

Effect of Levels of Potassium on Potassium Fraction, Yield and Nutrient Uptake by Cotton in Vertisol

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Abstract —A field experiment was conducted at Dept. Soil Science and Agricultural Chemistry, Dr. PDKV, Akola (MS) during 2009-10 to study effect of levels of potassium on potassium fractions, yield and nutrient uptake by cotton in Vertisol. There were nine treatments replicated thrice in randomized block design. The treatments comprised of recommended dose of fertilizers (RDF), RDF along with 12.5, 25 and 37.5 kg K₂O ha⁻¹, RDF along with 2% KNO₃ foliar spray (one time) and 2% KNO₃ foliar spray (two times), one water spray at 50 DAS, two water spray treatment at 50 DAS and 75 DAS and absolute control. The results of the present experiment revealed that, application of RDF + 37.5 kg K₂O ha⁻¹ recorded highest seed cotton yield (15.50 q ha⁻¹). Significantly highest stalk yield (35.96 q ha⁻¹) was also recorded in the treatment RDF + 25 kg K₂O ha⁻¹. The highest N, P and K content and uptake were observed in treatment RDF + 37.5 kg K₂O ha⁻¹. Significantly highest water soluble K (8.1 mg kg) exchangeable K (90.6 mg kg⁻¹) was recorded with treatment RDF + 37.5 kg K₂O ha⁻¹. The non-exchangeable and total K content in soil was also recorded significantly highest with the application of RDF + 37.5 kg K₂O ha⁻¹.

Evaluate the potassium availability in some shrink-swell soils of vidarbha region of Maharashtra by existing methods. Kiran S. Pore, Harshal S. Pore and *Dr. S.K. Ray Department of Soil Science and Agricultural Chemistry, Dr. PDKV, Akola (MS) and *NBSS & LUP, Nagpur

Anomaly in 1N NH₄OAc extractable K with plant uptake in shrink-swell soils of Peninsular India lead to take up the present study which evaluates the existing methods of extraction of potassium in these soils. Twenty four surface soil samples (0-20 cm) were selected from different treatments of long term and short term experiments undertaken at Dr. P.D.K.V. Research farm in Akola and in Wanirambhapur sites. Different forms of potassium were analyzed as water soluble K, exchangeable K by 1 N NH₄OAc and 0.1 M BaCl₂, non-exchangeable K by 1 N HNO₃ and 0.2 M NaBPh₄ and total K by acid dissolution.

The results showed that 1N NH₄OAc extracted higher values of K than 0.2M BaCl₂. The 1N HNO₃ extracted higher non-exchangeable K than sodium tetraphenyl borate (NaBPh₄). The water soluble K had significant positive relationship with EC, NH₄OAc-K with pH and available N and BaCl₂ K with available N and available P. Non-exchangeable K by HNO₃ on the other hand was significantly positively correlated with EC, available P and BaCl₂ K. NaBPh₄ K showed relationships with EC, available P, water soluble K and BaCl₂ K. The uptake of K by plant was significantly and positively correlated with available P, BaCl₂ K, HNO₃ K and NaBPh₄ K.

The study also suggested that non-exchangeable K by NaBPh₄ method provides a better alternative to express plant K uptake values for optimum fertilizer recommendation.