

## Influence of biofertilizers on soil physico-chemical and biological properties during cropping period

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A field experiment was carried out to find out the influence of biofertilizers on soil physico-chemical and biological properties during cropping period at Agricultural Research Station (ARS), Kovilpatti. The present study revealed that the biofertilizers inoculation resulted in the shift in the pH reducing the alkalinity slightly and the organic carbon content increased slightly in all the biofertilizer inoculated treatments compared to uninoculated soil. The available Nitrogen in soil was higher where *Azospirillum* was a component. The mycorrhiza and phosphobacteria increased the available soil Phosphorus status. The soil Potassium was found to be higher in co inoculation of Azophos and mycorrhiza. The soils of the biofertilizer inoculated plots exhibited a higher population of total bacteria, fungi and actinomycetes in general than initial sample indicating an enhanced soil biological activity.

Key words : Black cotton soil, Biofertilizers, Major nutrients and Soil microbes.

### INTRODUCTION

Soil although appears static and inert is in fact dynamic and versatile in nature beaming with biological activities and chemical reactions that goes on continuously unabated. Although the influence of biofertilizers and their favourable effects have been realized in many crops, the investigation on cotton is much limited particularly so, for the type of premonsoon sowing followed in rainfed system of the cotton belt of southern Tamil Nadu. The low soil organic matter and multiple nutrient deficiencies are the main reasons for lack of sustainability. Microbial inoculants which are ecofriendly and environmentally safe and of low cost technology, help to sustain the fertility of soil and improve productivity of rainfed agriculture as the farmers have to gamble with monsoon and they could not venture to go in for higher fertilizer option in premonsoon sowing fearing monsoon failures and consequent crop failure. The calcareous nature of this soil affects the availability of many micronutrients. These soils are inherently very fertile and predominantly used for growing cotton, millet, sorghum, soybean and pulses like, pigeonpea (Sehgal, 2000). The present study is proposed to investigate the influence of biofertilizers on soil physico-chemical and biological properties during the cropping period.

### MATERIALS AND METHODS

The influence of biofertilizers was investigated in a premonsoon sowing in black cotton soil under rainfed

conditions in KC-2 cotton variety at Agricultural Research Station (ARS), Kovilpatti during the year 2001-2002. The trial was laid out in RBD with 7 treatments with three replications in plots of 5 x 5 m size. The treatments were *Azospirillum*, Azophos, phosphobacteria, mycorrhiza, Azophos + mycorrhiza along with 75% of the recommended NPK of 40:20:0 kg ha<sup>-1</sup> for rainfed cotton. Plots with mere recommended full level of NPK and uninoculated control without NPK were maintained as check. In each treatment, the soil samples were collected at regular intervals and pH, organic carbon, nitrogen, phosphorus and potassium were estimated and their microflora like bacteria, fungi and actinomycetes were enumerated.

The soil samples were suspended in distilled water in 1:2 ratio (w/v) and the pH was determined using Elico digital pH meter. The organic carbon was determined by the wet digestion method (Walkley and Black, 1934). The available nitrogen was estimated by Alkaline permanganate method (Subbiah and Asija, 1956). The available phosphorous and potassium were estimated by colorimetric method (Olsen *et al.*, 1954) and Flame photometer (Stanford and English, 1949), respectively.

The microbial population in the soil was enumerated by serial dilution and plating the appropriate dilutions in different agar media. Aliquots of 1 ml of appropriate dilutions were plated in the nutrient agar (Rangaswami, 1966), Martin's Rose Bengal agar (Martin, 1950) and Kenknight's agar (Allen, 1953), respectively for total bacteria, fungi and actinomycetes. The plates were

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