



## EFFECT OF PESTICIDES AND INSECTICIDES ON BIOFERTILIZER

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**ABSTRACT**

Biofertilizers increase in the use of fertilizers leads to increased crop productivity. Chemical fertilizer leads to damage in soil texture and raises other environmental problems. Therefore, the use of biofertilizers is both economical and environment friendly. The Present study deals with the effect of pesticides and insecticides on biofertilizer. Many bacteria and fungi can enhance plants growth. These two pesticides (Quinolphos and Urea) and two Insecticides (Monodhan and Dimethoate) were used to observe their effect on bio fertilizer. MRS broth was used for production of *Lactobacillus acidophilus* and *Lactobacillus fermentum* and NAM broth was used for production of *Bacillus subtilis*. Biofertilizer were obtained by centrifugation from *Lactobacillus acidophilus*, *Lactobacillus fermentum* & *Bacillus subtilis*. When these biofertilizer were mixed with insecticides (Monodha & Dimethoate) and pesticides (Quinolphos & Urea) maximum growth of plants were observed.

**KEY WORDS:** Biofertilizer, Insecticides, Pesticides, Centrifugation, Crop Productivity.

**INTRODUCTION**

Fertilizer is widely used to supply essential nutrients for plant to increase yield. In fact, yield of most crop plants are increase linearly with the amount of fertilizer that they absorb. (Haddad *et al.*, 1997). Micro-organism employed to enhance the availability of nutrients, nitrogen (by fixing atmospheric N<sub>2</sub>) & phosphorus (by solubilizing soil phosphorus), to the crops called Bio-fertilizer (Anandraj *et al.*, 2001; Biswas *et al.*, 2001) (Young, 1994). The main sources of bio-fertilizers are bacteria, fungi and cyanobacteria (blue green algae). Enhanced grain and straw yields resulting from the use of cyanobacterial strains as bio fertilizers were reported by Fayez (1985). Nitrogen fixing cyanobacteria or blue green algae is ecologically input in rice cultivation in the tropics. Field experiments were conducted to compare the efficiency of two newly developed carrier based BGA bio-fertilizer. (Khush *et al.*, 1992). The effect of plant associated microorganism on plant health and growth; they enhance stress tolerance, provide disease resistance, aid nutrient availability and uptake and promote biodiversity. (Liou *et al.*, 2002; Satyendra, *et al.*, 2010). Plants have a special relationship with bacteria and fungi. They provide the plant with nutrient, resistance against disease and ability to combat worst climatic conditions (Alkhani *et al.*, 2006). Biofertilizers are eco-friendly fertilizers, which are being used to improve the quality and fertility of the soil. Bio-fertilizers are made from biological wastes and they do not contain any chemicals. They are beneficial to the soil, as they enrich the soil with micro-organisms that help in producing organic nutrients, which in turn help the soil to fight disease. They also restore the depleted nutrients of the soil. Many PGPR stimulate the growth of plants by helping to control pathogen. They are often known as microbial fertilizers or microbial inoculants. Inoculation with a mixture of *Azotobacter* & *Azospirillum* with full doses of rock phosphate and inorganic N-fertilizer, in

combination with inoculation with vascular arbuscular mycorrhiza (VAM), improved growth of both datura (*Datura stramonium*) and ammi (*Ammi visnaga*: Fam. Umbelliferae) plants (Sharaf, 1995). Bio fertilizer is a natural organic fertilizer known that help to provide all the nutrients required by the plants & helps to increase the quality of the soil with a natural microorganism environment. Biofertilizer is culture of micro organism used for inoculating seeds or soil or broth under ideal condition to increase the availability of plant nutrients (Singh *et al.*, 2006). The interaction among the rhizosphere, the root of higher plants and the soil borne microorganism has a significant role in plant growth & development. The organic compound, released by roots and bacteria play an important role in the uptake of mineral nutrient (Marozsan *et al.*, 2005).

A pesticide is a substance or mixture of substances used for preventing or controlling the damage caused by pest. The pests may be insects, plant diseases, fungi, weeds, nematodes, birds and fish. Many pesticides are poisonous to human. When pesticides enter in to a organism via water or any other process it participate in the regular metabolism, by which a pesticides or chemical, changed into one or more different chemical within a living organism as a result metabolic product, or metabolite, many become either more toxic than the original pesticides ingredient.

**In the present study Quinolphos used:** Quinolphos is a chemical pesticides used as an insecticides.

**Effect of Pesticides on human health:** The effect of pesticides on human health is worst. Due to pesticides there can be number of diseases occurs like, lungs cancer, Chronic liver damage, chronic hepatitis, endocrine and reproductive disorders, immuno suppression, cytogenic effects, breast cancer, polyneuritis *etc.*

**Production of biofertilizer**

Production of *B. subtilis*, *L. acidophilus* and *L. fermentum* as Biofertilizer-

For the production of bio-fertilizer 500 ml MRS broth was prepared.

❖ Pure culture of bacteria was inoculated in broth & incubated for 2 days.

- ❖ After incubation, centrifuged Nutrient broth at 10,000 rpm for 10 minutes. Supernatant was discarded and the Pallet was dissolve in distilled water.
- ❖ This solution was collected in a beaker and used as a bio-fertilizer.

**TABLE 1:** Different types of organism isolated from soil & these organisms used for the production of biofertilizers

(1) <i>Bacillus subtilis</i>	(2) <i>Lactobacillus acidophilus</i>	(3) <i>Lactobacillus fermentum</i>
Domain- Bacteria	Kingdom:-Eubacteria	Kingdom:-Bacteria
Phylum-Firmicutes	Class:- Bacilli	Division:-Firmicites
Class- Bacilli	Order:Lactobacillales	Class:- Bacilli
Order- Bacillales	Family:-Lactobaceae	Order:- Lactobacillales
Family- Bacillaceae	Genus:- <i>Lactobacillus</i>	Family:- Lactobaceae
Genus- <i>Bacillus</i>	Species:- <i>acidophilus</i>	Genus:- <i>Lactobacillus</i>
Species- <i>subtilis</i>		Species:- <i>fermentum</i>
<b>Characteristics</b>	<b>Characteristics</b>	<b>Characteristics</b>
1) <i>Bacillus subtilis</i> is a Gram Positive bacterium commonly found in Soil.	1) <i>Lactobacillus acidophilus</i> is bacteria that normally live in the human small intestine and vagina.	1) <i>Lactobacillus fermentum</i> is a Gram positive bacteria in the genus Lactobacillus.
2. <i>B. subtilis</i> is rod shaped and has the ability to form a tough, endospore.	2) <i>Lactobacillus acidophilus</i> is rod shaped Gram positive bacterium.	2) It is associated with active dental caries.
3. <i>B. subtilis</i> - Growth temperature 30 <sup>0</sup> c.		3) It has been found in sourdough.

**TABLE 2-** The effect of seeds inoculation with *Bacillus subtilis* on Green gram plant

Treatment	2 <sup>nd</sup> day (in cm.)	4 <sup>th</sup> day (in cm.)	6 <sup>th</sup> day (in cm.)	8 <sup>th</sup> day (in cm.)	10 <sup>th</sup> day (in cm.)	Final-Initial average (in cm.)
Control	4.04	8.5	12.6	17.3	19.7	13.78
Bio-fertilizer	3.72	9.02	11.4	16.4	23.2	18.38
BF +Urea	4.6	8.37	10.1	17.9	24.74	19.22
BF + Quinolphos	3.5	9.75	10.3	18.0	28.5	<b>23.50</b>
BF + Dimethoate	5.08	10.7	12.7	20	23.7	18.00
BF + Monodhan	4.22	8.5	16.4	22.82	23.2	<b>17.30</b>
BF + Monodhan + Urea	3.54	8.37	16.2	24.5	23.1	17.60
BF + Quinolphos + Dimethoate	4.02	7.23	11.4	15.7	20.96	16.11



**FIGURE 1:-** Effect of Seed inoculation with *B. subtilis* on Green gram plant

**RESULT**

- Bio fertilizer gave beneficial effect.
- Maximum growth (23.5 cm) was observed in the pot in which Biofertilizer with Quinolphos (Pesticides) was added. It increases the growth of plants.

- Minimum growth (17.3 cm) was observed in the pot in which Biofertilizer and Monodhan (Insecticides) was added. It decreases the growth of plants.

**TABLE 3-** The effect of seeds inoculation with *L. fermentum* on Brinjal plant

Treatment	2 <sup>nd</sup> day (in cm.)	4 <sup>th</sup> day (in cm.)	6 <sup>th</sup> day (in cm.)	8 <sup>th</sup> day (in cm.)	10 <sup>th</sup> day (in cm.)	Final-Initial average (in cm.)
Control	2.0	5.0	5.8	6.21	6.8	5.80
Bio-fertilizer	2.48	6	6.54	7.1	9.04	9.34
BF +Urea	3.21	6.3	7.1	9.20	10.92	8.50
BF + Quinolphos	4.2	6	6.9	8.14	9.82	<b>7.62</b>
BF + Dimethoate	3.1	4.8	5.6	7.46	9.05	8.02
BF + Monodhan	3.10	4.2	5.6	7.2	11.9	9.40
BF + Monodhan + Urea	3.72	5.1	5.9	9.14	9.14	8.17
BF + Quinolphos + Dimethoate	3.14	4.9	6.1	8.36	11.28	8.18



**FIGURE 2:** Effect of Seed inoculation with *Lactobacillus fermentum* on Brinjal plant

- Bio fertilizer gave beneficial effect.
- Maximum growth (9.40 cm) was observed in the pot in which Biofertilizer and Monodhan (Insecticides) was added. It increases the growth of plants.
- Minimum growth (7.62 cm) was observed in the pot in which Biofertilizer and Quinolphos (Pesticides) was added. It decreases the growth of plants.

**TABLE 4:** Effect of seeds inoculation with *Lactobacillus acidophilus* on Tomato plant

Treatment	2 <sup>nd</sup> day (in cm.)	4 <sup>th</sup> day (in cm.)	6 <sup>th</sup> day (in cm.)	8 <sup>th</sup> day (in cm.)	10 <sup>th</sup> day (in cm.)	Final-Initial average (in cm.)
Control	3.2	3.62	4.16	6.76	6.9	4.70
Bio-fertilizer	3.9	3.8	5.0	7.44	8.62	6.52
BF +Urea	2.9	4.0	5.4	8.7	9.26	<b>7.06</b>
BF + Quinolphos	2.7	3.6	4.8	7.1	7.4	5.50
BF + Dimethoate	2.1	3.12	4.9	5.92	6.2	4.38
BF + Monodhan	2.0	3.5	5.2	7.4	7.3	4.98
BF + Monodhan + Urea	2.1	3.8	4.2	6.72	7.1	5.30
BF + Quinolphos + Dimethoate	2.8	3.7	4.1	6.60	7.7	6.43



**FIGURE 3:-** Effect of Seed inoculation with *Lactobacillus acidophilus* on Tomato plant

- Bio fertilizer gave beneficial effect.

- Maximum growth (7.06 cm) was observed in the pot in which Biofertilizer and Urea (Pesticides) was added. It increases the growth of plants.
- Minimum growth (4.38 cm) was observed in the pot in which Biofertilizer and Dimethoate (Insecticides) was added. It decreases the growth of plants.

## DISCUSSION

All bio fertilizers *B. subtilis*, *L. fermentum* and *L. acidophilus* were found to be effective in plant growth, On using *B. subtilis* as bio fertilizer average plant growth increase from 13.78cm to 18.38cm. When *B. subtilis* used with Quinolphos (Pesticides) plant growth was 23.5cm which is maximum. On using *L. fermentum* as bio fertilizer average plant growth increase from 5.8cm to 8.39cm and when Monodhan (Insecticides) used with bio fertilizer (*L. fermentum*) average plant growth was found to be 9.4cm which is more than biofertilizer with Dimethoate. On using *L. acidophilus* as bio fertilizer average plant growth increase from 4.7 cm to 6.52cm and with Urea (Pesticides) it was found to be 7.06cm which is maximum it is beneficial for plant growth.

## CONCLUSION

Bio fertilizer gave beneficial effect.

***Bacillus subtilis***: - On combination with Bio fertilizer (*B. subtilis*) with Monodhan and Urea the plant growth increase it is found to be beneficial for plant growth.

***Lactobacillus fermentum***: - On combination with Bio fertilizer (*L. fermentum*) with Quinolphos and Dimethoate the plant growth increase.

***Lactobacillus acidophilus***: - On combination with Biofertilizer (*L. acidophilus*) with Quinolphos and Dimethoate the plant growth was maximum.

In the present study it is concluded that combination of Biofertilizer with Pesticides and Insecticides have more effective for plant growth as compare to use individual pesticides and insecticides.

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