

Development of Nano Silver Impregnated Food Packaging Materials

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The growing demand for increased shelf-life of food and the need for protection against foodborne diseases, fuel the development of new food packaging materials. Silver-nanoparticle (AgNp) impregnated packaging materials are promising candidates for active food packaging. These active packaging materials are capable of extending the shelf-life of foods and reducing the risk of pathogens.

The current research work is focused on the development of AgNp incorporated coating for polymer-based food packaging. AgNp dispersed in polyvinyl alcohol solution was prepared by in situ reduction method, in which silver nitrate and polyvinyl alcohol (PVA) acted as precursor and capping agent respectively. Presence of silver nanoparticles in the solution was confirmed by photoluminescence spectroscopy and UV-Vis spectroscopy. In order to reduce coating solubility PVA solution was cross-linked. The compatibility of the coating with the substrate was enhanced by plasma treatments. Contact angle measurements were employed to monitor the wettability changes. The solubility of the coating was examined by gravimetric methods. The effects of cross-linked temperature and cross-linked agents on solubility were studied. The presence of silver nanoparticles in the coating was confirmed by surface plasmon resonance and electron micrographs. The modified Kirby-Bauer (disk diffusion) method was employed to measure the anti-bacterial effect of the coating.

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