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ALKALINE TREATMENT FOR EXTRACTION OF HEMICELLULOSE

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The interest in the use cellulose nanofibrils films in several sectors is growing. The cellulosic pulp used in the process of obtaining the nanofibrils has a hemicellulose content, therefore it is important to understand the effect of hemicellulose on the properties of nanofibers films. One way to evaluate this effect is to produce films with different levels of hemicellulose. The hemicellulose content in the cellulosic pulp can be reduced by alkaline treatments, however, alkaline treatments can cause a change in the crystalline arrangement of cellulose. To assess the intensity of alkaline treatment that extracts hemicellulose without converting to type II, 15 g of the cellulose pulp of *eucalyptus sp.* were treated with 500 mL of KOH (2.5%, 5.0%, 10%, 20% and 40%) for 24 hours at 25 °C. After the basic treatment, the pulps were filtered and washed with DI water, until neutral pH. Thereafter, the treated pulps were oven dried at 60 °C until constant weight. To quantify the amount of hemicellulose withdrawn by the treatments. The samples were subjected to total acid hydrolysis (H_2SO_4 12 mol.L⁻¹). The carbohydrate content was quantified by ion chromatography. The sample diffractograms were obtained using the diffractometer operating at 40 kV with a current 20 mA and speed of 2 °.min⁻¹ using Cu-K α .com radiation wavelength of 0.15418 nm. As expected the basic treatments caused reduction of the hemicellulose content in the pulps. However, concentrations of KOH above 10% did not cause a further significant reduction in the amount of hemicellulose. The lowest hemicellulose content obtained in the cellulosic pulp was approximately 2%. The diffractograms showed that the treatments with 20% KOH and 40% KOH caused a change in the type of cellulose crystallinity, from type I to type II. The severe alkaline treatment causes the reagent to penetrate the cellulose structure by breaking the intermolecular hydrogen bonds, causing a rearrangement in the internal structure for the cellulose II. Treatment with 10% KOH was the most efficient in extracting the hemicellulose, without causing a change in the crystal structure.

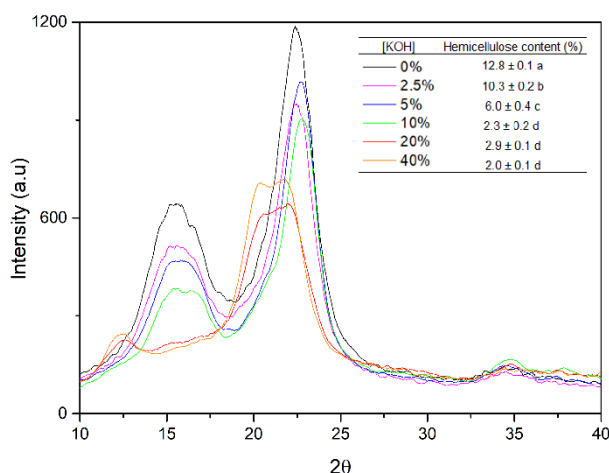


Fig.1

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