



Research  
Paper

## Influence of organic amendments on soil enzyme activities, yield, yield attributes and economics of chickpea (*Cicer arietinum* L.) grown in vertisol

S.V. PATIL, S.I. HALIKATTI, M.N. SREENIVASA AND H.B. BABALAD

See end of the paper for authors' affiliations

Correspondence to :

**S.V. PATIL**

Department of Agronomy,  
College of Horticulture,  
SIRSI (KARNATAKA)  
INDIA  
Email : sangappavpatil@gmail.com

### ABSTRACT

A field experiment was conducted on clayey soil at Agricultural Research Station, Annigeri, UAS, Dharwad during *Rabi* season of 2009-10 and 2010-11 to study the influence of organic amendments on soil biological activities, yield, yield attributes and economics of chickpea (*Cicer arietinum* L.) grown in Vertisol. The soil application of various organic manures and foliar spray of liquid organic manures at flower initiation and 15 days after flowering (DAF) significantly enhanced the soil enzyme (dehydrogenase, phosphatase) activity, yield and yield attributes of chickpea *viz.*, number of pods per plant, 100-seed weight, grain yield and haulm yield. Among various treatment combinations, the application of enriched compost 1/3 + vermicompost 1/3 + glyricidia leaf manure 1/3 equivalent to 100 per cent RDN and foliar spray of panchagavya @ 3 per cent at flower initiation and 15 DAF has recorded significantly higher dehydrogenase (10.12  $\mu\text{g TPF/g soil/day}$ ) and phosphatase (22.33  $\mu\text{g PnP/g soil/hr}$ ) activity in soil, higher grain yield (2400 kg/ha), haulm yield (3423 kg/ha), number of pods per plant (66.38) and 100-seed weight (20.91 g) compared to other treatment combinations. Significantly higher B:C ratio (3.34) was recorded with  $\text{OM}_2$  among organic manures,  $\text{LM}_1$  (3.31) among liquid organic manures and  $\text{OM}_2\text{LM}_1$  (3.69) among combination of both.

Patil, S.V., Halikatti, S.I., Sreenivasa, M.N. and Babalad, H.B. (2011). Influence of organic amendments on soil enzyme activities, yield, yield attributes and economics of chickpea (*Cicer arietinum* L.) grown in vertisol, *Adv. Res. J. Crop Improv.*, 2 (2) : 235-240.

**KEY WORDS :** Organic chickpea, Enriched compost, Liquid organic manures, Dehydrogenase, Phosphatase enzymes

India is self sufficient in food grain production due to intensive cropping with high doses of chemical fertilizers to tap the potential of high yielding crop varieties in irrigated condition under a constant plant protection umbrella. However, modern chemical based agricultural practices have led to several new challenges, *viz.*, decline in productivity, degradation of soil and water resources, diminishing biodiversity and increase in environmental pollution that inturn influence the economic level of farmers. Under such situation organic nutrient management has a significant role in improving crop productivity as well as soil fertility.

Soil is a living tissue with regular complex biochemical reactions involving enzymes such as urease, dehydrogenase and phosphatase in soil catalyses biochemical reactions, which are responsible for nutrient cycling in soils and are directly concerned with carbon, nitrogen and phosphorus cycle. The dehydrogenase enzyme activity is commonly used as an indicator of biological activity in soils (Burns, 1978). Phosphatases are a broad group of enzymes that are capable of catalyzing

hydrolysis of esters and anhydrides of phosphoric acid (Schmidt and Lawoski, 1961). In soil ecosystem, these enzymes are believed to play a critical role in P cycles (Spier and Ross, 1978) as evidence shows that they are correlated to P stress and plant growth.

Pulses form an integral part of the vegetarian diet and the cheaper source of protein for the poor farmers of the Indian subcontinent. Among pulses, chickpea (*Cicer arietinum* L.) is one of the most important pulse crop extensively grown in India during *Rabi* season. Alternative sources of soil fertility build up through use of renewable resources like organic manure, liquid manures, biofertilizers and rock phosphate with phosphorus solubilizing bacteria has potential to improve soil fertility and crop yield on sustainable basis. The present study was under taken to know the influence of organic amendments on soil biological activities, yield, yield attributes and economics of chickpea grown in Vertisol.