M. Siregar, Natania, M.Eng, and Yuniwaty Halim, M.Sc. as Heads of Microbiology, Chemistry, Food Processing Technology, and Quality Control Laboratory, respectively.
8. Ms. Dini as Quality Control staff at PT Arum Mas Jaya for the help on extending informations from Mr. Li along the research process, and also the support.
9. Dr. Nuri Arum Anugrahati and Yuniwaty Halim, M.Sc. as thesis examiners, whom gave the author blessings as the extension of God's hands.
10. Beloved parents and brother (Peter Hendry, Violina, and Billy Collhins) for the love, patient, and full support while the doing thesis research and the making of report.
11. All lecturers of Food Technology Study Program of Universitas Pelita Harapan for giving endless knowledge to prepare students before facing the individual research task.
12. Celine Angelia, Fransiska, Marsela Elvina, Lydia Senjaya, Sherly, and other Food Technology batch 2015 including the thesis partners for endless care and support.
13. Laboratory assistants and lecture assistants who have helped and supervised the author when conducting the research on laboratory.
14. Behalf members of Spiritual Growth for Students 2017/2018 for the prayers and cheers throughout the thesis process.
15. All relatives and friends that could not be mentioned one by one for concerns and love for the author.

Furthermore, the author would like to apologize for any mistakes which occur on this thesis report. Criticism and suggestion are welcomed for the improvement of the report and the author itself. From that point, it is hoped that this report would give benefits for the readers and contribute to the scope of Food Technology. Thank you.

Tangerang, February 2019

Author

TABLE OF CONTENTS

	page
COVER	
STATEMENT OF THESIS AUTHENTICITY	
APPROVAL BY THESIS SUPERVISOR	
ABSTRACT	iv
<i>ABSTRAK</i>	v
ACKNOWLEDGEMENTS	vi
TABLE OF CONTENTS	viii
LIST OF FIGURES	xi
LIST OF TABLES	xiii
LIST OF APPENDICES	xiv
CHAPTER I INTRODUCTION	
1.1 Research Background.....	1
1.2 Research Problem.....	4
1.3 Objectives.....	4
1.3.1 General Objective	4
1.3.2 Specific Objectives	5
CHAPTER II LITERATURE REVIEW	
2.1 Chili Sauce	6
2.2 Ingredients of Chili Sauce.....	7
2.2.1 Chili	8
2.2.2 Water.....	9
2.2.3 Spices	9
2.2.4 Thickening Agent	10
2.2.4.1 Native Starch	10
2.2.4.2 Modified Starch	12
2.2.5 Preservative.....	12
2.3 Production Process of Chili Sauce	13
2.3.1 Sorting and Grading of Raw Material	13
2.3.2 Cleaning.....	14

2.3.3 Steaming	14
2.3.4 Grinding	14
2.3.5 Mixing	14
2.3.6 Cooking	15
2.3.7 Cooling	15
2.4 Physicochemical characteristics standard of chili sauce	15
CHAPTER III RESEARCH METHODOLOGY	
3.1 Materials and Equipment	17
3.2 Research Procedures	18
3.2.1 Preliminary stage	18
3.2.1.1 Regular cooking method.....	19
3.2.1.2 Modified cooking method.....	20
3.2.2 Main research stage	21
3.2.3 Experimental Design	22
3.2.3.1 Preliminary Stage	22
3.2.3.2 Main Research Stage	24
3.2.4 Physicochemical Analyses.....	28
3.2.4.1 Viscosity Analysis (Viscometer).....	28
3.2.4.2 Color (Chromameter)	28
3.2.4.3 Total Soluble Solid (Refractometer).....	28
3.2.4.4 pH Value (pH Meter).....	28
3.2.5 Sensory Evaluation	29
3.2.6 Proximate Analysis Procedures	29
3.2.6.1 Moisture Content Analysis (AOAC, 1995)	29
3.2.6.2 Ash Content Analysis (BSN, 1992).....	29
3.2.6.3 Protein Content Analysis by Kjeldahl Method (AOAC, 1995)	30
3.2.6.4 Fat Content Analysis by Soxhlet Extraction Method (BSN, 1995)	31
3.2.6.5 Carbohydrate Content Analysis by difference Method (AOAC, 2005)	31

CHAPTER IV RESULTS AND DISCUSSION

4.1 Physicochemical Characteristics of Chili Sauce in Varied Processing Time and Temperature.....	32
4.1.1 Viscosity	32
4.1.2 Color.....	34
4.1.3 Total Soluble Solid.....	39
4.2 Selected Treatments based on Physicochemical Characteristics of Chili Sauce on Varied Processing Time and Temperature	40
4.3 Physicochemical Characteristics of Chili Sauce on Varied Concentration of Thickening Agents	42
4.3.1 Viscosity.....	42
4.3.2 Color.....	44
4.3.3 Total Soluble Solid.....	47
4.3.4 pH Value	49
4.4 Selected Treatments based on Physicochemical Characteristics of Chili Sauce on Varied Concentrations of Thickening Agents.....	51
4.5 Sensory Characteristics	53
4.5.1 Scoring of Sensory Attributes	53
4.5.2 Hedonic of Sensory Attributes.....	54
4.6 Selection of Best Treatment	55
4.7 Proximate Analysis	57
CHAPTER V CONCLUSIONS AND SUGGESTIONS	
5.1 Conclusions	58
5.2 Suggestions	58
BIBLIOGRAPHY	59
APPENDICES	64

LIST OF FIGURES

	page
Figure 2.1 Flowchart of chili sauce processing.....	13
Figure 2.2 Color chart of °Hue value	16
Figure 3.1 Precooked chili sauce	19
Figure 3.2 Production process of chili sauce by regular cooking method	20
Figure 3.3 Production process of chili sauce by modified cooking method	21
Figure 3.4 Cooking apparatus	22
Figure 4.1 a) Effect of temperature and time on viscosity of chili sauce processed by regular cooking method; b) by modified cooking method	32
Figure 4.2 Effect of temperature on chili sauce lightness value by regular cooking method.....	35
Figure 4.3 a) Effect of temperature on chili sauce lightness value processed by modified cooking method; b) Effect of time on chili sauce lightness value processed by modified cooking method.	36
Figure 4.4 a) Effect of temperature and time on chili sauce a* value processed by regular cooking method; b) by modified cooking method	37
Figure 4.5 a) Effect of time and temperature on chili sauce b* value processed by regular cooking method; b) by modified cooking method	38
Figure 4.6 Effect of temperature and time on total soluble solid of chili sauce processed by regular cooking method	40
Figure 4.7 Effect of corn starch concentration, modified starch concentration, and cooking time and temperature on viscosity of chili sauce	41
Figure 4.8 Effect of corn starch concentration, modified starch concentration, and cooking temperature and time on chili sauce a* value	42
Figure 4.9 a) Effect of corn starch and modified starch concentrations on chili sauce b* value; b) Effect of corn starch concentration and cooking temperature and time on chili sauce b* value; c) Effect of modified starch concentration and cooking temperature and time on chili sauce b* value	47

Figure 4.10 a) Effect of corn starch and modified starch concentrations
on total soluble solid of chili sauce;
b) Effect of corn starch concentration and cooking
temperature and time on total soluble solid of chili sauce 49

Figure 4.11 Effect of corn starch concentration, modified starch
concentration, and cooking temperature and time
on pH value of chili sauce 50



LIST OF TABLES

	page
Table 2.2 Formulation of chili sauce.....	7
Table 3.3 Experimental design of main research stage.....	24
Table 4.1 Physicochemical characteristics of chili sauce processed by regular compared to the modified cooking method	41
Table 4.2 Physicochemical characteristics of chili sauce according to the two best observation values.....	48
Table 4.3 Scoring test result of the selected treatment of corn starch concentration, modified starch concentration, and cooking temperature and time compared to commercial chili sauce.....	53
Table 4.4 Hedonic test result of the selected treatments of corn starch concentration, modified starch concentration, and cooking temperature and time compared to commercial chili sauce.....	54
Table 4.5 Observation values of the best scoring sensory properties of selected chili sauce compared to the commercial chili sauce.....	55
Table 4.6 Observation value of the best hedonic sensory properties of selected chili sauce compared to the commercial chili sauce.....	56
Table 4.7 Proximate analysis of selected and commercial chili sauce	57

LIST OF APPENDICES

	page
Appendix A	
Chili Sauce Viscosity on Preliminary stage.....	A-1
Statistical Analysis of Chili Sauce Viscosity on Preliminary stage.....	A-5
Appendix B	
Color Observation of Chili Sauce on Preliminary Stage.....	B-1
Statistical Analysis of Chili Sauce Chroma Value on Preliminary stage.....	B-2
Appendix C	
Chili Sauce Total Soluble Solid on Preliminary stage.....	C-1
Statistical Analysis of Chili Sauce Total Soluble Solid on Preliminary stage.....	C-2
Appendix D	
Selection of Best Treatment affecting Physicochemical Characteristic of Chili Sauce in Varied Cooking Temperature and Time	D-1
Appendix E	
Chili Sauce Viscosity on Main research stage.....	E-1
Statistical Analysis of Chili Sauce Viscosity on Main research stage.....	E-6
Appendix F	
Chili Sauce Chroma Value on Main research stage.....	F-1
Statistical Analysis of Chili Sauce Chroma Value on Main research stage.....	F-10
Appendix G	
Chili Sauce Total Soluble Solid on Main research stage.....	G-1
Statistical Analysis of Chili Sauce Total Soluble Solid on Main research stage.....	G-5

Appendix H

Chili Sauce pH Value on Main research stage.....H-1

Statistical Analysis of Chili Sauce pH Value
on Main research stage.....H-5

Appendix I

Sensory Evaluation Questionnaire.....I-1

Sensory Evaluation ResultsI-3

Statistical Analysis for Sensory Evaluation of Chili Sauce.....I-29

Appendix J

Selection of Best TreatmentJ-1

Appendix K

Proximate Analysis of Chili SauceK-1

Statistical Analysis of Chili Sauce Proximate CompositionK-6

