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Effect of zinc enriched compost on soil chemical properties and nutrients availability

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SUMMARY

A field experiment was conducted on a Typic Haplustalf with sandy loam texture to study the effect of Zn-E compost on soil properties and distribution of zinc fractions in soil. The experiment was laid out in Randomized Complete Block Design with three replications. There were eight treatments comprising of recommended dose of compost, NPK fertilizers, $ZnSO_4$ and zinc enriched compost. Application of NPK + compost + $ZnSO_4$ at 20 kg ha^{-1} and different levels of Zn-E compost treated plots recorded significantly higher values of primary, secondary and micronutrients in soil at tillering, panicle initiation and at harvest stages. A slight improvement in soil pH, electrical conductivity and organic carbon content noticed higher values in NPK + zinc enriched levels followed by package of practice. The application of Zn-E compost increased the amount of zinc present in different fractions. Increase in amount of zinc present in different zinc fractions might be due to the higher solubility and mobility of the added zinc source. Water soluble plus exchangeable fractions significantly increased with the enrichment of compost.

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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 m t (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). Among the micronutrients, zinc is now being regarded as the third most limiting nutrient element in rice after N and P (Gupta, 1995). In spite of liberal application of N, P and K fertilizers, normal growth of high yielding varieties of crops could not be obtained due to little use of micronutrients. It has been estimated that zinc deficiency in soils is widespread and nearly 50 per cent of the Indian soils (Takkar, 1996) and 74 per cent of Karnataka soils are deficit in zinc (Rattan *et al*., 1997).

The poor crop recovery of micronutrients necessitates the adoption of improved techniques like use of synthetic chelates. Since it is a costly technology, resorting to enrichment with organic manures which acts as natural chelates seems to be economically viable. 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 (Singh, 1987).

EXPERIMENTAL METHODS

The study was carried out at College of Agriculture, Navile, Shivamogga, the experiment was laid out in Randomized Complete Block Design, replicated thrice.

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