

ID 121

Screening of anti-inflammatory potential of three selected Sri Lankan medicinal plant extracts

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Abstract

Medicinal plants represent a notable source in the treatment of various chronic diseases. They possess a variety of phytoconstituents, particularly polyphenols with promising biological activities. The anti-inflammatory activity of dietary polyphenols can suppress chronic inflammation in many chronic diseases. The present study was conducted to determine total polyphenol content (TPC), total flavonoid content (TFC) and anti-inflammatory activity of *Garcinia zeylanica* L. (Family: Clusiaceae, common name: Garcinia), *Hibiscus rosa-sinensis* L. (Family: Malvaceae, common name: Rose mallow) and *Trianthema portulacastrum* L. (Family: Aizoaceae, common name: Black pigweed). The aqueous extracts of (0.125 mg/mL) dried fruits of *G. zeylanica*, flowers of *H. rosa-sinensis* and leaves of *T. portulacastrum* were prepared by refluxing for 4h. The resulting aqueous extracts were filtered and lyophilized (-55 °C). The percentage yield was calculated in freeze-dried plant materials. The TPC and TFC were determined using Folin Ciocalteu method and aluminum chloride method respectively. The results of TPC and TFC were expressed as gallic acid equivalents (GAE) and quercetin equivalents (QE) respectively. The anti-inflammatory activities of plant extracts were determined by the xanthine oxidase (XO) inhibitory assay (reference compound-allopurinol) and nitric oxide (NO) scavenging assay (reference compound-ascorbic acid). The percentage yield of aqueous extracts of *G. zeylanica*, *H. rosa-sinensis*, and *T. portulacastrum* were 14.55%, 16.55%, and 11.75%, respectively. *H. rosa-sinensis* achieved the highest content of polyphenols (63.05±0.24 GAE/g) and the highest content of flavonoids (14.25 ± 0.13 QE/g) followed by *T. portulacastrum* (24.26±0.18 GAE/g and 5.21 ± 0.02 QE/g) and *G. zeylanica* (7.22±0.08 GAE/g and 0.67±0.01 QE/g). *G. zeylanica* and *H. rosa-sinensis* exhibited the highest significant anti-inflammatory activity representing the lowest IC₅₀ values for the XO inhibitory assay (2.41±0.03 mg/mL) inhibitory and the NO scavenging assay (0.36±0.04 mg/mL) when compared to the reference compounds (p<0.05) respectively. In conclusion, of the three selected medicinal plants, *H. rosa-sinensis* was found to be a potent anti-inflammatory agent with comparatively high TPC, TFC content and NO scavenging activity. However, the amounts of bioactive compounds could vary based on geographic location where the plants/parts were collected, season of the year and extraction protocol.

Key words: Anti-inflammatory activity, Aqueous extracts, Polyphenols

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