

Scaffolds of Poli (ϵ - caprolactone) with whiskers of hydroxyapatite.

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Abstract – *Scaffolds* of poly (ϵ -caprolactone)/hydroxyapatite has been studied in tissue engineering. The aim of this work was to produce the composite and characterized by SEM, XRD and EDS. It was possible analyzed the morphology and composition of the whiskers of hydroxyapatite, polycaprolactone and *scaffolds*. Unfortunately, the whisker appears to be agglomerate in the matrix of PCL, needing to add some element, which in the future will acts for the dispersion of the ceramics in the matrix.

Poly (ϵ - caprolactone) (PCL), is a biodegradable polymer which has a good biocompatibility, who has the approval of the *Food and Drug Administration (FDA)*. This polymer has been studied in many researches, above all, in tissue engineering [1-2]. *Scaffolds* of PCL are more attractive for bone engineering, when it includes bioactive materials; its principal role is to induce bones cells to the *scaffolds* [3]. An example is the hydroxyapatite, which has chemical and crystallographic similarity to the apatitic mineral in human bones [4]. The aim of this study was to develop a system consisting of hydroxyapatite and poly (ϵ -caprolactone) (PCL), wherein HA were dispersed in the PCL matrix. The form of the hydroxyapatite used was whisker like.

The method used for the PCL, described by Mikos [5], and for the whiskers was to adopt the method alkaline hydrolysis of α -TCP, made in lab. [6] The porosity used was 70%, made by the inclusion of NaCl (Snythy) in the Poly (ϵ -caprolactone) (Aldrich) and the solvent used were chloroform. The *scaffolds* were casting in Teflon molds with 36 mm².

The ceramics were characterized by X- Ray Diffractometer (XRD), Energy Dispersive X-Ray Detector (EDS) and Scanning Electron Microscopy (SEM), for the polymer as well.

By XRD analysis, it was observed the phase of the hydroxyapatite whiskers, appeared just like the patterns JCPDS 09-0432 (figure 1a). The EDS showed 1.23 as the relation between Calcium and Phosphorus (figure 1b), this rate was low because the difficult of collect for analyze. The morphology of the whiskers were observed in the SEM images (figure 2a), it presents cluster, unfortunately. Also, it was possible to analyze the porosity and its distribution of porous and whiskers (figure 2b). However, the matrix of PCL involved the whiskers which made it difficult to comments.

The *scaffold* of PCL/HA presents an important role for tissue engineering, however needs to improve its distribution and morphology.

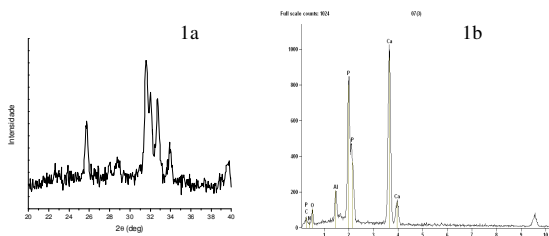


Figure 1: Whiskers of hydroxyapatite a) XRD b) EDS.

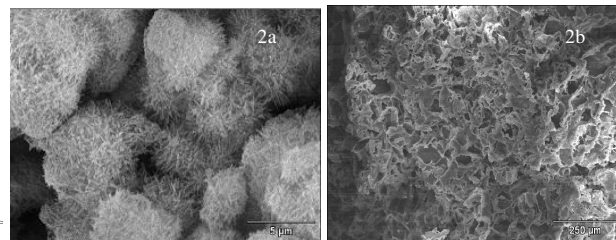


Figure 2: SEM imagem a) Whiskers of hydroxyapatite 5000x magnification, b) PCL/HA 100x magnification.

References

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