

Research
Paper

Impact of zinc enriched compost on availability of zinc and zinc fractions, nutrients uptake and yield of rice (*Oryza sativa* L.)

See end of the paper for authors' affiliations

Correspondence to :

P. VEERANAGAPPA

Department of Soil Science and Agricultural Chemistry, University of Agricultural Sciences, G.K.V.K., BENGALURU (KARNATAKA) INDIA
Email : veera346@gmail.com

P. VEERANAGAPPA, H.C. PRAKASHA, VIJAY MAHANTHESH, K.R. ASHOKA, M.B. MAHENDRA KUMAR AND R. NAGARAJ

ABSTRACT

A field investigation was undertaken during *Kharif* 2008 at College of Agriculture, Shivamogga to study the impact of zinc enriched compost on availability of zinc and zinc fractions, nutrients uptake and yield of rice (*Oryza sativa* L.). The study revealed that uptake of nutrients by grain and straw was significantly higher in treatment package of practices followed by NPK + Zn-E compost at 15 kg ha⁻¹ and NPK + Zn-E compost at 10 kg ha⁻¹ treatments. Correlation studies revealed that the zinc fractions and soil chemicals properties showed positive relationship among each other. Soil chemical properties viz., pH, EC, OC, available N, P, K, exchangeable Ca, Mg, available S, DTPA Zn, Cu, Mn and Fe were positively and significantly correlated with the zinc fractions. Uptake of nutrients (N, P, K, Ca, Mg, S, Cu, Zn, Mn and Fe), yield were correlated positively with zinc fractions. Path coefficient analysis indicated that major zinc fractions available to rice are crystalline sesquioxide bound Zn, Res Zn, water soluble plus exchangeable Zn, Organically bound Zn fractions.

Veeranagappa, P., Prakasha, H.C., Mahanthesh, Vijay, Ashoka, K.R., Kumar, M.B. Mahendra and Nagaraj, R. (2011). Impact of zinc enriched compost on availability of zinc and zinc fractions, nutrients uptake and yield of rice (*Oryza sativa* L.), *Adv. Res. J. Crop Improv.*, 2 (2) : 203-207.

KEY WORDS : Zn-E compost, Zinc, Zinc fractions, Rice, ZnSO₄, Nutrient uptake

Zinc application in the enriched form may enhance the fertilizer use efficiency and increase the rice yield. The enrichment of organic manures with micronutrients not only enhances the rate of decomposition but also improves the nutrient status. Application of FYM with ZnSO₄ increased the DTPA-Zn content in soils (Devarajan, 1987). Zinc enriched organic manures improves the availability of micronutrients in soil by preventing their fixation and precipitation thereby enhancing the use efficiency of applied zinc, thus saving the cost on fertilizer. Rice is a most important staple food crop in world as well as in India. It serves as a major source of calories for about 60 per cent of the world population. Globally, it occupies an area of 147 m ha with production of 525 mt (Anonymous, 2007). India is the largest rice growing country, while China is the largest producer of rice. Rice provides 32.59 per cent of the dietary energy and 25-44 per cent of the dietary protein. In India, rice is grown in an area of 42.0 m ha with a production of 88.0 m t with an average production of 2.65

t ha⁻¹ (Anonymous, 2007).

RESEARCH PROCEDURE

Total zinc was determined by digesting the soil samples with hydrofluoric acid in closed polypropylene bottles. 100 mg of soil sample was transferred into a 250 ml polypropylene bottle, 2 ml of aquaregia was added to disperse the sample. Later, exactly 10 ml of hydrofluoric acid was added and the contents were shaken to dissolve the sample for a period of 2 to 8 hr. The residue present after the treatment was dissolved using saturated solution of boric acid and subsequently used for the determination of total Zn by atomic absorption spectrophotometry (Page *et al.*, 1982).

Soil Zn fractions were estimated by subjecting soils to fractionation using different extractions of volume 25 ml each. First 2.5 g soil was treated with 1 M Neutral Mg(NO₃)₂, followed by 0.05 M Cu(OAc)₂, 0.1M NH₂OH.HCl (pH 2), 0.2 M (NH₄)₂C₂O₄ (pH 3) and 0.1