Synthesis of antibacterial and biocompatible regenerated bacterial cellulose-titanium dioxide nanocomposites for advanced biomedical applications

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Various bioactive polymers and nanomaterials have been impregnated into BC matrix to enhance its intimate properties. In the present study, nanocomposites of regenerated bacterial cellulose (RBC) were synthesized with titanium dioxide (TiO_2) nanoparticles. Powdered BC was dissolved in N-Methylmorpholine-N-oxide (NMMO) and TiO_2 nanoparticles were added to the BC solution. The regenerated RBC-TiO_2 films were produced from composite solution and characterized through FE-SEM, TEM and XRD analysis. The nanocomposites revealed strong antibacterial properties against *E. coli*. Biocompatibility and cell toxicity of the composites was evaluated with animal fibroblast cells. The microscopic pictures revealed strong attachments and proliferation of the cells to the composite surface. Furthermore the MTT assay didn't show any toxicity towards animal cells. The obtained results indicate that these antibacterial and biocompatible RBC-TiO2 nanocomposites can find potential applications in biomedical fields.