



Abstract

Pipeline to Develop and Characterize a Potential Regenerative Topical Treatment Based on Lavender Essential Oil and the CW49 Peptide †

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Abstract: Wound healing in adult mammals results in scar formation, which prevents recovering the full functionality of the original skin. This area of dermatology is constantly evolving and especially focuses on aging and the design of recovery treatments for skin burns. Because it has been reported that *Lavandula angustifolia* essential oil and the CW49 peptide present regenerative, healing, and anti-inflammatory effects, we selected these two natural compounds to formulate a topical treatment with potential regenerative capability. This was accomplished by synthesizing oil-in-water (O/W) emulsions at 10:90% *w/w* with lavender oil and the CW49 peptide. The formulations were characterized physicochemically and evaluated in terms of biocompatibility, antibacterial activity, and wound-healing potential. The results showed that emulsions exhibited a droplet size of about 1 µm, a marked pseudoplastic behavior and a superior shelf stability of over 9 months. Additionally, they induced 35% hemolysis when compared with the positive control (similar to commercially available controls), induced platelet aggregation, and have a potent antibacterial activity against *Staphylococcus aureus* (20% of growth inhibition). The wound-healing potential was preliminarily evaluated for the CW49 peptide in a 2D scratch wound model of human keratinocytes, demonstrating an effective concentration for closure of 20 µg/mL. Thus far, we established a pipeline to develop and characterize the regenerative potential of bio-based topical treatments, particularly those based on lavender essential oil and the CW49 peptide.

Keywords: *Lavandula angustifolia*; CW49 peptide; wound healing; skin regeneration

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