Pengaruh Kompregnasi *Phenol Formaldehyde* Dengan Bahan Pengawet 1% Terhadap Sifat Fisika Dan Mekanika Kayu Jabon Merah (*Neolamarckia macrophylla* (Roxb.) Bosser).

Patricia Winasti[1], Tomy Listyanto[2]

INTISARI

Intisari

Kayu jabon merah (*Neolamarckia macrophylla* (Roxb.) Bosser) merupakan salah satu jenis kayu cepat tumbuh yang memiliki potensi tinggi dalam industri kehutanan. Namun, kayu ini memiliki kelemahan pada berat jenis, stabilitas dimensi, dan ketahanan mekanis. Penelitian ini bertujuan untuk mengevaluasi pengaruh variasi konsentrasi larutan fenol formaldehida (5%, 10%, dan 15%) serta perlakuan suhu (tanpa pemanasan dan pemanasan 60°C) terhadap sifat fisika dan mekanika kayu jabon merah, meliputi kadar air, absorbsi, retensi, berat jenis, stabilitas dimensi, keteguhan lengkung statik (*modulus of elasticity*/MOE dan *modulus of rupture*/MOR), keteguhan tekan tegak lurus serat, serta kekerasan.

Metode yang digunakan dalam penelitian ini adalah Rancangan Acak Lengkap (RAL) dengan enam kombinasi perlakuan yang masing-masing diulang sebanyak lima kali. Sampel diambil secara acak dan proses kompregnasi dilakukan menggunakan *vacuum-pressure chamber* dengan tekanan 75 kg/cm² selama 30 menit. Selanjutnya, dilakukan pengujian sifat fisika dan mekanika kayu sesuai dengan British Standard No. 373 tahun 1957. Data dianalisis menggunakan analisis variansi (ANOVA) untuk mengetahui signifikansi pengaruh perlakuan.

Hasil penelitian menunjukkan bahwa perlakuan kompregnasi memberikan pengaruh signifikan terhadap beberapa sifat fisik dan mekanika kayu jabon merah. Berdasarkan analisis ANOVA, perlakuan berpengaruh signifikan terhadap kadar air, retensi, absorbsi, ASE longitudinal, ASE radial, dan MOR. Konsentrasi larutan fenol formaldehida berpengaruh signifikan terhadap kadar air, retensi, dan ASE longitudinal, sedangkan pemanasan berpengaruh signifikan terhadap MOR dan ASE radial. Interaksi antara keduanya juga signifikan terhadap absorbsi dan ASE longitudinal. Berdasarkan Uji T (*Independent Sample T-Test*), perlakuan kompregnasi efektif menurunkan kadar air, penyusutan, rasio T/R, serta meningkatkan berat jenis dan nilai ASE dibandingkan dengan kayu tanpa perlakuan, yang menunjukkan peningkatan stabilitas dimensi dan densitas kayu.

Kata Kunci: Kayu jabon merah, fenol formaldehida, kompregnasi, stabilitas dimensi, sifat mekanika.

---

[1] Mahasiswa Fakultas Kehutanan UGM

[2] Staff Pengajar Fakultas Kehutanan UGM

The Effect Of Phenol Formaldehyde Compregnation With 1% Preservative On The Physical And Mechanical Properties Of Red Jabon Wood (Neolamarckia macrophylla (Roxb.) Bosser).

Patricia Winasti[1], Tomy Listyanto[2]

ABSTRACT

Red jabon wood (Neolamarckia macrophylla (Roxb.) Bosser) is a fast-growing wood species with high potential in the forestry industry. However, this wood has weaknesses in specific gravity, dimensional stability, and mechanical strength. This study aimed to evaluate the effect of varying phenol-formaldehyde solution concentrations (5%, 10%, and 15%) and temperature treatments (unheated and heated at 60°C) on the physical and mechanical properties of red jabon wood, including moisture content, absorption, retention, specific gravity, dimensional stability, static bending strength (modulus of elasticity/MOE and modulus of rupture/MOR), compressive strength perpendicular to the grain, and hardness.

The method used in this study was a Completely Randomized Design (CRD) with six treatment combinations, each replicated five times. Samples were taken randomly, and the compression process was carried out using a vacuum-pressure chamber at a pressure of 75 kg/cm² for 30 minutes. Next, the physical and mechanical properties of the wood were tested in accordance with British Standard No. 373 of 1957. Data were analyzed using analysis of variance (ANOVA) to determine the significance of the treatment effects.

The results showed that the compregnation treatment had a significant effect on several physical and mechanical properties of red jabon wood. Based on ANOVA analysis, the treatment had a significant effect on water content, retention, absorption, longitudinal ASE, radial ASE, and MOR. The concentration of phenol formaldehyde solution had a significant effect on water content, retention, and longitudinal ASE, while heating had a significant effect on MOR and radial ASE. The interaction between the two was also significant on absorption and longitudinal ASE. Based on the T-Test (Independent Sample T-Test), the compregnation treatment effectively reduced water content, shrinkage, T/R ratio, and increased specific gravity and ASE value compared to untreated wood, which indicated an increase in dimensional stability and wood density.

Keywords: *red jabon wood, fenol formaldehida, compregnation, dimensional stability, mechanical properties.**

---

[1]Student of Faculty of Forestry UGM
[2] Lecturer of Faculty of Forestry UGM