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Instrumental Neutron Activation Analysis (INAA) and Atomic Absorption Spectroscopy (AAS) for the Elemental Analysis Medicinal Plants from India Used in the Treatment of Heart Diseases

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Abstract : Introduction: Minerals and trace elements are chemical elements required by our bodies for numerous biological and physiological processes that are necessary for the maintenance of health. Medicinal plants are highly beneficial for the maintenance of good health and prevention of diseases. They are known as potential sources of minerals and vitamins. 30 to 40% of today's conventional drugs used in the medicinal and curative properties of various plants are employed in herbal supplement botanicals, nutraceuticals and drug. Aim: The authors explored the mineral element content of some herbs, because mineral elements may have significant role in the development and treatment of gastrointestinal diseases, and a close connection between the presence or absence of mineral elements and inflammatory mediators was noted. Methods: Present study deals with the elemental analysis of medicinal plants by Instrumental Neutron activation Analysis and Atomic Absorption Spectroscopy. Medicinal herbals prescribed for skin diseases were purchased from markets and were analyzed by Instrumental Neutron Activation Analysis (INAA) using 252Cf Californium spontaneous fission neutron source (flux* 109 n s-1) and the induced activities were counted by γ-ray spectrometry and Atomic Absorption Spectroscopy (AAS) techniques (Perkin Elmer 3100 Model) available at Department of Chemistry University of Pune, India, was used for the measurement of major, minor and trace elements. Results: 15 elements viz. Al, K, Cl, Na, Mn by INAA and Cu, Co, Pb Ni, Cr, Ca, Fe, Zn, Hg and Cd by AAS were analyzed from different medicinal plants from India. A critical examination of the data shows that the elements Ca , K, Cl, Al, and Fe are found to be present at major levels in most of the samples while the other elements Na, Mn, Cu, Co, Pb, Ni, Cr, Ca, Zn, Hg and Cd are present in minor or trace levels. Conclusion: The beneficial therapeutic effect of the studied herbs may be related to their mineral element content. The elemental concentration in different medicinal plants is discussed.

Keywords : instrumental neutron activation analysis, atomic absorption spectroscopy, medicinal plants, trace elemental analysis, mineral contents
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