

**QUALITY ENHANCEMENT OF BIOGAS PRODUCED
BY DOMESTICALLY OPERATED BIOGAS PLANTS IN
SRI LANKA**

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Thesis submitted in partial fulfillment of the requirements for the
degree Master of Engineering in Energy Technology

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August 2024

Declaration

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Acknowledgment

I take this opportunity to express my profound gratitude and deep regards to a great many people who have provided this opportunity and those who helped and supported to make it so useful. First I owe a great many thanks to the Department of Mechanical Engineering, University of Moratuwa Sri Lanka for their support in finding a masters degree final year research.

I would like to express my thanks to the research supervisor Prof. Saliya Jayasekara for his contribution to scheduling my valuable meetings and for assisting, guiding for extending his support throughout the period.

Completion of this Research could not have been accomplished without the support of other supportive organizations. First I would like to give my great gratitude on behalf of the National Engineering Research and Development Center for giving information, then, Mr. Chathura & staff of the HELPO organization for supporting to carry out of testing and supplying measuring equipment. Finally, Sambodi Orphanage, Galle, the place where biogas was used for my testing purposes.

I also extend my heartiest thanks to our parents and friends for their cooperation in making my final year research progress really useful. Finally, I thank all who turned my final year research progress into a really valuable one.

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Abstract

At present there is an energy crisis around the world. The energy consumption as well as its demand rapidly increasing every day. As a solution for this escalating energy demand and prices with environmental impact, people have already started to switch into renewable energy sources. Biogas is one of renewable energy source that can be generated using domestic food waste as well as municipal waste which has been a hazard for the day-to-day life of the people.. Especially for domestic purposes, it has been a challenging solution for LPG and a good solution for the areas where there is a scarcity of firewood. The problem with biogas is the emission of Hydrogen Sulfide (H_2S) unburnt Methane (CH_4). In commercial and industrial practices, biogas digesters that generate biogas are built to collect sewerage from the apartments, commercial buildings, or industries for the treatments. The gas produced from the waste has a considerable amount of H_2S which has a bad odor when the biogas emitted to the atmosphere, hence people will not be willing to use it as a fuel. As well as the presence of H_2S and CO_2 in the biogas has detrimental effects on health, corrosion of the components, and lowering the calorific value. This research focuses on the quality enhancement of biogas produced by domestically operated biogas plants in Sri Lanka targeting domestic, commercial, and industrial biogas plants that can be easily operated by using municipal wastes, industrial sewerage, and cattle dung.

Basically, the biogas cleaning system developed here (purifying unit) has separation units of carbon dioxide, hydrogen sulfide, and water vapor. Calcium Hydroxide Pellets and Activated Carbon are used to remove CO_2 when Ferric Oxide pellets remove Hydrogen Sulfide. Silica Gel is used to remove water vapor. Finally, the quality of gas that sending through this purifying systems was tested. According to the test results, a fine-tuning process was carried out to optimize the gas properties and relative composition of the gases.

Key Words: Digester, Activated Carbon, Calorific Value, Biogas purification, Scrubbers

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