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EXTRACTION AND CHARACTERIZATION OF *Gongronema latifolia* ; its opportunities for use in Biocomposite technology

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PURPOSE OF THE ABSTRACT

Biofibre technology is a new direction of study which has informed the world of alternative sources of fibrous materials for use in pulp making, structural and non-structural materials and a host of other applications where biomass can comfortably replace the classical use of glass and synthetic fibres. This concept of bio fibre technology has brought about research development in the identification and characterization of non-woody plants and other plant parts that are good sources of fibre. This development prompted the choice of climbers such as *Gongronema latifolia* and a vast host of others, based on the fore knowledge of their basic agronomic and physical properties (turgidity and strength), traditional uses of these plants as re-enforcing materials and ropes and their relative abundance as compared to glass and synthetic fibers not excluding the possibility of genetically modifying them to ensure sustainability.

Gongronema latifolia bastfibres were extracted from the young plant stems using tank water retting extraction process, and the resulting fibres were uniform with almost circular cross-sections. Phytochemical analysis revealed great quantity of glycosides relative to the slight presence of residual tannins (0.0062 ± 0.003), with absence of alkaloids, Steroids, reducing sugars, and proteins. Lipophilic and alcohol extractives obtained using soxhlet extraction technique with n-hexane / methanol as the extracting solvent systems were found to be 0.91%w/w and 3.26%w/w respectively. Moisture and ash content were found to be $0.50 \pm 0.02\%$ w/w and $1.27 \pm 0.40\%$ w/w respectively. Determination of structural component on %w/w basis shows the cellulose content to be $53.54 \pm 3.43\%$, acid insoluble lignin $32.10 \pm 6.52\%$, hemicelluloses $10.32 \pm 1.26\%$, acid soluble lignin $2.21 \pm 0.09\%$. The acid soluble lignin derived product-vanillic, p-coumaric and ferulic acids were found to be 0.606 ± 0.014 , 0.920 ± 0.014 and 0.633 ± 0.001 respectively. Cellulose lignin ratio is 1.67. The physical and mechanical parameters include diameter 0.113mm, tensile strength 84.72 MPa, percentage elongation 2.75% and Young's modulus 1540.36 MPa. The result obtained show that *Gongronema latifolia* lignocellulose bast fibre has comparable properties with other natural fibres and shows potentials for use in pulp making and structural applications in biocomposite reinforcement technology.

FIGURES



FIGURE 1

Retted fibres of Gongronema Latifolia

Fig 1. Retted fibrous strands of Gongronema Latifolia



FIGURE 2

Application of natural fibres in biocomposite

Figure 2 : Composite Automotive Toyota Corolla Doors, produced from Natural Fibre Reinforced Composite. (Exterior and Interior Views)

KEYWORDS

Biocomposites | Characterisation | Natural fibers | extraction

BIBLIOGRAPHY