

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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