

Title: PLA blended gelatine-based nanofibrous mats with enhanced hydrophobicity for soft tissue regeneration

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Abstract: Wound healing requires a substantial amount of moisture for faster recovery. Completely hydrophobic or hydrophilic biomaterials are not suitable to be applied for cell growth in wounded areas. The study aimed to prepare a nanofibrous scaffold from the blend of a solution of hydrophobic PLA and a solution of hydrophilic gelatine. The stability of the blend was achieved using a surfactant and an electrospun nanofibrous scaffold was made out of the solution. The optimum composition of gelatine and PLA to make a scaffold of uniform fibre diameter was achieved with the help of conductivity, viscosity and FESEM analysis. The optimum scaffold was characterised by TGA, DSC and XRD analysis. The water contact angle of the optimum sample was observed at 27°. The blended scaffold was found non-toxic to cells and showed a 30% faster healing of wounds in the rat model test compared to the healing rate of the PLA scaffold or the gelatine scaffold alone. The histological assay also supported the blend scaffold as an encouraging material for tissue regeneration.

Keywords: Polylactic acid (PLA); Electrospinning; Gelatine; Tween 80; Wound healing.

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