

GREEN SYNTHESIS OF NANOSILVER FOR GELATIN FILMS WITH ANTIMICROBIAL PROPERTY PREPARATION

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Nanomaterials can play an important role in antibacterial applications. Various nanostructured metallic particles have been used for nanocomposite packaging materials. Silver nanoparticles (AgNPs) are regarded as an antibacterial agent for food package. The objective of this study was to prepare antimicrobial nanocomposite films using gelatin and AgNPs. Gelatin was used as a polymer matrix for reduction and stabilization of the silver nanoparticles. Films were characterized by XRD, XRF, UV-Vis, FTIR, and antibacterial activity. Gelatin (3.0 g) was stirred at ~90 °C for 30 min. The pH of the solutions was adjusted to pH 11, then 1 mL of AgNO₃ at various concentrations (0, 45, 90, and 180 mmol.L⁻¹) was added drop-wise into the solution mixtures. The neat gelatin (gel) and gel/AgNPs 45 mmol.L⁻¹ films did not show any UV-Vis absorption peak in ~430 nm, but gel/AgNP 90 mmol.L⁻¹ and gel/180 mmol.L⁻¹ films exhibited a high absorption peak, which is related to the collective oscillations of the surface electrons. All FTIR peaks of the gel control and of the gel/AgNP show similar spectrum. The higher AgNPs concentration in the films, the higher the antibacterial activity against food-borne pathogens. The X-ray diffractograms of films was carried out for identifying crystalline phases by PANalytical X'pert High-Score Plus software, in which, showed the presence the peaks position (2) at 32.2°, 54.7°, 55.5° and 74.6° to gel/AgNPs 90 mmol.L⁻¹ and 11.7°, 28.5°, 50.5° to 180 mmol.L⁻¹ for silver. But wasn't possible identify to gel/AgNPs 45 mmol.L⁻¹, because the low concentration. Was possible to produce crystalline silver nanoparticles in the gelatin films and obtain films with antimicrobial activity.