Biocomposites based on natural polymers with medical applications

Abstract

In the present doctoral thesis is described the obtaining of biocomposites based on BC and PHBHV with potential applications in the field of wound healing using the ex situ method, being tested from a structural, morphological, thermal stability and biocompatibility point of view. Also, for the first time, biocomposites based on PHBHV and double layered hydroxides were prepared for applications in the medical field, the biological tests revealing a good biocompatibility of them. In addition, biocomposites based on BC and magnetite were synthetized, the obtaining of this type of materials by in situ method being reported for the first time, respectively by dispersing magnetic nanoparticles in the culture medium of producing bacteria, morpho-structural and biological investigations reveal that this biomaterials have suitable properties for wound healing applications. Moreover, for the first time, biocomposites based on SF and magnetic nanoparticles were synthesized, morpho-structural and biological investigations performed highlighting the obtaining of materials with adequate properties for applications in the field of wound healing. Furthermore, hydrogels based on fibroin, acrylamide and graphene oxide were prepared with potential applications in the field of bone reconstruction, the characterizations performed reveal appropriate morpho-structural properties for the proposed medical field and a good mineralization capacity obtained by an synergistic effect of the components used. As well, the electrochemical behavior of azathioprine was investigated and a redox mechanism was presented for this drug, subsequently, a mechanism of interaction between azathioprine and DNA was proposed for the first time using electrochemical data obtained using DNA, poli [A] and poli [G] based biosensors and mass spectra registered.