MECHANICAL AND MORPHOLOGICAL BEHAVIOUR OF CHITOSAN SCAFFOLDS PRODUCED BY PARTICLE AGGREGATION METHOD

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Development of novel biomaterials and its practical application have been the subject of much research in the field of scaffolds for tissue engineering, providing the success of producing scaffolds biomaterials that facilitate tissue growth and provide structure support for cells. The design and production of scaffolds for tissue engineering is yet unable to completely reproduce the native tissue properties. Preferably, scaffolds would be made of biodegradable polymers whose properties are more similar to the ECM. Chitosan, which is the copolymer of D-glucosamine and N-acetyl-D-glucosamine, is an excellent material due to its versatile properties and is one of the widely studied polymers for tissue engineering application. The objective of the present work was to characterize mechanical and morphological chitosan scaffolds produced by a particle aggregation method. Chitosan scaffolds were prepared throughout two steps: using the ionotropic gelation for macrosphere production and aggregation to produce the scaffolds. The chitosan scaffolds were characterized by Scanning Electron Microscopy (SEM) and Compression Tests. Through SEM results, was observed a three-dimensional structure, with 55% porosity and interconnectivity between pores. The pores were inhomogeneous and varied in the range of 40-262 μm. The mechanical characterization by compression tests showed a very elastic and easily conformable structure, since the stress required to deform the scaffold is lower. The cytotoxicity results proved that the produced has no toxicity effects and cell viability values were enclose in 80%. The present work offered a new methodology for the chitosan scaffolds manufacture, producing satisfactory three-dimensional structural materials with a simple strategy based on the application of an adhesive material to obtain chitosan scaffolds.