

FERTILIZER-INDUCED PHOSPHORUS DYNAMICS IN GRUMUSOLS AND CALCIC RED LATOSOLS

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A better understanding of how soil characteristics affect Phosphorus (P) dynamics with fertilizer application is needed for optimum P management. Hence, this study was conducted to examine the changes in pH, EC, pore water phosphorus, Olsen P (OP), and degrees of phosphorus saturation (DPS) in non-fertilized and fertilized grumusols (GRU) and calcic red latosols soils (CRL) at two phosphorus application rates. Three treatments with three replicates from each soil type were arranged in a completely randomized design. Non-fertilized (T1) and TSP fertilized at 30 (T2) and 60 (T3) kg P ha⁻¹ from each soil sample were incubated for 8 weeks using glass jars in a controlled environment. Soil samples were analyzed for pH, EC, OP, DPS and dissolved reactive phosphorus (DRP) in pore water at 2-week intervals. Data were analyzed using R statistical software and the mean separation was carried out using the Least Significant Difference (LSD) test. The pH and EC of each soil type were not significantly different ($p>0.05$) among all treatments, except pH at week 2, in GRU and EC at week 2, in CRL. Olsen P values in both GRU and CRL soils increased with higher TSP application rates throughout the study. This effect became statistically significant by 6th and was sustained until 8th while 2nd and 4th weeks showed no significant impact. Dissolved reactive P levels in both GRU and CRL showed no significant differences ($p>0.05$) except for CRL in 8th week. Dissolved reactive P values were slightly greater in GRU compared to CRL. The effect of DPS became significant from week 6 to week 8, with no significant impact observed in 2nd and 4th weeks for either soil. Grumusols had a higher DPS than CRL across the study. Olsen P and DPS significantly affect soil Phosphorus dynamics after TSP fertilizer application under controlled conditions.

Keywords: Degree of P saturation, Fertilized soils, Pore water P, Soil test P