

**PENGARUH PENAMBAHAN JERAMI PADI PADA PEMBUATAN
PELET BIOMASSA ECENG GONDOK MENGGUNAKAN
METODE TEKNOLOGI OLAH SAMPAH DI SUMBERNYA**

TUGAS AKHIR

Sebagai salah satu syarat untuk menyelesaikan

Program Strata -1

Departemen Teknik Lingkungan
Fakultas Teknik Universitas Andalas

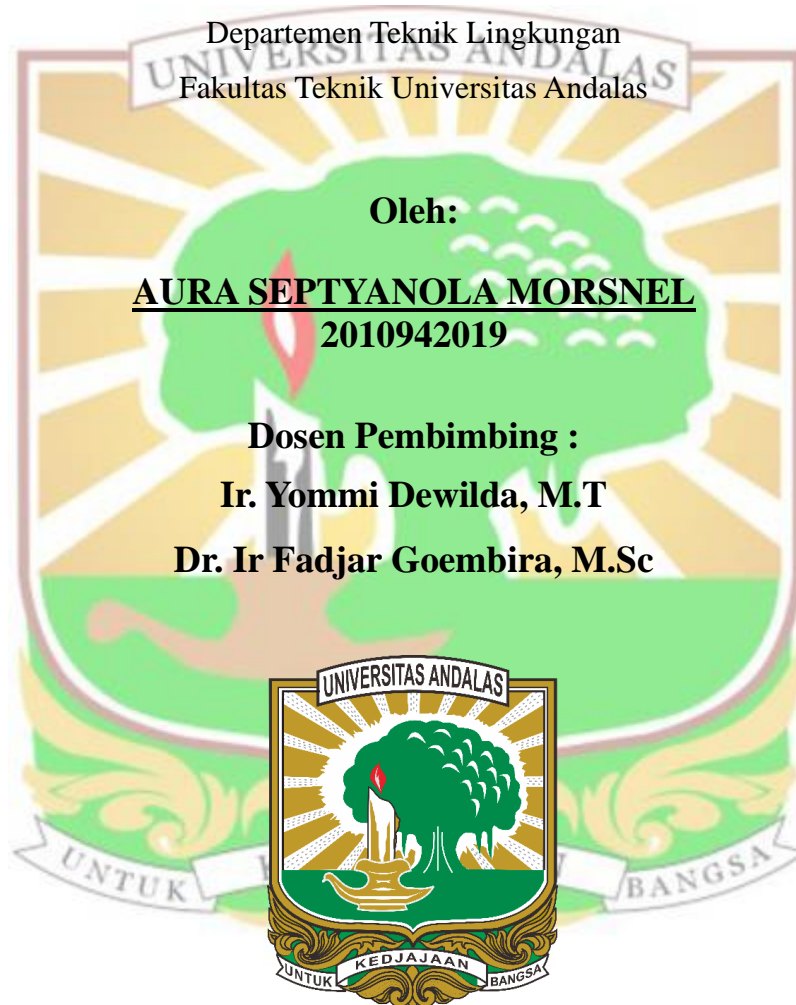
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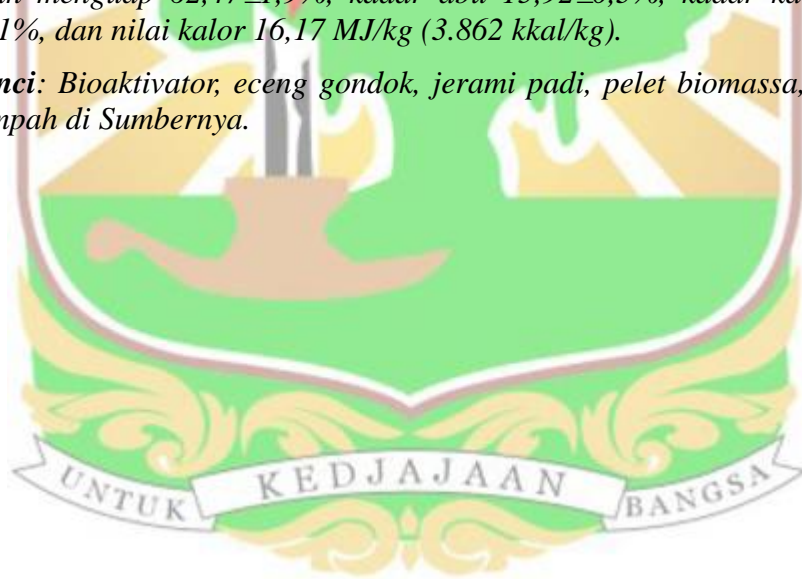


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ABSTRAK

Eceng gondok merupakan tumbuhan air yang mengandung lignoselulosa dan dapat dimanfaatkan sebagai sumber energi untuk pelet biomassa. Tingginya kadar air pada eceng gondok dapat mempengaruhi kualitas pelet biomassa yang dihasilkan. Oleh karena itu diperlukan penambahan dengan limbah biomassa lain seperti jerami padi yang memiliki kadar air yang lebih rendah. Penelitian ini bertujuan menganalisis pengaruh penambahan jerami padi dalam proses pembuatan pelet biomassa berbahan dasar eceng gondok menggunakan metode Teknologi Olah Sampah di Sumbernya (TOSS) yang terdiri dari proses pencacahan, biodrying, dan peletisasi. Selama proses biodrying dengan penambahan bioaktivator AR124 dilakukan pengukuran kadar air, suhu, penyusutan, bau, dan lama proses biodrying. Penelitian dilakukan secara triplo dengan variasi rasio antara eceng gondok dan jerami padi, yaitu C1 (1:1), C2 (1:2), dan C3 (1:3). Selama proses biodrying, dilakukan analisis dan pengukuran kadar air, suhu, pH, bau, penyusutan, dan lama proses biodrying. Kualitas pelet biomassa dibandingkan dengan analisis proksimat dan nilai kalor sesuai standar SNI 8966:2021 tentang Bahan Bakar Jumptan Padat untuk Pembangkit Listrik. Hasil penelitian menunjukkan bahwa semua variasi pelet biomassa memenuhi baku mutu, dengan variasi terbaik C3 yang memiliki kadar air $6,16 \pm 0,3\%$, kadar zat mudah menguap $62,47 \pm 1,9\%$, kadar abu $15,92 \pm 0,3\%$, kadar karbon tetap $15,45 \pm 2,1\%$, dan nilai kalor $16,17 \text{ MJ/kg}$ (3.862 kkal/kg).

Kata Kunci: *Bioaktivator, eceng gondok, jerami padi, pelet biomassa, Teknologi Olah Sampah di Sumbernya.*



ABSTRACT

Water hyacinth is an aquatic plant that contains lignocellulose and can be utilized as an energy source for biomass pellets. The high moisture content in water hyacinth can affect the quality of the resulting biomass pellets. Therefore, it requires the addition of other biomass waste, such as rice straw, which has a lower moisture content. This study aims to analyze the effect of adding rice straw in the process of making biomass pellets based on water hyacinth using the Teknologi Olah Sampah di Sumbernya (TOSS) method, which consists of shredding, biodrying, and pelletizing processes. During the biodrying process, with the addition of AR124 bioactivator, measurements were taken of moisture content, temperature, shrinkage, odor, and the duration of the biodrying process. The study was conducted in triplo with variations in the ratio of water hyacinth to rice straw, namely C1 (1:1), C2 (1:2), and C3 (1:3). During the biodrying process, analyses and measurements of moisture content, temperature, pH, odor, shrinkage, and the duration of the biodrying process were carried out. The quality of the biomass pellets was compared using proximate analysis and calorific value in accordance with the SNI 8966:2021 standard for Refuse Derived Fuel (RDF) for Power Plants. The results of the study showed that all variations of biomass pellets met the quality standards, with the best variation being C3, which had a moisture content of $6.16 \pm 0.3\%$, volatile matter content of $62.47 \pm 1.9\%$, ash content of $15.92 \pm 0.3\%$, fixed carbon content of $15.45 \pm 2.1\%$, and a calorific value of 16.17 MJ/kg (3,862 kcal/kg).

Keywords: Bioactivator, biomass pellets, Teknologi Olah Sampah di Sumbernya, rice straw, water hyacinth.

