

**SIFAT FISIKA DAN MEKANIKA PADA KEDUDUKAN  
AKSIAL DAN RADIAL KAYU JABON MERAH (*Neolamarckia  
macrophylla* (Roxb.) Bosser) DARI PACITAN**

Oleh :

Saddam Putra Setiawan<sup>1</sup>, Fanny Hidayati<sup>2</sup>, Sri Sunarti<sup>3</sup>

**INTISARI**

Produktivitas kayu yang semakin menurun seiring perkembangan zaman yang diakibatkan kecenderungan pemakaian kayu yang terus meningkat. Pemilihan jenis dengan daur tumbuh cepat diharapkan dapat meningkatkan produktivitas kayu. Jabon merah (*Neolamarckia macrophylla* (Roxb.) Bosser) memiliki potensi untuk dikembangkan karena memiliki daur tumbuh cepat. Penelitian ini bertujuan untuk mengetahui sifat fisika dan sifat mekanika pada kedudukan aksial dan radial kayu jabon merah.

Bahan yang digunakan 3 pohon Jabon merah umur 11 tahun. Rancangan penelitian berupa acak lengkap secara faktorial menggunakan dua faktor yaitu kedudukan aksial (pangkal, tengah, ujung) dan kedudukan radial (dekat hati, tengah, dekat kulit). Pengujian dilakukan pada parameter kadar air (KA), berat jenis (BJ), perubahan dimensi, rasio T/R, keteguhan lengkung statis, tekan sejajar serat, tekan tegak lurus serat dan kekerasan mengacu pada British Standard 373 : 1957.

Nilai rata-rata KA basah dan kering udara sebesar 83,34% dan 16,75%. BJ basah, kering udara dan kering tanur sebesar 0,343; 0,356; dan 0,378. Penyusutan longitudinal, tangensial dan radial dari kondisi basah ke kering udara sebesar 0,163%; 2,13%; dan 0,656%. Penyusutan longitudinal, tangensial dan radial dari kondisi basah ke kering tanur sebesar 0,324%; 5,65%; dan 2,24%. Rasio T/R dari kondisi basah ke kering udara dan ke kering tanur sebesar 2,62% dan 3,22%. tegangan batas proporsi, *modulus of elasticity* (MoE), dan *modulus of rupture* (MoR) sebesar 258,61 kg/cm<sup>2</sup>; 62,11 (×1000) kg/cm<sup>2</sup>; dan 527,55 kg/cm<sup>2</sup>. Keteguhan tekan sejajar serat dan tegak lurus serat sebesar 290,89 kg/cm<sup>2</sup> dan 94,42 kg/cm<sup>2</sup>. Kekerasan sebesar 261,83 kg/cm<sup>2</sup>. Hasil analisis keragaman kedudukan aksial menunjukkan perbedaan nyata pada KA basah, BJ basah, BJ kering udara, BJ kering tanur, keteguhan lengkung statis pada batas proporsi, keteguhan tekan sejajar serat dan tegak lurus serat. Pada kedudukan radial menunjukkan perbedaan nyata pada KA basah, BJ basah, BJ kering udara, BJ kering tanur, penyusutan basah ke kering udara arah tangensial, penyusutan basah ke kering tanur arah tangensial, penyusutan basah ke kering tanur arah radial, rasio T/R basah ke kering tanur, rasio T/R basah ke kering udara, tegangan batas proporsi, MoE, MoR, tekan sejajar serat, tekan tegak lurus serat dan kekerasan.

**Kata Kunci** : *Neolamarckia macrophylla*, sifat fisika, sifat mekanika, kedudukan aksial, kedudukan radial

---

<sup>1</sup> Departemen Teknologi dan Hasil Hutan Fakultas Kehutanan UGM

<sup>2</sup> Badan Riset dan Inovasi Nasional

## PHYSICAL AND MECHANICAL PROPERTIES IN THE AXIAL AND RADIAL POSITIONS OF RED JABON (*Neolamarckia macrophylla* (Roxb.) Bosser) WOOD FROM PACITAN

By :

Saddam Putra Setiawan<sup>1</sup>, Fanny Hidayati<sup>2</sup>, Sri Sunarti<sup>3</sup>

### ABSTRACT

Wood productivity has been declining over time due to the increasing tendency of wood usage. Selecting fast-growing tree species is expected to enhance wood productivity. Red jabon (*Neolamarckia macrophylla* (Roxb.) Bosser) has potential for development because it has a rapid growth cycle. This study aims to determine the physical and mechanical properties of 11-year-old red jabon wood from Pacitan, at axial and radial positions.

The materials used were 3 red Jabon trees aged 11 years. The research design was factorial complete randomization using two factors, axial position (base, middle, end) and radial position (near the heart, middle, near the skin). Tests were carried out on the parameters of moisture content, specific gravity, dimensional changes, T/R ratio, static bending constancy, compressive parallel, perpendicular to the fiber and hardness referring to British Standard 373: 1957.

The average moisture content while fresh and air-dry is 83,34% and 16,75%. The specific gravity while fresh, air-dry, and kiln-dry is 0,343; 0,356; and 0,378. The shrinkage from fresh to air-dry in the longitudinal, tangential, and radial directions is 0,163%; 2,13%; and 0,656%, while from fresh to kiln-dry is 0,324%; 5,65%; and 2,24%. The tangential-to-radial (T/R) shrinkage ratio from fresh to air-dry and from fresh to kiln-dry is 2,62 and 3,22. proportion limit stress, modulus of elasticity (MoE), and modulus of rupture (MoR) are 258,61 kg/cm<sup>2</sup>; 62,11 × 10<sup>3</sup> kg/cm<sup>2</sup>; and 527,55 kg/cm<sup>2</sup>. The compressive strengths parallel and perpendicular to the fiber are 290,89 kg/cm<sup>2</sup> and 94,42 kg/cm<sup>2</sup>, respectively. The hardness value is 261,83 kg/cm<sup>2</sup>. Analysis of variance shows that the axial position has a significant effect on several parameters, including moisture content while fresh, specific gravity while fresh, air-dry, and kiln-dry, static bending strength at proportional limit, compressive strength parallel and perpendicular to the fiber. Meanwhile, the radial position significantly affects the moisture content while fresh, specific gravity while fresh, air-dry, and kiln-dry, shrinkage from fresh to air-dry and from fresh to kiln-dry in the tangential and radial directions, T/R ratio from fresh to air-dry and kiln-dry, proportion limit stress, MoE, MoR, compressive strength parallel, perpendicular to the fiber, and hardness.

**Keywords:** *Neolamarckia macrophylla*, physical properties, mechanical properties, axial position, radial position

---

<sup>1</sup> Study Program of Forest Product Technology, Faculty of Forestry UGM

<sup>2</sup> National Research and Innovation Agency