Abstract

Acne vulgaris is a widespread dermatological condition that has shown the need for more effective and long-term treatments. This study evaluates the wound healing effects of *C. grandis* leaf extract and *M. alternifolia* oil combination on HaCaT cells as a potential anti-acne agent. *C. grandis* leaf extract and *M. alternifolia* oil has shown to have antioxidative and anti-inflammation properties, respectively; thus, combining both suggests wound healing activities. The core methodology includes a scratch assay to evaluate wound healing with supporting cell viability tests that were compared against the negative control. Cell viability results narrowed down the optimal concentration for wound healing effects with nine combinations chosen: *C. grandis* leaf extract at 100, 200, and 400 ppm with *M. alternifolia* oil at 78, 312.5, and 1250 ppm. Findings show significant ($p \leq 0.05$) wound closure activity at both 12 and 24 hour periods across all nine formulations. Concentrations with 100, 200 and 400 ppm *C. grandis* leaf extract mixed with 312.5 ppm *M. alternifolia* oil, as well as 400 ppm *C. grandis* leaf extract mixed with 1250 ppm *M. alternifolia* oil showed the highest wound healing activity at 100%. Relative cell viability of formulations showed no significant cytotoxic effects, with most combinations showing relative viability to the negative control exceeding 100%, which indicates cell proliferation. These results suggest that the combination of *C. grandis* leaf extract and *M. alternifolia* oil acts as a promising anti-acne agent that can work against infection, inflammation, oxidative stress, and prolonged cell proliferation simultaneously.

Keywords: wound healing, HaCaT cells, *Coccinia grandis* leaf extract, *Melaleuca alternifolia* oil, cell viability