



## Evaluation of Total Phenolic Content, Total Flavonoid Content, and *In Vitro* Antioxidant Activity of *Curcuma longa* and *Alpinia galanga* Rhizome Extracts

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### Abstract

Oxidative stress contributes to the development of chronic diseases, increasing interest in natural antioxidants from medicinal plants. This study compared the total phenolic content (TPC), total flavonoid content (TFC), and *in vitro* antioxidant activity of rhizome extracts from *Curcuma longa* and *Alpinia galanga*. TPC was determined using the Folin–Ciocalteu method and expressed as gallic acid equivalents (GAE), while TFC was measured by the aluminium chloride colourimetric assay and expressed as quercetin equivalents (QE). Antioxidant activity was assessed using DPPH and ABTS radical scavenging assays. *C. longa* showed higher phenolic and flavonoid contents (TPC:  $145.52 \pm 1.19$  mg GAE/g; TFC:  $161.34 \pm 0.98$  mg QE/g) and stronger antioxidant activity (DPPH IC<sub>50</sub>:  $25.72 \pm 2.81$  µg/mL; ABTS IC<sub>50</sub>:  $19.20 \pm 1.97$  µg/mL) compared with *A. galanga*, which had lower TPC and TFC values ( $89.05 \pm 2.35$  mg GAE/g and  $54.65 \pm 2.59$  mg QE/g, respectively) and weaker radical scavenging activity (DPPH IC<sub>50</sub>:  $85.50 \pm 1.28$  µg/mL; ABTS IC<sub>50</sub>:  $76.75 \pm 1.04$  µg/mL). These findings highlight the important role of phenolic and flavonoid compounds in antioxidant activity and indicate that *C. longa* has greater potential as a natural antioxidant source under similar extraction conditions.

**Keywords:** *antioxidant activity, total phenolic content, total flavonoid content, Curcuma longa, Alpinia galanga, medicinal plants*