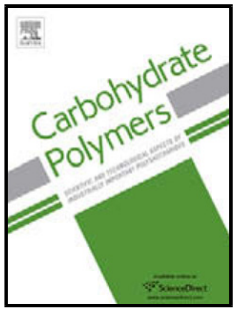

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Self-bonded composite films based on cellulose nanofibers and chitin nanocrystals as antifungal materials

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Highlights

Cellulose nanofibers and chitin nanocrystals composites were made via hot-pressing
The addition of chitin nanocrystals decreased the permeability of the films
Amino groups present in chitin inhibited the colonization by *aspergillus* condispores

ABSTRACT

Cellulose nanofibers and chitin nanocrystals, two main components of agricultural and aquacultural by-products, were obtained from blue agave and yellow squat lobster industrial residues. Cellulose nanofibers were obtained using high pressure homogenization, while chitin nanocrystals were obtained by hydrolysis in acid medium. Cellulose nanofibers and chitin nanocrystals were characterized by X-Ray diffraction, Atomic Force Microscopy and Infrared spectroscopy. Self-bonded composite films with different composition were fabricated by hot pressing and their properties were evaluated. Antifungal activity of chitin nanocrystals was studied using a Cellometer® cell count device, mechanical properties at tension were measured with an universal testing machine, water vapor permeability was evaluated with a thermohygrometer and surface tension with sessile drop contact angle method. The addition of chitin nanocrystals reduced slightly the mechanical properties of the composite. Presence of chitin nanocrystals influenced the growth of *Aspergillus sp* fungus in the surface of the composites as expected.

Keywords: blue agave, yellow squat lobster, cellulose, chitin, nanocrystals, antifungal properties

1. INTRODUCTION

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