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Bacterial cellulose aerogel enriched in nanofibers obtained from Kombucha SCOBY byproduct,

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Abstract

Symbiotic Culture of Bacteria and Yeast (SCOBY) pellicle is a by-product of Kombucha tea fermentation that can be a cheap and fast-growing source of cellulose. SCOBY develops a 3D cellulose membrane on the surface of Kombucha tea and since its microstructure can be chemically modified, it has promising applications in the development of biocomposites. This study presents a simple procedure to transform Kombucha SCOBY membranes into cellulose nanofiber aerogels. The protocol consisted in an alkaline purification followed by an acidic hydrolysis and lyophilization. The obtained nanofibers presented thickness that ranged principally between 50 and 110 nm, good crystallinity (90%) and thermal stability (343 °C). The simplicity of this nanofiber aerogel protocol may contribute to the development of nano-scale materials giving higher value to this by-product that generally is composted. Further studies should be addressed to test this nanocellulose fibers combined with other polymers for the development of eco-friendly composites.

Keywords: Kombucha SCOBY; Cellulose membrane; Bacterial cellulose nanofiber aerogels; Acid hydrolysis