

ABSTRAK

PENGARUH WAKTU TERHADAP VOLUME BIOGAS HASIL OLAHAN LIMBAH CAIR KELAPA SAWIT MENGGUNAKAN STARTER KOTORAN KAMBING

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Limbah cair kelapa sawit memiliki potensi besar sebagai bahan baku produksi biogas dengan metode anaerobik, yang melibatkan aktivitas mikroorganisme tanpa oksigen bebas. Proses fermentasi selama pembentukan biogas dapat dibantu dengan menambahkan starter untuk mempercepat proses penguraian yang dilakukan oleh mikroorganisme.

Pada penelitian ini, biogas diproduksi menggunakan limbah cair kelapa sawit yang ditambahkan starter berupa kotoran kambing. Tiga digester dibuat dengan komposisi bahan yang berbeda, yaitu D1 (4:6), D2 (5:5), dan D3 (6:4). Fermentasi biogas dilakukan selama 40 hari dengan pengamatan harian suhu dan volume biogas. Pengukuran kualitas limbah meliputi COD, BOD, TDS, TSS, dan pH yang hanya diukur pada awal dan akhir fermentasi.

Hasil penelitian menunjukkan bahwa limbah cair kelapa sawit dapat diolah menjadi biogas. Fermentasi biogas dilakukan selama 40 hari dengan hasil volume biogas tertinggi sebanyak 23,970 L pada digester D1. Uji nyala api berhasil dilakukan pada digester D1. Analisis dan pengamatan nilai COD, BOD, dan TDS pada biogas hasil fermentasi digester D1 menghasilkan penurunan berturut-turut sebesar 48%, 49%, dan 34%. Untuk nilai TSS mengalami peningkatan sebesar 21%.

Kata kunci: limbah cair kelapa sawit, kotoran kambing, biogas, anaerobik

ABSTRACT

THE EFFECT OF TIME ON THE VOLUME OF BIOGAS FROM PROCESSED PALM OIL LIQUID WASTE USING GOAT MANURE STARTER

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Palm oil liquid waste has great potential as a raw material for biogas production using the anaerobic method, which involves the activity of microorganisms without free oxygen. The fermentation process during biogas formation can be assisted by adding a starter to accelerate the decomposition process carried out by microorganisms.

In this research, biogas was produced using palm oil liquid waste with goat manure as starter. Three digesters were made with different material compositions, which are D1 (4:6), D2 (5:5), and D3 (6:4). Biogas fermentation was conducted for 40 days with daily observation of temperature and volume. Waste quality measurements include COD, BOD, TDS, TSS, and pH which are only measured at the beginning and end of fermentation.

The results showed that palm oil liquid waste can be processed into biogas. Biogas fermentation was conducted for 40 days with the highest biogas volume of 23,970 L in digester D1. The flame test was successfully conducted in digester D1. Analysis and observation of COD, BOD, and TDS values in fermented biogas in digester D1 resulted in a decrease of 48%, 49%, and 34%, respectively. The TSS value there was an increases 21%.

Keywords : palm oil liquid waste, goat manure, biogas, anaerobics