ABSTRACT

EFFECT OF RICE STRAW SOAKING USING CAUSTIC SODA SOLUTION AND YEAST ADDITION (*Saccharomyces cerevisiae*) ON BIOGAS PRODUCTION

By

RINA ANGGRAINI PURBA

Biogas is a source of energy derived from organic materials such as manure and agricultural waste. The formation of biogas consists of three stages, namely hydrolysis, acidogenesis, and methanogenesis. This experiment aimed to study the effect of rice straw soaking within caustic soda (NaOH) solution and the addition of yeast (*Saccharomyces cerevisiae*) on biogas production using batch mode. Experiment was conducted using 3-L batch digester using substrate composed of a mixture of cow manure and rice straw with a wet weight ratio of 3:1 (cow manure: rice straw). The experiment was conducted using completely randomized factorial design of two factors. The first factor is soaking time of rice straw in 1% caustic soda solution which was composed of three levels, namely 0 (without pretreatment), 1 day (24 hours), and 2 days (48 hours). The second factor was yeast dose with three levels, namely 0, 0.5, and 1 gram. All treatment was replicated 3 times. Characteristics of the substrate (water content, total solid, volatile solid, ash, and C/N ratio), and digester performance (pH and temperature), production and productivity biogas was measured. Results show that biogas production until day 30th was significantly affected by soaking time at \( \alpha = 5\% \). Yeast addition until 1 gram, however, did not influence the biogas production. The analysis also showed that there is no significant interaction between the soaking time and yeast dose on the biogas production. The biogas production using a mixture of cow dung and rice straw without soaking gave the highest cumulative biogas production (6,593 ml for 30 days). Biogas produced from all treatments provide a blue flame when burned which indicates high methane gas content.

Keywords: Biogas, cow dung, rice straw, caustic soda, yeast, soaking