

PEMANFAATAN LIMBAH SERBUK BATANG KELAPA SEBAGAI BAHAN BAKU PAPAN PARTIKEL DENGAN PEREKAT ASAM SITRAT

INTISARI

Kebutuhan terhadap produk panel berbasis kayu semakin meningkat serta semakin terbatasnya kayu. Papan partikel merupakan salah satu produk panel kayu yang dikembangkan untuk memanfaatkan limbah kayu dan bahan lignoselulosa lainnya. Pemanfaatan limbah serbuk batang kelapa sebagai bahan baku papan partikel serta penggunaan perekat asam sitrat menjadi salah satu alternatif produk ramah lingkungan. Oleh karena itu, penelitian ini bertujuan untuk mengetahui pengaruh jumlah perekat asam sitrat dan suhu kempa terhadap sifat-sifat papan partikel serbuk batang kelapa, serta mengetahui sustainabilitas pemanfaatan limbah serbuk batang kelapa menjadi papan partikel.

Penelitian ini menggunakan rancangan acak lengkap pada dua faktor yang berbeda, yaitu jumlah asam sitrat (0%, 10%, dan 20%) dan suhu kempa (180°C dan 200°C). Pembuatan papan partikel menggunakan ukuran partikel lolos 10 mesh, tekanan kempa 3,5 MPa selama 10 menit dengan target kerapatan 0,8 g/cm³. Pengujian sifat fisika dan mekanika papan partikel berdasarkan standar JIS A 5908-2003. Data hasil pengujian kemudian dianalisis menggunakan SPSS dan diuji lanjut HSD (*Honestly Significant Difference*) metode Tukey pada taraf uji 99% dan 95%.

Hasil penelitian menunjukkan bahwa peningkatan jumlah asam sitrat dan suhu kempa berpengaruh nyata terhadap sifat fisika dan mekanika. Sifat papan partikel terbaik diperoleh pada jumlah asam sitrat 20% dengan suhu kempa 200°C dengan nilai rata-rata kerapatan (0,82 g/cm³), kadar air (6,80%), pengembangan tebal (5,37%), penyerapan air (37,89%), kekasaran permukaan (5,19 µm), internal bonding (1,0 MPa), modulus patah (8,76 MPa), dan modulus elastisitas (3,24 GPa). Semua nilai tersebut dapat memenuhi standar JIS A 5908-2003 tipe 8. Berdasarkan kajian sustainabilitas pemanfaatan limbah serbuk batang kelapa sebagai bahan baku papan partikel memberikan nilai positif terutama pada aspek ekonomi dan lingkungan.

Kata kunci: limbah serbuk batang kelapa, papan partikel, perekat asam sitrat, suhu kempa, sustainabilitas.

UTILIZATION OF COCONUT TRUNK WASTE AS RAW MATERIAL PARTICLEBOARD BONED WITH CITRIC ACID

ABSTRACT

The consumption of wood-based panel products continues to increase and the limit of wood supply. Particleboard is one of wood panel products that has been developed by using wood waste and other lignocelluloses materials. Utilization of coconut trunk waste as raw material for particleboard and using citric acid as a natural adhesive has become an environmentally friendly alternative. This study aimed to determine the effect of amount of citric acid and pressing temperature on properties of particleboard from coconut trunk waste, and to know the sustainability of utilization of coconut trunk waste for particleboard.

This study used a completely randomized design with two different factors: i.e. amount of citric acid (0%, 10% and 20%) and pressing temperature (180°C and 200°C). Particleboard manufactured by using particle size passed 10 mesh, hot pressed pressure 3.5 MPa for 10 minutes with a target density of 0.8 g/cm³. Physical and mechanical properties of particleboard were tested based on JIS A 5908-2003 standard. Data derived from the tests were analyzed by SPSS and by Tukey's Honestly Significant Difference (HSD) further test at a level of 99% and 95%.

The results showed that increasing the amount of citric acid and pressing temperature affected significantly to the physical and mechanical properties. The best properties of particleboard were formed by 20% amount of citric acid and 200°C pressing temperature with the value of density 0.82 g/cm³, water content 6.80%, thickness swelling 5.37%, water absorption 37.89%, the surface roughness 5.19 µm, internal bond strength 1.0 MPa, modulus of rupture 8.76 MPa, and modulus of elasticity 3.24 GPa. The physical and mechanical properties of boards with 20% citric acid and 200°C pressing temperature satisfied the requirement of the JIS A 5908-2003 standard type 8. Based on the sustainability study of utilization of coconut trunk waste as a raw material for particleboard has provided the positive impact, especially for the economic and environmental aspects.

Keyword: coconut trunk waste, particleboard, citric acid adhesive, pressing temperature, sustainability.