

Evaluation of biological and confinement properties of a bone substitute to in situ preparation based on demineralized bone matrix for bone tissue regeneration

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The objective of this project is to evaluate the bioactive and confinement properties of a bone substitute based on a demineralized bone matrix (DBM) developed at EIA University and the Tissue Bank. Structural and morphological properties were evaluated by scanning electron microscopy (SEM), X-ray diffraction (DRX) and Fourier transform infrared spectroscopy (FTIR-ATR). Water absorption capacity and degradation were also evaluated. The cytotoxicity was evaluated by the MTT test. The bioactivity of the bone substitute was evaluated by immersing the samples in simulated body fluid for four weeks. Tests of confinement of tibial fragments of a human donor with bone defects of a certain size were performed to ensure that the substitute remains in the defect despite fluid. According to the authors' knowledge, the methodology for evaluating samples in a confined environment has not been evaluated before in real human bones. The morphology of the samples showed irregular surface and presented certain porosity. Degradation and absorption measurements established a loss of 3% and 150% in one month respectively. The MTT showed that the system is not cytotoxic. Apatite groups formed from the first week were visualized by SEM and confirmed by EDS. These calcium phosphates are necessary to stimulate bone regeneration and, thanks to the porosity of the developed material, osteinduction and osteoconduction are possible. The results of the tests of confinement of the material showed that the migration of the bone filling to other sites is insignificant, although the samples were subjected to the passage of simulated body fluid.

Biography

Martha Elena Londoño López has completed her PhD in Materials Science and Technology in 2011 at the National University of Colombia. She is a research professor at EIA University. She has published more than 12 articles in renowned magazines. She has been leading a research project for four years to develop a bone substitute based on demineralized bone matrix, obtaining good results *in vitro* and soon to initiate tests *in vivo* in an animal model.

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