TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	iii
ABSTRACT IN THAI	iv S
ABSTRACT IN ENGLISH	v
TABLE OF CONTENTS	vii
LIST OF FIGURES	x
LIST OF TABLES	xi
CHAPTER 1 INTRODUCTION	1 235
CHAPTER 2 LITERATURE REVIEW	3
2.1 Black glutinous rice	3
2.1.1 Composition of rice	3
2.1.2 Antioxidant in plant products	5
2.2 Processing of rice by heating	6
2.2.1 Soaking	6
2.2.2 Rice milling	7
2.2.3 Heating	8
2.3 Yogurt	9
2.3.1 Factors affecting the physical and sensory	
properties of yogurts	
2.3.2 Quality of yogurt	JIO ¹ JOIN J
CHAPTER 3 MATERIALS AND METHODS	ai University
3.1 Raw material	s e ¹⁵ r v e d
3.2 Chemical reagents and equipment	

3.2.1 Chemical reagents	15
3.2.2 Equipment	16
3.3 Methods	17
3.3.1 Preparation of black sticky rice powder	18
3.3.2 Optimization of rice particle size and type of soaking	
solution in the production of black glutinous rice	
solution	18
3.3.3 Optimization for the soaking water ratio to black	
glutinous rice and soaking time to produce black	
glutinous rice solution	19
3.3.4 Optimization of heating time, heating method and	
heating medium to produce black glutinous rice solution	20
3.3.5 The effect of incubation times on fermented black	
glutinous rice drink	21
	6
CHAPTER 4 RESULTS AND DISCUSSION	22
4.1 The effects of rice particle sizes and types of soaking solution	
in the production of black glutinous rice solution	22
4.2 The effects of soaking water ratios to black glutinous rice and	20
soaking times to produce black glutinous rice solution	28
4.3 The effects of heating times, heating methods and heating	22
A 4 The effect of investories times are forwarded block platform	33
4.4 The effect of incubation times on fermented black glutinous	40
rice drink	40
CHAPTER 5 CONCLUSION AND RECOMMENDATION	44
DEEEDENCES	16
ADDENDICES	40 Ve
AFFEINDICES	J4
APPENDIX A FIGURES	57
AITENDIA DEHYSICALAHAIYSIS	51

viii

APPENDIX C Proximate analysis	59
APPENDIX D Chemical analysis	63
APPENDIX E Antioxidant analysis	68
APPENDIX F Microbiological analysis	72

CURRICULUM VITAE

75

<mark>ລິບສີກຣົ້ນກາວົກຍາລັຍເຮີຍວໃหນ່</mark> Copyright[©] by Chiang Mai University All rights reserved

LIST OF FIGURES

Figur	e	Page
2.1	Structure of amylase	3
2.2	Structure of amylopectin	4
2.3	Cyanidin 3-glucoside	6
2.4	Main processing steps in the manufacture of set and stirred yogurt	10
3.1	A basic production process of fermented black glutinous rice drink	17
4.1	The number of total microorganism in black glutinous rice solution affected by heating methods, heating media and heating times	39
4.2	The number of lactic acid bacteria in black glutinous rice solution affected by heating methods, heating media and heating times	40
4.3	The number of <i>Lactobacillus bulgaricus</i> and <i>Streptococcus</i> <i>thermophilus</i> in fermented black glutinous rice drink	580 43 Unive

LIST OF TABLES

Table

Page

4.1 Physical properties of black glutinous rice solution affected by particle rice sizes and types of soaking solution 23 4.2 Chemical properties of black glutinous rice solution affected by particle rice sizes and types of soaking solution 25 4.3 Physical properties of black glutinous rice solution affected by the ratios of soaking water to rice and soaking times 29 Chemical properties of black glutinous rice solution affected 4.4by the ratios of soaking water to rice and soaking times based on wet basis 31 4.5 Some of the chemical properties of black glutinous rice solution affected by the ratios of soaking water to rice and soaking times based on dry weight basis 32 4.6 Physical properties of black glutinous rice solution affected by heating methods, heating times and heating media 34 Chemical properties of black glutinous rice solution affected 4.7by heating methods, heating time and heating media 36 4.8 Physical properties of fermented black glutinous rice drink affected by different incubation times

xi

4.9 Chemical properties of fermented black glutinous rice drink affected by different incubation times

ลิ<mark>ปสิทธิ์มหาวิทยาลัยเชียงใหม่</mark> Copyright[©] by Chiang Mai University All rights reserved

42