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Research Article

Distribution of various forms of potassium in *Inceptisol* of Baloda block in Janjgir district of Chhattisgarh

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Summary

The potassium status of *Inceptisol* of Baloda block at Janjgir district of Chhattisgarh State was evaluated for the pH, EC, organic C, available and water soluble K, exchangeable and non exchangeable, values in the soils. Surface soil samples collected from 87 villages in Baloda block in which 1003 samples were identified as *Inceptisol.* The soil pH showed positive and significant correlation with water soluble, exchangeable and available-K. Organic C exhibited significant and positive correlation with water soluble and exchangeable-K and negative correlation with non-exchangeable K. Significant and positive correlations were observed among different soil K fraction. The order of dominance of different forms of soil potassium was non-exchangeable K > exchangeable K > available K > water- soluble K. Potassium fixation study reveals that K fixation decreased beyond 20 ppm K addition level in the soil under study.

Key words : K- fraction, Fixing capacity, *Inceptisol*

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Introduction

Potassium is the third major essential plant nutrient which is absorbed by plant is in larger amount than any other mineral element except nitrogen. Potassium plays number of vital and crucial physiological roles in plant growth and development, but its importance is often under estimated, as it doesn't produce rapid growth like nitrogen. Although the crop response to applied fertilizer K is very meagre due to its well soil supply, however, its exploration by the crop is very high results in depletion of non-exchangeable fraction of this element. Soil K exists in soil solution and in exchangeable and non-exchangeable (fixed and structural) forms. The amount of solution and exchangeable potassium is usually a small fraction of total K (1–2% and 1–10%, respectively). The bulk of soil K usually is associated with K-bearing micas and feldspars (Sekhon, 1995). Researchers have shown (Bansal *et al.*,2002 and Kirkman *et al.*, 1994) that there is a continuous but slow transfer of potassium in the primary minerals to the exchangeable and slowly available form of potassium. The release of these non-exchangeable forms of K occur when the level of exchangeable K and solution K (labile K) was decreased by crop removal and or leaching (Sparks *et al.*, 1980). The quantity of these non - exchangeable forms of potassium (Total K, reserved K, mobile K and residual K) present in a soil has been the basis for the assessment of the potassium status in soils in recent times. For sustaining soil fertility and crop productivity, it is always emphasized that nutrient removed must be replenished through balanced fertilization and manuring. Results of fertilizer trial in India have shown the negative balance of available K (Nambiar and Ghosh 1984) and Sharma, 2002).

Resources and Research Methods

Baloda is a Taluka comes under Janjgir district in the state of Chhattisgarh, and about 87 villages come under this Taluka, it is located 22.15° North latitude, 82.48° East longitude with an altitude of 280 m above the mean sea level. Surface (0-15 cm depth) soil samples were collected with the help of soil auger and local spade with proper labels from different villages. Collected soil sample from the study area were dried and crushed with the help of wooden rod and passed through 2 mm sieve and then used for the determination of soil pH,