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# Effect of different sources of organic manures on soil properties under organic cotton production system

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## ABSTRACT

**We compared the nutrient uptake, nutrient status of the soil, moisture content, soil organic carbon and microbial biomass after the harvest of cotton genotypes. Cotton genotypes Sahana and Jayadhar were grown in black clay loam soil that had been exposed to different manurial treatments *viz.*, farmyard manure (FYM), vermicompost (VC), neemcake (NC) and glyricidia and compared with recommended dose of fertilizer (RDF) alone and integrated application of RDF + FYM. Cultivar Sahana recorded significantly higher (0.72 %) organic carbon (OC) as compared to Jayadhar (0.68 %).The increase in OC content with Sahana was to an extent of 5.88 % over Jayadhar. Among manurial treatments, RDF with FYM recorded significantly higher OC (0.78 %) over RDF alone (0.62%). The increase and buildup of available N, P and K was to an extent of 2.63, 17.37 and 3.87 per cent with Sahana. Soil available N, P and K were significantly higher with RDF + FYM (360.50, 60.50 and 495.33 kg NPK/ha, respectively) except RDF alone which was on par. The population of soil bacteria, fungi and actinomycetes ($85.40X10^4$,$52.66X10^3$ and $34.81X10^2$ CFU/g of soil, respectively) were significantly higher with FYM 100 per cent + VC 100 per cent as compared to RDF alone and other organic manurial treatments. Soil moisture content differed significantly as influenced by varieties and manurial treatments. However, no significant change in bulk density (BD) was observed with varieties and manurial treatments.**

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**Key words :** Organic carbon, Sahana, Jayadhar, Bulk density, Microbial population.

## INTRODUCTION

Organic manures play an important role as a substitute for mineral nutrients due to indiscriminate use of chemical fertilizers affecting soil health. The present structure and output of agricultural system could not be maintained without the advent and widespread use of synthetic or mineral fertilizers. Out of the major plant nutrient, nitrogen not only provides the greatest responses in crop yield from fertilizer addition but is also the most readily lost from the agroecosystem. Its use has increased dramatically in recent decades, but its losses have limited its use to full extent in any production system.

Nitrogen losses have a number of environmental consequences. In particular, N loss can negatively affect the quality of soils, groundwater, surface water and the atmosphere. The application of organic manures, generally added as a nutrient source not only improves soil properties including higher plant available water holding capacity and cation exchange capacity (CEC) and lower BD, but also foster beneficial microorganisms (Drinkwater *et al.*, 1995). Soil in organic production system losses less nitrogen into nearby water system compared to conventional production system. Conventional farming has played an important role in improving food and fibre productivity to meet human demands but has been largely dependent on intensive inputs of synthetic fertilizers, pesticides, and herbicides. These conventional farming practices and associated chemical inputs have raised many environmental and public health concerns (Horrigan *et al.*, 2002). Prominent among these are the reduction in biodiversity (Lupwayi *et al.*, 2001), environmental contamination (Horrigan *et al.*, 2002), and soil erosion (Reganold *et al.*, 1987). Public concerns over environmental health and food quality and safety have led to an increasing interest in alternative farming practices with lower inputs of synthetic chemicals and greater dependence on natural biological processes.

Looking into these myths and dogmas, the present investigations were initiated first time in organic cotton production system to asses the role of organic sources of nutrients on soil health including populations of soil flora.

## MATERIALS AND METHODS

The experiment was carried out at University of Agricultural Sciences, Dharwad, Main Agricultural Research Station (MARS), Karnataka, India. The soil

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