Quantitative Elemental Analysis of Cyperus rotundus Medicinal Plant by Particle Induced X-Ray Emission and ICP-MS Techniques

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Abstract : Particle Induced X-ray Emission (PIXE) and Inductively Coupled Plasma Mass Spectroscopy (ICP-MS) techniques have been employed in this work to determine the elements present in the root of Cyperus rotundus medicinal plant used in the treatment of rheumatoid arthritis. The elements V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Rb, and Sr were commonly identified and quantified by both PIXE and ICP-MS whereas the elements Li, Be, Al, As, Se, Ag, Cd, Ba, Tl, Pb and U were determined by ICP-MS and Cl, K, Ca, Ti and Br were determined by PIXE. The regional variation of elemental content has also been studied by analyzing the same plant collected from different geographical locations. Information on the elemental content of the medicinal plant would be helpful in correlating its ability in the treatment of rheumatoid arthritis and also in deciding the dosage of this herbal medicine from the metal toxicity point of view. Principal component analysis and cluster analysis were also applied to the data matrix to understand the correlation among the elements.