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Title: ASSESSMENT OF TRACE ELEMENTS IN SOIL AND PLANT SAMPLES UNDER INTENSIVE CROPPED AREA OF SAHIBGANJ BLOCK (JHARKHAND)

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Abstract: Sahibganj district has been characterized under Sub Zone IV of Agro climatic Zone VII known as Eastern Plateau Hill Region. District comprises 9 blocks in which Sahibganj block has special identity, politically as well as religiously due to geographical situation of block near the bank of Holy Ganga River. GPS based 32 soils and 15 edible parts of plant samples were collected from farmer's field all around the Sahibganj block from Lat. N 24014'58.7'' – N 25019'32.9'', Long. E 870 30'43.5''- E 870 37'19.1'' and Alt. 5-28 msl. Soil reaction was found neutral to some extent in saline pH range and varied from 7.40 to 8.56. In different land situation, pH variation noticed in narrow range (7.40-8.46 in upland situation and higher pH 8.30-8.50 in badi land). About 56% soil samples showed pH range 7.0-8.0 and rest 44% having more than 8.0 pH value. Electrical conductivity of soil found in the range of 0.21 to 1.01 dS m⁻¹. Upland soil showed 0.41 dS m⁻¹ EC, while in badi land EC was found higher 0.74 dS m⁻¹. Organic carbon content was found higher in badi land 11.94 g kg⁻¹ followed by medium land 10.72 g kg⁻¹. As per availability of sand, silt and clay per cent in soil samples showed sandy loam texture class. WHC of soil increasing with decreasing slope and found 33.87% in upland soil and 38.32% in badi land soil. Zinc content in soil ranged from 0.16 to 2.80 mg kg⁻¹ with mean value 0.80 mg kg⁻¹. Zinc availability was lower (0.44 mg kg⁻¹) in upland soil as compared to others land situation. In the study areas 47% soil were found deficient in Zn (critical limit 0.5 mg kg⁻¹), while 44% soils were noticed in between 0.5-1.0 mg kg⁻¹. Its need immediate attention for its poorer management in soil. Emerging deficiency of Copper in Sahibganj block was also noticed. Mean content of Fe was found lower in badi land 10.27 mg kg⁻¹ followed by 21.83 and 22.47 mg kg⁻¹, respectively in up and medium land situation of Sahibganj block. Emerging deficiency of Fe was also found (6% soil having < 10 mg kg⁻¹ Fe content) in study areas. Content of Mn was found in the range of 3.42 to 17.88 mg kg⁻¹, lower mean content 5.50 mg kg⁻¹ was found in badi land situation, while higher 13.61 mg kg⁻¹ observed in upland soil. About 6% of the analyzed soil was found below 5.0 mg kg⁻¹ and rest 94% having more than 5.0 mg kg⁻¹ Mn content in soil. Content of Pb, Ni and Co was varied respectively in ranged from 0.44 to 2.66 (Mean 1.69 mg kg⁻¹), 0.04 to 2.36 (Mean 0.54 mg kg⁻¹) and 0.01 to 1.92 (Mean 0.61 mg kg⁻¹). Content of Pb, Ni and Co are highly safe in respect to considering safe limit. Variations of Pb, Ni and Co content in soil were found in narrow range. Significant and negative correlation were found in between pH x Fe (-0.348*), pH x Mn (-0.730*), While significant positive correlation were found in between pH x Co (0.378*), EC x Pb (0.441**), OC x Fe (-0.378*), OC x Mn (-0.586**), OC x Co (0.418*), clay x Pb (0.604**) and Clay x Ni (0.451 **) in soil samples. Mean content of Zn, Cu, Fe, Mn, Pb, Ni, and Co were found 7.87, 0.62, 28.43, 7.51, 0.56, 2.43 and 1.15 mg kg⁻¹ respectively in edible part of plants that were collected from farmer's field of Sahibganj block. Mean moisture content was notice 86.63, 70.06, and 52.84 %, respectively in plant family group Solanaceae, Brassicaceae and others (including poaceae, fabaceae and apiaceae). Content of Zn, Fe, Mn, Pb, Ni and Co in edible part of Brassicaceae family was observed 12.09, 36.35, 10.76, 0.85, 4.86 and 1.20 mg kg⁻¹, respectively. All these elements were found higher than that of others two groups of plants. While Cu content found higher in solanaceae family (0.79 mg kg⁻¹) followed by a group of poaceae, fabaceae, apiaceae (0.66 mg kg⁻¹) and brassicaceae (0.43 mg kg⁻¹). Translocation factor for all the elements were found maximum in Brassicaceae family than others group of plant family. HRI was more than 1.0 for Ni in broccoli, mustard and pea. While Mn, Pb and Ni only noticed > 1.0 HRI in mustard. The interpretation of experimental data of farmers field, reflected the real scenario of malnutrition in study areas and it was clearly indicated that if a farmer include 300g fresh edible part of plant per day in their diet, even then it does not fulfill the recommended nutrition requirement. A wider gap in recommended and supplement amount of Zn (76.40-84.26%), Cu (87.33-93.66%) and Fe (14.70-43.13 %) and Mn (0.00-55.00%) was found in dietary allowance per day for children, male and female residing in rural areas in Sahibganj block.

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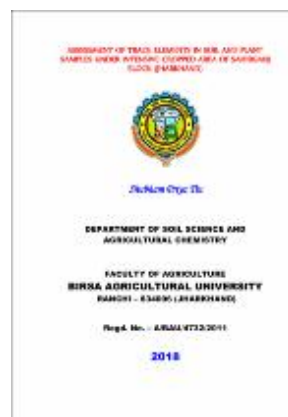
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