Poster

Cationization of cellulose from Posidonia oceanica

Raquel Mª Roldán (1), María M. Ballesteros (1)y Ana Moral (1,*)

(1)Molecular Biology and Biochemical Engineering Department, Pablo de Olavide University. Ctra. de Utrera, km. 1, Sevilla 41013. Spain.

Keywords: cellulose, Posidonia oceanica, tide residues.

ABSTRACT

Motivation:
Most of the cellulose used in industrial applications is obtained from trees and other plant species (Gilarranz et al, 1999; Santos et al, 1997). In parallel, many countries have been forced to use non-wood raw materials for pulp and paper due to its limited forest resources. Each year tons of algae and marine plants deposited on the coasts generating a high environmental impact during its decomposition and therefore, they are collected and managed as waste . P. oceanica is one of the most abundant species that inhabit the Mediterranean Sea. It is a superior flowering plant. The epidermal cell wall containing cellulose, pectin and low lignin. These features allow you to be a source of obtaining important cellulose due to the proportions of this polysaccharide in cell division. The objective of this study is to explore an alternative way to value this residue by a cationization of pulps from the waste tide (Posidonia oceanica). The product has potential applications in paper industry as flocculant, retention agent and adsorbent.

Methods:
In order to determine the optimal conditions of the pulping process, 27 experiments selected by a factorial design of five variables (time, temperature, concentration of sodium hydroxide, anthraquinone and liquid-solid ratio) were studied. After that, mercerization (with 10, 20 and 30% w/v of soda at 20, 40 and 60 min) was carried out as a preparation method of cationization process with 2-chloro-3-hydroxypropyltrimethylammonium chloride (CHPTAC). The degree of substitution that occurs in the P. oceanica fibers was quantified by elemental analysis and scanning electron microscope (SEM) was employed for the determination of structural changes.

Results:
A comparison of results from cationization process of P. oceanica are carried out, which shown that P. oceanica is an excellent raw material to obtain cellulose for different applications.

Conclusions:
The cationization of P. oceanica fibers allows a high degree of substitution resulting in a product with potential applications in the paper industry such as flocculant, retention and adsorbent. This gives a value to natural tidal waste and avoids the use of contaminants during the industrial process.

REFERENCES

[Gilarranz, M.A., Oliet, M., Rodriguez, F., Tijero, J. (1999). Methanol-based pulping of Eucalyptus Globulus, Canadian Journal of Chemical Engineering, 77, 515.

Santos, A., Rodriguez, F., Gilarranz, M.A., Moreno, D., Garcia-Ochoa, F. (1997). Kinetic modeling of kraft delignification of Eucalyptus Globulus, Industrial Engineering Chemical Research, 36, 4114.