

Title (4)	: The production and characterization of bacterial cellulose pellicles obtained from oil palm frond juice and their conversion to nanofibrillated cellulose
Journal	: Carbohydrate Polymer Technologies and Applications, Volume 5, June 2023
Document Type	: Article
Publisher	: Elsevier Ltd.
UniKL Author	: Siti Nur Nadhirah Said Azmi, Zainatul 'Asyiqin Samsu, Ahmad Syafiq Fauzan Mohd Asnawi, Sharifah Sopliah Syed Abdullah
Link to Full Text	: https://www.sciencedirect.com/science/article/pii/S2666893923000488
Link to Scopus Preview	: https://www.scopus.com/inward/record.uri?eid=2-s2.0-85160816780&doi=10.1016%2fj.carpta.2023.100327&partnerID=40&md5=a519ff05a5e68092a6ea8da3e033906a
Abstract	: This study explored the potential of using oil palm frond (OPF) juice as a fermentation medium for bacterial cellulose (BC) synthesis by <i>Acetobacter xylinum</i> 0416, followed by its conversion into nanofibrillated cellulose (BNFC). The effect of adding nitrogen sources to OPF juice on the BC yield and thickness was investigated, with corn steep liquor (CSL) showing the most promising results, increasing BC yield and thickness by six- and four-fold, respectively. The resulting BC-OPF+CSL pellicles demonstrated excellent thermal stability, high crystallinity and a large swelling ratio. The study also investigated the conversion of BC-OPF+CSL pellicles into BNFC using either homogenization, ultrasonication, or a combination of both. The combination of ultrasonication and homogenization produced the best results, disintegrating the BC fibers into BNFC with a diameter of 13–21 nm and water retention value of 6105%. Low BNFC crystallinity and thermal stability were also observed, indicating successful BC fibrillation. These findings suggest that OPF juice is a promising alternative fermentation medium for BC production and that combining ultrasonication and homogenization is a simple and safe method for converting BC-OPF+CSL pellicles into BNFC. This research offers a potential eco-friendly solution for BC production and its conversion into value-added products such as BNFC.