

Development of *Ixora Coccinea* extract-loaded nanoemulgel for antioxidant property

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ABSTRACT

Introduction: The effectiveness of lipophilic drugs is often hindered by challenges such as poor solubility and low bioavailability. Nanoemulgel, designed to address these issues by combining nanoemulsion with a gel, has shown promise. The present study aimed to formulate a nanoemulgel incorporating nanoemulsion containing the ethanol extract of *Ixora coccinea* leaves and assess its antioxidant properties. Additionally, the formulated nanoemulgel was evaluated in terms of particle size, stability, and drug release profile, providing insights into its potential as an effective drug delivery system. **Materials and Methods:** The ethanol extract of *I. coccinea* leaves was obtained using the cold maceration method. A nanoemulsion incorporating the extract was prepared through a two-step process, initially employing a low-performance technique with a magnetic stirrer and subsequently employing a high-performance technique using a sonicator. The antioxidant properties of the extract were assessed using the DPPH assay method prior to formulating the nanoemulsion. The particle size of the nanoemulsion was determined using dynamic light scattering with a Zetasizer. Two topical nanoemulgels (NEG1 and NEG2) containing a nanoemulsion loaded with *I. coccinea* extract were formulated. The characteristics examined included color, odor, clarity, spreadability, and washability of the formulated nanoemulgel. Additional assessments involved spreadability, homogeneity, grittiness, and stability parameters such as pH and viscosity. In vitro drug release studies using the Franz Diffusion cell method were also conducted. The antioxidant activity of the formulated nanoemulgels were also tested. **Results:** The findings reveal that the formulated nanoemulgel (NEG1) incorporating the stable nanoemulsion loaded with *I. coccinea* extract has the highest antioxidant activity and is a promising formulation with satisfactory drug content, viscosity, and spreadability. **Conclusion:** Further study on this formulated nanoemulgel in animal models is needed to determine its efficacy and safety, as well as its economic viability.