

## Determination of Elemental Profile of Tobacco Plant and Soil using Neutron Activation Analysis

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Even when cultivated in uncontaminated soils, tobacco plant has higher propensity to extract and accumulate trace elements. The concentrations of essential elements (K, Ca, Mg, Na, Cl, Mn, Fe, Cu, and Zn) and 28 non-essential elements in tobacco plant (leaves, stem, and root) of Northeast India and their respective soils were quantitatively measured. The concentrations of Hg in all samples analyzed were found to be < 10 mg/kg. The bioconcentration factor values indicated that Cd (7) is selectively absorbed and translocated in the tobacco leaves compared to Zn (1.7), Cu (1.5), Ni (0.12), and Pb (0.1). Under acidic soil conditions, tobacco plant efficiently absorbed and translocated Cl<sup>-</sup> ion with great ease, whereas it may be a very low accumulator of rare-earth elements. The concentrations of Mn, Cu, Sb, Cs, Rb, and Pb are very similar to the “reference plant,” whereas significantly higher concentrations of Al, Sc, Ti, Zr, Hf, Ta, Th, and U are present in the roots of tobacco plant relative to the “reference plant.” Principal component analysis has revealed that Northeast Indian tobacco can be clearly differentiated from other varieties of tobaccos used in different countries because of their element profiles.

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