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Development and Evaluation of *Elaeocarpus Serratus* (Ceylon Olive) Leaf and Fruit Skincare Gels

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Background: The global demand for plant-based skincare products is increasing due to their safety, cost-effectiveness and potential as natural sources of bioactive compounds to address skin conditions such as wrinkles and premature aging. *Elaeocarpus serratus* (Ceylon olive) is rich in antioxidants and presents a promising candidate for mitigating skin cell damage.

Objective: This study aimed to formulate herbal skincare gels using leaves and fruits of *E. serratus*.

Methods: Plant extracts were obtained via solvent extraction of 1:2(w/v) specimen-to-water ratio, assisted by sonication and heating at 45°C. These water-based extracts were individually incorporated into Carbomer-940 gel formulations. Both the extracts and the final gel products were evaluated in duplicates for antioxidant activity using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) radical scavenging assay, Sun Protection Factor (SPF) using UV-Visible spectrometer at 290-320 nm wavelengths, and heavy metal content using Inductively Coupled Plasma Mass Spectrometry (ICP-MS).

Results: The gel formulated with the fruit extract exhibited superior antioxidant activity ($55.02 \pm 0.07\%$), compared to the leaf extract-based gel ($50.87 \pm 0.10\%$). Conversely, the leaf extract gel showed a higher SPF value (18.09 ± 0.32), compared to the fruit gel (10.57 ± 0.06 , $p < 0.05$). ICP-MS analysis revealed no detectable levels of Hg or Cr in either product. However, the following levels were recorded: Cd:0.45 ppm, Pb:1.40 ppm and As:0.25 ppm in the leaf gel; and Cd:0.43 ppm, Pb:0.95 ppm, and As:0.25 ppm in the fruit gel. All values fall within the safety limits specified by the consumer affairs authority ($\text{Hg} \leq 1 \text{ ppm}$, $\text{Cr} \leq 2 \text{ ppm}$, $\text{Cd} \leq 3 \text{ ppm}$, $\text{Pb} \leq 10 \text{ ppm}$ and $\text{As} \leq 3 \text{ ppm}$).

Conclusion: These findings indicate that *E. serratus* leaf and fruit gels are safe for topical use, offering substantial antioxidant properties and significant sun protection. Future research will focus on optimizing the formulations through synergistic combinations of leaf and fruit extracts to further enhance bioactivity and sensory attributes.

Keywords: *Elaeocarpus serratus*, Antioxidants, Skin-gel