INSTRUMENTAL NEUTRON ACTIVATION ANALYSIS AND ATOMIC ABSORPTION SPECTROSCOPY, AN ADVANCED ANALYTICAL METHODS FOR TRACE AND MAJOR ELEMENTS METAL IONS DETECTION AND QUANTIFICATION OF MEDICINAL PLANTS WITH REFERENCE TO THEIR NUTRITIONAL ASPECTS

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Abstract: 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. Human body cannot produce minerals within our bodies, so we must obtain them through our food viz. medicinal plants in natural form. Enzymes do not work without minerals. All cells require enzymes to work & function. Medicinal plants are essential natural source of minerals which constitutes one of the potential sources of new products and bioactive compounds for drug development. Deficiency or excess of one or more mineral causes the metabolic imbalance so diseases. Recent research indicates that adequate dietary intake of essential minerals and trace minerals may prevent and reduce effects of poisoning by environmental pollutants and enhance the ability to work and prevention of diseases. Much effort has been concentrated on seeds while leafy vegetables have to large extent been ignored. Very little research work is conducted in this area using a powerful techniques Instrumental Neutron activation analysis and Atomic absorption Spectroscopy techniques. Hence present study was investigated to the elemental analysis of medicinal herbals plants from India , prescribed for specific treatment purposes were analyzed by Instrumental Neutron Activation Analysis using $^{252}$Cf Californium spontaneous fission neutron source (flux *$10^9$ n s$^{-1}$) and the induced activities were counted by $\gamma$-ray spectrometry and Atomic Absorption Spectroscopy techniques (Perkin Elmer 3100 Model) available at University of Pune, India was used for the measurement of major, minor and trace elements from five medicinal plants. 15 elements viz. Al, K, Cl, Na, Mn by Instrumental neutron activation analysis and Cu, Co, Pb Ni, Cr, Ca, Fe, Zn, Hg and Cd by Atomic Absorption Spectroscopy. 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 Fe, Zn, Hg, Pb, Ni, Cr, Cd, Na, Mn, Cu and Co which are present at minor or trace level, the toxic elements Pb, Cd and Hg found in the samples were below the detection limits prescribed by World Health Organization (WHO) regulations. The elemental concentration in different medicinal plants is discussed.

Keywords: Major and minor elemental analysis, Instrumental Neutron activation, atomic absorption spectroscopy, medicinal plants

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