

LIST OF CONTENTS

Chapter		Page
I INTRODUCTION.....		
Statement of the problem.....		1
Objectives of the study		3
Scope of the study.....		3
Benefits of the study.....		3
II LITERATURE REVIEW.....		
Theory Review		5
Review of the related studies.....		15
Characters		16
Summary of literature review.....		17
III RESEARCH METHODOLOGY.....		
Part 1 : Anaerobic digestion tests on the influence of particle sizes and total solids on biogas production	19	
Part 2 : Economic evaluation of biogas production using different Particle sizes of food waste.....	28	
IV RESULT AND DISCUSSION.....		
Anaerobic digestion tests on the influence of particle size and Total solids on biogas production	31	
Economic Evaluations.....	37	
V CONCLUSIONS AND RECOMMENDATION		
Conclusion.....	44	
Recommendation.....	46	

LIST OF CONTENTS (CONT.)

Chapter	Page
REFERENCE	47
APPENDIX	52
BIOGRAPHY	74

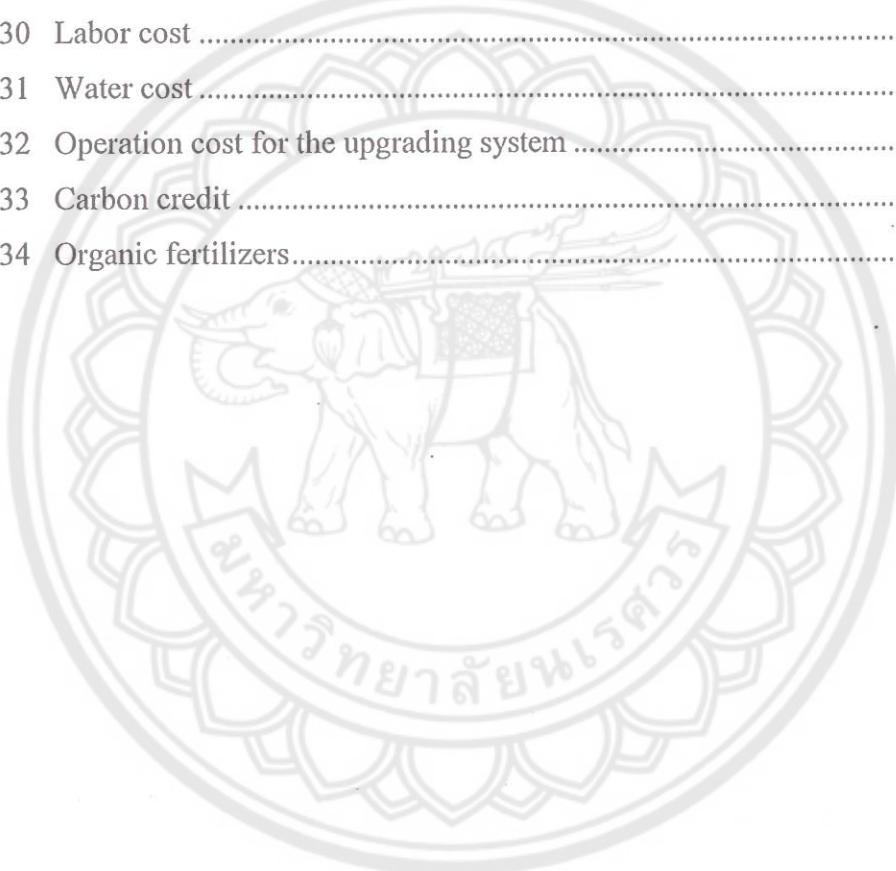


LIST OF TABLES

Table	Page
1 Composition of biogas	7
2 Properties of various fuels	8
3 Digestate Characteristics.....	12
4 Food waste characteristics	13
5 Chemical composition analytical methods	20
6 Samples used for the experiment on the influence of particle sizes.....	22
7 Samples used for the experiment on the total solids	25
8 Technical assumptions	29
9 Economic assumptions.....	29
10 Chemical characteristics of food waste.....	34
11 Methane yield from different particle sizes	36
12 Cost and benefit analysis for 15 yrs fixed dome digester	42
13 Results of economic comparison and sensitivity of biogas power plant From the food waste	43
14 Economic evaluation for project A (Electric grinder).....	60
15 Economic evaluation for project B (Manual blender).....	61
16 Economic evaluation for project C (Non grinder food waste)	62
17 Investment cost.....	63
18 Labor cost.....	63
19 Water cost	64
20 Operation cost for the upgrading system	64
21 Carbon credit	65
22 Organic fertilizers.....	66
23 Investment cost.....	67
24 Labor cost.....	67
25 Water cost	68

LIST OF TABLES (CONT.)

Table	Page
26 Operation cost for the upgrading system.....	68
27 Carbon credit	69
28 Organic fertilizers.....	70
29 Investment cost.....	70
30 Labor cost	71
31 Water cost	71
32 Operation cost for the upgrading system	71
33 Carbon credit	72
34 Organic fertilizers.....	73



LIST OF FIGURE

Figure		Page
1	Solid waste generation rate per capita of Asian countries	5
2	EPA food recovery hierarchy	6
3	Biological process of anaerobic digestion	9
4	Flow chart of the methodology.....	18
5	pH measurement	22
6	Experiment on the influence of particle size on biogas production set up	23
7	Cow dung used as start up	25
8	Setup of the experiment on the influence of total solid on biogas production.....	26
9	Water displacement method for measuring biogas	27
10	Gas chromatography	28
11	Physical characteristics of food waste.....	32
12	Physical characteristics of food waste in picture.....	32
13	Peak biogas production from different particle sizes	35
14	Daily biogas production from total solids.....	37
15	Chemical results laboratory letter.....	53
16	Chemical composition laboratory results.....	54
17	Biogas analysis on particle size laboratory results letter	55
18	Biogas analysis laboratory results: Sample A	56
19	Biogas analysis laboratory results: Sample B.....	57
20	Biogas analysis laboratory results: Sample C.....	58
21	Biogas analysis laboratory results: Sample D	59

LIST OF THE ABBREVIATIONS

AD	=	Anaerobic digestion
BOD	=	Biological oxygen demand
CH ₄	=	Methane
CO ₂	=	Carbon dioxide
COD	=	Chemical oxygen demand
GC	=	Gas chromatography
kWh	=	Kilo watt hour
VS	=	Volatile solids
TS	=	Total solids
PS	=	Particle size
MC	=	Moisture content
NPV	=	Net present Value
PBP	=	Payback period
BCR	=	Benefit cost ratio
LCOE	=	Levelised cost of energy
RT	=	Retention time (days)