Investigating the Physical Properties of Polycaprolactone/Eucomis autumnalis Nanocellulose Composite

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Abstract : Among the commonly studied organic fillers for polycaprolactone (PCL), cellulose is the most promising. It is available in various particle sizes and sources, providing numerous options for finding a suitable match for PCL matrices. In this study, cellulose was extracted from the leaves of E. autumnalis to create a PCL/nanocellulose composite through melt blending. The prepared nanocellulose was blended with PCL at a weight ratio of 97/3, and the resulting composite was characterized by its thermal and mechanical properties. The results showed that the addition of nanocellulose to PCL improved its mechanical properties, with a maximum increase of 29% in tensile strength and 31% in Young's modulus. The SEM analysis confirmed the successful blending of PCL and nanocellulose. The findings of this study suggest that the nanocellulose from Eucomis autumnalis plant has the potential to improve the mechanical properties of PCL and could be used in biomedical and packaging applications.

Keywords : polycaprolactone, medicinal plants, Eucomis autumnalis, nanocellulose, composite

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