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Formulation and evaluation of the anti-inflammatory activity of an herbal cream utilizing *Curcuma longa L.*(Turmeric) and *Elaeocarpus serratus L.(*Ceylon olive)

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The utilization of herbal remedies in skin care formulations has gained considerable attention due to their natural origin and potential therapeutic benefits. *Elaeocarpus serratus L.*(Ceylon olive) and *Curcuma longa L.* (Turmeric) are well known for their medicinal and cosmetic properties. However, there is a lack of research on the formulation and evaluation of herbal cream using Ceylon olive and Turmeric. This study was focused on harnessing the therapeutic potential of Ceylon olive and turmeric paste made with aloe vera gel in the formulation of an optimized herbal cream for improved skin care. The methodology involved the preparation of samples, including the drying and grinding of Ceylon olive leaves and turmeric rhizomes. Aloe vera gel was extracted from *Aloe barbadensis* leaves. Aloe vera gel was mixed with the same amount of powdered turmeric and Ceylon olive in 1:1, 1:2 and 2:1 ratios to prepare the paste. The anti-inflammatory activity of the pastes was evaluated using the Human Red Blood Cell (HRBC) membrane stabilization assay. Based on the findings, turmeric: Ceylon olive (2:1) ratio was selected for the formulation of different batches of cream by optimizing the polyethylene glycol 4000, glycerin and methyl paraben amounts. Color, odor, state, consistency, pH, washability, and phase separation parameters of the cream formulations were evaluated. The results of the HRBC membrane stabilization assay indicated that turmeric paste exhibited the lowest IC_{50} value of 322.60±7.80 µg/mL and the highest percentage inhibition whereas Ceylon olive paste showed an IC_{50} of 436.87 µg/ml. The combination of turmeric and Ceylon olive at a 2:1 ratio showed the highest inhibitory effect and the lowest IC_{50} value 283.59±5.93 µg/ml. Suggesting a stronger inhibitory effect compared to both Ceylon olive and turmeric paste alone and turmeric: Ceylon olive, 1:1 and 2:1 ratio pastes. Among formulated cream batches, the formulation (F2) was showed the lowest IC_{50} 132.15±3.48 µg/ml value and highest percentage inhibition of 98.60±0.98% at 1000 mg/ml concentration whereas standard acetyl salicylic acid showed an IC_{50} of 533.23±23.91 µg/ml only. F1 and F2 formulations showed higher anti-inflammatory effect than standard anti-inflammatory compound acetyl salicylic acid. The study concludes that turmeric and Ceylon olive paste showed significant anti-inflammatory activity, with potential synergistic effects when combined in 2:1 ratio. The formulated herbal creams, particularly the F1 and F2 formulations, demonstrated higher inhibitory effects and could serve as highly effective in skincare formulations. However, further optimization is recommended for the F3 and F4 formulations, as they exhibited lower inhibitory effects. The findings of this study provide valuable insights for the development of herbal creams with enhanced therapeutic properties for various skin conditions and offer more natural and safer alternatives in skincare solutions. It has significant implications in both traditional medicine and modern healthcare for the effective treatment of anti-inflammatory conditions.

Keywords: Anti-inflammatory activity, *Elaeocarpus serratus* (Ceylon olive), *Curcuma longa* (Turmeric), Herbal cream, Skin care