

Bioadditive Containing Hydrogel Film: An Excellent Polymeric Food Packaging Material for Fresh Fruits and Vegetables

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Materials used in food packaging play significant role in determining the shelf life of a food product, and hence, not only important factor from cost involved but also environmental consciousness and disposal point of view¹. Additives are often combined with food packages to exploit their functional or aesthetic properties which, if not properly selected, may affect the environmental issue. Therefore, attention has been given for the preparation of bioadditive incorporated some novel hydrogel films which can be used for food packaging, specially for fresh fruits and vegetables. The existing polyvinylpyrrolidone-sodium carboxy methyl cellulose (PVP-CMC) hydrogel film^{2,3} was modified with three different additives [Sepiolite (Sep), PVA Nanofiber (PVA) and Bacterial Cellulose (BC) in various concentrations to improve its mechanical and other functional properties. The films were prepared by solvent casting method. The produced films were thin (varying from 0.07-0.09 mm) and transparent (vide Fig. 1 for optical images). They were further investigated through Fourier Transform Infrared Spectroscopy (FTIR), X-ray diffraction study (XRD), and Scanning Electron Microscopy (SEM, Fig. 1). These confirmed that the modified PVP-CMC films were true biocomposites. The values of tensile modulus decreased as 47.79 ± 13.85 MPa (PVP-CMC-BC) > 33.75 ± 7.19 MPa (PVP-CMC-Sep) > 25.21 ± 5.97 MPa (PVP-CMC-PVA) > 20.53 ± 2.37 Mpa (PVP-CMC). Irrespective of types and kinds, all additives exhibited an improvement in mechanical properties of the PVP-CMC hydrogel based packaging system, and among them, BC performed as the best one, which is a renewable polymer.

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Reference:

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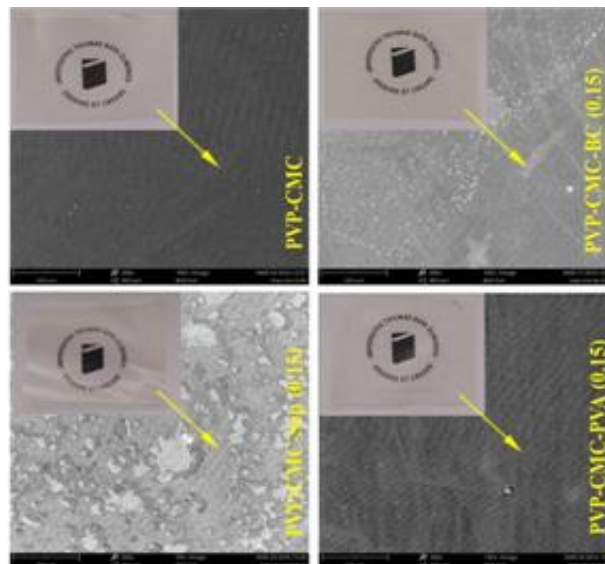


Figure 1: Optical and SEM images of additive containing hydrogel films