

## SOIL UREASE AND ACID PHOSPHATE ENZYME ACTIVITIES AS INFLUENCED BY FYM AND ROCK PHOSPHATE

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### ABSTRACT

The influence of different sources of phosphorus in combination with different levels of farm yard manure on urease and acid phosphatase soil enzymes in swell shrink soil was conducted under laboratory condition during 1999-2000. The study comprised six levels of farm yard manure (viz., 0, 10, 20, 30, 40 and 50 Mg ha<sup>-1</sup>) in combination with single super phosphate @ 60 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> and rock phosphate @ 60 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> separately. The treatments were replicated thrice in factorial Completely Randomized Block Design. The results of incubation study revealed that the application of rock phosphate significantly increased the soil urease activity of swell shrink super phosphate throughout the incubation period. Whereas, the application of single super phosphate was found superior over rock phosphate for enhancing the acid phosphate activity except at 10<sup>th</sup> days incubation. The interaction effect of farm yard manure and phosphatic fertilizers were to be significant for both the soil enzymes at all incubation period. The highest mean urease activity (23.05 mg NH<sub>4</sub>-N 100g<sup>-1</sup> soil ha<sup>-1</sup>) was noticed at 10<sup>th</sup> days incubation period in the treatment of FYM @ 50 mg ha<sup>-1</sup> along with rock phosphate @ 60 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>. While, the highest mean acid phosphates activity (10.31 up 'P' g<sup>-1</sup> soil hr<sup>-1</sup>) was observed at 30<sup>th</sup> days incubation period in the treatment combination of FYM @ 50 Mg ha<sup>-1</sup> + single super phosphate @ 60 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup>.

**Key words :** Soil enzymes, FYM, SSP and Rock phosphate

A major agricultural research priority is to sustain soil productivity and to develop better methods to monitor changes in soil physical, chemical and biological properties as affected by fertilization and manuring. The use of organic manure held a prestigious position with firmness in the past but subsequently the introduction of high analysis fertilizers cost a shadow on their spread. It is well known that addition of organic manures has shown considerable increase in crop yield and significant influence on physical, chemical and biological properties of soil.

As per the present compilation based on about 9.5 million soil tests values for available phosphorus in Indian soils, it is seen that 49.3 per cent of districts and Union territories are in the low category, 48.8 per cent in the medium class and 1.9 per cent of the total districts have high phosphorus status. A number of physical, chemical and biological parameters have been developed to characterize phosphorus supplying power of soils. Soils with high content of amorphous iron and aluminium oxides have largest P-fixing capacities while soils containing high

amounts of clay also retain more phosphorus. The relative amounts of soil phosphorus fraction (calcium, aluminium and iron phosphates and reductant phosphates) present in any soil very dependent on weathering, pH, organic matter, parent material, cropping and fertilizer practices.

Nutrient cycling in soil involves biochemical and physical and chemical reactions with the biochemical processes being mediated by micro-organisms, plant roots and soil animals. All biochemical reactions are catalysed by enzymes. Most of the enzymes added to soil by decaying microbial tissues and by plant and animal residues are likely degraded by soil protease and what remains is incorporated with the humus.

The enzyme activity in soil has been found to be affected by both phosphatic fertilizers and farm yard manure. The urease and acid phosphatase are two important enzymes having important role in cycling of N and P, respectively.

The application of phosphatic fertilizers and farm yard manure is an important practice in the process of cultivation of field crops. Addition of organic matter through incorporation of green manure or recycling of crop residues in to soil influences the reactions of phosphate and its availability to plants. Phosphorus