



Modeling of water stress and fertilization technique in phosphate uptake by corn plants

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Abstract : Phosphorus is a limited resource in arid region, and its efficient use is a main task for sustainable agriculture. The main objective of this work is to determine the kinetics of P release from El- Nubaria sandy soil represents new reclaimed areas in Egypt, treated with prepared compost and chemical fertilizers applied individually or mixture and cultivated with corn under two irrigation regimes, i.e. 80 and 60% of calculated irrigation requirements. Four kinetic models i.e. modified Freundlich equation (MFE), Elovich, parabolic diffusion and first-order models represent both empirical and theoretical models to evaluate P desorption reactions. According to higher correlation coefficient of determination (R^2) and the low standard error (SE), Elovich and MFE models were the best fitted models. Purely organic fertilizer applied gave the lowest rate value compared to chemical one, but the constant represents the capacity factor of P released from the used soil was higher in mixture treatments than the chemical one. Application of 80% of IR and mixture between organic and chemical fertilizers could be the best management in having suitable rate of release, and optimum reserving fertilizer with minimizing of using chemical fertilizers.

Keywords: Phosphorus, desorption, Kinetic models, water scarcity, organic, mineral, fertilizers.

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