ESPCA - ADVANCED SCHOOL ON THE PRESENT AND FUTURE OF BIOENERGY

Analysis of nanometric porosity of lignocellulosic materials derivated from sugarcane bagasse and submitted to wet pressing

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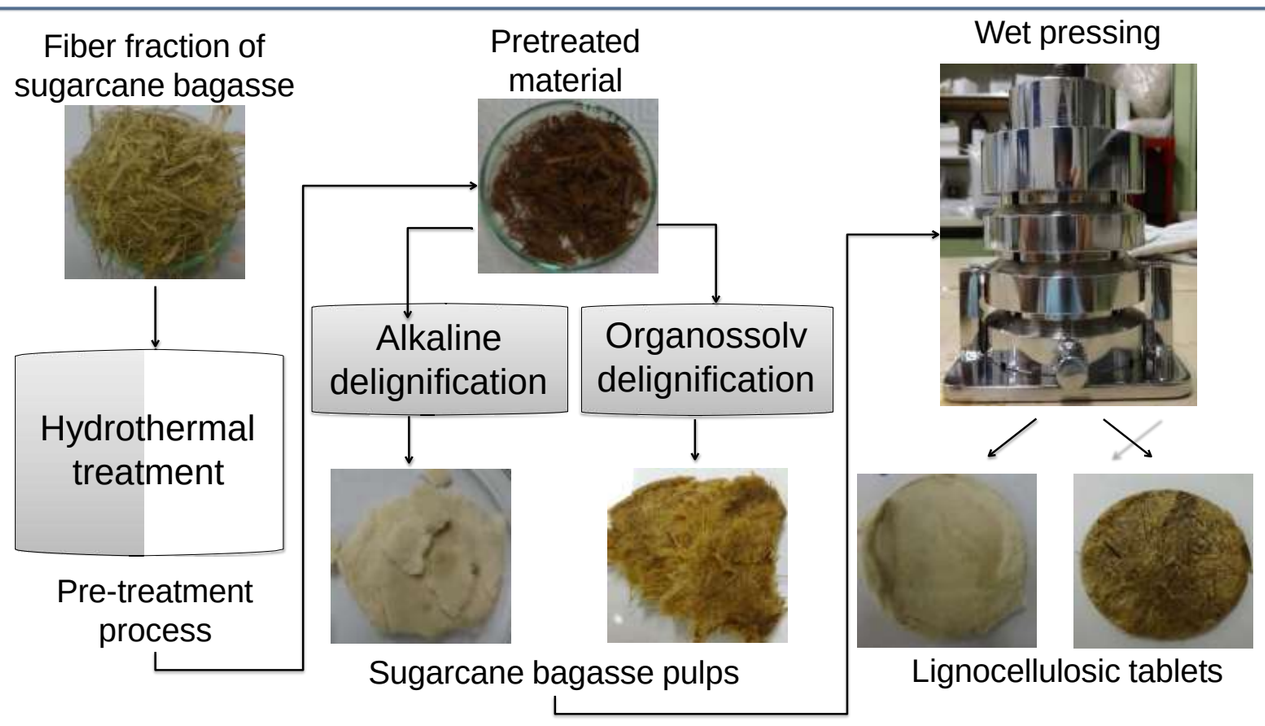
INTRODUCTION

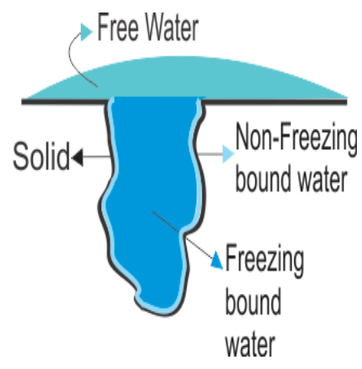
Biomass resources, especially from lignocellulosic raw materials, are an important source of energy and chemicals. In Brazil, the production of 1st generation ethanol from sugarcane is a consolidated technology. Nowadays, several academic and industrial researchers are involved in the studies to produce 2nd generation ethanol from sugarcane bagasse. These studies include physical and/or chemical methods for conversion of lignocellulosic raw materials to fuel and chemicals. In this context, the role of the accessibility of chemicals and solvents to the internal structure of lignocellulosic tissues is of fundamental importance to improve the separation of the macro-components (cellulose, hemicelluloses and lignins) and the yield of the conversion process.

The aim of this work is the study of the nanometric porosity of sugarcane bagasse and the effects that the hydrothermal and delignification processes on the evolution of the nanometric porosity in the obtained pulps.

MATERIALS AND METHODS



Thermoporometry method

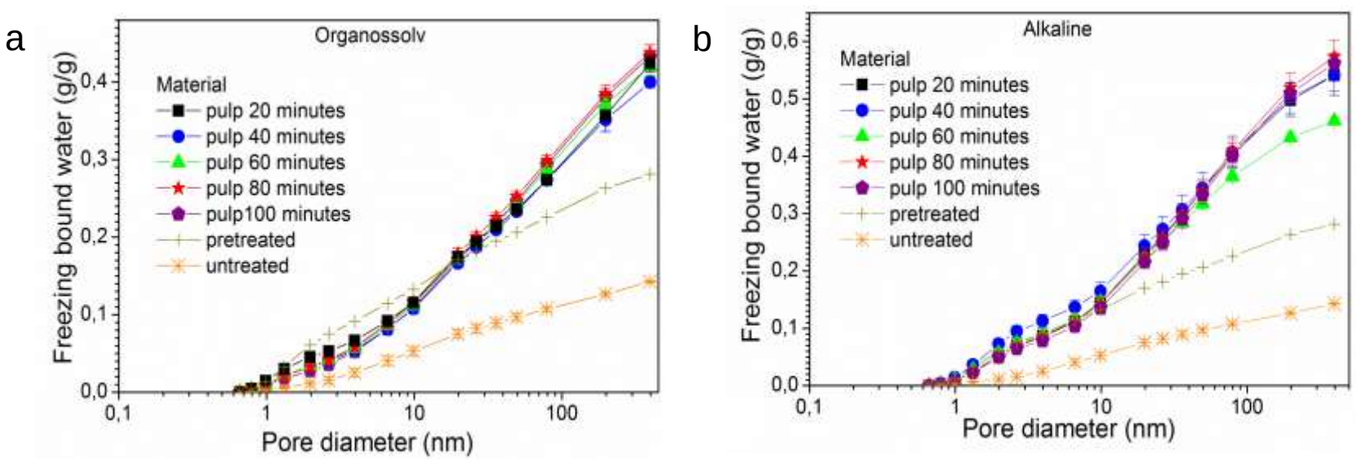


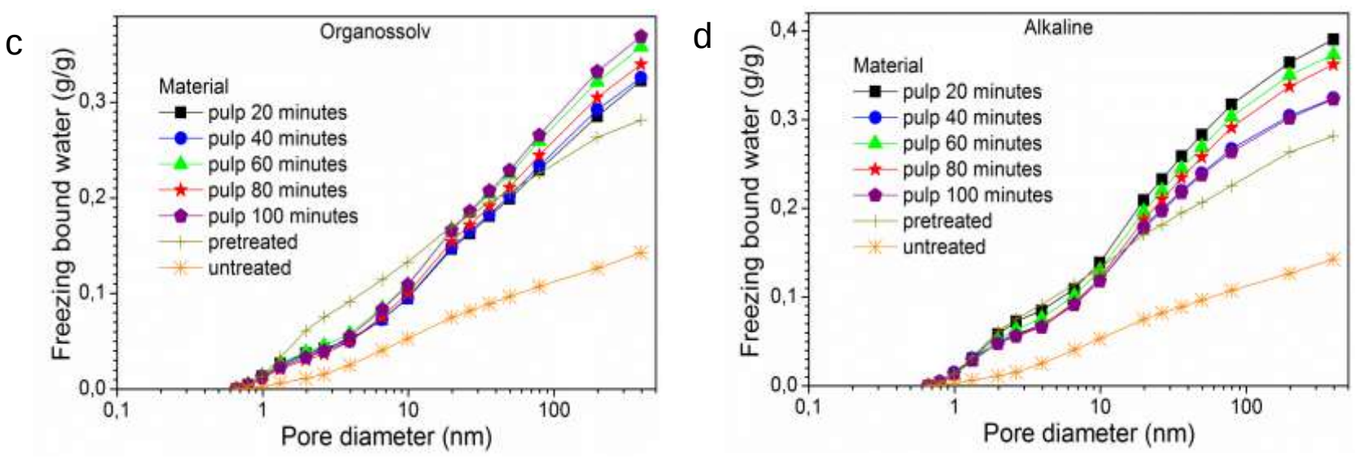
Pore representation and the three type of water detected by thermoporometry.

Table 1: Types of water discriminated by thermoporometry.

Type	Measure	Location
FBW	Melt <0°C	Pores 1- 400 nm

RESULTS





Pore size distribution of organosolv and alkaline pulps before and after wet pressing. a) Organosolv pulp before wet pressing, b) Alkaline pulp before wet pressing, c) organosolv pulp after wet pressing with 21 MPa pressure and d) alkaline pulp after wet pressing with 21 MPa pressure.

CONCLUSIONS

The nanometric porosities determined by thermoporometry indicates that:

- -Hydrothermal treated materials, organosolv and alkaline pulps produced increase in the nanometric porosity compared to the untreated material;
- The nanometric porosity for organosolv and alkaline pulps were not affected by the severity of the processes;
- The wet pressing performed at 21 MPa produced a decrease in porosity for all pups, but the porosity remained higher than that of untreatedsugarcane bagasse.

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