

***Study on the Potential for Biogas Production from Cattle Rumen with a Comparison of Adding Cattle Manure and Banana Peel Waste***

Zeni Ulma, SST., M.Eng. (*Thesis Supervisor*)

**Moh. Hajar Rofiqi**  
***Renewable Energy Engineering Program***  
***Department of Engineering***

***ABSTRACT***

*The utilization of cattle rumen contents, cattle manure, and banana peel waste to produce biogas through anaerobic fermentation is an alternative method to reduce waste in the agricultural and livestock sectors. This study was conducted to determine the quality of each composition, where the compositions in this research included a mixture of cattle rumen contents and cattle manure in a 50%:50% ratio, a mixture of cattle rumen contents and banana peel waste in a 50%:50% ratio, and a composition with three materials fermented simultaneously in a 40%:30%:30% ratio. The study used a biodigester with a batch operating system and single-stage configuration, with the fermentation process occurring in the digester for 17 days. The analysis aimed to assess the quality of biogas produced from each composition, measuring biogas volume and methane gas concentration for each trial. The results indicated that the highest biogas volume was obtained from the substrate composition of cattle rumen contents and banana peel waste, amounting to 325.5 ml, while the highest methane (CH<sub>4</sub>) content was found in the composition of cattle rumen contents and cattle manure at 18.80% with a carbon dioxide percentage of 23.06%. The best flame test resulted from the experiment consisting of cattle rumen contents and cattle manure.*

*Keywords: Biodigester, cattle manure, cattle rumen contents, banana waste, methane, biogas volume.*