EVALUATION OF THE BIOCOMPATIBILITY OF FLOURENSIA CERNUA EXTRACTS IMMOBILIZED IN HYDROGELS FORMED BY SEMI-INTERPENETRATED NETWORKS OF COLLAGEN AND POLYURETHANE FOR TISSUE ENGINEERING APPLICATIONS.

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Flourensia cernua is a semi-desert plant that stands out for its bioactive phenolic compounds (BPCs), which make it promising for the development of bioproducts in biomedicine and agriculture. In this study, the effect of Flourensia cernua extract concentration on the physicochemical properties, as well as on the biocompatibility, of polyurethane cross-linked collagen hydrogels is analyzed. Extracts obtained from a solid state fermentation were used, which were immobilized in different concentrations within polymeric hydrogel matrices, creating the biomatrices H-B (0%), H-E50 (6.91%), H-E100 (13.83%) and H-E150 (20.75%), with 30% of polyurethane with respect to 6 mg of porcine dermis collagen. The hydrogels were polymerized at physiological conditions (pH 7.4, 37 °C for 4h). FTIR spectroscopy revealed a semi-interpenetrating polymeric network with the CFBs, promoted by urea bonds and hydrogen bridges, generating semi-crystalline rough surfaces with fast gelation speed and higher resistance to thermal degradation. The immobilization of the extracts in the hydrogels did not induce cytotoxic effects on monocytes and fibroblasts; on the contrary, they increased the metabolic activity and cell proliferation of both cell lines. The matrices present a multidose release behavior of the extract at pH 4.5 and pH 7.4; showing a higher release in the H-E150 biomatrices. In addition, the mineralization bioactivity in solution of simulated body fluids was evaluated to verify that the hydrogels induce the formation of carbonated apatite on their surface. The results obtained show the potential of hydrogels with immobilized plant extracts for tissue engineering applications.

Keywords: hydrogel, Flourensia cernua, biocompatibility

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