

Evaluation of anti-inflammatory and antioxidant properties of Genus *Piper* in Sri Lanka

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In Sri Lanka, the genus *Piper* is represented by ten species including five wild and two cultivated species. Most of the species of the genus *Piper* are important as medicinal plants and used in various systems of medicine. This study aims to evaluate the bioactivity (anti-inflammatory and antioxidant properties) of the selected five *Piper* spp. (*P. nigrum* L., *P. longum* L., *P. betle* L., *P. chuyva* (Miq.) and *P. sylvestre*). Specimens of leaves and fruits were collected from their natural habitats and cultivations, and were subjected to the extraction of essential oils by steam distillation. Three replicates were done for each concentration and data were analyzed using the MINITAB 17 statistical package.

Antioxidant activity was tested using 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay and ferric reducing antioxidant power assay. The isolated essential oils of *Piper* species exhibited remarkable DPPH free radical scavenging ability at different concentrations. The results revealed that the essential oil of *P. betle* exhibited the highest radical scavenging activity (92.8% at 1 mg/mL) and the value is higher than even of the standard, Butylated Hydroxy Toluene (BHT), (74.5% at 1 mg/mL). Further, essential oils of *P. chuyva* and *P. longum* have shown 91.8% and 63.1% inhibition percentages at 1 mg/mL.

Essential oil isolated from *P. betle* has showed remarkable ferric reducing antioxidant power (mean absorbance, 1.89 at 1 mg/mL) compared to the standard, BHT, (2.01 at 1 mg/mL). Further, it was observed that its antioxidant activity increased with the increment of the concentration of essential oil (0.03-1 mg/mL). These results suggested the potential of using essential oils of leaves of *P. betle*, *P. chuyva* (1.31) and *P. longum* (1.28) as sources of natural antioxidants.

This study also focused on evaluating anti-inflammatory activity by using Human Red Blood Cell (HRBC) membrane stabilizing method. Higher mean inhibition percentage was observed for the essential oil of *P. betle* leaves (79.6% at 1 mg/mL) compared to the standard (aspirin) and the activity significantly increased with higher concentrations (76.4% at 0.5 mg/mL and 79.6% at 1 mg/mL). Further, 62 % and 58.3 % of inhibitions percentages were shown by essential oils of *P. chuyva* and *P. longum* respectively.

According to the findings of this study, bioactivity properties of the leaves and fruits of these *Piper* species can be used in future perspectives for developing novel pharmaceuticals.

Keywords: Anti-inflammatory activity, Antioxidant activity, Genus *Piper*