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Extraction and characterization of natural fibers from the Pantanal

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Abstract – The study of fibers from the Pantanal has been performed with the purpose of assisting research related to nanofibers and nanocomposites as fillers in polymer matrices. Were performed to characterize the plant species of the Pantanal (bocaiuva, tucum, taboa and camalote) on the content of lignin, hemicellulose and cellulose. By the process of calendering, the extraction took place and these fibers were characterized by thermogravimetry, diameter and morphological analysis by scanning electron microscopy was used to obtain information to technological advances such as nanotechnology.

In the area of composites and nanocomposites, one of the challenges is to obtain new materials that are produced from renewable raw materials. As reinforcement of plastics, vegetable fibers have some advantages over synthetic fibers due to its abundance and biodiversity, lignocellulosic fibers are sources of renewable resource, biodegradable, low density and its extraction is low cost. However vegetable fibers have some disadvantages, such as the variability of properties and low uptake in its natural state the number of matrices [1]. Among the species of fibrous Pantanal, for the most potential to be used as reinforcement in polymer composites are bocaiuva (*Acrocomia aculeata* (Jacq.) Lodd.) and tucum (*Bactris glaucescens* Drude). Besides these species, some aquatic plants also exhibit these characteristics such as camalote (*Eichhornia crassipes* (Mart.)), and the taboa (*Tipha domingensis* Pers) [2]. These species were collected and were characterized (Table 1) by their composition of cellulose, hemicellulose and lignin. By calendering was obtained different amounts of mass of dry fiber in relation to the fresh leaves and stems (Md), depending on the species processed. The average diameter of the fibers (Φ) extracted were determined in software developed by Embrapa Agricultural Instrumentation. By thermogravimetry in nitrogen atmosphere was determined the degradation temperature (Td) of the studied species and scanning electron microscopy (SEM) revealed the presence of waxes and greases in structure to the fibers of the species bocaiuva, taboa and camalote acceptable if we consider that the fibers do not undergo any prior chemical treatment. It was observed that the fibers bocaiuva, tucum and taboa had a rough structure, oriented in the longitudinal direction (Figure 1). Such characteristics are important to obtain nanoscale structures through chemical and physical methods.

Table 1: Analysis of Protein, Cellulose, hemicellulose, lignin of the plant species of the Pantanal.

Material	Protein (%)	Cellulose (%)	Hemicellulose (%)	Lignin (%)	Md (%)	Φ (mm)	Td (°C)
Bocaiuva	5,08	36,84	23,02	10,79	60,2	0,5	200
Taboa	17,97	29,59	19,79	8,95	21,0	0,3	200
Tucum	9,72	33,52	20,82	9,05	-	0,68	250
Camalote	9,23	32,99	23,85	1,56	0,7	0,59	188

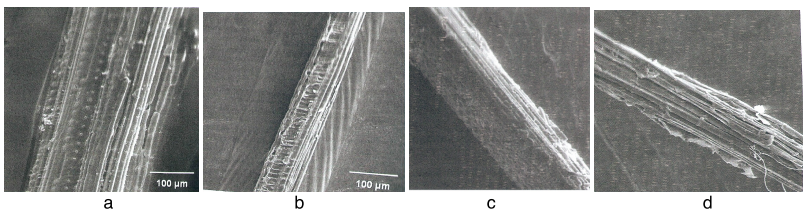

Figure 1:
Scanning electron micrograph of the fibers previously dried, without chemical treatment, **a)** bocaiuva **b)** taboa **c)** tucum and **d)** camalote.

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