

World Congress on
Advanced Biomaterials and Tissue Engineering
October 17-18, 2018 Rome, Italy

***In vitro and in vivo* evaluation of β -TCP/Fap bioceramics scaffolds**

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Bio composites consisting of β -Tricalcium Phosphate (β -TCP) with 26.52% Fluorapatite (Fap) were elaborated and characterized in order to evaluate its potential application in bone graft substitute. Bioactivity was determined with *in vitro* tests by immersion of samples in simulated fluid body for several periods of time. The SEM (Scanning Electron Microscope), EDS (Energy Dispersive X-Ray Spectroscopy) and Atomic Absorption Spectroscopy showed the deposition of apatite layer on the surface of samples showing a good bioactivity. However, after 6 days of soaking, the dissolution rate of Ca^{2+} and PO_4^{3-} decreased which is due probably to the improvement of crystallization of the apatite layer. These findings agree with those observed after 6 weeks post implantation of prepared macroporous scaffolds in rabbits. All histological observations of the preliminary *in vivo* study in the tibia of rabbits proved the biocompatibility and the resorption of the investigated bioceramic. In contrast, the implantation period will have to be optimized by further extensive animal experiments.

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