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RESEARCH PAPER

Effect of organic manures and various levels of rock phosphate with PSB on soil physico-chemical properties, available NPK nutrients in soil and their uptake by chickpea (*Cicer arietinum* L.) grown in vertisol

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Abstract **:** A field experiment was conducted on vertisols at Agriculture Research Station, Annigeri, UAS, Dharwad during *Rabi* season of 2009-2010 and 2010-2011,to study the effect of organic manures and various levels of rock phosphate with PSB on soil physico-chemical properties, available NPK nutrients in soil and their uptake by chickpea (*Cicer arietinum* L.). The soil application of organic manures with varied levels of rock phosphate with PSB had significant influence on the soil physico-chemical properties, available NPK nutrients in soil and their uptake by chickpea crop. Among various treatment combination, compost 5t per ha with rock phosphate 200kg per ha recorded significantly higher soil organic carbon content(0.56%), higher available NPK in soil(233kg N, 22.75kgP_2O_5, 349.5kg K_2O / ha), higher NPK uptake by chickpea (119.51kg N, 15.79kg P_2O_5, 71.81kg K_2O / ha), higher grain yield(2130kg / ha), haulm yield (3300kg / ha), number of pods per plant (67.76), 100 seed weight(20.71g) and higher BC ratio(3.36) compared to other treatment combinations.

Key Words **:** Rock phosphate, Organic manures, PSB, Soil physico-chemical properties

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INTRODUCTION

Indian soils are poor in available phosphorus status, while pulses need greater phosphorus than most of the nutrients. Application of organic manures and rock phosphate with PSB secretes various organic and inorganic acids which help in increasing crop productivity by way of increasing in solubility of insoluble P, stimulating plant growth by providing hormones, vitamins and other growth factors. Several authors reported that, inoculation of PSB improves the physico-chemical, bio-chemical and biological properties of rock phosphate amended soil. It has been reported that the higher available phosphorus and aggregate stability levels, higher soil carbon levels and enzyme activities and lower soil pH were also reported due to inoculation of these PSB along with rock phosphate (Iman, 2008).

Chickpea is an important pulse crop extensively grown in India during *Rabi* season. Being leguminous crop, it utilizes atmospheric nitrogen fixation to meet its partial nitrogen requirement, and thus, occupies an important place in crop rotation in different region of the country. The results of large number of experiments on manures, fertilizers conducted across the country revealed that neither chemical fertilizers nor organic sources alone can sustain the soil productivity under high intensive cropping systems (Singh and Yadav, 1992). Therefore, under rainfed situation and less intensive

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