

Integrated Pharmacognostic and Phytochemical Profiling of Selected Medicinal Plants for the Development of a Polyherbal Formulation

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Abstract: *The present study aimed to systematically evaluate selected medicinal plants— (Piper nigrum), (Phyllanthus emblica), (Zingiber officinale), (Cinnamomum zeylanicum), and (Ocimum basilicum) through integrated pharmacognostic, phytochemical, and antioxidant analyses to support the development of an effective polyherbal formulation. Macroscopic examination confirmed the characteristic sensory and morphological attributes of each plant, ensuring proper identification for quality control. Microscopic evaluation further verified authentication by revealing diagnostic features such as stone cells and starch grains in Black pepper, rosette crystals in Amla, oleoresin cells in Ginger, sclerenchyma in Cinnamon bark, and peltate glandular trichomes in Basil. Pharmacognostic parameters including moisture content, ash values, and extractive values showed variations reflective of each plant's unique chemical nature, with methanol extractives generally higher, indicating the abundance of alcohol-soluble phytoconstituents. Preliminary phytochemical screening confirmed the presence of bioactive compounds such as alkaloids, flavonoids, glycosides, tannins, diterpenes, carbohydrates, proteins, essential oils, and phenols across the samples, supporting their traditional medicinal uses. Antioxidant assays (DPPH, ABTS, and Total Antioxidant Capacity) demonstrated that Amla possessed the highest free-radical scavenging activity, followed by Cinnamon and Basil. The polyherbal extract exhibited synergistic antioxidant activity, exceeding several individual extracts but remaining slightly lower than Amla alone. Compared with standard ascorbic acid, all extracts showed lower activity, validating the reliability of the methods used. Overall, this integrated assessment scientifically supports the suitability of these plants for polyherbal formulation development. Their diverse phytochemical profiles and antioxidant properties highlight their therapeutic relevance and potential application in natural health products*

Keywords: Pharmacognosy Phytochemical screening Antioxidant activity Polyherbal formulation Medicinal plants Amla Cinnamon Free radical scavenging

