

**PRELIMINARY STUDY OF OIL PALM FROND ENSILATION FOR
BIOETHANOL PRODUCTION**

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BACHELOR'S DEGREE
in

SUSTAINABLE ENERGY AND ENVIRONMENT
LIFE SCIENCES AND TECHNOLOGY



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Revision after Thesis Defense on 18 July 2023

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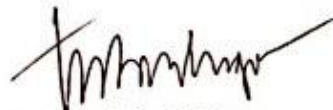
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ABSTRACT

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Background of this study is caused by the limitation of feedstock for bioethanol production and the high amount of oil palm frond waste. This study explores utilization of OPF and aim to determine the optimum silage condition, glucose concentration, and bioethanol production from OPF ensilation. The silage process variables were water ratio (1:1, 1:2, 1:5), agitation (with or without agitation), and silage duration (5 to 20 days). *Lactobacillus plantarum* was used as added bacteria in ensilation. The OPF silage was fermented using instant yeast. The results of the fermentation show that bioethanol generation can be achieved; however, not as well as expected. Sample with the highest bioethanol concentration, 3100 mg/l, with a water ratio of 1:5, no agitation, and 5 days of silage. The non-fermented sample from the silage process also produced ethanol. The sugar from OPF silage could be more optimal if the correct duration was found to complete cellulose hydrolysis. To conclude, these results show the potential for ethanol production using OPF silage. Duration of the silage process should be modified to find the optimum silage process condition. With optimal condition in both silage and fermentation, increased and efficient bioethanol production could be obtained.

Keywords: Oil palm frond, silage, bioethanol, fermentation

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DEDICATION

To my mom and the world

ACKNOWLEDGEMENTS

I want to thank Allah SWT first and foremost for his blessing. I want to express my gratitude to my parents and family for their support and understanding. They never wavered in their conviction in my talents, and they never stopped encouraging me.

I would like to thank my advisor, Dr.-Ing. Evita H. Legowo, and my co-advisor, Dr. Irvan S. Kartawiria, for their significant guidance, support, and mentorship during my research journey. The course and quality of my thesis have been greatly influenced by their knowledge and insightful feedback.

In order to complete my thesis successfully, I would want to express my gratitude to the staff and administrators of Swiss German University for providing a favorable research atmosphere and required resources.

I want to thank everyone who helped me for their support, encouragement, and insightful discussions throughout the entire study. And I want to express my gratitude to all the academics, researchers, and writers whose research and writings served as the foundation for this study. Their thoughts and suggestions were extremely helpful in developing the theoretical foundation and research technique.

Last but not least, I want to thank my self for trying hard. You can sleep now!

In conclusion, without the combined efforts and assistance of everyone stated above, this thesis would not have been feasible. Once again, I want to thank you for your support, advice, and encouragement.

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