(127)

A Comparison of Mechanical and Physical Wood Properties of Big-Leaf Mahogany (*Swieteniam acrophylla*) and African Mahogany (*Khaya senegalensis*) of Sri Lanka

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Abstract

The Mahogany species are economically valuable members of the Meliaceae family. In Sri Lanka, *Swietenia macrophylla* widely distributed in home gardens and forest plantations of wet and intermediate zones. However, recently large-scale *Khaya senegalensis* plantations are started to establish. *S. macrophylla* is a well aware timber species in the local market; conversely, knowledge of locally grown *K. senegalensis* is limited. The external appearance of wood of both species is similar. Therefore, this study aimed to compare mechanical and physical characteristics of wood of both species to assist on future applications. The wood samples were collected from randomly selected 05 felled trees per each species in Kurunagala district that 03 samples were extracted from heart wood at diameter at breast height of every tree, aged around 25-30 years. The specimens were prepared according to code of BS 373:1957. For physical property analysis, wood densities were determined and for mechanical property analysis, Module of Rupture (MOR), Module of Elasticity (MOE), compression parallel to grain and compression perpendicular to grainwere tested. All tests were conducted in wood science laboratory of State Timber Corporation, Battaramulla. *K. senegalensis* recorded higher mean wood density (772 kgm^{-3}) than *S. macrophylla* (600 kgm^{-3}). Mean of MOR of *K. senegalensis* and *S. macrophylla*are 74 Nmm^{-2} and 53 Nmm^{-2} respectively. Mean of MOE of *K. senegalensis*is 8,514 Nmm^{-2} while *S. macrophylla* recorded 4,809 Nmm^{-2}. Compression test results also show higher mechanical properties in *K. senegalensis*. Mean compression parallel to grain values in *K. senegalensis* and *S. macrophylla* are 38 Nmm^{-2} and 30 Nmm^{-2} respectively. Mean compression perpendicular to grain test reported 13 Nmm^{-2} in *K. senegalensis* though *S. macrophylla* recorded only 08 Nmm^{-2}. Higher wood density might be thereason for higher mechanical properties in *K. senegalensis*. Analysing the resultscan be summarised that tested mechanical and physical properties are comparatively higher in *K. senegalensis*. However, Mahogany species are generally harvested at age 40-45 years. Therefore, wood of more matured trees should be tested and compared in future studies. Moreover, working property comparison for both speciesis also required because the timber demand of the market does not on solely depend on mechanical and physical properties of wood.

Keywords: *Khaya*, Big-leaf Mahogany, Mechanical properties, Physical properties