

Sonochemical method for the synthesis of silver nanoparticles in κ -carrageenan from silver salt at different concentrations

ABSTRACT

A green sonochemical method was developed for preparing silver nanoparticles (Ag-NPs) in κ -carrageenan in different concentrations of AgNO₃. The κ -carrageenan was used as an eco-friendly stabilizer and ultrasonic irradiation as a green reducing agent. The number of Ag-NPs increased with increasing concentrations of AgNO₃. Formation of Ag/ κ -carrageenan was determined by UV–visible spectroscopy where the surface plasmon absorption maximum was observed at 410–416 nm. XRD analysis showed the Ag-NPs are of a face-centered cubic structure. TEM images showed the well-dispersed Ag-NPs with an average particle size 5 nm. SEM images showed the spherical shape of the Ag-NPs. The FT-IR spectrum indicated the presence of κ -carrageenan in capping the Ag-NPs. The use of photo irradiation provides a green and economic method features to the synthesis reported in this study.

Keyword: Green method; Ultrasonic irradiation; Silver nanoparticles; κ -carrageenan; Silver nitrate