# 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 $CH_4$/g VS at lower operating temperatures.

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

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## 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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