CHONDROITIN SULFATE-*B*-POLY(LACTIC ACID) BLOCK COPOLYMERS: SYNTHESIS AND SELF-ASSEMBLED

André R. Fajardo[1,2*], Adley F. Rubira[1], Edvani C. Muniz[1], Redouane Borsali[2] and Sami Halila[2]

[1]Grupo de Materiais Poliméricos e Compósitos (GMPC), Chemistry Department, Maringá State University, Av. Colombo, 5790, 87020-900, Maringá, Paraná, Brazil. (*) drefajardo@hotmail.com
[2]Centre de Recherches sur les Macromolécules Végétales (CERMAV-CNRS), affiliated with Université Joseph Fourier and member of the Institut de Chimie Moléculaire de Grenoble, BP 53, F-38041 Grenoble Cedex 9, France.

ABSTRACT

An original amphiphilic block copolymer based on the biopolymer chondroitin sulfate (CS) and poly(lactic acid) (PLA) was synthesized by a suitable synthesis route and "click" chemistry approach.[1] At first, CS was end-functionalized with alkyne groups by a reductive amination reaction with a propargyl derived.[2] In a second step, PLA was end-functionalized with azide groups. The structural characterization of the functionalized polymers (CS-alkyne and PLA-N_3), was performed by ^{1}H and ^{13}C NMR and FTIR spectroscopic techniques. The block copolymer (CS-*b*-PLA) was synthesized by Cu(I) catalyzed in a "click" reaction and its structural characterization was performed by ^{1}H and DOSY ^{1}H NMR and FTIR. The CMC value found by fluorescence measurements for the CS-*b*-PLA block copolymers was 0,048 mg/ml. The size distribution and morphology presented by the CS-b-PLA in aqueous medium was investigated by DLS analysis and microcopy techniques (SEM-FEG and TEM). From these techniques, it was found that the copolymer systems form micelles with core-shell assembly (see Fig. 1).[3] This original amphiphilic block copolymers could to form interesting well-defined and stable micelles in aqueous media. The core-shell structure that forms the micelles is very attractive for several biomedical and pharmacological applications; such as in drug delivery systems. This is encouraged by the cell viability assays data, which showed that both copolymers did not exhibit cytotoxic effect on healthy cells.

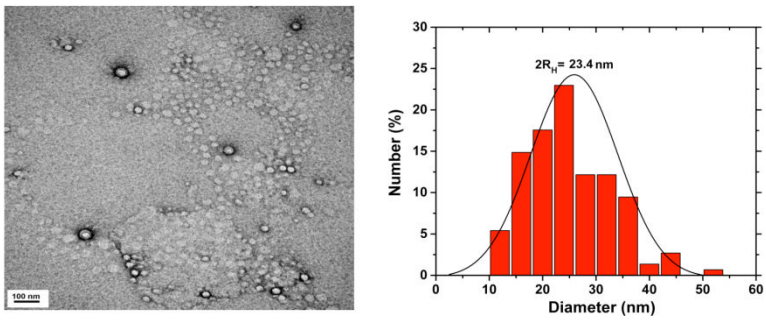

Fig. 1: TEM images recorded for the CS-*b*-PLA systems and the size distribution ([copolymer] = 0.1 mg/ml).

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References:

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