HPTLC Fingerprinting and Evaluation of Wound Healing Potential of Lotus Leaf Extract-Loaded Nanofiber Patches

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Abstract:

The leaves underwent successive extraction with ethanol to obtain a diverse range of bioactive compounds. The fingerprinting of ethanol extracts of *Nelumbo nucifera* leaves confirmed the separation of distinct phytochemicals according to their polarity index based on the number of separated compounds, colour, and Rf values visualized under UV light at 254 nm. 10 compounds were separated in the ethanolic extract (Rf 0.20–0.87). At 366 nm wavelength in the ethanolic extract, 7 compounds get separated (Rf 0.19–0.84). The ethanol extract was incorporated into nanofibers using polymers PVP K90 and ethyl cellulose. Wound healing efficacy was assessed in an incision model in Wistar rats across four groups: direct extract application, extract-loaded nanofiber patches, placebo nanofibers, and untreated control. Nanofiber patches demonstrated the highest wound closure (99 % by Day 12) and fastest epithelialization (Day 9), followed by direct extract (85 %, Day 11), placebo (70 %, Day 14), and control (65 %, Day 16). These findings suggest that both lotus extract and its nanofiber formulation enhance wound healing, with nanofibers offering improved sustained release and therapeutic benefits.

Keywords: Wound healing, lotus (*Nelumbo nucifera*) leaves extract, nanofiber patches, antioxidant activity, herbal formulation.

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