

## **Preparation and characterization of cornhusk/sugar palm fiber reinforced cornstarch-based hybrid composites**

### **ABSTRACT**

In the current study, a series of hybrid composite films were prepared from cornhusk fiber (CHF) and sugar palm fiber (SPF) through a solution casting technique, using cornstarch (CS) as matrix and fructose as a plasticizer. SPF at 2%, 4%, 6%, and 8% (w/w dry starch) concentrations was loaded into CS/CH composites with 8% CHF and 25% fructose. The physical, morphological, thermal, tensile, and barrier characteristics of the final product were evaluated. From the findings, there was a marked decrease in density, moisture content, solubility, and water absorption of the hybrid films. SEM images exhibited a strong interfacial interaction and good biocompatibility between polymer matrix and reinforcement fiber, which reflected on the enhanced tensile strength and Young's modulus as well as the relative crystallinity. The thermostability of hybrid films has also been enhanced, as indicated by the increased onset degradation temperature. Fourier transform infrared analysis revealed an increase in intermolecular hydrogen bonding following fiber loading. As well as the water barrier assessment showed greater resistance to vapor transmission, evidenced by the lower water vapor permeability rate following SPF loading. To sum up, the hybridization of CS/CH composites with SPF, in general, has improved the performance of the biocomposites for biomaterials applications, especially for 6% of SPF loading.

**Keyword:** Cornstarch matrix; Cornhusk; Sugar palm; Hybrid composite; Characterization