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Programme and the Book of Abstracts

TWENTY-FIRST YOUNG RESEARCHERS' CONFERENCE MATERIALS SCIENCE AND ENGINEERING

Belgrade, November 29 – December 1, 2023

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Study of the properties of oxidized cellulose plus bioglass as a new bioink for application in regenerative medicine

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There are numerous researches on biomaterials, with the association of some natural and synthetic polymers and ceramic materials, for the development of hydrogels and bioinks, in an attempt to develop a biomaterial that is resistant, biocompatible and bioactive, which forms a bond with the host tissues and promotes tissue regeneration. The purpose of this work is to produce a bioink based on a hydrogel of chemically oxidized cellulose and bioglass (58S) for application in regenerative medicine. In this study, the chemically oxidized cellulose gel was obtained from a natural source of sugar cane bagasse, the material was washed, bleached, chemically treated with the TEMPO reagent and sonicated to obtain a viscous gel. Tertiary bioglass (58S) obtained by the sol-gel method was used because it showed better viability and cell proliferation. Chemically oxidized cellulose and bioglass (58S) were combined to form the composite. The results obtained were promising for characterizing the composite as a bioink. In this way, the rheological tests characterized the composite as a hydrogel. Subsequently, to form the bioink, bone cells (MG-63) were inserted inside the hydrogel. The results of the cell tests showed that after ten days the cells were still viable, as well as DAPI showing that the cells were inserted inside the material, characterizing it as a bioink and the Alizarin Red test showing the ability to form a mineralized matrix.