



Influence of Long-Term use of Fertilizers and Farmyard Manure on the Adsorption-Desorption Behaviour of Sulphur in Soils

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Abstract: An understanding of the adsorption-desorption behaviour of sulphate (SO_4^{-2}) in soils after 34 years of long-term fertilization would be an invaluable supplement to our knowledge of the chemistry of (SO_4^{-2}) in soils and would assist in developing (SO_4^{-2}) application strategies for successive crops. With this objective, we collected surface soil samples (0-15 cm) from the agricultural crop land on which a rotation of maize-wheat-cowpea fodder had been grown for 34 years. The soil samples were investigated for adsorption and desorption behaviour of (SO_4^{-2}), supply parameters and buffering capacity of soil samples were computed from the sorption data. Sulphate adsorption increased while percentage S adsorbed decreased gradually with increasing levels of added sulphur (SO_4^{-2}). Bonding energy constant (K) and Freundlich constant (n) decreased with S application. The adsorption and desorption of applied (SO_4^{-2}) were inversely related and the soils that adsorbed the most readily released it the least into the soil solution and vice-versa. Application of S decreased maximum buffering capacity and increased (SO_4^{-2}) supply in soil. Various adsorption-desorption parameters were significantly related with (SO_4^{-2}) uptake of maize and wheat crops. Adsorption maxima, desorption maxima, supply parameter and maximum buffering capacity are the major parameters governing S availability in soils.

Key Words: Adsorption, Buffering capacity, Desorption, Sulphur, Farmyard manure
