

BIOGAS PRODUCTION USING ANAEROBIC BIODIGESTER FROM CASSAVA STARCH EFFLUENT

Budiyono¹⁾, Siswo Sumardiono¹⁾, and Sunarso²⁾

¹⁾ Department of Chemical Engineering,

Faculty of Engineering, Diponegoro University

²⁾ Department of Animal Agriculture, Diponegoro University

Abstract

IKMs' factory activity in Margoyoso produces liquid and solid wastes. The possible alternative was to use the liquid effluent as biogas raw material. This study focuses on the used of urea, ruminant, yeast, microalgae, the treatment of gelled and ungelled feed for biogas production, pH control during biogas production using buffer Na₂CO₃, and feeding management in the semi-continuous process of biogas production that perform at ambient temperature for 30 days. Ruminant bacteria, yeast, urea, and microalgae was added 10% (w/v), 0.08% (w/v), 0.04% (w/v), 50% (v/v) of mixing solution volume, respectively. The pH of slurry was adjusted with range 6.8-7.2 and was measured daily and corrected when necessary with Na₂CO₃. The total biogas production was measured daily by the water displacement technique. Biogas production from the ungelting and gelling mixture of cassava starch effluent, yeast, ruminant bacteria, and urea were 726.43 ml/g total solid and 198 ml/g total solid. Biogas production from ungelting mixture without yeast was 58.6 ml/g total solid. Biogas production from ungelting mixture added by microalgae without yeast was 58.72 ml/g total solid and that with yeast was 189 ml/g total solid. Biogas production from ungelting mixture of cassava starch effluent, yeast, ruminant bacteria, and urea in semi-continuous process was 581.15 ml/g total solid. Adding of microalgae as nitrogen source did not give significant effect to biogas production. But adding of yeast as substrate activator was very helpful to accelerate biogas production. The biogas production increased after cassava starch effluent and yeast was added. Requirement of sodium carbonate (Na₂CO₃) to increase alkalinity or buffering capacity of fermenting solution depends on pH-value.

Key Words: biogas cassava; C/N ratio; ruminant bacteria; semi-continuous biodigester; yeast