

**Nisrina Firdausiyah, 2015. Variasi Perbandingan Bahan Baku Kompos dan Kotoran Sapi serta Waktu Fermentasi dalam Produksi Biogas dengan Penambahan Konsorsium Bakteri Hidrolitik. Skripsi ini dibimbing oleh Drs. Agus Supriyanto, M. Kes. dan Dr. Ni'matuzahroh. Departemen Biologi, Fakultas Sains dan Teknologi, Universitas Airlangga, Surabaya.**

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## ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh variasi perbandingan bahan baku kompos dan kotoran sapi, waktu fermentasi serta kombinasi keduanya dalam produksi biogas dengan penambahan konsorsium bakteri hidrolitik. Parameter biogas yang diukur dalam penelitian ini adalah kadar metana dan volume biogas. Rancangan penelitian yang digunakan adalah rancangan faktorial 3 x 4 dengan 3 kali ulangan, terdiri atas 3 level perbandingan bahan baku kompos dan kotoran sapi (1:2, 1:1, dan 2:1) serta 4 level waktu fermentasi (10, 20, 30 dan 40 hari). Konsorsium bakteri hidrolitik yang ditambahkan sebanyak 10 %. Kadar metana diukur dengan metode absorpsi dan volume biogas diukur dengan metode volumetri. Data yang diperoleh dianalisis menggunakan uji ANAVA Dua Arah dengan derajat signifikansi 5 %. Data kadar metana dilanjutkan dengan uji *Duncan*, sedangkan volume biogas dilanjutkan dengan uji *Games-Howell*. Hasil analisis menunjukkan bahwa perbandingan bahan baku kompos dan kotoran sapi hanya berpengaruh terhadap kadar metana ( $p = 0,000$ ) tetapi tidak berpengaruh terhadap volume biogas ( $p = 0,777$ ), waktu fermentasi berpengaruh terhadap kadar metana ( $p = 0,023$ ) dan volume biogas ( $p = 0,002$ ), tetapi kombinasi keduanya tidak berpengaruh terhadap kadar metana ( $p = 0,845$ ) dan volume biogas ( $p = 0,745$ ). Perbandingan bahan baku kompos dan kotoran sapi yang paling efisien untuk produksi biogas adalah 2:1 karena menghasilkan kadar metana sebesar 69,70 % dan volume biogas sebesar 899,82 mL. Sedangkan waktu fermentasi yang paling efisien adalah 20 hari karena menghasilkan kadar metana sebesar 67,27 % serta volume biogas sebesar 970,03 mL.

**Kata kunci:** Bahan baku kompos, kadar metana, konsorsium bakteri hidrolitik kotoran sapi, volume biogas, waktu fermentasi

**Nisrina Firdausiyah, 2015. The Variations of Ratio on Compost Feedstock and Cow Manure as well as Fermentation Time in Biogas Production with the Addition of Hydrolitic Bacteria Consortium. This study was guided by Drs. Agus Supriyanto, M. Kes. and Dr. Ni'matuzahroh. Department of Biology, Faculty of Science and Technology, Universitas Airlangga, Surabaya.**

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### **ABSTRACT**

*The research was aimed to determine the influence of variations of ratio on compost feedstock and cow manure, fermentation time and the combination of both in biogas production with addition of hydrolytic bacteria consortium. The measured parameter of biogas in this research was methane concentration and volume of biogas. The used experimental design was 3 x 4 factorial design with three replications, consisting of three levels of ratio on compost feedstock and cow manure (1:2, 1:1 and 2:1) and four levels of fermentation time (10, 20, 30, and 40 days). The addition of hydrolytic bacteria consortium was 10 %. The methane concentration was measured by absorption method and volume of biogas was measured by volumetric method. The obtained data were analyzed using two-way ANAVA test at 5 % significance level. The data of methane concentration was followed by Duncan test, whereas volume of biogas was followed by Games-Howell test. The result showed that the ratio on compost feedstock and cow manure only affected on methane concentration ( $p = 0,000,$ ) but did not affect on volume of biogas ( $p = 0,777$ ). Fermentation time affected on methane concentration ( $p = 0,023$ ) and volume of biogas ( $p = 0,002$ ), but the combination of both did not affect on methane concentration ( $p = 0,845$ ) and volume of biogas ( $p = 0,745$ ). The most efficient ratio on compost feedstock and cow manure for biogas production was 2:1 because it produced 69,70 % methane concentration and 899,82 mL volume of biogas. Whereas, the most efficient fermentation time was 20 days because it produced 67,27 % methane concentration and 970,03 mL volume of biogas.*

**Keywords:** *Compost feedstock, methane concentration, hydrolitic bacteria consortium, cow manure, volume of biogas, fermentation time*