TERBENTUKNYA KAYU TERAS DAN HUBUNGANNYA TERHADAP KERAPATAN DASAR DAN KADAR AIR SEGAR SERTA SIFAT KIMIA KAYU MAHONI (*Swietenia mahagoni* (L.) Jacq) UMUR MUDA

INTISARI

Mahoni merupakan salah satu kayu komersial yang cukup diminati di Indonesia karena penampakannya yang indah, kualitas finishing yang bagus, mudah dikerjakan, dan mudah dikeringkan tanpa cacat yang berarti. Karakteristik seperti ini biasanya ditemui pada kayu tua, tetapi untuk kayu umur muda hal ini belum tentu diperoleh. Penelitian kayu mahoni (umur 1-5 tahun) dilakukan untuk mengkaji terbentuknya kayu teras dan sebagian sifat-sifat dasar kayu untuk memperkuat kedudukan kayu mahoni umur muda.

Mahoni umur 1-5 tahun ditebang pada arah aksial 5 %, 20 %, 35 %, 50 %, 65 %, and 85 % dari total tinggi pohon untuk mengamati terbentuknya teras dan distribusinya di dalam pohon. Setiap umur diwakili oleh enam pohon (kecuali satu tahun) sehingga total sampel sebanyak 29 pohon. Umur empat dan lima tahun dibagi menjadi diameter besar dan kecil. Kerapatan dasar (KD) dan kadar air segar (KA-segar) diukur sepanjang ketinggian pohon untuk melihat hubungannya dengan proporsi teras. Distribusi kadar ekstraktif, kadar fenolat total (KFT), dan kadar polisakarida total (KPT) dianalisis pada ketinggian relatif 5 dan 50 %. Analisis gula dengan GC-MS dilakukan untuk melihat senyawa gula utama yang terlibat dalam pembentukan kayu teras. Pada penelitian ini menggunakan rancangan acak lengkap. Uji *Duncan* dilakukan untuk mengevaluasi kelompok yang berbeda nyata.

Hasil penelitian menunjukkan bahwa terbentuknya kayu teras di mahoni pada saat umur empat tahun berdasarkan perbedaan warna teras dan gubal. Distribusi teras ditemukan mendekati ketinggian relatif 65 %. Persentase teras, diameter teras, dan tebal gubal dari pangkal ke ujung pohon berturut-turut berkisar 57,6 - 0 %, 6,83 – 0 cm, dan 1,50 – 4,27 cm di diameter besar serta 44,4 – 0 %, 4,02 – 0 cm, dan 1,57 - 3,55 cm di diameter kecil. Proporsi kayu teras lebih ditentukan oleh diameter dibandingkan oleh umur pohon. Dengan demikian, pemilihan diameter yang besar untuk program pemuliaan pohon perlu dipertimbangkan. Rerata nilai KD dan KA-segar umur 3-5 tahun berturut-turut berkisar 0.44 – 0.55 g/cm^3 dan 54.0 – 71.1 %. KD berkorelasi positif secara nyata terhadap proporsi teras, sedangkan pola sebaliknya ditemukan antara KD dengan ketebalan gubal. Pada bagian teras, KD dan KA-segar lebih rendah dibandingkan di kayu gubal. Peningkatan tertinggi ekstraktif terlarut *n*-heksana, metanol-air, ekstraktif total, dan KFT ditemukan setelah terbentuknya kayu teras (4 - 5 tahun). Zat ekstraktif yang larut ini bersifat racun yang perlu dipertimbangkan dalam mutu kayu. Nilai kadar ekstraktif, KFT, dan KPT turun dari ketinggian relatif 5 % ke 50 % dan naik dari gubal ke kayu teras kecuali KPT. Senyawa gula utama (fruktosa, glukosa, manosa dan xilosa) diduga memainkan peran penting dalam proses terbentuknya kayu teras.

Kata kunci: Mahoni, kayu teras, kerapatan dasar, kadar ekstraktif, senyawa gula

HEARTWOOD FORMATION AND ITS RELATIONSHIP WITH BASIC DENSITY AND GREEN MOISTURE CONTENT AND CHEMICAL PROPERTIES OF YOUNG MAHOGANY (*Swietenia mahagoni* (L.) Jacq) WOOD

ABSTRACT

Mahogany is one of the commercial timbers that is quite demanded in Indonesia for having beautiful appearance, good finishing quality, easy to work with, and easy to be dried without significant defects. Those characteristics are likely found on old mahogany wood rather than on its young wood. Research on young mahogany (1-5 years) was conducted to examine the heartwood formation and some of its wood basic properties to add the value of young mahogany wood.

Wood of 1-5 years old mahogany trees were taken at 5%, 20%, 35%, 50%, 65% and 85% of the total tree height to investigate the formation and distribution of heartwood within the tree. Total samples were 29 trees, represented by 6 individual trees per age (except for one year old). The ages of four and five years were divided into big and small diameters. Wood basic density (BD) and green moisture content (GMC) were also measured to investigate their relationshop with heartwood proportion. The distribution of extractive content, total phenolic content (TPC), and total soluble polysaccharide content (TSP) were analyzed at 5% and 50% of tree height. Sugar analysis by GC-MS analysis was carried out to identify main sugar compounds involved in the heartwood formation. In this study, a completely randomized design was used. Duncan's test was performed to evaluate which group means differ.

Results showed that the heartwood formation of mahogany started at the age of four, marked by color differences. Heartwood was distributed up to 65% of tree height. The percentage of heartwood, heartwood diameter, and sapwood thickness from the bottom to the top of the tree ranged from 57.6 to 0%, 6.83 to 0 cm, and 1.50 to 4.27 cm in large diameter trees and 44.4 to 0%, 4.02 to 0 cm, and 1.57 to 3.55 cm in small diameter trees, respectively. Heartwood proportion was determined more by tree diameter than age, therefore it is considerable to select large diameter trees through breeding program. Mean BD and GMC of 3-5 years-old trees ranged from 0.44 to 0.55 g/cm^3 and 54.0 to 71.1%, respectively. Basic density was positively correlated with heartwood proportion, while reversed pattern was found between BD and sapwood thickness. In the heartwood part, BD and GMC were lower than in sapwood. The highest increase in n-hexane soluble extractives, methanol-water soluble extractives, total extractives, and TPC were found after heartwood formation (4-5 years). Those extractive substances were toxic, which need to be considered. The amount of extractive content, TPC, and TSP decreased from 5% to 50% of total height and increased from sapwood to heartwood, except for the TSP. Main sugar compounds (fructose, glucose, mannose and xylose) might play a key role in the process of heartwood formation.

Keyword: Mahogany, heartwood, basic density, extractive, sugar compound