

Área: FIS

Rehydration capacity of polyaniline-modified bacterial cellulose hydrogels in different solvents.

Pâmela Elise Munzlinger (PG)*¹, Leandra Marcon (IC)¹, Kauanny Duarte de Moraes (IC)¹, Carla Dalmolin (PQ)¹.pamela.munzlinger@edu.udesc.br*¹Departamento de Química, UDESC

Keywords: Polyaniline, Bacterial cellulose, Hydrogels, Rehydration.

Highlights

CB and CB/Pani hydrogels present >90% WRC; CB rehydrates more than CB/Pani, except in PBS, which favors the rehydration of both types of hydrogels.

Abstract

Bacterial cellulose (BC) is a highly hydrophilic biopolymer used as a hydrogel, which can be easily functionalized due to its three-dimensional structure that allows the incorporation of other polymers and compounds. Polyaniline (Pani), is a conducting polymer easily synthesized and useful for many applications. In this work, water retention (%) and rehydration capacity of BC and BC/Pani hydrogels were evaluated using different solvents: deionized water, PBS, 0.1 M HCl, and (only for BC) 0.1 M aniline solution in 0.1 M HCl. BC and BC/Pani membranes were weighed after removing the excess of water to obtain their wet weight (w_{wet}). Then, they were lyophilized and their dry weight (w_{dry}) measured in order to obtain water retention (WR), according Eq. (1). These materials were soaked into different solvents for 1 week. Specimens were removed at certain intervals and weighed again as rehydration weight (w_{rehyd}). When w_{rehyd} remains constant, these values were used to calculate rehydration capacity (RC) by Eq. 2.¹ All measurements were made in triplicate.

$$WR = \left(\frac{w_{wet} - w_{dry}}{w_{dry}} \right) \cdot 100 \quad (1) \quad RC = \left(\frac{w_{rehyd} - w_{dry}}{w_{wet} - w_{dry}} \right) \cdot 100 \quad (2)$$

Results are showed in Figure 1. WR in water were greater than 90% for both samples, but after freeze-drying and rehydration, RC values of BC were higher than BC/Pani, showing Pani presence reduces water absorption. However, this behavior wasn't observed for rehydration with buffer solution. Higher RC values for ionized solvents indicate the ionic force in solution has a positive influence on rehydration of these membranes, especially in BC modified with Pani.

[1] AMMAR, H. O. *et al.* Polymeric Matrix System for Prolonged Delivery of Tramadol Hydrochloride, Part I: Physicochemical Evaluation.

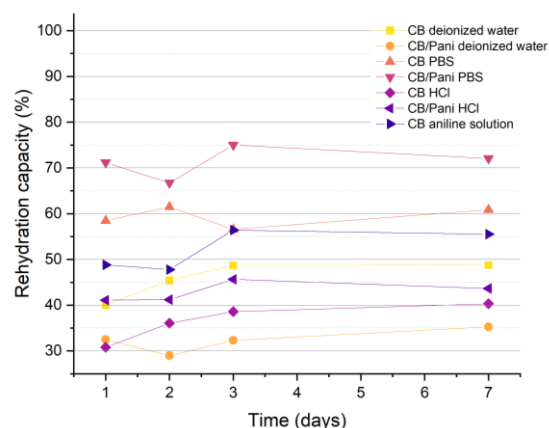


Figure 1: RC as function of time for BC and BC/Pani in different solvents

Acknowledgments

