

EXPLORING RABBIT SKIN AS A NOVEL DECELLULARIZED DERMAL SUBSTITUTE FOR BURN WOUND HEALING

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Aim:

Burn wounds represent a significant medical challenge. Autografts remain the standard treatment, however, are unsuitable for deep or extensive burns(1). Decellularized skin xenografts offer a viable alternative, having significantly reduced immunogenicity, still there is currently no skin-derived decellularized xenografic matrix due to its low resemblance to human skin (2)(3). This study proposes decellularized rabbit skin as a viable mimetic alternative. We describe a novel protocol for valorizing an agro-food by-product, exceeding 5000 skins/day, into highly preserved decellularized rabbit dermal matrices (HP-dRDMS) for burn wound treatment and skin regeneration.

Method:

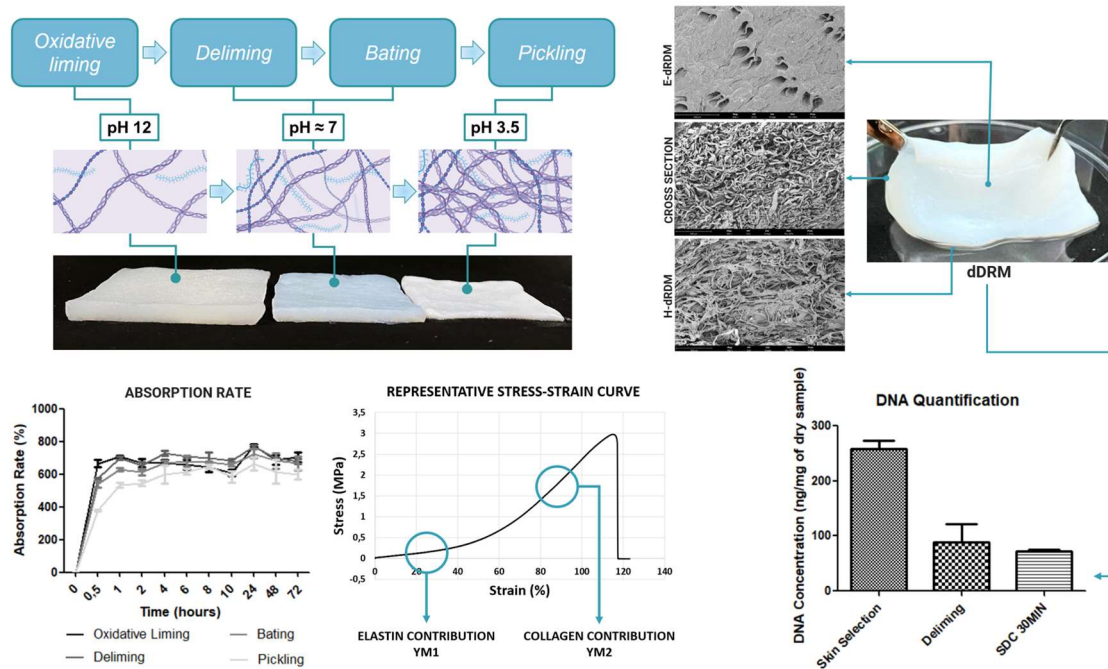
Rabbit skin by-products were processed at Cortadoria Nacional de Pêlo S.A., following pioneer methodologies obtaining rabbit dermis for tannery. Decellularization agents (EDTA, SDS, and SDC) were further applied with varying exposure times. Decellularization efficiency was confirmed through DNA quantification, and extracellular matrix (ECM) preservation evaluated by ECM components quantification, morphological analysis, swelling properties, and mechanical behavior. Biocompatibility was assessed by *in vitro* culturing human dermal fibroblasts (hDFs) up to 10 days.

Results/Discussion:

The results show pH influences the collagen matrix conformation and swelling capability. Differences in the dermis' topography were observed depending on the decellularization agents and exposure time. Mechanical analysis revealed similar performance to human skin, especially with the SDC protocol. DNA quantification confirmed successful decellularization. *In vitro*, hDFs adhered, spread, and proliferate within the HP-dRDMS over the 10 days of culture.

Conclusion:

This study demonstrates a successful protocol for rabbit dermis decellularization, preserving ECM components and yielding high-quality matrices with biological, structural, and biomechanical properties to support skin regeneration in burn wounds.



References:

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3. Rosadas, M., et al., (2024). Frontiers in Materials, 12(10), 1285948.

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