

Hydrogel with Hemostatic Action for Bleeding Wounds - Preliminary Study

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Received: 7.08.2025; Accepted: 21.09.2025; Published: 16.11.2025

Abstract: The aim of this preliminary study was to develop and evaluate the hemostatic properties of a novel wound dressing material based on a gelatin matrix incorporating *Equisetum arvense* (horsetail) extract, intended for the effective treatment of hemorrhagic wounds. The obtained hydrogel was composed of aqueous extract of *E. arvense*, incorporated into a gelatin base prepared at concentrations ranging from 1.5% to 2.5% (w/v). The plant extract was obtained using the Soxhlet extraction method, employing 10 g of dried horsetail material and 200 mL of Millipore-grade distilled water. The formulation was designed to achieve a synergistic effect by combining the hemostatic and regenerative properties of the horsetail extract with the biocompatibility and gel-forming ability of gelatin. Scanning electron microscopy (SEM) analysis revealed the microstructure of the resulting hydrogel and demonstrated its capacity to promote the adhesion of erythrocytes from fresh human blood to the hydrogel surface after 30 minutes of incubation at 37°C, as well as visible clot formation. While this investigation represents a preliminary phase, the findings suggest a strong potential for the medical application of this hydrogel, particularly in the management of external hemorrhagic wounds. The proposed bioproduct aims to facilitate prompt hemostatic response, stimulate tissue regeneration processes, and promote effective wound healing with reduced scar tissue formation. Further in-depth investigations will be undertaken to validate its therapeutic efficacy and optimize its potential for clinical application.

Keywords: Gelatin–Horsetail Hydrogel; Hemostatic Properties; Wound Dressing; SEM Analysis; Tissue Regeneration Potential.

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Acknowledgments

This study was supported by the Core Program within the National Research, Development and Innovation Plan 2022–2027, carried out with the support of MCID-grant number 7 N/2022-23020101(SIA-PRO) and by project PNRR-I8 no. 842027778 (contract no 760096).