

## **PREPARATION AND CHARACTERISATION OF CASSAVA STARCH BASED ELECTROSPUN NANOFIBRES**

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This work reports the preparation and characterisation of electrospun nanofibre mats using cassava starch blended with poly(ethylene oxide) (PEO) as a sustainable alternative to conventional petroleum-derived polymers. The environmental concerns regarding the non-biodegradable plastic waste and the urgent need for biodegradable materials such as starch-based nanofibres are particularly attractive for sustainable material development. Cassava starch is an abundant, renewable and biodegradable polysaccharide with limited spinnability for electrospinning applications. It was extracted from fresh tubers and PEO was added to enhance the spinnability of starch solutions. Cassava starch and PEO solutions were blended in various ratios (3:1, 1:1 and 1:3) and electrospun. Water was used as the solvent to dissolve both cassava starch and PEO polymers. The electrospinning process was optimised by changing polymer concentrations and instrumental parameters to obtain bead-free nanofibre mats. According to scanning electron microscopic images, nanofibre mats with smooth surfaces and minimum beads were obtained when cassava starch:PEO ratio was 1:3. Average fibre diameter was determined to be 112 nm. Fourier transform infrared spectroscopic studies revealed molecular interactions between cassava starch and PEO via hydrogen bonding. The mechanical property testing showed cassava starch/PEO nanofibre mats had a higher value for Young's modulus (31.06 MPa) compared to pure PEO nanofibre mats (7.15 MPa) indicating significant improvement in stiffness for cassava starch/PEO mats. These findings highlight that mixing cassava starch with PEO enhances spinnability, fibre morphology and mechanical strength. This offers a promising route for developing sustainable, biodegradable materials for potential applications in filtration, packaging and biomedical fields.

**Keywords:** Biopolymers, Cassava starch, Electrospinning, Nanofibres, PEO