

Investigation on Polymer Based Nano-Silver as Food Packaging Materials

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Abstract : Commercial nanocomposite food packaging type nano-silver containers were characterised using scanning electron microscopy (SEM) and energy-dispersive X-Ray spectroscopy (EDX). The presence of nanoparticles consistent with the incorporation of 1% nano-silver (Ag) and 0.1% titanium dioxide (TiO₂) nanoparticle into polymeric materials formed into food containers was confirmed. Both nanomaterials used in this type of packaging appear to be embedded in a layered configuration within the bulk polymer. The dimensions of the incorporated nanoparticles were investigated using X-Ray diffraction (XRD) and determined by calculation using the Scherrer Formula; these were consistent with Ag and TiO₂ nanoparticles in the size range 20-70nm both were spherical shape nanoparticles. Antimicrobial assessment of the nanocomposite container has also been performed and the results confirm the antimicrobial activity of Ag and TiO₂ nanoparticles in food packaging containers. Migration assessments were performed in a wide range of food matrices to determine the migration of nanoparticles from the packages. The analysis was based on the relevant European safety directives and involved the application of inductively coupled plasma mass spectrometry (ICP-MS) to identify the range of migration risk. The data pertain to insignificance levels of migration of Ag and TiO₂ nanoparticles into the selected food matrices.

Keywords : nano-silver, antimicrobial food packaging, migration, titanium dioxide

Conference Title : ICNN 2014 : International Conference on Nanoscience and Nanotechnology

Conference Location : Istanbul, Turkey

Conference Dates : December 05-06, 2014