



FIFTEENTH YOUNG RESEARCHERS' CONFERENCE
MATERIALS SCIENCE AND ENGINEERING

December 7-9, 2016, Belgrade, Serbia
Serbian Academy of Sciences and Arts, Knez Mihailova 36

PROGRAMME &
THE BOOK OF ABSTRACTS

MATERIALS RESEARCH SOCIETY OF SERBIA
INSTITUTE OF TECHNICAL SCIENCES OF SASA

December 2016, Belgrade, Serbia

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Program and the Book of Abstracts

**Materials Research Society of Serbia
&
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Characterization of porous scaffolds based on gellan gum and bioactive glass under biomimetic bioreactor conditions

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Porous nanocomposite scaffolds containing 2 wt% gellan gum (GG) and 2 wt% bioactive glass nanoparticles (BAG, 70 mol% SiO₂, 30 mol% CaO) were examined regarding the initial mechanical properties, as well as hydroxyapatite (HAp) formation in a perfusion bioreactor. 2 wt% GG samples served as controls. Over 7 days in the simulated body fluid, HAp formed both under continuous perfusion (1.1 ml min⁻¹) and under static conditions as confirmed by FEG-SEM and EDS analyses. Mechanical evaluation has revealed the need for optimization of the synthesis procedure in order to discern if the HAp formation was kinetically or mass transfer controlled.

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Operating conditions in the bioreactor prototype applying hydrostatic pressures

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A new bioreactor prototype was constructed with the possibility to apply hydrostatic pressures up to 3 MPa in order to imitate conditions in intervertebral discs. The bioreactor consists of a pressurized chamber filled with oil closed by a membrane transferring the pressures to the cultivation chamber mounted underneath. The prototype was examined in terms of achieving and maintaining a given pressure, response dynamics of the system, and the reproducibility of experimental conditions. Measurements and analysis of pressures in two chambers were used to determine the pressure transmittance rate, signal delay in the cultivation chamber as well as the presence of bubbles.