



## INTISARI

Semakin meningkatnya populasi penduduk mengakibatkan tingkat konsumsi energi meningkat, sumber energi fosil sangat terbatas, sehingga diperlukan pemikiran untuk mendapatkan energi dari sumber yang dapat diperbarui. Limbah pertanian dan sampah pasar dapat dimanfaatkan untuk menghasilkan alternatif sumber energi terbarukan. Penelitian ini bertujuan mengetahui potensial biogas jerami padi dan sawi hijau sebagai bahan baku pembuatan biogas secara batch, mendapatkan data pengaruh komposisi campuran dan pretretmen jerami padi terhadap produksi biogas dan mendapatkan parameter kinetika pembentukan biogas dari jerami padi dan sampah sayur sawi hijau.

Sampah sayuran sawi hijau (*Brassica Juncea*) dan jerami padi, dicampur dengan komposisi tertentu sehingga menghasilkan rasio C-N=20, stater inokulum dari cairan effluent biodigester dimasukkan kedalam Erlenmeyer ditambahkan air sehingga volume totalnya 350 ml. pH awal campuran diukur dengan pH universal, campuran diberi N<sub>2</sub> supaya kondisi anaerob tercapai lalu erlenmeyer ditutup rapat-rapat, fermentasi dilakukan didalam water bath pada suhu (35<sup>0</sup> ±1)<sup>0</sup>C. Volume biogas dan pH diukur setiap hari. Metan, VFA, TS dan VS dinalisis setiap 7 hari. Proses fermentasi diamati selama 49 hari. Variabel yang diteliti meliputi perbandingan massa substrat dengan air, R (0,66;1;1,5) dan perlakuan awal jerami, J(ditambah EM-4 ukuran 0,5 cm, diserbuk, dipotong ukuran 0,5 cm).

Hasil terbaik didasarkan pada kadar metana tertinggi dan yield biogas terbanyak diperoleh dengan R=1, dimana yield biogas tertinggi diperoleh 0,030 L/g VS, dengan kadar metana tertinggi tercapai pada hari ke-21 sebesar 62,18 %. Pretretmen awal jerami padi secara biologis dengan penambahan EM-4 akan meningkatkan yield biogas sebesar 0,016L/gVS menjadi 0,03L/gVS (188%). Model kinetika produksi biogas didekati dengan model kinetika orde satu dengan harga k=0,0311 1/hari.

**Kata Kunci :** Jerami padi, sawi hijau, EM-4, biogas, metana.



## ABSTRACT

*Population growth increases energy consumption level. Due to fossil energy sources are very limited; it needs efforts to get energy from renewable resources. Agricultural and market waste can be use to produce the renewable energy resources. The objectives of this study were to investigate potential of rice straws and green mustard (*Brassica Juncea*), to achieve experimental data of the effect of mixture compositions and rice straws pretreatment, and to develop kinetic parameters of biogas production.*

*Vegetable waste of green mustard and rice straws were mixed in certain composition until C to N ratio was 20. Inoculums stater from bio-digester effluent was put into Erlenmeyer, water was then added until total volume of 350 ml. initial mixture pH was measured by using universal pH. Nitrogen was introduced to the mixture to get anaerob condition and the Erlenmeyer was then isolated. Fermentation was conducted in water bath at temperature of  $(35 \pm 1)^{\circ}\text{C}$ . volume and pH of the biogas were measured every day. Methane, VFA, TS, and VS were analyzed every 7 days. Fermentation process was observed for 49 days. The variables investigated were ratio of substrate amount to water of 0,66 ; 1; and 1,5, rice straws pretreatment by adding EM-4 with the size of 0,5 cm, powdered, and cut to 0,5 cm size.*

*The highest result according to the highest methane content and biogas yield was obtained at ratio of the substrate amount to water of 1 with the biogas yield of 0,030 L/g VS, the highest methane content obtained at at day 21<sup>st</sup> of 62,18%. Biological rice straws pretreatment by adding EM-4 increased the biogas yield of 188%( from 0,016L/gVS to 0,03L/gVS). Kinetic model of the biogas production was approach by first order reaction with constant k of  $0.03111 \text{ day}^{-1}$*

*Keywords : Rice straw, green mustard (*Brassica Juncea*), EM-4, Biogas, Methane*