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Phytochemical and Antioxidative Properties of *Kaempferia* Species Found in Bangladesh

Merin Monira Khanam, Karmokar Arup, Hossain AKM Zakir, Ashrafuzzaman* Md

Bangladesh Agricultural University, Bangladesh

Abstract

The genus *Kaempferia* (Zingiberaceae) comprises medicinally significant species widely utilized in traditional medicine for their diverse bioactive compounds and therapeutic potential. This study systematically investigates the phytochemical composition, antioxidant capacity, and pigment profile of the rhizomes of five *Kaempferia* species indigenous to Bangladesh. The total phenolic content (TPC) and total flavonoid content (TFC) were quantified, while antioxidant activity was assessed using DPPH and FRAP assays from the methanolic extract of rhizome. Additionally, major pigments, including chlorophyll a, chlorophyll b, total chlorophyll (a+b), and total carotenoids, were analyzed from the leaf extract. Among the studied species, *K. pulchra* exhibited the highest TPC (14.45 mg GAE/g) and TFC (31.31 mg QE/g), whereas *K. angustifolia* demonstrated the strongest DPPH radical scavenging activity (153.1 mg/mL) and the highest FRAP value (910.01 µM Fe^{2+}/L), indicating superior antioxidative potential. Conversely, *K. galanga* exhibited the lowest antioxidant activity (186.5 mg/mL DPPH and 50.23 µM Fe^{2+}/L FRAP). Pigment analysis revealed that *K. rotunda* contained the highest concentrations of chlorophyll a (0.60 mg/g FW), chlorophyll b (0.70 mg/g FW), and total chlorophyll (1.30 mg/g FW), while *K. parviflora* exhibited the highest total carotenoid content (0.15 mg/g FW). These findings underscore the considerable antioxidative and pharmacological potential of *K. pulchra* and *K. angustifolia*, highlighting their suitability for applications in herbal medicine and pharmaceutical formulations. Further investigations into their bioactive compounds and mechanistic pathways could facilitate their integration into evidence-based therapeutics.

Keywords: *Kaempferia, Medicinal potential, Antioxidant, TPC, TFC.*