

Synthesis and characterization of regenerated bacterial cellulose–zinc oxide nanocomposites

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Bacterial cellulose (BC) a biopolymer has been used in the synthesis of nanocomposites mainly to enhance its applications in biomedical treatments, and electronic devices. Zinc oxide nanoparticles (ZnONP) owing to their efficient antimicrobial, catalytic and UV filtering properties, are significantly utilized in biopolymer composites. Presently we successfully prepared the BC composites with ZnONP and characterized it through various analytical tools. Solution of BC was prepared by dissolving it in N-Methylmorpholine-N-oxide (NMMO). ZnONP were dispersed in dissolved BC and mixed well through sonication and stirring. Films of BC-ZnO were produced through applicator and then purified with distilled water. The structural analysis revealed the synthesis of BC-ZnONP composites. Fe-SEM analysis showed the ZnONPs attached to the surface and embedded inside the BC sheets. XRD also produced specific peaks for both BC and ZnONP in the composites. The definite photoluminescence emission peaks for ZnONP in its powdered and composites forms located coincidentally further strengthen the facts of composite synthesis. The study will set new dimensions in the biomedical applications of BC composites.