

Variasi Aksial dan Radial Sifat Fisika dan Mekanika Kayu Tusam (*Pinus merkusii* Jungh. et de Vriese) yang Tumbuh Pada Hutan Rakyat di Tana Toraja, Sulawesi Selatan

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INTISARI

Tusam (*Pinus merkusii* Jungh. et de Vriese) adalah salah satu jenis konifer yang merupakan tumbuhan asli di beberapa daerah di Indonesia. Dalam upaya untuk meningkatkan nilai tambah dari pohon tusam yang tumbuh pada hutan rakyat di Tana Toraja, Sulawesi Selatan, dilakukan penelitian tentang sifat fisika dan mekanika kayunya.

Penelitian ini dirancang menggunakan rancangan acak lengkap dengan tiga ulangan dan dua faktor yaitu letak aksial batang (pangkal, tengah, dan ujung batang bebas cabang) serta letak radial batang (dekat hati, tengah, dan dekat kulit). Pembuatan contoh uji berdasarkan British Standard method BS 373.

Nilai rerata untuk kadar air segar dan kering udara kayu sebesar 130,12% dan 14,12%. Berat jenis segar, kering udara dan kering tanur kayu sebesar 0,47, 0,53 dan 0,57. Penyusutan radial, tangensial dan longitudinal dari kondisi segar ke kering udara berturut-turut sebesar 1,73%, 3,63%, dan 0,47% serta dari kondisi segar ke kering tanur berturut-turut sebesar 3,65%, 6,91%, dan 0,47%. Pengembangan radial, tangensial dan longitudinal dari kondisi kering tanur ke basah berturut-turut sebesar 3,50%, 6,97% dan 0,61%. Keteguhan lengkung statik sampai BP, MoE dan MoR berturut-turut sebesar 37,81 MPa, 6850,80 MPa dan 63,31 MPa. Keteguhan tekan sejajar serat sebesar 33,52 MPa. Keteguhan tekan tegak lurus serat sebesar 11,78 MPa. Keteguhan geser sejajar serat 9,31 MPa; Keteguhan belah 10,81 N/mm; serta Kekerasan kayu penampang radial dan tangensial sebesar 23,54 MPa dan 25,14 MPa. Interaksi antara kedudukan aksial dan radial berpengaruh sangat nyata pada kekerasan kayu penampang tangensial dan berpengaruh nyata pada keteguhan belah sejajar serat. Kedudukan aksial berpengaruh sangat nyata terhadap berat jenis segar, keteguhan lengkung statik pada batas maksimum, keteguhan lengkung statik pada modulus elastisitas, dan keteguhan geser sejajar serat. Sifat fisika yang lain seperti, berat jenis kering udara, berat jenis kering tanur, dan sifat mekanika seperti, keteguhan tekan sejajar serat, dan keteguhan tekan tegak lurus serat hanya berpengaruh nyata pada kedudukan aksial. Kedudukan radial berpengaruh sangat nyata terhadap kekerasan kayu penampang tangensial dan berpengaruh nyata terhadap keteguhan tekan tegak lurus serat dan kekerasan kayu penampang radial.

Kata kunci :Tusam, sifat fisika kayu, sifat mekanika kayu, letak aksial, letak radial, longitudinal, tangensial, radial, BP, MoE, MoR

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**Axial and Radial Variation in the Physical and Mechanical Properties of
Merkusii Pine (*Pinus merkusii* Jungh. et deVriese) Grown on the Community
Forest in Tana Toraja, South Sulawesi.**

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ABSTRACT

Merkusii pine (*Pinus merkusii* Jungh. et deVriese) is a native conifer trees grown in some places in Indonesia. In an effort to increase the added value of the trees grown on community forest in Tana Toraja, South Sulawesi, a study on the physical and mechanical properties of the wood was carried out.

The study was conducted by using a Completely Randomized Design of two factors that is axial (bottom, middle, and top of the tree) and radial (near by the pith, middle, and near by the bark) positions. Wood sample for the study was prepared according to British Standard BS 373.

The average rate of green wood and equilibrium moisture content (EMC) is 130,12 % and 14,12 %. Specific gravity (SG) in green wood, air dry and oven dry are 0,47; 0,53 and 0,57 respectively. The average radial, tangential and longitudinal shrinkage of wood from green to air dry condition are 1,73%; 3,63%; and 0,47% while shrinkage from green to oven dry condition are 3,65%; 6,91%; and 0,47% respectively. The average radial, tangential and longitudinal swellings of wood from oven dry to wet condition are 3,50%; 6,97% and 0,61%. The static bending strength in proportion limit, MoE and MoR are 37,81 MPa; 6850,80 MPa; and 63,31 MPa. The compression parallel to grain is 33,52 MPa. The compression perpendicular to grain is 11,78 MPa. The shear strength value is 9,31 MPa; The resistance to cleavage value is 10,81 N/mm; and also wood hardness in the radial and tangential surface are 23,54 Mpa and 25,14 MPa. Interaction between axial and radial positions have very significant effect on wood hardness in the tangential surface and significant effect on resistance to cleavage. The axial position have very significant effect on the SG in green wood and static bending strength in proportion limit and MoE, the shear strength. Other physical properties such as SG in air dry and oven dry, and mechanical properties such as compression parallel to grain and compression perpendicular to grain, are only effected significantly by the axial position. Radial positions have very significant effect on wood hardness in the tangential and significant effect on the compression parallel to grain and wood hardness in the radial surface.

Keywords : merkusii pine, physical properties, mechanical properties, axial position, radial position, longitudinal, tangential, radial, proportion limit, MoE, MoR.

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