

# Re-designing the Food Packing tool by Reinforcing with the Bio-Degradable Composite

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## Abstract:

In this Fast-Food era, the usage of food wrapping material has become inevitable. In practice, most of the food packaging materials used are made up of aluminium foil or synthetic polymer which leads to serious health issues to human, and are not environment friendly. This synthetic polymer package could be replaced with a biodegradable polymer which would retain the food quality and also, to enhance the food's self- life. The present study is to develop a packaging film that are biodegradable, antimicrobial, antifungal rich with antioxidants in preserving food. The film was fabricated by casting the mixed composites of TiO<sub>2</sub> (nanoparticle), pomegranate peel powder (biopolymer), and polymer material (Agar-agar/polyethylene terephthalate (PET)). The nanoparticles of TiO<sub>2</sub> were characterised by Scanning Electron Microscopy (SEM), X-ray diffraction (XRD) and the Fourier Transform Infrared Radiation (FTIR). From SEM analysis, the particle size of TiO<sub>2</sub> was observed to be between 61.43nm to 98nm and from XRD study the tetragonal phase of TiO<sub>2</sub> was confirmed (JCPDS 21-1272). The peaks of the FTIR spectra indicates the stretching and bending vibrations of Ti – O bonds and Ti –O – Ti bonds. The treated pomegranate peel powder was blended with TiO<sub>2</sub> (3:1).The surface texture of the mixture was analyzed by SEM analysis and the increase of active surface area (increased particle size up to 115 nm) was observed which will enhance the efficient packaging application. In addition, the morphological study illustrate the agglomeration between the nanoparticle and biopolymer which can retain the heat capacity of the food stored. Henceforth, the proposed film would be a better candidate for an efficient bio-compatible packaging.

