Fumaria officinalis L. Extracts: Cytotoxic, Antioxidant, and Anti-Inflammatory Potential in Human Keratinocytes

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Abstract:

Fumaria officinalis L. (fumitory, Fumariaceae) is recognized as a valuable source of natural bioactives and is widely used for its diverse pharmacological properties. This study aimed to examine the beneficial effects of fumitory extracts related to skin. Specifically, extracts' cytotoxicity, antioxidant and anti-inflammatory properties, as well as sun protection factor (SPF) were examined. Cytotoxicity was evaluated in HaCaT human keratinocyte cells using a concentration range of 25 to 100 μg/mL, identifying all tested concentrations as non-cytotoxic. The production of intracellular reactive oxygen species (ROS) in HaCaT cells, exposed to the extract with or without hydrogen peroxide treatment, was measured using the H2DCFDA assay (25-100 μg/mL). The results demonstrated that fumitory extracts showed significant *in vitro* antioxidant capacity. The anti-inflammatory potential of the extracts, *i.e.*, the impact of the extracts on pro-inflammatory cytokines: interleukin-1β (IL-1β) and macrophage inhibitory factor (MIF) was also evaluated using cell-based ELISA (100 μg/mL). Therefore, it was shown that in bacterial lipopolysaccharide (LPS)-treated cells, fumitory extracts significantly reduced IL-1β and MIF expression in comparison to LPS alone, confirming the anti-inflammatory activity of the extracts against LPS challenge. Nevertheless, the SPF values of fumitory extracts at tested concentrations (25-100 μg/mL) were low (0.29-1.25). Regarding the results related to antioxidant and anti-inflammatory properties, findings suggest that fumitory extracts represent a promising source of bioactives with potential application in pharmaceutical, cosmetic, or dermo-cosmetic formulations.