

# DESIGNING CHITOSAN AND PVA BASED BIOPOLYMER BLEND FILMS: A STUDY ON ELECTROLYTE PERFORMANCE AND COMPOSITION OPTIMIZATION

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**Abstract:** In this current investigation, we fabricated solid biopolymer blend films utilizing chitosan (CS) and poly (vinyl alcohol) (PVA), both being biopolymers. These films were prepared with diverse compositions through the solution casting method, and their structural characteristics were assessed using X-ray diffraction (XRD) and Fourier transform infrared spectroscopy (FTIR). The FTIR analysis unveiled compelling evidence of intermolecular interactions between these two polymers, primarily attributed to hydrogen bonding. Remarkably, our XRD deconvolution analysis revealed that the poly-blend composition consisting of 60 wt.% PVA and 40 wt.% CS, designated as C4 exhibited the most pronounced amorphous character with a notably low degree of crystallinity. Moreover, our investigation into dielectric spectroscopy disclosed that the C4 sample manifested the highest dielectric constant among all compositions, suggesting its potential suitability as a polymer host for applications in electrolyte systems.

**Keywords:** Biopolymer blend films; XRD analysis; Dielectric study; Solution casting; Amorphous