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Bioactive phytochemical distribution in different parts and leaf positions of Pimenta dioica (L.) Merr. (Myrtaceae)

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Pimenta dioica (L.) Merr. (Myrtaceae) is an evergreen aromatic spice widely used in perfumery, food and the cosmetic industry in many parts of the world. The present study compared total antioxidant capacity (TAC), total phenolic content (TPC), total flavonoid content (TFC), leaf area (LA), and fresh to dry weight ratio of P. dioica leaves at different maturity stages (1^{st} , 2^{nd}, 3^{rd} ,4^{th} and 5^{th} leaf positions) and different plant parts (immature leaf, mature leaf and bark). The TAC, TPC and TFC were determined using Ferric Reducing Antioxidant Power Assay (FRAP), modified Folin–Ciocalteu method and a calorimetric method, respectively. Significantly high TAC 562.38±9.42 (mg TE/g DW) and TPC 279.53±7.02 (mg GAE/g DW) were detected in leaf extract obtained from the 1st leaf position. However the highest TFC 303.48±8.87 (mg RE/g DW) was detected in the 5^{th} leaf position. According to the phytochemical distribution pattern, significantly higher TAC [619.84±11.98 (mg TE/g DW)], TPC [267.53±5.03 (mg GAE/g DW)], TFC [305.48±8.87 (mg RE/g DW)] were observed in extracts obtained from the bud region. A strong relationship between TAC and TPC in different plant parts of P. dioica was observed (R^2 =0.9462). Order of decreased leaf area was 4^{th}> 5^{th}>3^{rd}>2^{nd}>1^{st} leaf. The decrease in leaf area after the 5^{th} leaf is due to senescence. According to the fresh weight:dry weight ratio, the highest and the lowest values were observed for the 5^{th} leaf and the 1^{st} leaf positions, due to high amount of moisture content. Further, harvesting of immature leaves and bud portions could be suggested for better therapeutic benefits.

Keywords: Pimenta dioica, total antioxidant capacity, total flavonoid content,total phenolic content

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