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Effect of EM(Effective Microorganism)Addition on the Quality of Methane Production from Rice Straw

Tri Widjaja[1]*, Hasrul Anwar[1], Danawati Hari Prajitno[1], Lily Pujiastuti[1]

[1]Department of Chemical Engineering, Institut Teknologi Sepuluh Nopember Jl. Raya ITS,Kampus SukoliloSurabaya, Kode Pos 60111Indonesia

Abstract : Utilization of agricultural wastes for biogas production is one of the most demanding technologies in sustainable energy production concerning to the sustainability of environmental issues. Rice straw is one of abundant agricultural wastes in Indonesia that can be used as the source of lignocellulose for biogas production. One of the methods to increase the methane quality is by adding a Effective Microorganism (EM). EM contains of 80 microorganisms species which can produce organic acids and enhance decomposition of organic material. This study tested the effect of EM addition on the methane quality of a rice straw-cow dung mixture (RCE) with variable rice straw-cow dung mixture only (RC) as a control. This experiments were conducted in anaerobic batch reactor over 30 days with a working volume of 3.6 L at the mesophilic temperature. Several parameters were measured to determine the effect of EM addition on methane quality such as volatile fatty acids (VFAs), chemical oxygen demand (COD), and methane yield. In addition, total solid (TS), volatile solid (VS), CH_4,CO_2 and H_2S were analyzed. COD of RC and RCE were 62.34% and 40.54% respectively. Yield of methane production for RC and RCE were 0.195 $Nm^3/kgCOD_{removal}$ and 0.234 $Nm^3/kgCOD_{removal}$ respectively. When the addition of EM was done, the quality of methane increased from 38.54% to 41.24%. With cow dung microorganism, the composition of biogas was 38.54% CH_4, 9.41% CO_2 and 0.39%H_2. With a mixed cow dung microorganisms-EM, the composition of biogas was 41.24 %CH_4,8.7% CO_2 and 0.36%H_2.

Keywords : Rice straw, Cow dung,EM,Methana, Volatile fatty acid.

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