

PREPARATION AND CHARACTERIZATION OF MAGNETIC COMPOSITES BASED ON N-PALMITYL CHITOSAN FOR BIOMEDICAL APPLICATIONS

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Abstract

This paper presents the synthesis of modified chitosan derivatives with different amount of hydrophobic groups and evaluates their potential to be employed in order to obtain magnetic composites for biomedical applications. N-palmityl chitosan derivatives with different degrees of substitution have been obtained through the reaction of chitosan with palmitoyl chloride, using various molar ratios. Acylated derivatives structure has been investigated and confirmed by Fourier transform infrared (FT-IR) and proton nuclear magnetic resonance (¹H-NMR) spectroscopy. The degree of substitution has been determined through quantification of remaining free amino groups after acylation by trinitrobenzene sulfonic acid (TNBS) assay. The thermal decomposition behaviour of the acylated derivatives has been investigated by thermogravimetry analysis coupled with Fourier transform infrared spectroscopy and mass spectrometry (TG-FTIR-MS). A double emulsion process has been used to obtain a new magnetic composite based on N-palmityl chitosan, intended for biomedical applications. The magnetic composite exhibits a submicron size and a positive zeta potential, (characteristics determined with a Malvern Zetasizer NanoS instrument) and good magnetic properties (evaluated using a vibrating sample magnetometer (Lakeshore VSM 7400 System)). In the same time, these characteristics were dependent on degree of substitution of modified chitosan.

Keywords:

ACKNOWLEDGEMENTS

This work was supported by a grant of the Romanian Ministry of Education, CNCS - UEFISCDI, project number PN-II-RU-PD-2012-3-0282.

Author did not supply full text of the paper/poster.