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***In Vitro* Analysis of Synergistic Anti-Inflammatory Effect of *Ipomoea pes-caprae* (Bintahuru) and *Scaevola taccada* (Thakkada) Methanolic Leaf Extract as a Polyherbal Preparation**

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Abstract

Diverse flora in coastal biomes not only protects shorelines from erosion, supporting biodiversity, but also possess medicinal value. These plants are often neglected, removed for coastal development, or undervalued. To advocate on conservation, it is vital to validate the said medicinal properties and cultural significance, demonstrating value to society. *Ipomoea pes-caprae* and *Scaevola taccada* are abundantly found in coastal areas of Sri Lanka, with individually documented anti-inflammatory properties. To add to the limited scientific work on synergistic anti-inflammatory potential, of the said two species, this study was conducted to analyse, combined anti-inflammatory and phytochemical properties of methanolic leaf extracts. Leaves were collected from the coastal area of Gampaha district and methanolic leaf extracts were prepared as A (*I. pes-caprae*), B (*S. taccada*), with three combinations, as C (A:B;1:1), D (A:B;1:2), E (A:B;2:1). Dilution series of 0.04×10^{-1} g/mL- 0.04×10^{-5} g/mL were prepared using all 5 preparations. Egg albumin denaturation assay for anti-inflammatory analysis and phytochemical tests (Phenolic, Terpenoids, Flavonoids, Alkaloids and Tannins) were conducted. All tests were done in triplicates and statistical analysis was done using via R version 4.4.3 software. Significantly higher anti-inflammatory activity percentages of all 5 extracts (A- 86.8%; B-102.5%; C-63%; D-86.2%; E-62.3%) were demonstrated at 0.04×10^{-1} g/ml, compared to the positive and negative controls ($p < 0.001$). Of the tested preparations, *S. taccada* demonstrated the highest anti-inflammatory potential individually, whereas *I. pes-caprae* individually and mixed preparation of 1:2 ration showed similar second highest anti-inflammatory properties. Presence of flavonoids and phenolics was demonstrated in all five extracts. There was no significant increase of anti-inflammatory activity compared to the individual extracts, due to synergistic activities, of the tested ratios. However, further research on investigating different extracting procedures, and different ratios of the two extracts, may yield more potent compounds with anti-inflammatory effects, leading to potential drug leads. The study emphasises the ecological and pharmacological significance of these coastal plant species by confirming their pharmacological relevance, promoting conservation and stimulating further research for sustainable drug discovery.

Keywords: *Ipomoea pes-caprae*, *Scaevola taccada*, Anti-inflammatory activity, Synergistic effect, Coastal medicinal plants