

PENGARUH KADAR PEREKAT FENOL FORMALDEHIDA DAN KOMPOSISI SERBUK KULIT KAYU AKASIA (*Acacia mangium* Wild.) TERHADAP SIFAT PAPAN PARTIKEL KAYU RANDU (*Ceiba* sp.)

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INTISARI

Potensi tanin dalam limbah kulit kayu akasia sangat berprospek untuk masa depan industri komposit atau papan partikel. Tanin mengandung gugus fenol yang dapat berkondensasi dengan formaldehida. Tanin terkondensasi sangat reaktif terhadap formaldehida dan mampu membentuk produk kondensasi berguna untuk bahan perekat *thermosetting* yang tahan air dan panas. Tanin diharapkan mampu mensubstitusi gugus fenol dari resin fenol formaldehida guna mengurangi pemakaian fenol sebagai sumberdaya alam tak terbarukan.

Bahan penelitian ini adalah partikel kayu randu dan serbuk kulit kayu akasia serta perekat fenol formaldehida. Kulit akasia dibuat serbuk dengan ukuran 60 mesh dan dicampur dengan partikel kayu randu kemudian disemprotkan perekat fenol formaldehida. Penelitian ini menggunakan rancangan acak lengkap dengan percobaan secara faktorial. Faktor yang digunakan adalah jumlah perekat (4%, 6% dan 8%) dan komposisi serbuk kulit kayu akasia (50%, 40% dan 30%) sehingga diperoleh 9 kombinasi perlakuan dengan 3 kali ulangan. Mat dipres panas pada suhu 135 °C pada tekanan 30 Mpa selama 10 menit dengan waktu pembukaan 30 detik. Papan partikel yang dihasilkan diuji sifat-sifat fisis dan mekanisnya berdasarkan standar ASTM D1037-99. Parameter yang diamati meliputi kadar air, kerapatan, penyerapan air, pengembangan tebal, keteguhan lengkung statik dan keteguhan rekat internal.

Hasil penelitian menunjukkan interaksi antara faktor jumlah perekat dan faktor komposisi serbuk kulit kayu akasia berpengaruh nyata terhadap kadar air, dan pengembangan tebal serta berpengaruh sangat nyata terhadap kerapatan. Faktor jumlah perekat berpengaruh sangat nyata terhadap kadar air, pengembangan tebal dan penyerapan air. Faktor komposisi serbuk kulit kayu akasia berpengaruh nyata terhadap kadar air, kerapatan dan pengembangan tebal. Nilai rata-rata kadar air terbaik sebesar 11,54% (P3C1). Pengembangan tebal terbaik sebesar 7,15 % (P3C1). Nilai MOR terbaik sebesar 82,52 kg/cm² (P1C1). Nilai MOE terbaik sebesar 9817,073 kg/cm² (P1C1).

Kata kunci : papan partikel, tanin, jumlah perekat, komposisi partikel, kayu randu, kulit kayu akasia, fenol formladehida.

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THE EFFECT OF FENOL FORMALDEHYDE GLUE CONTENT AND COMPOSITION OF ACACIA BARK POWDER TO THE PROPERTIES OF RANDU'S PARTICLE BOARD

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ABSTRACT

Tannin in acacia bark waste very potential for the future of the wood composite industry and particle board. Tannin contains a cluster phenol which can be condensed in formaldehyde. Condensing Tannin is very reactive to formaldehyde and able to form condensation products, materials useful for the thermosetting adhesive which is resistant in water and heat. Tannin expected to being substitution of cluster phenol from phenol formaldehyde resin to reduce the usage of natural resources as phenol that cannot be renewable.

Materials research are Randu wood particles, acacia bark powders and phenol formaldehyde adhesive. Acacia (*Acacia mangium*) bark was powdered into 60 mesh and mixed with wood particles of Randu (*Ceiba* sp.) and sprayed with phenol formaldehyde. This study used a random design with a factorial experiment. The factor used was the amount of adhesive (4%, 6% and 8%) and the composition of acacia bark powder (50%, 40% and 30%) so there is 9 treatment combination with 3 repetition. The matt was hot pressed at 135°C at pressure of 30 MPa for 10 minutes with 30 seconds pressure opened. The panels were tested for their physical and mechanical properties in accordance with ASTM D1037-99. Parameters observed include water content, density, percent water absorption, percent thickness swelling, internal bonding, MOR and MOE.

Results of the research shown the interaction between the amount of adhesive factors and composition of acacia bark powder factors affect significantly on water content, percent thickness swelling, modulus rapture (MoR) and modulus elasticity (MoE) and the effect very significantly on the density of particle board. The amount of adhesive is affects very significantly on water content, percent thickness swelling and percent water absorption. The composition of acacia bark powder affects significantly on water content, density and thickness swelling. The best average water content value is 11,54% (P3C1). The best average thickness swelling value is 7,15% (P3C1). MoR best value is 82,52 kg/cm² (P1C1). MOE best value is 9817,073 kg/cm² (P1C1).

Keywords: particle board, tannin, the amount of adhesive, particles composite, randu wood, acacia bark, phenol formaldehyde.

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