Production and characterization of PLA/nHAp fibers produced by rotary jet spinning process

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Bone regeneration is a topic that has become very relevant in the medical and scientific field. Poly (acid lactic) (PLA) is one of the most researched materials for biomaterials once it is biodegradable and does not induces inflammatory responses in the human body. The incorporation of nano-hydroxyapatite (nHAp) particles as an inorganic filler to PLA matrix is very promising, once it mimics the human bone structures and also can promote osteointegration simultaneously with *in vivo* controlled degradation [1-2]. The present work aims the production and characterization of fibers containing nHAp particles by rotary jet spinning process. The fibers were prepared using a solution of PLA and nHAp with chloroform as solvent. First, the nHAp particles (0.5% and 1% (w/w $_{mpolymer}$)) were dispersed in chloroform using ultrasonic irradiation for 10 min. Then, the PLA polymer was diluted in chloroform solution/nHAp under mechanical agitation for 120 min. Subsequently, the solutions were rotary spun at 3,000 rpm at room temperature. The fibers were characterized by scanning electron microscopy (SEM), thermogravimetric analysis (TGA), Raman spectroscopy, and SBF assays will be done to evaluate the bioactivity. The fibers showed a medium diameter in the range of 7-11µm. The thermogravimetric analysis for PLLA/ nHAp fibers showed a similar thermal behavior for fibers with and without nHAp. In addition, Raman spectroscopy shows a specific phosphate band, meaning that the incorporation of nHAp was successfully done by the proposed method. Thus, PLA fibers containing nHAp have great potential for applications in guided bone regeneration.

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