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Acoustic quality of vène wood (*Pterocarpus erinaceus* Poir) for xylophones instruments manufacture in Mali

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Abstract

Xylophone belongs to the idiophone group of instruments which is very present in the African traditional and popular music. Its sound percussion quality is related to the resonance and the intrinsic properties of used wood. In spite of numerous studies of the acoustic properties of wood, very few works are available on Pterocarpus species in general and notably on Pterocarpus erinaceus. In this study, the variability of acoustic properties of vène (Pterocarpus erinaceus Poir), used for xylophone instrument manufacture in Mali and the relationships between these properties and the basic density and extractive content were investigated in order to provide information about its overall suitability for xylophone making. A free-free flexural method, known as “Bing”, was used to determine the main mechanical properties for the xylophone instrument manufacture i.e. the damping coefficient ($\tan\delta$) and the specific dynamic modulus (E_L/ρ) while the basic density D_b and the extractives (EC) content were determined according to international standards ISO 3129 and ASTM D1105 (1996), respectively. The results showed that the dynamic specific modulus (E_L/ρ), the basic density (D_b) and the extractive content (EC) are significantly higher for wood from Guinean area than for wood from Soudanian area. For all provenances the values determined for these properties have been significantly higher for wood from external (EHW) and median heartwood (MHW) than for wood from internal heartwood (IHW). The damping coefficient, $\tan\delta$ (or loss factor) is significantly greater for wood from Soudanian area than for wood from Guinean area, and regardless of provenance, $\tan\delta$ was significantly greater for wood from IHW than in MHW and EHW. A significant correlation was found between E_L/ρ , $\tan\delta$, D_b and EC.

Keywords: Vène wood (*Pterocarpus erinaceus* Poir), xylophone instruments, acoustic properties, extractives, basic density.