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## Elaboration of active chitosan/polyvinyl alcohol film reinforced with zinc oxide nanoparticles for food packaging

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Active packaging is highly effective in reducing, delaying or inhibiting the spoilage and growth of pathogenic microorganisms that contaminate food products. Its use as coatings in foods appears as a promising alternative to improve the quality of the food during its processing and conservation. The objective of this work is to produce antimicrobial films based on chitosan and polyvinyl alcohol reinforced with zinc oxide nanoparticles (Cs/PVA/ZnONPs) for their application in food coatings. The methodology implemented consisted of preparing solutions of chitosan/PVA at different concentrations (1:1,1:2,1:4, Cs:PVA) by the sol-gel method and adding different amounts of zinc oxide nanoparticles (0.5,0.7,1% w/v) previously synthesized by the Priyadarsh method. For the formation of the nanocomposite films, the solutions were placed in Petri dishes and allowed to dry for 48 hours at room temperature. Subsequently, the properties of the films were evaluated as water vapor permeability, solubility, tensile strength, biodegradability and antimicrobial activity against the bacterium *Escherichia coli* through the disc diffusion test. The characterization of the nanoparticles of ZnO and nanocomposite films was carried out by infrared spectroscopy with Fourier Transform, X-ray diffraction, thermogravimetric analysis, and scanning electron microscopy; and the preservation capacity of foods coated with Cs/PVA/ZnONPs films compared to conventional packaging was compared. With this research, it is expected to obtain an active packaging that presents good barrier properties, physicochemical and mechanical and antimicrobial, which helps to extend the useful life of the food and does not generate a high impact on the environment. It is also intended that the antimicrobial activity increases with the addition of zinc oxide nanoparticles and the modified film can better preserve food than polymeric materials derived from petroleum.

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