

STUDY OF BIOGAS PRODUCTION FROM PALM OIL SOLID WASTES

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STATEMENT BY THE AUTHOR

I hereby declare that this submission is my own work and to the best of my knowledge, it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at any educational institution, except where due acknowledgement is made in the thesis.



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ABSTRACT

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In 2021 Indonesia currently provides 58% of global crude palm oil, resulting in enormous amounts of oil palm wastes. The purpose of this research is to determine which palm oil solid waste has the potential to be used as a substrate for biogas production, and what is the optimum method and parameter to produce an economically viable source of biogas. The method used for this research was by means of literature review, in which the data used were acquired from journals, thesis, reports and research papers. This research evaluates different oil palm wastes which are; Oil Palm Fronds (OPF), Empty Fruit Bunch (EFB), Decanter Cake (DC), Oil Palm Trunk (OPT) and Mesocarp Fibre (MF). Similar operating parameters of temperature, pH and digestion method were studied on the different oil palm solid wastes which resulted in EFB producing the highest yield of methane (429 mL CH₄/g VS). Further optimization of methane yield from the substrates were studied using different methods and operating parameters which resulted in the highest methane yield of 617 mL CH₄/g VS from co-digestion of DC + POME. Although, considering the economic viability; it was found that OPF as the waste from bioethanol production was most preferable, not only producing biogas but also bioethanol. It produced high methane yield of 514 ml CH₄/g VS at lower operating temperatures.

Keywords: Biogas, Oil palm solid waste, OPF, Anaerobic digestion, Methane Yield



DEDICATION

This work is dedicated to my family and friends, who supported me every step of the way.

I dedicate this to myself for all the hard work that I have done for the past four years of university.



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TABLE OF CONTENTS

STATEMENT BY THE AUTHOR	2
ABSTRACT	3
DEDICATION	5
ACKNOWLEDGEMENTS	6
List of Figures	11
List of Tables	12
CHAPTER 1 – INTRODUCTION	15
1.1 Background	15
1.2 Research Objectives	17
1.3 Significance of Study	17
1.4 Research Questions	17
CHAPTER 2 – BASIC LITERATURE REVIEW	18
2.1 Renewable energy target Globally	18
2.2 Current energy and future targets in Indonesia	18
2.2.1 Biomass in Indonesia	20
2.3 Palm oil	21
2.4 Wastes from Palm Oil	24
2.4.1 Waste from palm oil plantations	24
2.4.2 Waste from palm oil mill productions	25
2.5 Biogas	27
2.5.1 Anaerobic Digestion	28
2.5.2 Hydrolysis	29
2.5.3 Acidogenesis/Fermentation	29
2.5.4 Acetogenesis	29
2.5.5 Methanogenesis	30
2.5.6 Method of Anaerobic Digestion	31
2.5.6.1 Solid State Anaerobic digestion	31
2.5.6.2 Liquid State Anerobic digestion	32
2.5.6.3 Anaerobic Co-digestion (AnCoD)	32

2.5.7	Pretreatment.....	32
2.5.7.1	Mechanical Pretreatment.....	33
2.5.7.2	Chemical Pretreatment.....	34
2.5.7.3	Parameters.....	34
2.5.7.3.1	Temperature.....	34
2.5.7.3.2	pH.....	35
2.5.7.3.3	Inoculum.....	36
2.5.7.3.4	C/N ratio.....	36
2.5.7.3.5	Chemical Oxygen Demand.....	37
2.5.7.3.6	Total Solids.....	37
2.5.7.3.7	Volatile Solids.....	37
CHAPTER 3 – RESEARCH METHOD.....		38
3.1	Literature Review Methodology.....	38
3.2	Scope of Study.....	38
3.3	Time frame of the study.....	38
3.4	Data source and collection.....	39
3.5	Research Framework.....	39
CHAPTER 4 – RESULTS AND DISCUSSION.....		40
4.1	Results.....	40
4.1.1	Oil Palm Solid Wastes.....	40
4.1.2	Oil Palm Frond.....	42
4.1.2.1	Potential of Oil Palm Fronds Empty Fruit Bunch as biogas substrate through co-digestion.....	43
4.1.2.2	Ideal C/N ratio of Oil Palm leaves mixed with cow manure.....	45
4.1.2.3	Evaluation of biogas production from Oil Palm Fronds and cow manure.....	47
4.1.2.4	Biogas production from Oil Palm Frond through co-pretreatment from effluent of Ethanol.....	49
4.1.3	Empty Fruit Bunch.....	52
4.1.3.1	Potential of Empty Fruit Bunch as substrate for biogas production.....	52
4.1.3.2	Co-digestion of Empty Fruit Bunch and sewage sludge for biogas production.....	55
4.1.3.3	Biogas production using Solid-state Anaerobic co-digestion and Solid-state mono-digestion of Empty Fruit Bunch and Decanter Cake.....	57
4.1.3.4	Co-digestion of Palm Oil Mill Effluent and Empty Fruit Bunch.....	64

4.1.3.5	Co-digestion of Cow manure and Empty Fruit Bunch	67
4.1.3.6	Empty fruit bunch mushroom media as substrate for biogas	69
4.1.3.7	Effect of alkaline pretreatment of biogas production of Empty Fruit Bunch .	70
4.1.3.8	Best pre-treatment for Empty fruit bunch to improve biogas production.....	73
4.1.4	Decanter Cake	75
4.1.4.1	Effect of inoculum on biogas production of decanter cake	76
4.1.4.2	Biogas production from palm oil mill decanter cake at thermophilic condition by co-digestion and mono-digestion.....	78
4.1.4.3	Effect of temperature on biogas production of decanter cake	80
4.1.4.4	Enhancing biogas production by co-digesting wastewater and decanter cake	81
4.1.4.5	Co-digestion of sewage sludge and decanter cake	84
4.1.4.6	Effects of Pre-treatment of Decanter Cake	86
4.1.4.7	Effect of Partial Ozonation and Thermal pretreatment on Decanter Cake	89
4.1.5	Oil Palm Trunk	91
4.1.5.1	Solid-state anaerobic digestion of Oil palm trunk	91
4.1.5.2	Two-stage thermophilic bio-hydrogen and methane production form pretreated oil palm trunk.....	95
4.1.5.3	Methane Production Using Lignocellulolytic Enzymes from <i>Trichoderma koningiopsis</i> TM3 Through Co-digestion of Palm Oil Mill Effluent and Oil Palm Trunk Residues.....	97
4.1.6	Mesocarp Fibre	100
4.1.6.1	Biogas production from Mesocarp Fibre, Decanter Cake and Empty Fruit Bunch by Solid State Anaerobic Digestion	100
4.1.6.2	Effect of pretreatment on Mesocarp Fibre	102
4.1.6.3	Effect of Temperature on the biogas production from Mesocarp Fibre and Empty Fruit Bunch.....	105
4.1.6.4	Biological pretreatment of oil palm Mesocarp Fibre with Cattle Manure	107
4.1.6.5	Biogas production of palm Mesocarp Fibre and Empty Fruit Bunch	108
4.1.6.6	Effects of operating parameters on the biogas production of Mesocarp Fibre.....	111
4.2	Discussion	113
4.2.1	Oil Palm Solid Waste.....	113
4.2.2	Oil Palm Frond (OPF)	114
4.2.3	Empty Fruit Bunch (EFB)	117
4.2.4	Decanter Cake (DC)	120

4.2.5	Oil Palm Trunk (OPT)	123
4.2.6	Mesocarp fiber (MF).....	125
4.2.7	Comparison of substrates at similar conditions	128
4.2.8	Comparison of oil palm solid waste for methane production	129
CHAPTER 5 – CONCLUSION AND RECCOMENDATION		131
5.1	Conclusion.....	131
5.2	Recommendation.....	132
REFERENCES		133
ABBREVIATIONS		139
CURRICULUM VITAE.....		140



List of Figures

Figures	Page
2.3.1 <i>Elaeis guineensis</i>	21
2.3.2 Graphic representation of the development of palm oil production and plantation coverage in 1980 – 2015 (Hambali & Rivai -, 2017).....	22
2.4.1 Anatomy of an Oil Palm Tree and Oil Palm Frond (OPF).....	25
2.4.2 Mass balance of palm oil mill processing based on E. Hambali and M. Rivai.....	27
2.5.2 Anaerobic digestion process.....	28
2.5.5 Methanogenesis cycle.....	31
2.5.7 Schematic of lignocellulosic breakdown by pretreatment (Ji,2012)	33
3.5 Flowchart for the literature research.....	39
4.1.1 Projection of Indonesia's Palm oil waste production for 2016 – 2030.....	41
4.1.3.3 Methane yield and pH from (SS-AD) of EFB at S:I ratio of 2:1 and 3:1 with different % of Oil Palm Ash (OPA) addition. Methane yield (a) and pH (b) with S:I ratio 2:1; Methane yield (c) and pH (d) at S: I ration of 3:1.....	60

List of Tables

Table	Page
2.3 Graphic representation of the development of palm oil production and plantation coverage in 1980 – 2015 (Hambali & Rivai -, 2017).....	22
2.4.1 Total National Oil Palm Waste Production from Palm Oil Plantations in Indonesia in 2015 (Hambali & Rivai -, 2017).....	24
2.4.2 Palm Oil Solid wastes from Indonesia in 2015 (Hambali & Rivai -, 2017).....	25
4.1.1 Palm Oil Biomass-based products and their Commercialization Stage in Malaysia (2011).....	42
4.1.2.1 Summary of Monica Perdhani Putri’s research.....	44
4.1.2.2 Summary of Immega Adelia Nurdin and friends’ research.....	47
4.1.2.3 Summary of Ossai and Ochonogor Samuel’s research.....	49
4.1.2.4 Summary of Srirnachai Tussanee and friends’ research.....	51
4.1.3.1 Summary of Vincentius’ research.....	54
4.1.3.2 Summary of Wantanasak Suksong and friends’ research.....	56
4.1.3.3.1 Methane yield from solid-state anaerobic co-digestion.....	61
4.1.3.3.2 Summary of Muthita Tepsour, Nikannapas Usmanbaha and friends’ research.....	62
4.1.3.4.1 Methane yield and biodegradability from anaerobic co-digestion of EFB and POME.....	65
4.1.3.4.2 Summary of Sittikorn Saelor, Prawit Kongjan and Sompong O-Thong’s research.....	66
4.1.3.5 Summary of Huda Rosada and Budiyo’no’s research.....	68
4.1.3.6 Summary of Agus Purnomo, Supirhatin, M Romli and Udin Hasnudin’s research.....	70
4.1.3.7 Summary of Nicholas Agustianne’s research.....	72

4.1.3.8	Summary of Pornwimon Wadchasisit, Chairat Siripattana and Kamchai Nuithitikul's research.....	75
4.1.4.1	Summary of Suwimon Kanchanasuta and Nipon Pisutpaisal's research.....	76
4.1.4.2	Summary of Karaket Wattanasit, Kasem Asawateratanakil and Sompong O-Thong's research.....	77
4.1.4.3	Summary of SJ Malik, Aparna Saraf and Srinivas Kasulla's research.....	81
4.1.4.4	Summary of Thaniya Kaosol and Narumol Sohrathol's research.....	83
4.1.4.5	Summary of N Khairul Anuar and friends' research.....	85
4.1.4.6.1	Biogas and methane production of non-pretreated and pretreated decanter cakes on BMP test.....	87
4.1.4.6.2	Summary of Thaniya Kaosol and Worawith Rungarumanotai's research.....	88
4.1.4.7	Summary of Chonticha Rongwang, Supawadee Polprasert and Suwimon Kanchanasuta's research.....	90
4.1.5.1	Summary of Wantanasak Suksong, Aminee Jehlee, Apinya Singkhala and friends' research.....	92
4.1.5.2	Summary of Saruda Sittihikitpanya and friend's research.....	96
4.1.5.3	Summary of Tanawut Nutongkaew and friend's research.....	99
4.1.6.1	Summary of Sirsuda Chaikitkaew and friend's research.....	101
4.1.6.2	Summary of Devin Pathavi's research.....	104
4.1.6.3	Summary of Pornwimon Wadchasisit, Chairat Siripattana and friends' research.....	106
4.1.6.4	Summary of Mohammed Saidu, Ali Yuzir and friends' research.....	108
4.1.6.5	Summary of Supanna Chaipa and Seksak Asavavtisichai's research.....	110
4.1.6.6	Summary of M Saidu, A Richard, B Afiz and friends' research.....	112
4.2.1	Oil palm solid waste amount and current utilization in 2020.....	114
4.2.2	Summary of oil palm frond (OPF) for methane production.....	116
4.2.3	Summary of empty fruit bunch (EFB) for methane production.....	119
4.2.4	Summary of decanter cake (DC) for methane production.....	122
4.2.5	Summary of oil palm trunk (OPT) for methane production.....	124
4.2.6	Summary of mesocarp fibre (MF) for methane production.....	127

4.2.7	Summary of methane yield of oil palm solid wastes at similar working conditions.....	128
4.2.8	Summary of optimum methane production from oil palm solid waste.....	130

