



“EFFECT OF SEAWEED LIQUID BIOFERTILIZER (SEASOL) ON PLANT GROWTH OF *CAPSICUM ANNUM* L.

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ABSTRACT:

Seaweed contains all the trace element and growth hormone required by Plants. Present study to check effect of seaweed liquid fertilizer on plant growth of *capsicum* species. Pretreated seeds sowed in Germination Tray and Field condition. Concentrations used to treat were 0.25%, 0.50%, 0.1%, 1.5%, 2.0% and compared with control, foliar spray. Irrigation was done at days interval. Vegetative and Biochemical parameters were analyzed on day 45. These comparative results were shown that the *Capsicum annum* has maximum vegetative and biochemical yield when treated with 0.25% and followed by 0.50% seaweed liquid biofertilizer (seasol) and lowest yield in 2.0% treatment. So, 0.25% concentration of seasol is proved better for *Capsicum annum*.

Key words: *Seasol, Biofertilizer, Capsicum anum, Pretreated Seeds.*

INTRODUCTION:

The chemical fertilizers & organic manure consume more energy as compared to biofertilizers. For developing countries like India energy can become a limited factor for increasing agricultural production. So use of bio fertilizers in agriculture are an ideal source. The term bio fertilizers may be used to include all organic sources for plant growth which are rich in an available form for plant absorption through microorganisms. Hence, biofertilizers play an important role in soil fertility & crop production.

Seaweed: The marine algae are one of the most important marine resources in the world and widely used as human food, animal feed and raw material for many industries. They improve seeds germination, seedlings development, increase plant tolerance to environmental stresses, enhance plant growth and yield. (Jayasinghe, P., 2016). Seaweed extracts act as bio-stimulants mainly due to the presence of plant hormone. Main phytohormones identified in seaweed extracts are: auxin, cytokinin, gibberelin, abscisic acid and ethylene. (Lucasz Tuhy et.al.2013). Recent

researches proved that seaweed fertilizers are better than other fertilizers since they are very economic and ecofriendly (Gandhiappan and Perumal, 2001).

Capsicum annum: Chilli (*Capsicum annum* L.) belongs to the family, Solanaceae and originated from Southern North America and Northern South America (Wikipedia, 2019). In India, chilli is grown in almost all the states across the length and breadth of the country. Andhra Pradesh the largest producer of chilli in India, contributes about 30% to the total area under chilli, followed by Karnataka (20%), Maharashtra(15%), Orissa (9%), Tamil Nadu (8%) and other states contributing 18%.(Anonymous, 2015-16).These pepper have thick, hard leaves which means that a large amount of energy is used to produce the leaf (Burnett 1998). The plant grows upright with a single stem until 8–10 leaves are produced. The shoot then terminates in a flower and two side shoots are formed. These continue to grow producing 1–2 leaves and then form a terminal flower and a further two side shoots. This pattern is repeated for about five nodes (Burnett 1998). Nutrient supply particularly

nitrogen greatly influences root and shoot development and consequently fruit yield with growth. (P. Tejashvi 2016.)

MATERIALS AND METHODS:

Biofertilizer: bio-fertilizer used is Seasol (seaweed liquid bio-fertilizer) manufactured by Seasol I International PTY LTD. Exclusively imported and marketed by JJOVERSEAS, it is an Australian Organic Registered Garden Product.

Selection of crop plant:

The crop plant selected for the present study was *Capsicum annum*. The seeds were collected from agriculture sales outlet in Shevgaon.

Seeds with uniform size, color and weight were chosen for the experimental purpose.

Culture of seed:

Plastic trays with seeding holes were used for raising the crops. The seedling holes were filled with coco peat in which hot water treated seeds were sown. They were kept to ensure uniform environmental impact on the plant growth. The foliar sprays and watering were done at 2 days intervals. The trays were labeled as concentration as control, 0.25%, 0.50%, 1.0%, 1.5% and 2.0 % respectively.

Plant culture: in field

The seaweed liquid fertilizer (SLF) was prepared in above concentrations by using concentrated seasol biofertilizer.

Plant growth parameters:

The plants from each treatment were randomly drawn for different analyses. Plants taken from the trays and field also were uprooted carefully on day 45th.

Plant Height:

The height of each plant was measured from the root tip to stem tip of the plant in centimeters and the mean value of the height was calculated for each treatment.

Shoot height: The height of the shoot was measured from shoot tip to rhizosphere region of root in centimeters and mean value of the height was calculated for each treatment.

Root height:

The height of the root was measured from stem bottom to tip of each root in centimeters and mean value of the height was calculated for each treatment.

Fresh weight and dry weight:

The shoot parts of plant from randomly selected from each replicate and they were measured as the fresh weight and then kept in oven to dry for 48 hours 40°C.

Biochemical Analysis: Biochemical analysis like Total Carbohydrates content using Anthorne test method, Total Protein content by Lowry's test method (Lowry et. Al. 1951) and Total Chlorophyll (Sadashivam S and Manickam, A 2008)

RESULT AND DISCUSSION:

Effect of seaweed liquid fertilizer on vegetative growth of *Capsicum annum* was observed on 45th (days after sowing) in tray cultivation and field cultivation.

Parameters of Tray cultivation

The results of the vegetative parameters in the labrotary are summarized in the Table 1. The maximum height of plant observed in 0.25% seasol treated plant (13.0cm) and it is followed by control, 1.0%, 1.5%, 0.50% and lowest height of plant was observed in the plants treated with 2.0% (6.7cm). maximum fresh weight observed in 1.0% (0.04gm) and lowest fresh weight in 2.0% (0.02). the maximum dry weight 0.25% and 0.50% (0.006 gm).

Chlorophyll: The chlorophyll estimation done by Arnon(1949) method.

The chlorophyll content of plant treated with 0.25% seasol was highest chl.a 0.20mg/gm, chl.b 0.87mg/gm and total chl.1.07mg/gm. The chlorophyll content of plant treated with 1%

seasol chlorophyll is found to be lowest chl.a 0.37mg/gm, chl.b 0.38mg/gm and total chl.0.76mg/gm. The remaining all other are shown in figure 01

Protein

The protein estimation was carried out by Lowry's method. The highest protein content was found in plants treated with 0.50% of seasol. In 0.1ml sample 126µg protein present and in 0.2ml sample 138µg protein present while the lowest protein content was found in plants treated with 2.00% seasol. In 0.1ml sample 30µg protein present and in 0.2ml sample 44µg protein present. The remaining all other are shown in fig. 2

Carbohydrates

Carbohydrate estimation is carried out by using Anthrone reagent, It is observed that the carbohydrate content was gradually decreasing as the concentration of seasol increases. The highest carbohydrate content was found in plants of control. In 0.5ml sample 63µg carbohydrate and in 1.0ml sample 69µg carbohydrate was present. The lowest carbohydrate was recorded in plants without treatment 2.0% seasol concentration, in 0.5ml sample 13µg carbohydrate and in 1.0ml sample 18µg carbohydrate present. The remaining all other are shown in figure 3.

CONCLUSION:

It was concluded from the present investigation that 0.25% & 0.50% of seasol biofertilizer was proved better for growth of the *Capsicum annum*.

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Table no. 1: Plant growth parameters in tray cultivation.

Parameters	Fresh Weight (gm)	Dry Weight (gm)	Root Height (cm)	Shoot Height (cm)	Total Height (cm)
Control	0.03	0.004	5.4	5.6	11.0
0.25 %	0.03	0.006	7.9	5.1	13.0
0.50 %	0.03	0.006	2.4	5.1	7.5
1.0%	0.04	0.005	2.9	5.8	8.7
1.5%	0.03	0.005	2.0	5.7	7.7
2.0 %	0.02	0.004	2.8	3.9	6.7

Parameters of field cultivation:

The results of the vegetative parameters in the field site are summarized in the Table 2 The maximum height of plant recorded in control (12.9cm) and lowest height observed in the plants treated with 0.25% (6.9cm).

Table no. 2. Plant growth parameters in field cultivation.

Parameters	Fresh Weight (gm)	Dry Weight (gm)	Root Height (cm)	Shoot Height (cm)	Total Height (cm)
Control	0.12	0.015	3.1	9.5	12.6
0.25 %	0.09	0.010	1.5	5.4	6.9
0.50 %	0.11	0.015	2.1	6.9	9.0
1.0%	0.12	0.016	2.9	9.1	12.0
1.5%	0.10	0.011	1.9	6.5	8.4
2.0 %	0.13	0.019	1.9	8.0	9.9

Fig. no. 1: Graph showing chlorophyll estimation of *Capsicum*.

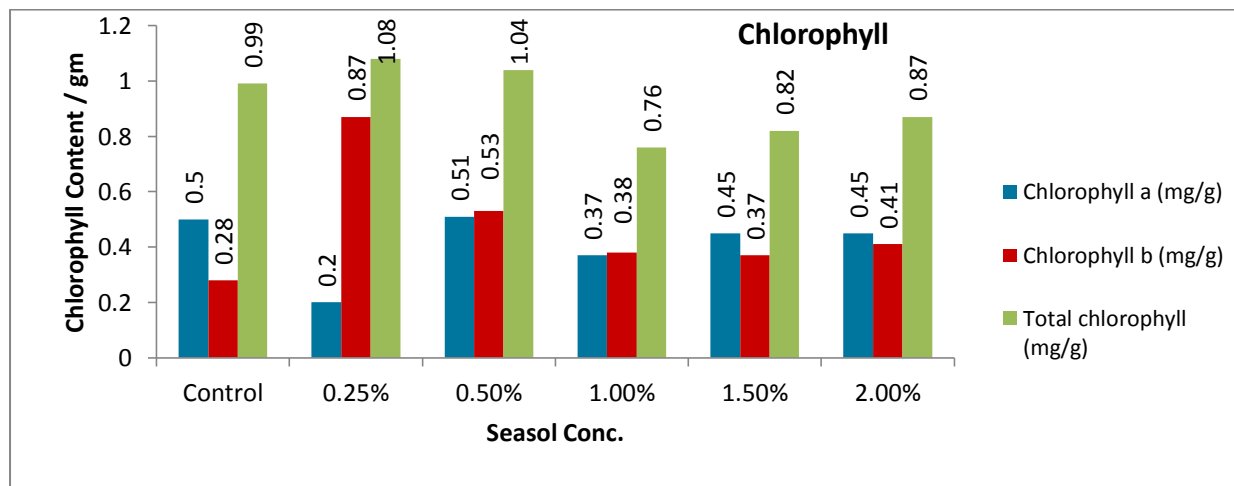


Fig.no.2: Graph showing protein estimation of *capsicum*.

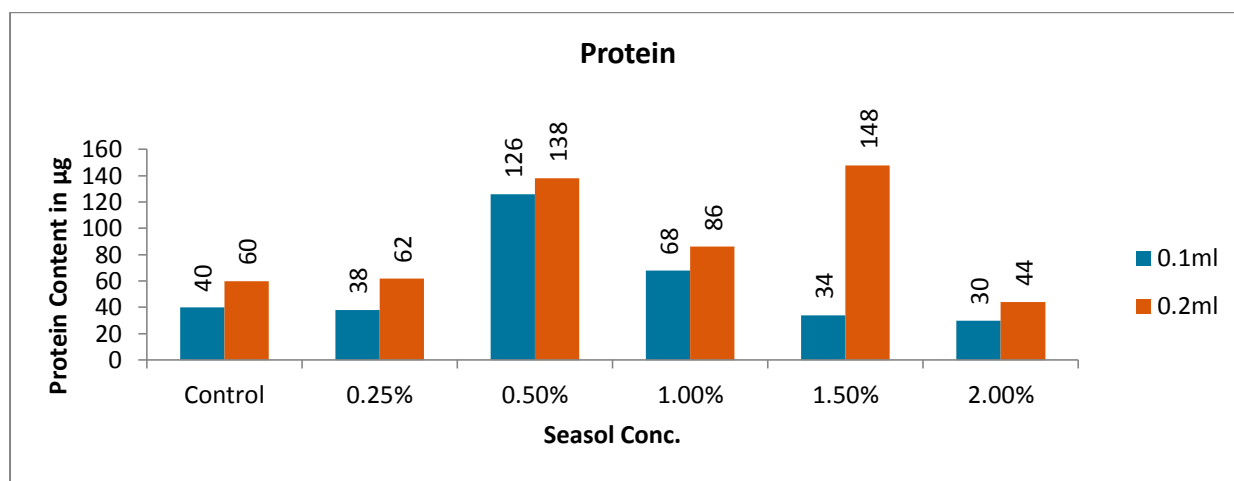


Fig. no. 3: Graph showing carbohydrate estimation of *capsicum*

