Physical and mechanical properties of three agroforestry tree species from Kerala, India

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Abstract

Wood properties of three locally important fast growing tree species (*Acacia auriculiformis, Acacia mangium*, and *Grevillea robusta*) occurring as scattered and boundary planted trees on the agricultural lands of Kerala were evaluated. Species and sample positions exerted a profound influence on the physical and mechanical properties of wood. Basic wood density of *A. auriculiformis* was greater than that of *A. mangium* and *G. robusta*, while moisture content followed a reverse sequence: *G. robusta* > *A. mangium* > *A. auriculiformis*. Wood density also increased from inner to outer positions along the radial direction, except for *G. robusta*. Although moisture content decreased from the inner to outer position of the specimens for *A. mangium*, no predictable pattern was discernible in this respect for the other two species. Shrinkage along radial direction followed a trend similar to that of wood moisture content. Most strength properties, however, followed a pattern analogous to that of wood density. Attributes such as work to limit of proportionality and work to maximum load in static bending, compressive stress at limit of proportionality in parallel to grain, compressive stress at limit of proportionality in perpendicular to grain, and end- hardness of *A. auriculiformis* were also greater than the values reported for teak (*Tectona grandis*). However, the physical and mechanical properties of *A. mangium* and *G. robusta*, except shrinkage, were inferior to teak.

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