

Research Paper :

Influence of fortified organic manures on the changes in physicochemical properties and nutrient availability in coastal saline sodic soil for rice

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ABSTRACT

In an incubation experiment, the changes in physio-chemical properties and the periodical release of nutrients with fortified organic manures to a coastal saline sodic soil was studied. The experimental soil was collected from the farmer's field at Sillankuppam village, Cuddalore district. The $\text{FeSO}_4 + \text{ZnSO}_4$ fortified green leaf manure and coir pith significantly exerted a favourable effect on reducing the salinity and sodicity and increasing the availability of major and micronutrients in soil. Among the organics, micronutrients fortified green manure was associated with the greatest improvement in physio-chemical properties and nutrient availability.

Key words : Fortified organic manures, Nutrient availability

The problem of coastal salinity occur to an extend of 3.1 M ha. Low organic matter and prevalence of high salinity and alkalinity causes deficiency of micronutrients due to precipitation and other harmful reaction in soil (Tandon, 1995; Tate, 1983). The uptake efficiency of micronutrients fertilizer is very low and seldom exceeds 2 per cent. Addition of soluble salts of iron and zinc is generally precipitated in the form of hydroxides. Instead of the micronutrient being applied as inorganic salts, if they are fortified with organic manures, it has the benefit of chelation of the added nutrients and helps in slow release of nutrients for the crop plants. Natural chelates may be cheap and efficient source of augmenting the availability and the productivity level (Prasad *et al.*, 1994). Hence, an attempt has been made to study the effect of micronutrient fortified organic manures on the physico-chemical properties and nutrient availability in the saline-sodic soil of coastal ecosystem.

MATERIALS AND METHODS

The present laboratory investigation was conducted in the Department of Soil Science and Agricultural Chemistry, Annamalai University during April to July 2008. The soil used for the incubation experiment was saline-sodic in nature with an initial pH-8.88 and EC-2.16 dS m^{-1} . The treatment design of incubation experiment is Factorial Completely Randomized Design (FCRD) with the following treatments replicated thrice.

M₁ - Control

M₂ - ZnSO_4 fortification (75 % recommended level)
M₃ - ZnSO_4 fortification (100 % recommended level)
M₄ - ZnSO_4 fortification (125 % recommended level)

M₅ - FeSO_4 fortification (75 % recommended level)
M₆ - FeSO_4 fortification (100 % recommended level)
M₇ - FeSO_4 fortification (125 % recommended level)
M₈ - $\text{ZnSO}_4 + \text{FeSO}_4$ fortification (75 % recommended level)

M₉ - $\text{ZnSO}_4 + \text{FeSO}_4$ fortification (100 % recommended level)

M₁₀ - $\text{ZnSO}_4 + \text{FeSO}_4$ fortification (125 % recommended level)

In a plastic incubation container, 500g of air-dried 2mm sieved soil were taken and treated with above treatments. The recommended quantities of fertilizers for rice 120:38:38 Kg NPK ha^{-1} was added. The soil moisture were maintained at flooded level during the entire incubation period of 90 days. Periodic soil samples were collected at 30, 60 and 90 days after incubation and analyzed for pH, EC, OC, available N, P, K, DTPA-Zn and Fe using the procedure of Jackson (1973).

RESULTS AND DISCUSSION

The results obtained from the present investigation are summarized below :

Soil pH and EC:

The pH and EC values of the (Table 1) saline-sodic