Mechanical and Microstructural Characteristics of Rice Husk Reinforced Polylactide Nano Composite

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Abstract: *The application of polylactides in tissue engineering is attracting significant interest. Using renewable; low cost; health and environmental friendly agro waste as reinforcement in electrospun polylactide nano composite fibres reduces the need for petroleum based fillers and enhances the strength of polylactides. In this paper, the morphological, mechanical and water permeability properties of electrospun treated and untreated rice- husk reinforced polylactide- nano- composite fibres are presented. The treated rice- husk particulates were ground, subjected to steam explosion and chemical treatment to remove its lignin and hemi-cellulose contents so as to increase the crystallinity of the filler. The addition of 4wt. and 6 wt. % untreated rice- husk filler increased the tensile strength by 95% and 43% respectively. Young's modulus, fracture stress, water permeability and other properties are also enhanced. This work shows that; the mechanical properties and biodegradability of scaffolds for tissue engineering can be improved by reinforcing polylactide with rice-husk instead of petroleum- based polymeric- nano- fiber composites.*

Keywords: Nano-composite, fibre, polylactide, rice- husk, mechanical properties, morphology