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Assessment of growth parameters on *Capsicum annuum* L. by treating vermi compost and blue green algae

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Abstract

Biofertilizers are the substance that contains microorganism's living or latent cells. Biofertilizers increase the nutrients of host plants when applied to their seeds, plant surface or soil by colonizing the rhizosphere of the plant. Biofertilizers are more cost-effective as compared to chemical fertilizers. The present study was carried out to investigate the role of Vermicompost and blue green algae in single and in combinations. For this purpose Chilli was selected as crop plant. The influence of vermicompost, and Blue green algae was assessed by the growth characters. Single fertilizer and double fertilizer treatments were given to chilli grown in separate pots.

Keywords: Growth character, chilli, blue green algae, vermicompost

Introduction

Blue green algae constitute an important group of microorganisms capable of nitrogen fixation. Most of the species possessing nitrogen fixation ability belong to the order Nostocales and stigonematales under the genera *Anabaena*, *Anabaenopsis*, *Aulosira*, *Chlorogloea*, *Cylindrospermum*, *Nostoc*, *Calothrix* Synonyms, *Tolypothrix*, *Fischerella*, *Haplosiphon*, *Mastigocladus*, *Stigonema* and *Westiellopsis*. At present over 100 species of blue green algae are known to fix atmospheric nitrogen. These have been found to be very effective on the rice and banana plantation. There is considerable variation between different forms of blue green algae and sometimes within the species in the culture flasks N fixed per 100 ml nutrient medium. Under field condition overall increase

Blue green algae are one of the most well adopted algal forms in saline habits. It has tremendous capacity to transform saline soil into productive neutral soil with greater amount of available nitrogen and carbon. Incubation of saline or alkaline soils with native blue green algae *in vitro* or *in vivo* resulted an improvement of Physico-chemical properties of Soils. At present over 100 species of blue green algae are known to fix atmospheric nitrogen. These have been found to be very effective on the rice and banana plantation. There is considerable variation between different forms of blue green algae and sometimes within the species in the culture flasks N fixed per 100 ml nutrient medium. Under field condition overall increase in the grain yield of rice is amounted to about 586 kg/ha. In case of crops other than rice algalization increased nearly 34 per cent yield.

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 (Sultan A Ismail 1997) [24]. The compost contains approximately 0.5 percent Nitrogen, 0.2 per cent phosphorus and potash in soluble form. It also contains sufficient quantities of micronutrients. The earthworms also release enzymes that lead to growth of microbes and bacteria.

Study Plant: *Capsicum annuum* L. Chilli, Bell pepper

Family: Solanaceae in almost every tropical country, capsicums have become the most popular condiment, being used to add zest and flavor to otherwise dull foods.

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The large green non-pungent forms of *C. Annum* are eaten raw as salads. They have a thick flesh and are hollow, often being stuffed with meat or potatoes and cooked. The large sweet red fruited types of capsicums are used in the dressing up of cheese, for stuffing olives and in various tinned meats. The small fruited stronger flavoured types of *C. annum* yield 'Paprikas' which is used as a flavournig and colouring material in cookery. Commercially, large quantities of paprika are used in the manufacture of sausages and other meat products. Spanish paprikas (Pimiento), however, lack pungency. Red or cayenne pepper, obtained by grinding dried fruits of 'bird chillies', *C. frutescens*, is used in the manufacture of sauces and curry powders and also in the preparation of pickles. Tbasco sauce is prepared by pickling the pulp of chilli fruits in salted water or strong. Vinegar, Capsaicin, the pungent constituent of Capsicum pods, is used in the manufacture of ginger ale and ginger beer. Medicinally, Capsicum peppers have been used internally, in the past, as a powerful stimulant and carminative, but externally as counter irritant to cure rheumatism.

Experimental Method

The seeds of chilli 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.

- Control
- BGA
- Vermicompost
- BGA + Vermicompost

The vermicompost and Blue green algae were collected from the research center of the college. It was identified that the algae found in the research center were *Lyngbya*, *Oscillatoria*, and *Rivularia*. These algae are very common in the lake adjoining the college and also in the paddy fields of Perungudi Village. 100 gm of algae, 100gm of

Vermicompost was applied the experimental pots.

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

The growth parameters such as shoot length, root length, number of flowers, fruit weight, and number of leaves, fresh weight and dry weight of the plants were calculated.

Result and Discussion

The shoot length ranged from 39.5 cm-42.2 cm in chilli. In single fertilizer treatment, Maximum shoot length was observed in Vermicompost. In double fertilizer treatment Maximum shoot length was observed in Vermicompost and Blue green algae. The root length ranged from 33.9cm-41.3cm in chilli. The Maximum root length was observed in Vermicompost. In double fertilizer treatment, Maximum root length was observed in Vermicompost and Blue green algae. The number of leaves ranged from 16-38 in chilli. In single fertilizer treatment, the maximum numbers of leaves were observed in Vermicompost. In double fertilizer treatment, The maximum number of leaves were observed in Vermicompost and Blue green algae. The Fruit weight ranged from 3.5 gm – 7.2 gm in chilli. In single fertilizer treatment, The maximum fruit weight was observed in Vermicompost. In double fertilizer treatment, The maximum fruit weight was observed in Vermicompost and Blue green algae. The number of flowers ranged from 8-11 in Chilli. In single fertilizer treatment, The maximum number was observed in vermicompost. In double fertilizer treatment, The maximum number was observed in Vermicompost and Blue green algae. The fresh weight ranged from 4.9 gm -7.1 gm in chilli. In single fertilizer treatment, The maximum fresh weight was observed in Vermicompost. In double fertilizer treatment, The maximum fresh weight was observed in Vermicompost and Blue green algae. The dry weight ranged from 3.9cm -5.2cm in chilli. In single fertilizer treatment, the Maximum dry weight was observed in Vermicompost. In double fertilizer treatment, the Maximum dry weight was observed in Vermicompost and Blue green algae.

Table 1: Maximum dry weight observed in Vermicompost

Chilli	Control	Blue green algae	Vermicompost	BGA + Vermicompost
Shoot length	39.5 cm	40.1 cm	40.7cm	42.2cm
Root length	33.9cm	35.8cm	36.7cm	41.3 cm
Number of Leaves	16	26	31	38
Number of Flower	8	9	10	11
Fruit weight	3.5gm	4.7gm	5.6gm	7.2gm
Fresh weight	4.9gm	5.8gm	6.5gm	7.1gm
Dry weight	3.9gm	4.5gm	4.9gm	5.2gm

Discussion

Chemical fertilizers are easily available to enhance the Growth of Crop plants But it has some side effect to the soil fertility when compared to 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

Brinjal gives higher growth features than BGA. However, Subbiah and Sundarajan (1993) 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), Farmyard manure + Sesbania green manure+ Blue green algae+ Phosphate Solubilising bacteria on Paddy (Nguyen Van Quyen and Sharma 2003) ^[3] 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).

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