PENINGKATAN NILAI KALOR BIOGAS DENGAN METODE VARIASI RASIO DAN WAKTU PURIFIKASI MENGGUNAKAN ADSORBEN ZEOLIT DAN ARANG AMPAS TEBU

Rachmad Nur Besari
14/368243/PT/06853

INTISARI

Penelitian ini bertujuan untuk mengetahui pengaruh variasi rasio dan waktu purifikasi biogas terhadap nilai kalor biogas. Analisis statistik yang digunakan adalah analisis pola searah. Metode pada penelitian ini dilakukan dengan dua fase. Fase pertama, sampel menggunakan metode variasi rasio. Fase kedua sampel yang mengalami penurunan kadar CO_2 terbanyak dari variasi rasio akan dilanjutkan menggunakan metode variasi waktu purifikasi. Perlakuan variasi rasio dibedakan atas lima perlakuan, yaitu 100% zeolit, 25% arang ampas tebu dan 75%zeolit, 50% arang ampas tebu dan 50% zeolit, 75% arang ampas tebu dan 25% zeolit, serta 100% arang ampas tebu. Variasi waktu dibedakan atas empat perlakuan, yaitu 10, 15, 20, dan 25 menit. Variabel yang diteliti yaitu presentase penurunan CO_2 pada variasi rasio dan variasi waktu, nilai kalor dan efisiensi pembakaran variasi waktu. Presentase penurunan kadar CO_2 terbanyak yaitu 77,66% pada perlakuan 50% arang ampas tebu dan 50% zeolit. Penurunan CO_2 perlakuan waktu purifikasi dengan 50% arang ampas tebu dan 50% zeolit terbanyak yaitu pada perlakuan 10 menit dengan presentase 78,46%. Hasil penelitian pada nilai kalor biogas yang terbaik yaitu pada perlakuan 10 menit waktu purifikasi sebesar 956,64 ± 2.19 kJ dengan adsorben 50% ampas tebu dan 50% zeolit. Efisiensi pembakaran terbaik terdapat pada perlakuan selama 20 menit sebesar 36,0 ± 7.64 %. Berdasarkan hasil penelitian dapat disimpulkan bahwa nilai kalor biogas dan efisiensi pembakaran biogas mengalami peningkatan dengan metode variasi rasio dan waktu purifikasi menggunakan adsorben zeolit dan arang ampas tebu.

Kata kunci: Adsorpsi, Biogas, Zeolit, Arang Ampas Tebu, Nilai Kalor

BIOGAS HEEAT VALUE INCREASE BY RATIO VARIATION AND PURIFICATION METHOD USING ZEOLITE ADSORBENTS AND SUGARCANE BAGASSE CHARCOAL

Rachmad Nur Besari
14/368243/PT/06853

ABSTRACT

The research aimed to determine the influence of the ratio and the time of biogas purification toward the biogas rate. The statistical analysis used was the one way ANOVA. There were two phases in this research. The first phase, the sample used the ratio variation. The second phase was done with the sample which experienced the most decreasing level of CO_2 within the ratio variation method then continued using the purification time variation method. The treatment of ratio variations were differentiated by five treatments, namely 100% zeolite, 25% of sugar cane and 75% zeolite, 50% of sugar cane and 50% zeolite, 75% of sugar cane and 25% zeolite, and 100% of sugar cane pulp. Time variations were differentiated over four treatments, i.e. 10, 15, 20, and 25 minutes. The variables examined were the percentage of CO_2 decrease level on variations in ratio and time variation, heat value and time variation of combustion efficiency. The highest level of CO_2 reduction was 77.66% from 50% of sugar cane pulp and 50% zeolite treatment. Thus, continued to the second stage which resulting the best highest decrease on CO_2 level was the time variation of 10 minutes (78.46%). Therefore, the best biogas heat value is at the treatment of 10 minutes purification time of 956.64 ± 2.19 KJ with adsorbent 50% sugar cane and 50% zeolite. Meanwhile, the best combustion efficiency is in the 20-minute treatment of 36.0 ± 7.64 %. Based on the results of the study, the value of biogas heat and the efficiency of biogas combustion has increased by the method variation ratio and time of purification using adsorbent zeolite and charcoal sugar cane.

Key Word : Adsorption, Biogas, Zeolit, Sugarcane bagasse charcoal, Heat value