



Perancangan Sistem *Biodigester Based On Toilet* Pada Asrama Mahasiswa Kinanthi I UGM

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10/301819/TK/37170

Diajukan kepada Jurusan Teknik Fisika Fakultas Teknik
Universitas Gadjah Mada pada tanggal 14 Oktober 2015
untuk memenuhi sebagian persyaratan untuk memperoleh derajat
sarjana S-1 Program Studi Teknik Fisika

INTISARI

Permasalahan energi menjadi perhatian penting bagi pemerintah saat ini, dikarenakan jumlah energi fosil semakin menipis. Instansi pendidikan UGM ikut serta dalam mengatasi permasalahan energi saat ini, salah satunya melalui pembangunan fasilitas asrama yang ramah dengan lingkungan dan pemanfaatan energi terbarukan. Penelitian ini bertujuan untuk mengetahui potensi biogas dari asrama Kinanthi I UGM, pembuatan rancangan *biodigester* beserta analisis teknik dan ekonomi.

Perancangan *biodigester* asrama Mahasiswa Kinanthi I UGM memanfaatkan limbah penghuni asrama serta sampah sisa makanan. Desain *biodigester* memenuhi parameter suhu mesofilik (25-30°C), C/N 22,693, pH 4,5-7. Sistem *Biodigester* terdiri dari bak pencampur, digester, bak outlet, serta pipa gas, digunakan 2 asumsi isian digester yaitu yang pertama feses manusia, urin, sampah makanan serta air bilas dan air guyur, asumsi kedua dengan pengenceran total solid 8%. Produksi biogas sebesar 19,539 m³/hari. Analisis ekonomi dengan nilai kesetaraan kalor LPG, kayu bakar, serta minyak tanah menunjukkan rancangan *biodigester* tidak layak dikembangkan dengan nilai NPV < 1, BCR < 1

Keyword : *Biodigester, Feses manusia, Urin, Sampah sisa makanan, Analisa teknik, Analisa Ekonomi*

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Design Of Biodigester Based On Toilet In Kinanthi I UGM Boarding House

by

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Submitted to the Department of Engineering Physics
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In partial fulfillment of Degree of
Bachelor of Engineering in Physics Engineering

ABSTRACT

Nowadays, the energy problems have become the important concern of government, because the amount of fossil energy has decreased. Education institution, Universitas Gadjah Mada takes part to overcome the energy problems by developing eco friendly bording house and renewable energy utilization. This research aims to know the biogas potential of Kinanthi I UGM bording house, design of the biodigester and technical and economic analysis.

Design of Kinanthi I UGM biodigester utilizes the boarder solid waste and foodwaste. Design of biodigester has fulfilled the parameter of temperature mesophilic (25-30°C), C/N ratio 22,693 and pH 4,5-7. Biodigester system consists of mixing tank, digester, outlet chamber and gas pipe, used two assumption of raw material for the process, first assumption consists of human faeces, urin, foodwaste, rinse water and water flush, second assumption is the dilution of total solid from the three organic material until 8%. Biogas production of the system is about 19,539 m³/day. Economic analysis with the calorific value equivalency of LPG, kerosene an firewood showed that the biodigester to be developed with with the calorific value equivalency of LPG because the NPV > 1 and BCR > 1, while with the calorific value equivalency of kerosene and firewood are not feasible to develop.

Keywords : *Biodigester, Human feaces, Urin, Foodwaste, Technical Analysis, Economic Analysis*

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