PHYSICO-CHEMICAL AND THERMAL CHARACTERIZATION OF THE BANANA PSEUDO-STEM FIBERS (BF)

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ABSTRACT

This paper focuses on the study of the properties of banana Fibers from Penja Cameroon. The traditional use of these fibers inspired researchers to investigate their properties. This study aims at improving the state of knowledge to diversify use. The fibers are extracted after boiling fresh stems in water. Then, the diameter of the fiber was measured following ASTM 2130-90 Standard, their density following D 3800-99 (2005) ASTM code, their water absorption rate, and their moisture content were measured. Their molecular structure was studied by ATR-FTIR spectroscopy. A quantitative analysis of the chemical composition was performed according to analytical techniques for the pulp and paper industry (IPAT). A TGA/DSC analysis was also performed. The Results reveal that banana fibers diameter ranges between $80-125\mu$m; a density of about 0, 32-0,66g/Cm^3 ; a moisture content of 11,26-13,20%. These fibers are also hydrophilic with a water absorption rate of 232-396%. The analyzed fibers exhibit functional groups that are related to the presence of hemicellulose, Cellulose, Pectin, and Lignin. The fibers have the following Chemical composition: Cellulose (59,15%), Hemicellulose (14,42%), Lignin (10,70%) , Pectin(3,79%) , Extractives (11,81%) and Ash (0,55%) . It is observed that these fibers are thermally stable up to 180°C.

Keywords: Banana fibers, Pseudo-Stem, operating temperature, Cellulose, Thermal Behavior.