



SIFSEC

LIVRO DE
RESUMOS

**Universidade de São Paulo
Instituto de Física de São Carlos**

**VIII Semana Integrada do Instituto de
Física de São Carlos**

**Livro de Resumos
24 a 28 de setembro de 2018**

**São Carlos
Instituto de Física de São Carlos
2018**

Universidade de São Paulo

Reitor: Prof. Dr. Vahan Agopyan

Vice-Reitor: Prof. Dr. Antonio Carlos Hernandez

Instituto de Física de São Carlos

Diretor: Prof. Dr. Vanderlei Salvador Bagnato

Vice-Diretor: Prof. Dr. Igor Polikarpov

Normalização e revisão - SBI/IFSC

Ana Mara Marques da Cunha Prado

Maria Cristina Cavarette Dziabas

Maria Neusa de Aguiar Azevedo

Sabrina di Salvo Mastrantonio

Ficha catalográfica elaborada pelo Serviço de Biblioteca e Informação do IFSC

Semana Integrada do Instituto de Física de São Carlos
(8: 24 set. – 28 set.: 2018: São Carlos, SP.).

Livro de resumos da VIII Semana Integrada do Instituto de
Física de São Carlos/ Organizado por Humberto Ribeiro de
Souza [et al]. São Carlos: IFSC, 2018
390p.

Texto em português.

1.Física. I. Souza, Humberto Ribeiro de C.II. Título.

ISBN : 978-85-61958-23-7

CDD 530

PG127

Phototherapy applied to cellulose and chitosan hydrogels in Tissue engineering

ONO, B. A. ¹

bruno.ono@usp.br

GUIMARÃES, F. E. G. ¹

SCOTT, J. P. ²

SHARMA, R. ²

JOHN, M. ²

COURTENAY, J. C. ²

DOS SANTOS, D. M. ³

CAMPANA-FILHO, S. P. ³

BUKZEM, A. L. ³

¹Instituto de Física de São Carlos - USP

²University of Bath - Reino Unido

³Instituto de Química de São Carlos - USP

We are developing a low-cost scaffold of cellulose and chitosan for cell growth, which has antibacterial properties and do not use growth factors. (1) The quaternized chitosan with different linear density of positive charge and molecular weight is being searched and synthesized to help the interaction with the cells. (2) Additionally, the opportunity to integrate the fields of Tissue Engineering and Phototherapy to promote synergistically the cell adhesion are being evaluated for using different wavelengths and fluences. This research is being carried out through national and international collaboration with researchers of University of Bath and São Carlos Institute of Chemistry. The first part of the project was to develop and characterize the material. The project is going to initiate the stage of drawing different patterns above the hydrogel to direct the cell growth at the surface material and developing tridimensional scaffolds to grow more complexity tissues and apply the phototherapy to observe the biological response. (3) The first stage of the project was developed at the University of Bath, which gave a researcher scholarship for the first semester of 2017, and the analyses and techniques to hydrogel development were made through FT-IR, Confocal Microscopy, Fluorescence Microscopy and RMN. The preliminary results indicate a chitosan with 40% and 8% Degree of quaternization and a molecular weight around 400 and 900 kg/mol. The higher cell attachment (near to 60%), low cytotoxicity and high cell spreading (median circularity of 0.2) was observed for the higher DQ similar to tissue culture plate. The gram-negative bacteria (*E. coli*) had the more damage at higher DQ material casted, however the same material presented the higher number of *E. coli* attach to it. These results have a high potential at the development of Tissue Engineering using natural sources of low cost and high technologic impact.

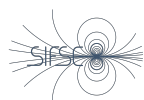
Palavras-chave: Hydrogel. Chitosan. Cellulose. Tissue engineering. Phototherapy.

Referências:

1 COURTENAY, J. C. et al. Surface modified cellulose scaffolds for tissue engineering. **Cellulose**, v. 24, n. 1, p. 253–267, 2017

2 SANTOS, D. M. DOS; BUKZEM, A. DE L.; CAMPANA-FILHO, S. P. Response surface methodology applied to the study of the microwave-assisted synthesis of quaternized chitosan. **Carbohydrate Polymers**, v. 138, p. 317–326, 2016. doi: 10.1016/j.carbpol.2015.11.056.

3 PREECE, D. et al. Red light improves spermatozoa motility and does not induce oxidative DNA



damage. **Scientific Reports**, v. 7, p. 46480, 2017. doi: 10.1038/srep46480.