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In Vitro Assessment of Efficacy and Safety of Prodigiosin as a Multi-functional Ingredient for Use in Cosmetic Formulations\

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This work aimed to evaluate the potential of prodigiosin as a key ingredient in cosmetic formulations. Following its production and purification from *Serratia nematodiphila*, the pigment's suitability for cosmetic use was assessed. In vitro studies were conducted to determine its efficacy and safety. These included antioxidant activity using the DPPH assay, antimicrobial activity against common skin bacteria, and anti-inflammatory activity via COX and LOX assays. The pigment's potential as a UV protectant was measured by determining its SPF. Additionally, in vitro cytotoxicity analysis on murine cells was performed to ensure its safety for topical applications. Using the characterized and validated prodigiosin, various cosmetic formulations, including facial creams and nail polish, were developed. This research highlights prodigiosin's significant promise as a natural, multifunctional ingredient in cosmetics, providing effective coloration along with valuable skin protection, antioxidant properties, and antimicrobial benefits, thus paving the way for its integration into the cosmetic industry.

Keywords: Antioxidant activity, Anti-inflammatory, Cosmetic formulations, Prodigiosin

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