RESEARCH PAPER

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Effect of *Azotobacter* spp. inoculum on growth of wheat variety trimbak

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Biofertilizer has been acknowledged as a substitute to chemical fertilizer to increase soil fertility and crop production in sustainable farming. Most of the farmers assume that chemical fertilizer gives more yield than the biofertilizer, ignoring environmental and long term losses. This study is done to test the efficiency and efficacy of the biofertilizer in opposition to the chemical fertilizer and in additions to this comparison also done among the four species of *Azotobacter* for their aid in increase in yield and biomass of wheat crop. The field experiment was conducted during *Rabi* 2006-07 season using randomized Block Design and Trimbak variety were used for sowing in 21 plots. About nine parameters of wheat crop were selected and intermittently readings were taken at 30, 60, 90 days of interval to observe alteration, due to use of biofertilizer, chemical fertilizer and some plots were kept as a control for comparison. ANOVA were used to test the significance in treatments.

Key words : Biofertilizer, *Azotobacter*, Wheat, Chlorophyll

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INTRODUCTION

Wheat is a largest used food crop in India. Mainly cultivation is done in Maharashtra, Punjab, Andhra Pradesh, Gujarat etc; Chemical fertilizers are mostly used for production of wheat, chemical fertilizers are harmful and cause soil pollution. This can affect product yield. Biomagnifications occurs which leads to disturbance in food chain (Merrington G, 2001). The cost of chemical fertilizer is increasing day by day and also not economical due to leaching and volatilization losses. Various kinds of biofertilizer can be used for this purpose. Nitrogen is main component for plant growth. Therefore, biofertilizer have achieved a special significance in modern agriculture. Biofertilizer are the good available choice in our hand to supply essential nutrients to the crop in biological ways without deleterious effect. Nitrogen fixing bacteria fixes nitrogen. Thus they are used as biofertilizer for many crops e.g. brinjal, cotton, wheat and groundnut (Tulsa Ram, 2005). Nitrogen fixing bacteria fixes nitrogen [Non-symbiotically] *Azotobacter*, *Clostridium* and [symbiotically] *Rhizobium*.

The genus *Azotobacter* comprises large, Gram-ve obligate aerobic rods, capable of fixing nitrogen non-symbiotically. It is roughly estimated that *Azotobacter* spp. can fix 10 to 15 kg. N_2/ha/annum (Badgire D.R, 1976). *Azotobacter chroococcum* is used as a bioinoculant known in benefit a wide variety of crops due to secretion of growth promoting substances, Vitamin B, antifungal, metabolites and phosphate volatilization which increase seed germination and plants stand and also improve the initial vigour of inoculated plants (Subba Rao, 1993). *Azotobacter* fixes atmospheric nitrogen in the rhizosphere region *i.e.* soil around the seedling or trees. Biofertilizer applied to seed or seedlings, bacteria remain around seeds or seedlings and use organic carbon for their metabolism. When seeds are germinated or seedlings set in soil they leave or exude root exudates which become food for these bacteria. They grow on these substances which include sugars, organic acids, and amino acids and fix atmospheric nitrogen most efficiently. Nitrogen so fixed by these bacteria becomes available to plants after dead and degradation of bacterial cells.

RESEARCH METHODOLOGY

Field experiment study was conducted at Biotechnology Department, Padmashri Vikhe Patil College, Loni. The soil of selected plot was medium black. The source of *Azotobacter* spp. was obtained from Botany department of P. V. P. College, Loni. For the experiment following *Azotobacter* spp. were used.