STRUCTURE AND PROPERTIES OF NANOCRYSTALLINE CHITOSAN
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Chitosan and its derivatives are polymers with excellent properties to be used in regenerative medicine because they guarantee efficiency in the healing process. This polymer has a great potential for the development of a new generation of biomaterials that can be used in regenerative medicine and tissue engineering. The nanocrystalline chitosan (nCh) is a modified form of chitosan prepared by the method of obtaining chitosan salts. It is characterized by having the same special properties of the precursor chitosan as biocompatibility, bioactivity, be non-toxic and biodegradable. The aim of this study was to develop a new method of obtaining nanocrystalline chitosan according to their chemical and physical characterization. The material was characterized by Absorption Spectroscopy in the Infrared Region - with the Fourier transform (FTIR-ATR), scanning electron microscopy, SEM, Nuclear Magnetic Resonance, NMR, Diffraction of X-rays, particle size analysis and the potential Zeta. The results indicated that the process of obtaining nanocrystalline chitosan did not change the structure of the precursor chitosan. The analysis in the FTIR showed the same functional groups of the precursor chitosan. The 1H-NMR spectroscopy was helpful in the analysis of the chitosan samples in a wide range of values to determine the degree of deacetylation (GD). The morphology indicates the homogeneity of the structure and the surface. The X-ray diffraction shows the reduction of crystallinity of QNC, which corresponds to the amorphous structure thereof. The value of the zeta potential of the chitosan acetate (AQ) in acid media (pH 4.43) was 43.6 mV, while the value of QNC (pH 7.3) was 15.4 mV due to its high polydispersity. The variation in particle size of samples and AQ using QNC 0.450 uM mesh filter, indicated the average particle size of 55.52 and 266.0 nm, respectively.