

## Comparative efficacy of cocultured inoculants (Azophosmet) over individual inoculants of cotton under *in vitro* and *in vivo* conditions

R. POORNIAMMAL, S.P. SUNDARAM, K. KUMUTHA AND R.PARIMALA DEVI

Department of Agricultural Microbiology, Tamil Nadu Agricultural University, COIMBATORE (T.N) INDIA

(Accepted : December, 2008)

The effect of cocultured inoculant (Azophosmet) was studied under *in vitro* and *in vivo* conditions compared with other individual inoculants was investigated. The cotton seeds were treated with the Azophosmet, revealed the surviving ability of *Azospirillum* Sp7, PSB PB1 and PPFM CO 47 noticed up to 24 h on the seeds. Inoculation of cocultured inoculants recorded the maximum increase in root length; shoot length, germination per cent and vigour index of cotton plants followed by CO 47 under *in vitro* conditions. Cocultured inoculants (Azophosmet) was effective in enhancing rhizosphere population of individual bioinoculants, plant growth and seed cotton yield under pot culture conditions.

Key words : Azophosmet, Cotton, Coculturing and PPFM.

### INTRODUCTION

Microorganisms play a vital role in sustainable agriculture and are used in maintaining soil texture, health and fertility. To have sustainability in agriculture, it is necessary to establish a production system, which is efficient, profitable, eco-friendly, conserving or enhancing renewable sources. Biofertilizers are now well recognized as important component of sustainable agriculture. Strategies to meet the growing nutrient demands for a sustainable production of cotton in cotton based cropping systems is needed (Kairon and Venugopalon, 2000). The results available suggested that the plant growth can be optimized to obtain maximum yields using specific combinations of selected microorganisms.

Nitrogen is an essential plant nutrient that is most commonly deficient, contributing to reduced agriculture yields. Atmosphere contains about 78% nitrogen, but crop plants can not take this directly. Some crop plants have an association with nitrogen fixing microorganism. *Azospirillum* is associative nitrogen fixing bacteria make contribution of nitrogen fixation.

Phosphorus is another major plant nutrient required in optimum for proper plant growth. About 98% of the soils in india have inadequate supply of available phosphorus. The role of Phosphobacteria particularly *Bacillus* and *Pseudomonas* insoluble phosphate in soil make it available to the plant is well known.

The introduction of efficient PGPR belong to the genus *Methylobacterium* ubiquitous in the phyllosphere and rhizosphere of the plants. It is well documented that bacteria have the ability to synthesize phytohormones such as Indole acetic acid, cytokinin and gibberlic acid and this

organism utilize methanol as a source of carbon and energy source and promote plant growth, it also induce systemic resistance against fungal plant pathogen.

However, reports are scanty on the use of mixed inoculants. Hence there were previous attempts in our laboratory to study the feasibility of using the 'N' fixers, phosphate solubilizers and a plant growth hormone synthesizer as single and combined inoculations using three different method of application to cotton crop (Senthil Kumar and Sundaram, 2005). The possibilities are still to be explored to coculture all beneficial microorganisms in a suitable single medium for easy application at a reduced input cost. In the present study, it was attempted to coculture three bioinoculants in a single medium and using as a single bioinoculant for cotton is explored.

### MATERIALS AND METHODS

***Comparative efficacy of Azophosmet over individual inoculations on seed germination and seedling vigour of cotton under in vitro conditions:***

The cottonseeds were surface sterilized and were treated with the pure cultures and cocultured inoculants. The seedling vigour of the treated seeds was calculated by the standard germination paper method (ISTA, 1993).

The treatment details of this experiment are as : T<sub>1</sub> - Control, T<sub>2</sub> - Seed treatment with *Azospirillum* Sp7, T<sub>3</sub> - Seed treatment with phosphate solubilizing bacteria PB1, T<sub>4</sub> - Seed treatment with PPFM CO 47, T<sub>5</sub> - Seed treatment with Azophosmet.

***Germination (%) (ISTA, 1999):***

Germination test in quadruplicate of 10 seeds, were