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Emu oil-based electrospun nanofibrous scaffolds for wound skin tissue engineering

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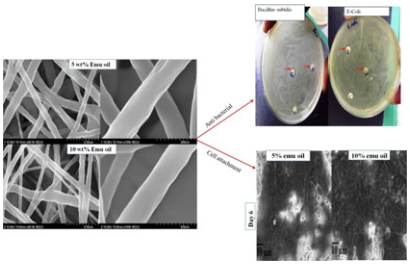
HIGHLIGHTS

- One-step preparation of emu oil-loaded polyurethane nanofibers is introduced.
- The introduced emu oil/PU electrospun mats are none cytotoxic and biocompatible.
- Broad-spectrum antibiotics effect was obtained.
- The introduced mats can be utilized in therapeutic and cosmetic applications.

GRAPHICAL ABSTRACT



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ABSTRACT

Emu oil blended nanofibrous membranes scaffolds were fabricated successfully via electrospinning with different composition ratios with polyurethane (PU). Emu oil is derived from the emu (*Dromaius novaehollandiae*), which originated in Australia, and has been reported to have anti-inflammatory properties. It has been observed that 10 wt.% is the optimum oil content in the electrospun solution to get good morphology ultrafine PU/emu oil blended nanofibers. The influences of emu oil content in nanofibrous morphology, and the viability and proliferation properties of cells (3T3-L1 fibroblasts) on blended nanofibers were analyzed. The composite material could support long-term cell growth, form three-dimensional networks of the nanofibrous structure, and provide good antibacterial activity. The antibacterial activity of this composite material was found to be active in both Gram positive and Gram negative species. So according to our results this composite material can be successfully applied in various biomedical fields, including wound dressing, skin disease treatments, etc.

1. Introduction

Many serious works have been done toward developing scaffolds for tissue engineering using biodegradable and biocompatible natural biological macromolecules or extracts of innate materials. An ideal scaffold should mimic the structure and biological function of native extracellular matrix (ECM) proteins, which provide mechanical support and regulate cellular activities. Furthermore

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