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Preparation of intelligence antibacterial films based on low density polyethylene and evaluation of its properties

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In this article, antibacterial film based on Low Density Polyethylene (LDPE), Potassium Sorbate (KS) and ethylene vinyl alcohol (EVOH) copolymer were prepared and characterized using Scanning Electron Microscopy (SEM), transmission electron microscopy (TEM), X-Ray Diffraction (XRD), Differential Scanning Calorimetry (DSC) and tensile tests. The oxygen barrier properties of the LDPE/EVOH/KS film were significantly better than those of the LDPE/KS film. In addition to barrier properties, the LDPE/EVOH/KS film also had better elastic modulus than their counterparts without EVOH. The antimicrobial film containing potassium sorbate decreased the growth rate and maximum growth of yeast and extended the lag period before mold growth was apparent. Therefore, it can prevent or reduce the rate of microbial spoilage in low viscosity liquids and on the contacted surface area of solid food products and as the result may prolong the shelf life of food products when it is used as a packaging material. Also, a novel sticker sensor has been fabricated based on methyl red and tests have been conducted to detect the freshness of meat by its color change in real time (when the red methyl red paper changed to yellow). These are prepared by entrapping within a pH sensitive dye that responds, through visible color changes to the spoilage volatile compounds that contribute to a quantity known as Total Volatile Basic Nitrogen (TVBN). Finally, the methyl red was successfully used as a sticker sensor for the real-time monitoring of meat freshness in ambient and chiller conditions.

Biography

Pouria Atabaki Pasdar has received Bachelor's degree in Polymer Engineering from the Islamic Azad University, Science and Research branch, Tehran, Iran and pursuing Masters in Polymer Engineering in the same university. His current research focuses on investigation of food packaging, bioplastics and nanotechnology in order to increase the shelf-life of food packages.

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