



ISSN: 2319-9490

## RESEARCH ARTICLE

# RESPONSE OF BIOFERTILIZERS ON GROWTH ATTRIBUTES OF BLACK GRAM *VIGNA MUNGO* (L.) HEPPER

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Received 21<sup>st</sup> February, 2018; Accepted 21<sup>st</sup> March, 2018; Published Online 06<sup>th</sup> April, 2018

### ABSTRACT

Bio fertilizers are commonly called microbial inoculants which are capable of stoping important nutritional elements in the soil from non- usable to usable form by the crop plants through their biological processes. For the last one-decade, biofertilizers are used in large quantity as an eco-friendly approach to reduce the use of chemical fertilizers, improve soil fertility status and for improvement of crop production by their biological activity in the rhizosphere. The seeds of *Vigna mungo* were treated with bio-fertilizers for 45 days as compared to untreated. It was observed that the seeds treated with experimental bio-fertilizer *Rhizobium* showed excellent result in the morphological and bio-chemical parameters.

**Key words:** Biofertilizer, *Rhizobium japonicum*, *Vigna mungo* (L) Hepper.

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**Citation:** Palaniraja, K. 2018. "Response of biofertilizers on growth attributes of black gram vigna mungo (l.) hepper" *International Journal of Current Research in Life Sciences*, 7, (04), 1495-1496.

### INTRODUCTION

Biofertilizer like *Rhizobium*, *Azotobacter*, *Azospirillum* and blue green algae (BGA) are in use since long time ago. *Rhizobium* inoculants is used for leguminous crops. Bio fertilizers are mostly named as microbial inoculants which are capable of controlling some of the nutritional element in the soil from useless to useful by the crop plant from their biological processes. Since many years biofertilizers are used in large amount as an eco-friendly process which has reduced the use of chemical fertilizer. This improve soil fertility status and for enhancement of crop production by their biological activity in the rhizosphere. Vast researches were carried out on the use of bacteria, (*Azotobacter*, *Azospirillum*, *Rhizobium*, *phosphobacteria*] VAM fungi as biofertilizers supply nitrogen and phosphorous improves the growth of several crop plants was observed (Marwaha, 1995). Dual inoculation of VAM and bacteria biofertilizers proved more effective in increasing the growth of different crop plants (Panwar, 1993). In recent years, biofertilizers have started on large scale as a promising component of integrating nutrient supply system in agriculture. Our whole system of agriculture depends in many important ways, on microbial activities and there appears to be a tremendous potential for making use of microorganisms in increasing crop production.

Some of the small or microbe fertilizers or biofertilizers are important part of our environment for sustainable agricultures practices (Bloemberg 2000). Main biofertilizers are nitrogen fixing bacteria, phosphate solubilizing and plant growth promoting microorganism (Goel 1999). Most of the biofertilizers benefiting the crop production such as *azotobacter*, *azospirillum* blue green algae (BGA) and *Rhizobium* (Hegdel999). Many experiments were conducted to study the effect of biofertilizers alone or in combination with other chemical fertilizers (Patel *et al.*, 1992). Pulses play a vital role in Indian agriculture. Pulses are important sources of food. They are very rich in protein, particularly to the vegetarian who constitute the bulk of population in India. Blackgram is an annual food legume. It is very nutritious and is recommended for diabetics. Biofertilizers are small microbes which can be created which contain living cells of nitrogen fixing and phosphate solubilizing microorganism for treatment of seed or soil. They are organic product which contains living cells of various types of microorganism, which are capable of converting important elements from unavailable to available from through biological processes (Vessey *et al.*, 2003). They are converting the area with the objective of increasing such microorganisms and accelerate microbial process to augment to extend of the availability of the nutrient in a form which can easily assimilated by plant (Subba-Rao *et al.*, 1986). The findings of previous studies in the field show that the biofertilizers are widely used in several countries with proven results in all kinds of plants and trees (Victor and Ruben, 2002). Nitrogen is an essential nutrient for the growth of

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**Table 1. Effect on morphological parameters of black gram plants treated with Biofertilizers**

TREATMENTS	(A) Number of leaves/plant (cm)	(B) Length of leaves (cm)	(C) Breadth of leaves (cm)	(D) Length of Plant (cm) (above ground)	(E) Shoot length (cm)	(F) Root length (cm) (below ground)	(D+F) Total length of plant (cm)
CONTROL	5.9	5.6	3.0	20.3	14.9	5.9	25.7
<i>Rhizobium</i>	7.2	6.4	3.3	25.2	21.4	6.1	33.6
<i>Azospirillum</i>	7.0	6.1	3.1	24.2	19.6	6.0	30.4

**Table 2. Effect on biochemical parameters of *Vigna mungo* (L.hepper) treated with bacterial Biofertilizer**

Sample	Total Carbohydrate Content	Total Chlorophyll Content	Total Protein Content
Control	2.15	0.823	2.5
<i>Rhizobium</i>	2.25	0.874	3.2
<i>Azospirillum</i>	2.24	0.865	2.9

different crops; its application is beset with economic burdens and environmental risks. Biological nitrogen fixation not only improves plant growth but also helps to minimize the use of chemical nitrogen fertilizers, so that the cost of production and environmental risks are reduced.

## MATERIALS AND METHODS

Seeds of *Vigna mungo* (L.Hepper) var Vamban 5 was used for the study which was obtained from pulse research station. This experiment was conducted at pot culture yard, faculty of agriculture, annamalai university during 2017 and this was laid out in RBD with three replications. Plant protection measures were carried out at the recommended level.

### Seed treatment with biofertilizers

The seeds were treated with *Rhizobium japonicum* and *Azospirillum* individually with rice starch in a container to form a slurry. *Vigna mungo* seeds were soaked in the slurry and kept overnight for germination.

### Inoculation of seeds treated with biofertilizers

Nearly 100 undamaged healthy seeds of were selected for each experiment. After selection, the seeds were sowed at equal depth in 10 pots with soil. 10 control pots were also maintained by sowing untreated seeds. The plants were watered at regular interval and the growth parameters were recorded after 45 days of sowing. The morphological parameters such as number of leaves, length of leaves, breath of leaves, length of plant, shoot and root length were measured for each treatments were measured. The bio chemical parameters such as the total chlorophyll, total protein content and total carbohydrate content were analysed.

## RESULTS AND DISCUSSION

It was observed that when the biofertilizer *Rhizobium japonicum* was applied to *Vigna mungo* (L.Hepper), the plant showed excellent growth as compared to control. In general all plants treated with bio fertilizers showed significant improvement in the parameters like, number of leaves, length of leaves, breadth of leaves, length of plant, shoot length and root length (Table 1). The total chlorophyll content levels of

*rillum* and control. The same results were observed in carbohydrate and protein content (Table 2).

## Conclusion

The seeds treated with bacterial biofertilizer *Rhizobium japonicum* showed significant increase in growth of the plant-*Vigna mungo* (Lhepper). The morphological parameters such as number, of leaves, length of leaves, breadth of leaves, length of plant, shoot length, root length, and total length of plant showed significant increase. Because it is cost effective and helps in keeping the environment pollution free.

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