

Effect of biofertilizers on the growth of *Vicia faba* cv. T-41

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SUMMARY

A pot experiment was conducted during the *Rabi* season of session 2006-2007 in G.F. (P.G.) College Shahjahanpur on *Vicia faba* cv. T-41 in order to study the effect of biofertilizers *i.e.* *Azospirillum* and *Rhizobium* in various concentrations (0.1, 0.25, 0.50, 0.75, 1.0 per cent) on different growth parameters (shoot length, root length, shoot fresh weight, root fresh weight, shoot dry weight, root dry weight and fruits per plant). A maintenance dose of N P K was also given at the rate of 50:100:50 kg/ha to maintain the growth of plants. Seed inoculation with both the bacteria *Azospirillum* and *Rhizobium* showed the considerable increase in all the growth parameters over the uninoculated control. In case of *Azospirillum*, seeds treated with 0.50 per cent bacterial culture showed the best results while in seeds treated with *Rhizobium* 0.25 per cent bacterial culture showed better results with respect to all growth parameters *i.e.* shoot length, root length, shoot fresh weight, root fresh weight, shoot dry weight, root dry weight and fruits per plant. Among both the bacterial treatments *Rhizobium* was better than *Azospirillum* because *Rhizobium* showed the better results with less amount of its culture. Thus *Rhizobium* is strongly recommended as suitable biofertilizer in improving growth parameters of *Vicia faba* cv. T-41.

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Modern agriculture is heavily dependent on the fossil fuel based inputs such as inorganic fertilizers, pesticides, herbicides and energy intensive machinery. Large-scale use of chemical fertilizers causes various problems. Continuous and unbalanced use of chemical fertilizers is leading to decrease in crop yield. Frequent use of chemical fertilizers at a higher rate also causes problems like soil health deterioration, ground water pollution and atmospheric pollution etc. The problems like leaching, volatilization, denitrification of nitrogen and deposition of non-available phosphorus in soil are also the resultants of heavy use of chemical fertilizers. Moreover, the nitrogenous fertilizers are already in short supply and expensive because industrial fixation of nitrogen is an energy intensive process, is solely based on mineral oils *i.e.* petroleum products which are non-renewable resources.

Biofertilizers, being natural products are eco friendly in nature, assume great significance in organic farming.

In India, majority of the farmers are small and marginal. Therefore, use of biofertilizers in conjunction with organic and inorganic fertilizers offers a great opportunity for sustainable crop production. Biofertilizers are cost effective and inexpensive source of plant nutrients do not require non-renewable source of energy during their production. They improve crop growth and quality of the product by producing plant hormones and also help in sustainable crop production through maintenance of soil productivity. They are useful as biocontrol agents, since they control many plant pathogens and harmful microorganisms.

Azospirillum and *Rhizobium* are important microorganisms widely distributed in agricultural lands as well as in the rhizosphere of the plants also. They are found as free living, symbiotic, heterotrophic, aerobic bacteria and may also grow under reduced conditions. *Azospirillum* has ability to fix molecular nitrogen (5-20 kg/hectare) from atmosphere independently without association, with roots, called asymbiotic/free living nitrogen fixers, while *Rhizobium* fixes atmospheric nitrogen by living in symbiotic relationship with the roots of leguminous plants. Thus most of the biofertilizers fix nitrogen and increase plant yield up to 80-90 per cent (Gahukar, 2005). It is with this aim an attempt has been made in present work to study the effect of biofertilizers on the growth of *Vicia faba* cv. T-41.

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