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Antioxidant Potency of Ethanolic Extracts from Selected Aromatic Plants by in vitro Spectrophotometric Analysis

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Abstract : Biological systems possess the ability to neutralize the excess of reactive oxygen species (ROS) and to protect cells from destructive alterations. However, many pathological conditions (cardiovascular diseases, autoimmune disorders, cancer) are associated with inflammatory processes that generate an excessive amount of reactive oxygen species (ROS) that shift the balance between endogenous antioxidant systems and free oxygen radicals in favor of the latter, leading to oxidative stress. Therefore, an additional source of natural compounds with antioxidant properties that will reduce the amount of ROS in cells is much needed despite their broad utilization; many plant species remain largely unexplored. Therefore, the purpose of the present study is to investigate the antioxidant activity of twenty-five selected medicinal and aromatic plant species. The antioxidant activity of the ethanol extracts was evaluated with in vitro assays: 2,2'-diphenyl-1-pycryl-hydrazyl (DPPH), ferric reducing antioxidant power (FRAP), non-site-specific- (NSSOH) and site-specific hydroxyl radical-2-deoxy-D-ribose degradation (SSOH) assays. The Folin-Ciocalteu method and AlCl3 method were performed to determine total phenolic content (TPC) and total flavonoid content (TFC). All examined plant extracts manifested antioxidant activity to a different extent. Cinnamomum verum J.Presl bark and Ocimum basilicum L. Herba demonstrated strong radical scavenging activity and reducing power with the DPPH and FRAP assay, respectively. Additionally, significant hydroxyl scavenging potential and metal chelating properties were observed using the NSSOH and SSOH assays. Furthermore, significant variations were determined in the total polyphenolic content (TPC) and total flavonoid content (TFC), with Cinnamomum verum and Ocimum basilicum showing the highest amount of total polyphenols. The considerably strong radical scavenging activity, hydroxyl scavenging potential and reducing power for the species mentioned above suggest of a presence of highly bioactive phytochemical compounds, predominantly polyphenols. Since flavonoids are the most abundant group of polyphenols that possess a large number of available reactive OH groups in their structure, it is considered that they are the main contributors to the radical scavenging properties of the examined plant extracts. This observation is supported by the positive correlation between the radical scavenging activity and the total polyphenolic and flavonoid content obtained in the current research. The observations from the current research nominate Cinnamomum verum bark and Ocimum basilicum herba as potential sources of bioactive compounds that could be utilized as antioxidative additives in the food and pharmaceutical industries. Moreover, the present study will help the researchers as basic data for future research in exploiting the hidden potential of these important plants that have not been explored so far.

Keywords : ethanol extracts, radical scavenging activity, reducing power, total polyphenols.
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