

ABSTRACT

Organic waste is one of the most serious environmental problems in many countries, especially in densely populated urban areas. Although organic waste has great potential to be processed into biogas, there is still a lot of organic waste that has not been optimally utilized. This is due to the lack of adequate infrastructure and waste management systems, lack of public awareness of the benefits and ways to manage organic waste, and limited technology and resources to carry out biogas processing. The impacts of this underutilization of organic waste include increased waste volume, increased greenhouse gas emissions, and loss of valuable renewable energy potential. Therefore, more serious and comprehensive efforts are needed to build an effective organic waste management system and increase public awareness of the importance of utilizing organic waste as a renewable energy source through biogas production.

In this research, it will utilize organic waste and rainwater available around the city of Bandung with a volume of about 1000 liters to produce alternative energy in the form of biogas. This research is a development of previous research that focuses on biogas production. In this research, rainwater will be utilized to accelerate the formation of bacteria in organic waste. The system will also include a gas concentration monitoring feature to monitor the levels of methane gas produced during the biogas generation process. In addition, consider the overall dimensions of the device, with an overall size of about 120x100x120 cm and an empty weight of about 60 kg. The biodigester will be placed on the ground for easy maintenance and to ensure compatibility with the surrounding environment. In addition, we will also conduct a hydraulic pressure test with a pressure level of about 100 kPa.

The proposed solution has the potential to reduce organic waste pollution from farms by 10% while generating about 12 liters of methane gas in each production cycle. The process involves mixing organic waste in a 1:2 ratio which is then fermented in a biodigester for 14 days. The biodigester system is equipped with a monitoring device that monitors the progress of methane gas production, including gas pressure and concentration. Test results of the monitoring system showed an average concentration of 1,832 ppm with an average pressure of about 1 ATM. With these results, it is expected to support organic waste management properly.

Keywords: Waste, Organic, Biogas, Biodigester