

Influence of Organic Matter Additions on Changes in Non-exchangeable K in a Limed and the Corresponding Unlimed Soil in Presence and Absence of N and K Fertilizers

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Abstract—A laboratory investigation was carried out to study the influence of N and K fertilizers on non-exchangeable K in a limed and the corresponding unlimed soil in presence and absence of organic matter. A Typic Haplustalf soil was used for this study. Limed soil was prepared by adding liming material uniformly to the soil and allowing it to react for 3 months with repeated wetting followed by air drying. Urea, MOP and FYM was used as N, K fertilizers and organic matter respectively. Soils were treated with respective fertilizers and organic matter as per treatment combinations and were incubated at room temperature for a period of 90 days under 60% of the Moisture holding capacity. Soils were sampled on 0th, 30th, 60th and 90th day of incubation and were analyzed for water soluble, exchangeable and non-exchangeable K. Results revealed that irrespective of treatments, water soluble K decreased with increase in the period of incubation. However, exchangeable K initially decreased then increased but again decreased at the later period of investigation. On the other hand, non-exchangeable K showed a decreasing and increasing trend throughout the period the period of incubation. Results showed a dynamic interaction among different chemical forms leading to shifting of K from available to non-exchangeable form with time. Results further confirmed that exchangeable K is the prerequisite of non-exchangeable K. Liming had a significant positive effect on changes in different K fractions in soils. Application of N along with K fertilizer decreased exchangeable and non-

exchangeable K in both the limed and unlimed soils. Organic matter has little effect on accumulation of different fractions of K in both the soils. However, critical analysis revealed that organic matter releases some amount of K which in turn influences the accumulation of both exchangeable and non-exchangeable K particularly under limed situation.

Keywords: *Acid soil, liming, non exchangeable K, organic matter, N and K fertilizers.*