

## **Characterisation, Health-Promoting Properties and Food Applications of Anthocyanin-Rich Pigments of Flowers from The Geraniaceae and Lamiaceae Plant Families**

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### **Abstract**

**Introduction:** Colourants in food are important from a sensory appeal perspective. Anthocyanins are a major group of phenolic compounds used in the food industry as colourants and they are usually extracted from plant sources. Flowers from indigenous South African plants from the Lamiaceae and Geraniaceae families are potential sources of anthocyanins. The objective of this study was to characterize the anthocyanins and other phenolic compounds from flowers of these indigenous South African plant families and evaluate their stability, antioxidant properties and potential as a natural food colourant.

**Materials and methods:** Flower petals were air-dried and ground to a powder. Phenolic extracts were prepared from the flower petal powders using acidified water. Phenolic composition of the extracts was determined using LC-MS. Extracts were analysed for pH, temperature, and oxidative stability.

**Results and discussion:** Flowers from the Geraniaceae families contained delphinidin, petunidin and malvidin 3,5 diglucosides and rutosides while flowers from the Lamiaceae plant families contained pelargonidin rutoside and an aromatic acylated anthocyanin. The flowers from Geraniaceae contained the most anthocyanins while the Lamiaceae family contained the most phenolic acids.

For temperature stability, extracts of flower species of the Lamiaceae plant family had a lower degradation rate constant and higher half-life than extracts of flower species of the Geraniaceae except for *P. zonale* hybrid (Geraniaceae). The same trends in degradation rate constant and half-life were observed for oxidative stability. The higher stability of extracts from the Lamiaceae family could be due to intra- and inter-molecular co-pigmentation of aromatic acylated anthocyanins and other phenolic compounds.

The Geraniaceae flowers showed higher DPPH radical scavenging activity than Lamiaceae flowers. Air-dried flower powder from the Geraniaceae and Lamiaceae families could be applied as natural colourants in yogurt and fondant.

**Conclusion:** Flowers from the Lamiaceae and Geraniaceae families indigenous to South Africa show potential as natural anthocyanin-based food colourants with sufficient stability and antioxidant activity.