

Effect of regeneration on structural and physico-mechanical properties of plant cellulose and bacterial cellulose: a comparative study

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Cellulose is the most abundant polymer in nature. It is clean, nontoxic, biodegradable and biocompatible. Compared to plant cellulose (PC), bacterial cellulose (BC) is more pure, possesses high crystallinity, high mechanical strength and biocompatibility. Due to their insolubility in common solvents, PC and BC have not reached their potential applications. However, N-Methylmorpholine-N-oxide (NMMO) is used as solvent for PC and BC. A comparative study on the structural, thermal and physico-mechanical properties of regenerated plant cellulose (RPC) and regenerated bacterial cellulose (RBC) is required. In the present study, PC and BC were dissolved in NMMO/H₂O and uniform films were prepared by casting the solutions on glass plates through an applicator. FE-SEM, FTIR and XRD analysis were done for structural determination. Pore size, tensile strength, thermal stability and water holding capacity (WHC) were also determined. The comparative analysis show superior results for RBC than RPC. Regenerated PC and BC might offer new applications in medical and industrial fields.