

## **ABSTRACT**

### **THE EFFECT OF PRESSURE TO THE CHARACTERISTICS OF AKASIA LARGE LEAF AND CEMPAKA SAWDUST WASTE**

**By**

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In Indonesia, there are so much biomass like sawdust which come from wood waste industry and do not used optimally. Therefore, it can be used for alternative energy which more environmentally-friendly. There are some deficiencies from using biomass directly as source of energy, to overcome the deficiencies, biomass can be modified to biopellet. The aim of this research are to know the best pressure for making biopellet and to know the characteristic of Large Leaf Akasia sawdust biopellet and Cempaka sawdust biopellet. This research was using complete randomised design. There were two factors; the material of biopellet (Large Leaf Akasia sawdust and Cempaka sawdust) and pressure which used in making biopellet (0,5 ton (43 Mpa), 1 ton (86 Mpa), 1,5 ton (129 Mpa), 2 ton (172 Mpa), 2,5 ton (215 Mpa), dan 3 ton (258 Mpa)). Each treatment was repeated 3 times. The observed parameters were water content, mass density, bulk density, ash content, durability, water absorption, and color of biopellet. The result of this research shows that material used were significantly affected to bulk density and ash content. However, water content, mass density, durability, water absorption, and color of biopellet were not significantly affected to the material used. The pressure factor was significantly affected to mass density, bulk density, biopellet durability, but it was not significantly affected to water content, ash content, water absorption and discoloration of biopellet. The result of this research showed that Large Leaf Akasia sawdust biopellet (M1) produced a biopellet which has the higher mass density, bulk density, and ash content than Cempaka sawdust biopellet (M2). The best pressure for making of biopellet from waste of akasia large leaf and cempaka sawdust is 1,5 ton. It produced biopellet which has water content, mass density, and ash content that are conforming to SNI standard. It also has a high bulk density and durability, and a low water absorption.

**Keywords:** Biopellet, large leaf akasia sawdust, cempaka sawdust, pressure.

## ABSTRAK

### PENGARUH BESAR TEKANAN TERHADAP KARAKTERISTIK *BIOPELLET* DARI LIMBAH SERBUK GERGAJI KAYU AKASIA DAUN LEBAR DAN CEMPAKA

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Di Indonesia, biomassa seperti serbuk gergaji kayu yang berasal dari limbah industri kayu banyak dijumpai dan tidak dimanfaatkan secara maksimal. Sehingga bisa dijadikan sebagai energi alternatif yang lebih ramah lingkungan. Pemanfaatan biomassa sebagai sumber energi secara langsung memiliki beberapa kekurangan, untuk mengatasi kekurangan tersebut, biomassa dapat diubah menjadi *biopellet*. Penelitian ini bertujuan untuk mengetahui besar tekanan yang terbaik dalam pembuatan *biopellet* serta karakteristik *biopellet* berbahan serbuk gergaji kayu akasia daun lebar dan cempaka. Penelitian ini menggunakan Rancangan Acak Lengkap (RAL) yang terdiri dari 2 faktor yaitu bahan *biopellet* (serbuk gergaji kayu cempaka dan kayu akasia daun lebar) dan Tekanan yang digunakan saat pembuatan *biopellet* (0,5 ton (43 Mpa), 1 ton (86 Mpa), 1,5 ton (129 Mpa), 2 ton (172 Mpa), 2,5 ton (215 Mpa), dan 3 ton (258 Mpa)). Setiap kombinasi perlakuan diulang sebanyak 3 kali. Parameter yang diamati diantaranya kadar air, massa jenis, *bulk density*, kadar abu, kekuatan, daya serap air, dan warna *biopellet*. Hasil penelitian ini menunjukkan bahwa bahan serbuk gergaji kayu akasia daun lebar (M1) menghasilkan *biopellet* yang memiliki massa jenis, *bulk density*, dan kadar abu yang lebih tinggi dari *biopellet* berbahan serbuk gergaji kayu cempaka (M2). Tekanan yang terbaik untuk pembuatan *biopellet* dari limbah serbuk gergaji kayu akasia daun lebar dan cempaka adalah 1,5 ton, karena menghasilkan *biopellet* yang memiliki kadar air, massa jenis, dan kadar abu yang telah memenuhi standar SNI 8675:2018, memiliki *bulk density*, dan kekuatan yang besar, serta daya serap air yang rendah.

**Kata Kunci:** *Biopellet*, serbuk gergaji kayu akasia daun lebar, serbuk gergaji kayu cempaka, tekanan.