

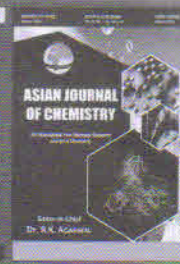


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Biosynthesis of Rice Starch-Manganese Dioxide (IV) Nanocomposite: Its Characterization and Biological Potential

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Manganese dioxide (MnO₂) nanoparticles were biosynthesized in this study, utilizing rice starch (a natural polymer) to form nanocomposites with useful biological and analytical properties. The synthesized nanocomposites were characterized by XRD, FTIR, UV-Vis, HRTEM, FESEM-EDX and Zeta potential analysis. FTIR confirmed the formation of rice starch-manganese dioxide (rice starch-MnO₂) nanocomposites and the presence of functional groups in the synthesis. XRD analysis determined the average crystalline size to be 38.27 nm, while FESEM and HRTEM revealed a spherical structure with irregular morphology. EDX confirmed a presence of manganese content 43.12%, oxygen 29.02% and carbon 27.86%. The anticancer activity against the HepG2 cell line (a human liver cancer cell line) was determined by MTT Assay, with an IC₅₀ value of 76.31 ± 0.092 µg/mL. Antioxidant activity shows appreciable potency in the DPPH scavenging assay. The nanocomposites were thought to be stable under thermal conditions and to have prominent antioxidant and anticancer properties.

Keywords: Rice starch-MnO₂ nanocomposite, Nanoparticles, Anticancer activity, Antioxidant activity.