Póster

Algae and tidal waste revalorization as reiforcing fibers in papermaking

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RESUMEN

Motivation: Cellulose is the basic component of the cell wall of vegetables and therefore, it is considered the most abundant polymer on earth (1). Cellulose has numerous biotechnological applications, from traditional uses such as production of pulp and paper products, to engineering of new materials.

Now, the main cellulose source is wood pulp from trees and woody species (2). This timber has a large proportion of lignin associated to the cellulose of its vegetal wall. The lignin is a very irregular compound which intercalates between the cellulose fibrils of the vegetable wall, being extremely difficult to degrade, and increasing the costs of cellulose extraction and the pollution generated by the processes wastes (3). Most algae have not lignin associated to the cellulose of the plant cell wall, so the cellulose extraction is easier, less expensive and produces a microcrystalline cellulose with chemical properties that can optimize the use of traditional cellulose in some applications as paper production, cosmetics, medicines and membrane filtration.

Similarly, the use of algae from tidal debris presents a number of advantages such as use of a waste to turn it into a product with added value. The tidal algae use lead to a decrease of the environmental impact compared to obtaining other reinforcing fibers from deforestation. There are few references regarding methodologies of macroalgal cellulose extraction, so it is intended to develop an extraction protocol using clean technologies that minimize environmental impact and optimize the extraction yield of cellulose, solving the problems associated with current production.

Methods:

The species collected and used in this experiment were: *Ulva sp*, *Cladophora sp* & *Enteromorpha sp*. Once they are dried,we proceed to the cellulose extraction, for that purpose We desing a own protocol according to several references and our previous knowledges. We used a tested model based in 15 experiments with differents values for the three main variables: Temperature, time and reagent concentration (4).

In order to define the extracted cellulose, X ray diffraction analyses, electron microscopy scanning and papermaking and measure of the final product properties have been done.

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