XXI B-MRS Meeting

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October 1st to 5th

SBPMat B-MRS BRAZILIAN MATERIA RESEARCH SOCIET

Maceió-AL, Braz

October 1st to 5th, 2023

Booklet | Presentation Schedule | Mobile App

until ~~April 17th~~ May 1st	~~June 00th~~ June 25th	until ~~June 19th~~ June 29nd	~~June 26th~~ July 07th	until July 26th
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Welcome

The **Brazilian Materials Research Society (B-MRS)** and the
Committee of the XXI B-MRS Meeting invite the worldwide
community of materials research to attend the 2023 Meetir
be held at the Ruth Cardoso Cultural and Exhibition Center
Maceió-Alagoas, Brazil, October 1st to 5th, 2023.

This traditional forum is dedicated to recent advances and
perspectives in materials science and related technologies.
be an excellent opportunity to bring together scientists, eng
and students from academy and industry to discuss the sta
art of Materials Science discoveries and perspectives.

Maceió is one of the main Brazilian capitals that has receiv
tourists mainly due to the receptivity of its inhabitants, the
beaches with warm waters and extraordinary gastronomy. Y
very well welcome to Maceió. Do not miss this opportunity.

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3D printed bone scaffolds based on potato starch activated by hydroxyapatite nanoparticles replaced by Sr2+

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3D printing is enables to the production of custom bone scaffolds and the use of starch (a natural polymer biocompatible and biodegradable) [1] incorporated by hydroxyapatite nanoparticles (HA) replaced by strontium ions is one potential biomaterial to induce bone formation and to reduce bone reabsorption [2]. In this context, this work evaluated the bioactivity of 3D printed produced bone scaffolds based on potato starch gels added with HA nanoparticles replaced by different molar percentages of Sr2+ ions (0,30,50,70, and 100%, HA_0, HA_30, HA_50, HA_70, HA_100) for a possible application in guided bone regeneration. The formulations (inks) were based on potato starchy hydrogels (10% w/w, d.b.) added of HA (5% w/w starch, d.b.). The scaffolds were printed using a 3D printing extrusion (BioedPrinterV4, Brazil). The printed scaffolds were characterized concerning swelling, biodegradability, cytotoxicity by MTT assay using MC3T3-E1 pre-osteoblasts cells, and the alizarin red assay to evaluate the ability of the membranes to induce mineralization. The HAp_100 showed the highest biodegradability value (70% in 14 days). The scaffolds showed significantly swelling in 2 h in medium (~60%); after this period, the swelling was not noticed. All scaffolds showed no cell toxicity. HAp_100 stood out positively in cell proliferation. Furthermore, scaffolds containing HAp had higher mineralization than ones without in both time intervals, and this effect was more evident with an increasing degree of Sr2+ substitution in the nanoparticles. It is evident that the incorporation of HAp and various levels of Sr2+ substitution has improved the properties of scaffolds for use in bone regeneration. Finally, 3D printing technology and starch holds significant promise for this application.

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References:

[1] MANIGLIA, B. C. et al. Int. J. of Biol. Macrom., v. 138, p. 1087, 2019.
[2] TOVANI, C.B. et al. Acta Biom., v. 92, p.315,2019.