

**PENGARUH PERLAKUAN BAHAN BAKU DAN SUHU KEMPA PANAS TERHADAP SIFAT PAPAN PARTIKEL TANPA PEREKAT (*BINDERLESS PARTICLEBOARD*) DARI AMPAS TEBU**

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**INTISARI**

Ampas tebu merupakan bahan non kayu berlignoselulosa yang memiliki potensi besar dan belum dimanfaatkan optimal di Indonesia. Penghilangan zat ekstraktif dikenal sebagai langkah yang penting dalam proses pembuatan produk komposit, karena kadang-kadang tidak kompatibel dengan perekat sintetis dan mempengaruhi kekuatan rekat komposit. Ampas tebu biasanya masih mengandung sisa gula. Penelitian ini bertujuan untuk mengetahui pengaruh perlakuan bahan baku sebelum proses pengempaan dan suhu kempa panas terhadap sifat papan partikel tanpa perekat (*binderless particleboard*) dari ampas.

Penelitian ini menggunakan rancangan acak lengkap yang disusun secara faktorial dengan dua faktor yaitu perlakuan bahan baku (bahan baku tanpa rendaman dan dengan perendaman) dan suhu kempa panas (160°C, 180°C, dan 200°C) dengan masing-masing 3 ulangan. Bahan baku ampas tebu diperoleh dari pabrik pengolahan gula tebu Gondang Baru di Klaten, Jawa Tengah. Partikel ampas tebu yang digunakan adalah yang lolos saringan 5x5 mm. Ampas tebu dengan perlakuan rendaman dimasukkan dalam air 80°C selama 3 jam. Bahan baku yang digunakan pada penelitian ini memiliki kadar air pada kisaran 8%. Pengempaan partikel dilakukan pada tekanan 40 MPa selama 15 menit dengan target kerapatan 0,8 g/cm<sup>3</sup>. Pengujian papan meliputi sifat fisik yaitu kadar air, kerapatan, penyerapan air, dan pengembangan tebal, dan sifat mekanik meliputi keteguhan lengkung patah (MOR) dan statik (MOE) serta uji keteguhan rekat (*Internal Bond*) menggunakan standar JIS A 5908 (1994). Data hasil pengujian dianalisis menggunakan SPSS seri 15, dilakukan uji lanjut HSD untuk faktor berbeda nyata dan sangat nyata.

Hasil penelitian menunjukkan bahwa interaksi antara perlakuan bahan baku dan suhu kempa berpengaruh sangat nyata terhadap sifat penyerapan air, keteguhan rekat (IB), dan modulus elastisitas papan, dan berpengaruh nyata terhadap kadar air dan sifat pengembangan tebal. Faktor suhu kempa memberikan pengaruh sangat nyata terhadap sifat fisik dan mekanik. Berdasarkan penelitian ini, peningkatan suhu kempa akan meningkatkan sifat fisik dan mekanik papan, sedangkan faktor perendaman bahan baku dalam air 80°C menurunkan sifat mekanik papan. Kualitas papan partikel tanpa perekat dari ampas tebu terbaik diperoleh dari kombinasi perlakuan bahan tanpa rendaman dan suhu kempa 200°C, dengan nilai rata-rata kadar air 5,76%, kerapatan 0,67 g/cm<sup>3</sup>, penyerapan air 29,06%, pengembangan tebal 2,53%, MOR 98,01 kg/cm<sup>2</sup>, MOE 17977,47 kg/cm<sup>2</sup>, serta keteguhan rekat 1,02 kg/cm<sup>2</sup>.

Kata kunci: ampas tebu, kempa panas, perlakuan bahan, papan partikel tanpa perekat,  
sifat fisik dan mekanik.

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## **THE EFFECT OF RAW MATERIALS TREATMENT AND PRESSING TEMPERATURE TO BINDERLESS PARTICLEBOARD PROPERTIES FROM BAGASSE**

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### **ABSTRACT**

Bagasses as high potential lignocellulosic raw materials are not well utilized in Indonesia. The extractives may not be chemically compatible with the conventional resin binders and may interfere the bonding of composites. Bagasse normally contains residual sugars. This research aims to evaluate effect of raw materials treatments before pressing process and temperature of hot press to optimize binderless particleboard properties from bagasses.

This research used a set of random sampling that arranged by two factors i.e, the raw materials treatment (with and without soaking) and temperature of hot press (160°C, 180°C, and 200°C) with three replication. Bagasses as raw materials were collected from sugar manufacture of Gondang Baru at Klaten, Central Java. Bagasses were converted into small particles without separated between rind and pith of bagasses, and were screened by 5 x 5 mm of filter. The bagasses with soaking treatment were soaked in hot water at 80°C for 3 hours. The raw materials had about 8% for moisture content. It pressed by 40 MPa of pressure for 15 minutes to get 0,8 g/cm<sup>3</sup> of density target. The physical properties include moisture content, density, water absorption, and thickness swelling, and mechanical properties include modulus of rupture (MOR), modulus of elasticity (MOE), and also internal bond (IB) were tested according to JIS A 5908 (1994). The data were analyzed by using SPSS program type 15, followed by HSD test.

The experimental results showed that the interaction between raw materials treatment and temperature pressing factors were highly significantly affected the water absorption, internal bonding, and modulus of elasticity binderless particleboards, and significant affected the moisture content and thickness swelling. The pressing temperature factors were highly significantly affected the physical and mechanical properties of the binderless particleboards. This results showed that the physical and mechanical properties increased with increasing the pressing temperature and the raw materials treatment by soaking in water 80°C affected to the decreasing of mechanical properties. The best quality of binderless particleboards from bagasses were produced from the raw materials without soaking treatment and 200°C temperature of pressing, with the averages values of moisture content was 5,75%, density was 0,67 g/cm<sup>3</sup>, 29,06% for water absorption value, thickness swelling was 2,53%, MOR was 98,02 kg/cm<sup>2</sup>, MOE was 17977 kg/cm<sup>2</sup>, and 1,02 kg/cm<sup>2</sup> for internal bond value.

Key words: bagasses, hot press, pretreatment, binderless board, physical and mechanical properties.

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