

# ISOLATION AND CHARACTERIZATION OF MICROCELLULOSE FROM AGAVE BAGASSE USING A GREEN METHOD

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## Abstract

The production of alcoholic beverages worldwide generates a high production of waste at the end of the process. Vinasses and bagasse are the main generators of environmental problems, due to their physicochemical composition. In Mexico, tequila factories produce large amounts of waste after *Agave* processing that represent an environmental problem, due to the large amounts of waste and its inadequate final disposal (irrigation of agricultural soils, clandestine burning, use as fuel for boilers, disposal in open dumps, among others). The aim of this study was the revaluation of the *Agave tequilana* Weber Va. Azul bagasse from the obtaining of cellulose using a green extraction method using hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) and sodium hypochlorite (NaClO). The characterization was carried out using Fourier Transform Infrared Spectrometer (FTIR), Scanning Electron Microscopy (SEM) and Differential Scanning Calorimetry (DSC). Micrographs showed the structure from native fiber (NF) and commercial fiber (CF) and was showed their elimination of lignin and hemicellulose after of treatments in the bagasse. The fibers after the alkaline treatment showed the removal of lignocellulosic compounds. At the end of the treatments, the microfibrils (MF) appear separated and with homogeneous sizes ranging from 80 to 250 μm in length. The FTIR showed absorption band at 1420, 1366, 1334, 1027 and 896 cm<sup>-1</sup> belong to stretching and bending vibrations of CH<sub>2</sub> and CH, OH and C–O bonds in cellulose. The DSC shown the endotherm occurs at 325 °C for the modified sample and in the commercial fiber at 335 °C, these peaks are related to the thermal degradation of cellulose and lignocellulosic compounds. The use of *Agave* bagasse and the proposal for the elimination of acids for the elimination for the removal of lignocellulosic compounds could be help the revalorization of tequila residues and the use the cellulose could be used in the industries as alimentary, pharmacy, and other industries.