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S Sarguna Sundaram

Research Center in Botany,
Saraswathi Narayanan College,
Madurai, Tamil Nadu, India

Estimation of chlorophyll content in *Cyamopsis tetragonalaba* (L.) by using vermicompost and blue green algae

S Sarguna Sundaram

Abstract

Bio fertilizers add nutrients through the natural process of nitrogen fixation, Solubilizing phosphorus and stimulating plant growth through the synthesis of growth promoting substances. Experiments were conducted to investigate the Chlorophyll content of vermi compost and BGA on *Cyamopsis tetragonalaba* (L.) In single and double combinations. It was found that Vermicompost in single fertilizer treatment; Vermicompost and BGA in double fertilizer treatment were found to have comparatively high values in nitrate reductase activity. The cultivated crops showed maximum value in double fertilizer treatment. Thus the combination of these fertilizers enhances the growth and yield.

Keywords: Bio fertilizers, chlorophyll content, blue green algae, vermicompost

Introduction

Blue green algae represent a self supporting system because they can photosynthetically provide energy for nitrogen fixation. Most of the experiments on Blue green algae were conducted in paddy fields. Blue green algae have a greater potential rice soil as rice fields provide an ideal environment for the establishment of BGA and nitrogen fixation by them.

Vermicompost is the remnants of the earthworms which feed voraciously on organic matter. Earthworms are beneficial organic creatures which man has not explored. They eat voraciously and feed day and night all garbage if it is shredded to fine pieces. The earthworms are called intestines of the earth and are bio-refineries purifying all waste into useful compost. Every house can adapt this simple process of converting garbage waste into wealth.

Study Plants: *Cyamopsis tetragonalaba* (L.) Cluster bean, Guar

Family: Fabaceae

Cluster bean is robust bushy annual up to 3m tall, bearing stiff erect branches that are covered grooved. The leaves are alternate and trifoliate, the leaflets being ovate and somewhat serrated. The pinkish white flowers are borne in dense axillary racemes. The pods are compressed, ridged, linear, erect, and clustered, giving the plant its name 'Cluster bean'. Each pod is 4-10 cm long, beaked and slightly constricted between the seeds. The seeds are oval varying in color from white to grey or black.

Experimental Method

The seeds of cluster bean were obtained from the Agriculture University, Madurai. The seeds were sown in separate pots and allowed to germinate. Four pots were selected for each crop. The pots were labeled for crop. The parameters were calculated in triplicates for the purpose of statistical evaluation. The following labels were pasted for each crop.

- A. Control
- B. BGA
- C. Vermicompost
- D. BGA + Vermicompost

The vermicompost and Blue green algae were collected from the research center of the college.

After three months the fertilizers were applied in cluster bean. The yield and growth parameters were assessed.

Estimation of Chlorophyll pigments

Leaf material (200mg) was ground in a pre-chilled pestle and mortar in diffuse light with 80 percent cold acetone and the homogenate was centrifuged at 3000× g for 2 minutes. Aliquots of 10ml of 80 percent cold acetone were added to the pellet and centrifuged till it was non-

Corresponding Author:

S Sarguna Sundaram

Research Center in Botany,
Saraswathi Narayanan College,
Madurai, Tamil Nadu, India

green. The supernatants were pooled and protected from light prior to the estimation of chlorophyll pigments.

The concentration of chlorophyll was calculated using the formula of Arnon (1949).

Chlorophyll a: $0.0127 \times A_{663} - 0.00269 \times A_{665}$ (mg/ml)

Chlorophyll b: $0.0229 \times A_{645} - 0.00488 \times A_{663}$ (mg/ml)

Total Chlorophyll: $0.0202 \times A_{645} + 0.00802 \times A_{663}$ (mg/ml).

Result and Discussion

Chlorophyll pigment in leaves ranged from 0.17 mg/g.f.wt - 0.24mg/g.f.wt in clusterbean. In single fertilizer treatment maximum Chlorophyll pigment was observed in Vermicompost. In double fertilizer treatment Vermicompost and Blue green algae showed higher than single fertilizer treatment.

Table 1: Chlorophyll pigment on *Cyamopsis tetragonalaba* L.

Crops	Control	BlueGreen Algae	Vermicompost	Blue Green Algae and Vermicompost
Cluster bean	0.14±0.019	0.20±0.003	0.21±0.12	0.23±0.003

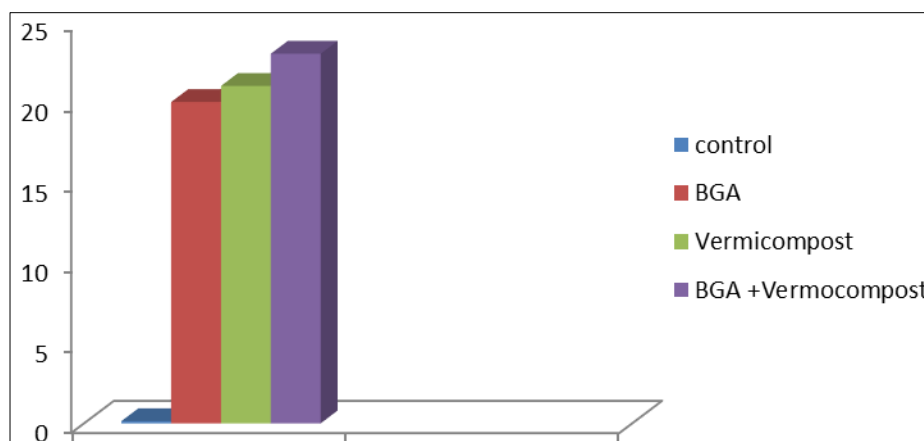


Fig 1: Shows Cluster bean

Discussion

Generally farmers apply fertilizers to enhance the yield of crop plants. The fertilizers are of two types namely chemical and bio fertilizers. Both of these are available in markets in different commercial brands. Application of Bio fertilizers is recommended by the agronomists to save the expenditures incurred by the farmers. Cultivation of Cheap and effective fertilizers are undertaken by the farmers under the guidance of agriculturists. For example in several rural areas vermicompost is being manufactured and sold in Markets. These fertilizer products fetch a considerable income to the farmers.

In the present study application of vermicompost alone to cluster bean gives higher growth features than BGA. However, Subbiah and Sundarajan (1993) [19] made a critical study on the influence of organic and inorganic fertilizers on the yield and nutrients uptake in Bhindi fruit was significantly increased by vermicompost treatment.

In Double fertilizer treatment it was found that vermicompost and BGA shows better growth properties. Application of Azolla, Vermicompost and Urea on Paddy (Singh *et al.* 2005), Farmacyard manure + Sesbania green manure+ Blue green algae+ Phosphate Solubilising bacteria on Paddy (Nguyen Van Quyen and Sharma 2003) Showed better yield than control.

Vermicompost contains a good amount of macro and micronutrients. It also serves as a very good base for establishing and multiplication of beneficial symbiotic microbes which helps in fixing nitrogen in the soil, besides enhancing the availability of phosphate and nitrogen uptake of phosphate by plants (Kale 1995) [11].

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