Physicochemical characterization of chondroitin sulfate-co-n-isopropylacrylamide for pharmaceutical purposes

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Introduction: The pharmaceutical industry uses particulate systems for controlled release formulations and vectored by providing improved efficacy, reduced toxicity and dose of drug administered, increasing patient adherence to treatment. Whereas the polymers have a low cost, are not recognized by the defense system of the organism and must provide controlled release of the drug, is proposed to form a copolymer from the reaction of a synthetic polymer with a natural. The synthetic monomer N-isopropylacrylamide (NIPAAm) polymerize to form poly (N-isopropylacrylamide) (PNIPAAm) classified as thermosensitive due to its ability to expand and contract at a certain temperature, releasing the drug during its contraction, spreading by the body. The chondroitin sulfate (CS) is a highly soluble natural polymer found in most mammals cartilage, being chemically modified by glycidyl methacrylate (GMA), forming the chondroitin sulphate modified (CSM), in order to reduce its solubility to prevent premature release of the drug, and is known bioadhesive to increase the residence time of the drug in the body, improve its bioavailability and reduce the number of doses delivered to the patient. The aims is to realize the physicochemical characterization of particles CSM and NIPAAm and copolymers CSM+NIPAAm5%, CSM+NIPAAm2,5% e CSM+PNIPAAm2,5% to choose the copolymer with the best properties of an efficient carrier of drugs. **Methodology:** The particulate systems (CSM, NIPAAm, copolymers CSM+NIPAAm5%, CSM+NIPAAm2,5% e CSM+PNIPAAm2,5%) were submitted to analysis of Nuclear Magnetic Resonance (NMR), Spectroscopy of the Transform Infrared Fourier (FTIR), Scanning Electron Microscopy (SEM), Thermogravimetric analysis (TG) and Differential Thermal Analysis (DTA) in three ratios of heating (5°C, 10°C and 20°C). **Results and Discussion/Conclusion:** The analysis of NMR, FTIR and SEM showed similarity to the structural and morphologic aspects of the copolymers studied, because was observed the same protons signals, components groups and spheres smooth and regular, respectively. The TG curves demonstrated that NIPAAm starts to decompose at about 126^0C, whereas the CSM has been more stable, because its degradation taking place at about 225^0C. Regarding copolymers analyzed CSM+NIPAAm5%, had a higher thermal stability compared to other copolymers evaluated, since its decomposition occurs at temperatures above the others copolymers, about 222^0C in the three reasons heating studied. The DTA curves of the materials analyzed showed values of temperatures consistent with the thermal decomposition events presented by TG curves. Thus, among the copolymers evaluated, the CSM+NIPAAm 5% presented to have the physicochemical properties most suitable for an efficient drug carrier.

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