

# **Surface Morphology and Thermal Properties of Cellulose from Three Species of Bamboo**

## **ABSTRACT**

Bamboo is a rapidly growing biomaterial and a high-yielding renewable resource indigenous to Asia and Oceania. Bamboo and wood differ in a variety of ways, including macroscopic and microscopic features, chemical composition, physical and mechanical properties. For this reason, the purpose of this study was to characterize the surface morphology and thermal properties of cellulose in three bamboo species: *Schizostachyum brachycladum*, *Bambusa vulgaris*, and *Bambusa oldhamii*. The cellulose in bamboo was removed using a chemical process that comprised dewaxing, delignification, and mercerization. The surface morphology of the cellulose was characterised using Field Emission Scanning Electron Microscopy (FESEM) and Atomic Force Microscopy (AFM). The thermal properties were then analysed by Thermogravimetric Analysis (TGA). The FESEM study revealed that mercerization resulted in fibrillation and fibre separation, which increased the effective surface area accessible for reinforcement. From the TGA analysis, bamboo cellulose was found to be thermally stable. Based on these findings, more research is needed on the qualities of bamboo, as well as cost-effective technology and management strategies. With the use of innovative procedures and adaptable technologies, bamboo can be processed into a wide range of goods and compete successfully with wood and other raw materials in the future.