

γ -ray assisted synthesis of silver nanoparticles in chitosan solution and the antibacterial properties

ABSTRACT

In the present study, chitosan had been utilized as a green stabilizing agent for the synthesis of spherical silver nanoparticles in the range of 5630 nm depending on the percentage of chitosan used (0.1, 0.5, 1.0 and 2.0 wt%) under γ -irradiation. X-ray diffractometer identified the nanoparticles as pure silver having face-centered cubic phase. Ultraviolet-visible spectra exhibited the influence of γ -irradiation total absorbed dose and chitosan concentration on the yield of silver nanoparticles. The antibacterial properties of the silver nanoparticles were tested against Methicillin-resistant *Staphylococcus aureus* (MRSA) (gram-positive) and *Aeromonas hydrophila* (gram-negative) bacteria. This work provides a simple and green method for the synthesis of highly stable silver nanoparticles in aqueous solution with good antibacterial property.

Keyword: Nanostructures; Electron microscopy; γ -ray irradiation; Chitosan; Silver