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The assessment of bilayer agar- sodium caseinat film properties containing ZnO nanoparticles

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Abstract

This study was aimed to investigated the effect of ZnO nanoparticle on physical, mechanical and optical properties of sodium caseinate/ agar bilayer film. The ZnO nanoparticles were added to the polymer matrix sodium caseinate in various concentrations (0.5, 1 and 2 wt.%) in a bilayer film. Mechanical properties, moisture and solubility, water vapor permeability (WVP), water absorption, color properties and transparency of films were studied. According to the results, addition of 2% ZnO to the bilayer film showed a 32% reduction of WVP in treatments than control. The water absorption rate and solubility were reduced in high percentage of ZnO. The tensile strength of a bilayer film also increased from 26.05 MPa to 41.48 MPa by increasing ZnO concentration up to 2%; but increasing the elongation showed significant increasing up to 1% nanoparticles. High amount of nanoparticles were reduced the permeability of light, and increased the opacity of the films.

Keywords: Bilayer film, Agar, Sodium caseinate, Nano zinc oxide