

SUITABILITY OF THE 7 IN 1 INTEGRATED SOIL SENSOR FOR MEASURING N,P,K LEVELS IN ALFISOLS IN ANURADHAPURA, SRI LANKA

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Soil sensors are widely used in site-specific nutrient management of agricultural soils. This study was conducted to investigate the applicability of the 7 in 1 integrated soil sensor (ISS) for measuring N, P and K contents of selected Alfisols, Anuradhapura. A bulk soil sample collected from 0-30 cm depth was analysed for available N, P and K and fixation curves were developed. Thirty two treatments (with triplicates) were prepared with four levels of N (25, 50, 75 and 100 mg kg⁻¹), three levels of P (12, 24, 36 and 48 mg kg⁻¹), and two levels of K (200 and 250 mg kg⁻¹) by adding N, P, K based on the fixation curves. The available contents of N, P and K in the treated samples were measured by the standard procedure and ISS at field capacity. Data were analysed using ANOVA under three-factor factorial experiment. The initial soil analysis revealed 0.1±0.01 mg kg⁻¹ of N, 12.9±3.8 mg kg⁻¹ of P and 141.4±4.2 mg kg⁻¹ of K were in the selected soil. The cubic (R²=0.997) quadratic (R²=0.999) and linear (R²=0.999) regression models were best fitted with the fixation behaviours of N, P and K, respectively. The responses of the sensor to the added N, P, K were significantly sensitive ($p < 0.05$). However, two- and three-way interactions were significantly different revealing a considerable influence of sensor reading for a given nutrient by the elevated levels of other nutrients ($p < 0.05$). However, a higher correlation ($r = 0.83$) was observed in N measured by a sensor and the standard procedures. It can be concluded the higher applicability of 7 in 1 ISS for measuring soil N content in the selected Alfisols.

Keywords: 7 in 1 integrated soil sensor, soil N, P and K fixation curve, Alfisols, Precision agriculture