

# Effect of Blue Green Algae on Plant Growth and Improving Soil Quality

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## Abstract

The extensive use of pesticides, chemical fertilizers and growing pollution on land has led to degradation in quality of soil. Uses of bio fertilizers can solve the problem to some extent. This research deals with practice of Blue Green Algae (BGA) to improve the soil quality and fertility. In this study the effect of blue green algae in plant growth and soil fertility was studied. By testing soil quality before and after application BGA on soil. A mustard crop was used in the trials. Seeds were tested for in vitro germination. In vitro germination of seed gave good result. 15 experimental pots were taken with soil and manure in ratio 2:1. BGA was mixed with 1kg soil and put on the surface of these pots and watered regularly. 5 control pots were taken without any BGA. The result of BGA on growth of mustard plant and soil fertility was checked by soil quality analysis and comparison from control soil. Based on the trial results it's clear that BGA helps a lot in improving soil fertility and plant growth

**Keywords:-** blue green algae, plant growth, soil quality..

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## I. INTRODUCTION

Blue green algae also known as "Cyanobacteria" was the type of bacteria tried in the trial for improving soil fertility and plant growth. They obtain their energy through photosynthesis. Contingent on the species; cyanobacteria can happen as single cells, fibers of cells, or provinces. Cyanobacteria contain a trademark shade which gives the gathering their blue-green hue. At the point when cyanobacteria blossoms start to bite the dust and break down, this shade may shade the water particular pale blue shading. Cyanobacteria are found all through the world in earthbound, freshwater and marine living spaces however blossoms normally happen in freshwater.

Increase the availability of phosphorous to crops by excretion of organic acid. The presence of blue-green algae in the immediate vicinity of rice seeds can decrease; this can be achieved either by pre-soaking the seeds in blue-green algal cultures or by field inoculation. Soaking of seeds or joint growth of seeds with BGA can benefit plant by adding plant growth regulator. To Increase nitrogen fixation best method would be to produce association between crop and suitable strain. Yield of crops increases by inoculating seeds with BGA.

For Protecting Water Quality and Supply through sustainable Land Use: such as Maintaining Wildlife Habitat and, biodiversity, renewable energy, production and consumption, plant and animal production practices and Labor Practices and Social

and Economic Equity. The challenges for small and fragmented landholdings, Natural Resources and Environmental Problems, Land Issues, Threats and Challenges in Agriculture and Rural Area, Water Shortage and Drought, Education, Water for Agriculture.

## II. EXPERIMENTS WITH RESULTS

### Checking seed viability

**In vitro Germination:** In this process the required necessary components are 1. Petri Plates 2. Filter Paper and 3. Mustard Seeds: 10-12. Firstly put filter paper in petri dish, Wet filter paper, put mustard seeds in petri dish and Leave it to grow. The processes are shown in Fig. 1 a, b



### For pots

In this process the required materials are 1. Flower Pots: 20, 2. Control: 5, 3. Experimental: 15, 4. BGA: 200 Grams, 5. Mustard Seeds: 200grams and 6. Gloves.

**Procedure:** In this case Mixing 200 gm of blue green algae in 1 kg of soil. spreading BGA soil on top layer of 15 pots containing soil and manure (2:1). 5 pots will be used as control. Water the pots and let the bga grow on top layer of pots. BGA will start growing within few days. After Blue Green Algae Grows put Mustard seed on the BGA soil as well as control soil and observe the growth.

## III. ANALYSIS WITH DISCUSSIONS

### Growth of plants

The growth level of plants for 2 days, 3 days, 5 days, 6 days and 7 days are shown in fig. 2.a-e. The observations resulted that growth level/height increases with days and Fig. 2.a shows lower and Fig. 2.e shows more in heights



### 3.2. Chlorophyll Estimation

Standard: Chlorophyll is evaluated in 80% CH<sub>3</sub>CO and absorbance at 663nm and 645nm are perused in spectr

photometer Utilizing the assimilation co-efficient the chlorophyll is assessed. The Procedure for this procedure are Gauge 1 gram of finely cut and very much blended example of leaf in a perfect mortar and pestle. Grind the tissue to a fine paste with addition of 20ml of 80% acetone. Centrifuge 500 rpm for five minutes and transfer the supernatant to a 100ml of volumetric flask. Grind the deposit to 20ml of 80% acetone centrifuge and transfer the supernatant to flask. Repeat the process until the residue is colorless. Then make up the solution to 100 ml with 80% acetone. Noted the absorbance at 645 and 663 nm against blank. This is depicted in Fig. 3.a - c.



Calculation:

$$Cha = 12.25 A_{663.2} - 2.69 A_{646.8}$$

$$Cha = 12.25(A_{663}) - 2.69(A_{645}) = 13.46 - 1.19167 = 12.2708 \mu\text{g/ml}$$

$$Chb = 21.5 A_{646.8} - 5.1 A_{663.2}$$

$$Chb = 21.5(A_{646}) - 5.1(A_{663}) = 9.5243 - 5.4927 = 4.0318 \mu\text{g/ml}$$

#### Measurement Tables

The Table 1, it shows that the experimental plant length is always more than the control plant length; the difference is 2.7 cm is low and 6 cm is higher for plant length

Table 1. Plants length for experiments and control with their difference & Results

Plant length Date	Experiment Plant Length	Control Plant Length	Difference
11.03.2016	3.7cm	1cm	2.7cm
15.03.2016	5cm	1.5cm	4.5cm
25.03.2016	9cm	4 cm	5cm
05.04.2016	15cm	10cm	5cm
20.04.2016	20cm	14cm	6cm

From the overall observation the Fast germination evident in BGA soil. The similar trends observed in some researchers [14-16].

### IV. CONCLUSION

In light of the few trails yield the results evident that BGA amended soil helps in good and fast growth of plants; it increases plant height and thickness of stem. The soil fertility was also improved and same was evident from the growth of plants. Mainly nitrogen content of soil was increased and that was observed by the plant fertility. The optimum values of control is 180 and BGA is 198. Likewise it helps in improving the pH of soil with chlorophyll content of plants.

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