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Effect of Biofertilizers (PSB, Azatobactor and Their Combination) on Plant Survival of *Phaseolus aureus* Roxb. Variety Radiatus (Mung/Green Gram)

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Abstract

Mung bean is an important pulse crop known for its nutritional and medicinal uses. As the seeds of this plant contain 40-50% of protein, which is highly digestible. Also the roots of this plant are thought to be narcotic, used to relieve bone pain, seeds, raw or boiled used in poultices, the green gram feeding decreases the cholesterol level in blood. So the present problem is that its cultivation is still lower due to lack of sustainable technology and unavailability of nutrients in the soil. It is a need of hour to increase the yield production of this pulse crop, if its nutritional and medicinal values are taken into consideration. Besides these values it also improves the soil fertility with the help of soil bacterium, *Rhizobium* that lives in the root nodules of this plant. The present study was done to assess the beneficial effects of biofertilizers like PSB and Azatobactor to overcome the problem. Besides, these biofertilizers increase the crop yield, survival percentage. They also live ecofriendly and are pollution free. These biofertilizers increase the soil fertility and mobilize the availability of nutrients in the soil by their biological activity.
Key Words : Mung plant, Survival percentage, PSB, Azatobactor.

Mung bean/green gram (*Phaseolus aureus* Roxb. var *radiatus*) belongs to family Fabaceae with diploid chrompsome no. 2n=22. It is an important world crop for providing an inexpensive source of vegetable protein. It has been estimated that it contains 40-50% of protein, which is highly digestible. It has great nutritional and medicinal and medicinal importance. Seeds of green gram are diuretic, seeds boiled, seeds of raw, used in poultices, also they are used for rheumatism, nervous system disorders, liver affictions and anorexia. Roots of this plant are thought to be narcotic, used for bone pains. Study showed that green gram feeding decreases the cholesterol level in blood. It is an annual, 0.3 to 1.5 m tall, errect or suberect plant, sometimes slightly twining at the tips. It is a deep rooted plant, much branched with long petioles. The leaves are alternate, trifoliate and dark or light green. The inflorescence is an auxiliary raceme. Seed germination is epigeal. It plays important role in maintaining the soil fertility, through symbiotic nitrogen fixation with root nodule bacterium (*Rhizobium*). This bacteria helps in improve nodulation, nitrogen fixation, crop growth and yield. It is cultivated in all continents of the world. In India its cultivation is limited. Though green gram is an important crop in MP and is a promising crop to meet the protein requirements of the future generation, but its production yield is still lower, due to low fertility and non-availability of improved varieties. To meet the present global demand, the production of this crop has to be improved by adopting sustainable technology. Azatobactor application to soil mobilize the availibility of nutrients in the soil by their biological activity this increase the soil fertility. Green gram on symbiotic association with soil bacterium *Rhizobium* forms nitrogen fixing root nodules which are agronomically significant (1—10).

Methods

The material, *Phaseolus aureus* Roxb. used in this experiment was procured from Sehore Agriculture College, Sehore (MP). The biofertilizer like PSB and Azatobactor were brought from Agro Industries, Bhopal. These biofertilizer can add 20—200 KgN/ha (by fixation), liberate growth promoting substances

Table 1. Percent of survival of mung bean due to treatments of Azotobactor and PSB.

Treatment	Survival (%) 2008	2009
Control	63	60
Azatobactor	77	58
PSB	52	50
Azatobactor + PSB	69	59
SE ±	0.96	0.93
CD	1.91	1.80

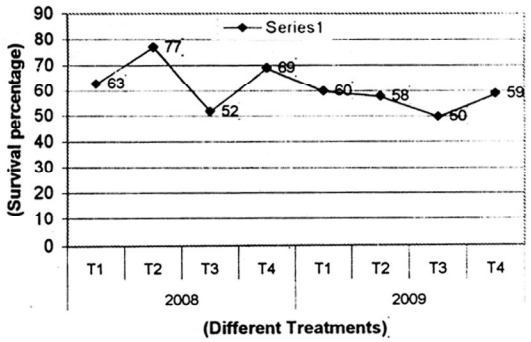

Figure 1. Variaties of survival of mung been different treatments. T_1 (Control), T_2 (Azatobactor treatment), T_3 (PSB treatment) and T_4 (PSB + Azatobactor treatment).

and increase crop yield by 10—50%. They are cheaper, pollution free,based on renewable energy sources and also improve soil tilth.

The experiments was conducted at Saifia Science PG College, Bhopal. For the cultivation of this pulse crop black soil is necessary. While performing this experiment all the parameters were taken into consideration. Prior to sowing the seeds were surface sterilized with 0.1% of mercuric chloride ($HgCl_2$) for 3 min and subsequently washed in distilled water for 6—7 times. After this the seeds were sown in sterilized pots in randomized block design in two sets. After germination the seedlings in pots were given different biofertilizer treatments.

One set of seedling without treatment (T_1) i. e. control represents generation first (G_1). The another set of three traits with different biofertilizer treatments i. e. the second generation (G_2) with Azatobactor treatment (T_2), third generation (G_3) with PSB treatment (T_3) and fourth generation (G_4) with combined treatment of Azatobactor and PSB (T_4). After giving these treatments to the mung bean seedlings, the survival rate and quality of the plant increases as compared to control. Effect of these biofertilizers was studed on the survival of the plant as compared to control. The data were analyzed following the analysis of variance (ANOVA) technique and the results were analyzed statistically.

Results and Discussion

Phaseolus aureus Roxb., a leguminous plant on symbiotic association with soil bacterium, *Rhizobium* forms nitrogen fixing root nodules which are agronomically significant as it provides an alternative to the use of energy expensive nitrogenous chemical fertilizers. On a global basis these symbiotic association between legumes and *Rhizobium* may reduce 70 million tons of atmospheric nitrogen to ammonia per annum. This plant improves soil fertility through their nitrogen fixing ability.

In 2008, when the mung seedlings were grown in the pots without treatment (T_1) i.e. control, the survival percentage was recorded as 63 and 60 respectively. When the same seedlings in other pots were given the treatment (T_2) of Azatobactor, the percentage of survival was 77 and 58 in the same years respectively. In the third treatment (T_3) of PSB to seedlings, the survial percent was 52 and 50 in 2008 and 2009. At the fourth treatment (T_4) of both PSB and Azatobactor the survival rate was recorded as 69% in 2008 and 59% in 2009 (Table 1, Fig. 1). When the results were analyzed statistically, it showed both standard error and critical differnce. The standard error (SE ±) and critical difference (CD) in 2008 was recorded as 0.96% and 1.91% respectively but it was 0.93% (SE ±) and 1.80 (CD) in 2009.

The Azatobactor treatment alone showed the survival percentage (77) more in 2008, as compared to control. But the survival of mung plant showed variation, it was all due to environmental conditions. But the biofertilizer treatments increased the survival percentage of mung plant (Table 1).

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