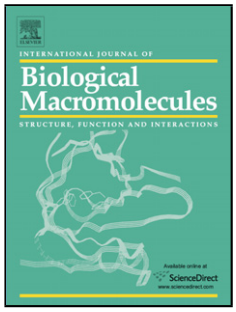

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Magnetic bionanocomposites from cellulose nanofibers: fast, simple and effective production method

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Abstract

Nanocellulose is becoming a topic of great interest due to its lightweight, huge availability and its interesting properties. Among these properties, it is worthy to distinguish its specific surface and its strength. Both properties allow producing films with great mechanical properties able to retain nanoparticles which can provide the nanopaper of much functionality. Many applications for nanocellulose nanocomposites have been reported, demonstrating the interesting opportunities that this product has in a near future. In this sense, the present work attempts to produce membranes based on cellulose nanofibers (CNF) filled with magnetite nanoparticles with the purpose of developing membranes for loudspeakers. The main advantage of this is the avoiding of the iron core that one can find in any loudspeaker, since the membrane itself acts as that core. Bionanocomposites ranging from 10 to 70% of magnetite nanoparticles were produced by filtration in a nitrocellulose membrane with a pore size of 0,22 µm. Tensile tests showed that mechanical properties were decreased as the amount of magnetite was increased. They were observed by FE-SEM to see the interactions between nanoparticles and CNF. Finally, a