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Isolation e characterization of cellulose from lignocellulosics fibers for application in nanotechnology

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Abstract – In recent years, lignocellulosic materials are seen as a good source material due to their availability, high mechanical resistance and low cost. The potential resource of lignocellulosics fibers, which can be used as source of cellulose nanofibers extraction. Theses nanofibers have been extracted by acid hydrolysis from lsugarcane bagasse and sisal. Nanocomposite films have been prepared by casting method from aqueous solution using glycerol as plasticizer. The final products have been evaluated by thermal degradation behavior using thermogravimetry (TG), crystallinity by X-ray diffraction and morphological structure have been investigated by transmission electronic microscopy (TEM) and mechanical properties tensile strength (TS) experiments.

In recent years, there has been an increasing trend towards more efficient utilization material from renewable source[1]. The great progress was achieved in the development of biodegradable products on the basis of agricultural materiasl[2]. Huge quantities of lignocellulosics fibers are available throughout the world from different source. These fibers are seen as a good source material due to their availability, high mechanical resistance and low cost [1-3].

In this study have been used LF, such as, sisal is a hard fiber extracted from the leaves of an annual plant abundant in South America, mainly in Brazil[2] and byproducts of agriculture residues which sugarcane that is a waste of alcohol production is important economical activity in São Paulo State. Theses fibers are potential resource for using as source of nanofibers cellulose extraction.

Cellulose nanofibers could be a viable alternative for news materials in which high performance as reinforcement agent for a biodegradable matrice[3]. Nanocomposite films are a possible response to the demand for environmentally friendly packaging materials.

The lignocellulosic fibers have been triturated and, subsequently, the cellulose was extracted using a pre-treatment with nitric and acetic acids mixture and hydrogen peroxide/sodium hidroxyde solution to remove lignin for sisal and sugarcane bagasse, respectively. Celulose nanofibers have been extracted by the acid hydrolysis with sulfuric acid from previously obtained cellulose. Nanocomposite films have been prepared by casting method from aqueous solution using glycerol as plasticizer. The final products have been characterized were evaluated by thermal degradation behavior using thermogravimetry (TG), crystallinity by X-ray diffraction (XRD), morphological structure was investigated by transmission electronic microscopy (TEM) and mechanical properties tensile strength (TS) experiments.

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