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Urease activity in soil as influenced by integrated nutrient management in tomato-onion cropping system

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ABSTRACT

Integrated use of organic manures and inorganic fertilizers was evaluated for soil health, crop response and economic feasibility in tomato-onion cropping system through field experiment for two years during *kharif* and *rabi* seasons of 2002-03 and 2003-04 at A.R.I. Rajendranagar, Hyderabad. Application of organic manures in conjunction with inorganic fertilizers significantly improved Urease activity in soil. Based on the results of this study it could be concluded that the combined use of organic manures at 50 per cent level of N with 50 per cent N through inorganic fertilizers is suitable for obtaining optimum yields

Key words : Vermicompost (VC), Poultry Manure (PM), Neem Cake (NC), Farm Yard Manure (FYM), Recommended dose of Nitrogen (RDN).

Use of organic manures with inorganic fertilizers can take care of the widening N:P:K ratio and emerging problems of micronutrient deficiencies. Judicious use of organic manures with inorganic fertilizers is therefore, needed for maintaining productivity and sustainability. A number of researchers in India have reported the advantage of INM on crop yield and soil fertility (Prasad *et al.*, 1999; Mishra and Prasad, 2000). Addition of organics also increases efficiency of added chemical fertilizers by its temporary immobilization, which reduces leaching of plant nutrients. The fertility of the soil gets depleted by growing same crop year after year. This problem can be avoided by changing the crop in a scientific manner selecting appropriate crop rotation.

Keeping in view the significance of organic manures in maintaining the soil health and importance of vegetables in human nutrition, the present study was undertaken to critically examine the use of different sources of nutrients to obtain better yields and to maintain good soil health in tomato-onion cropping system under integrated nutrient management.

MATERIALS AND METHODS

The present study was conducted at Agricultural Research Institute, Rajendranagar, Hyderabad during 2002-03 and 2003-04. The soil was red sandy loam, classified under Alfisols. Soil samples were collected prior to layout of the experiment at 0-30 cm depth and were analyzed for urease activity following standard procedure. The soil was with initial urease activity (2.92 µg urea N g^{-1} soil h^{-1}). The treatments consisted of four levels (25, 50, 75 and 100 per cent) each of vermicompost (VC), poultry manure (PM), neem cake (NC) and farm yard manure (FYM), along with one treatment of recommended dose of inorganic fertilizers (RDN) and control. In total, there were eighteen treatments which were laid out in a randomized block design, each replicated thrice. For tomato the entire dose of phosphorus and potassium @ 60 kg/ha were applied as basal dose. Nitrogen was supplied according to the treatments one week before sowing through different organic manures. For Onion entire dose of phosphorus and potassium @ 40 kg/ha were applied as basal dose and Nitrogen was applied @ 80 kg/ha in three equal splits *i.e.*, at the time of 40, 60 DAT and at flowering stage. Manures were not applied.

The experimental data were analysed by the method of analysis of variance as suggested by Fisher (1948). All the characters were analysed to test the variance of different treatments at 5 per cent level of significance.

RESULTS AND DISCUSSION

Results indicated that the urease activity was significantly influenced by the application of different levels of manures in conjunction with inorganic fertilizers (Table 1 and Fig. 1). The activity of enzyme increased with increase in level of manure application in combination with fertilizers in both seasons. The highest enzymatic activity in all the manures was recorded at 100 per cent level, however, it was *at par* with 50 and 75 per cent of manure