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Effect of seaweed liquid fertilizer of *Sargassum wightii* on germination, growth and productivity of brinjal

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ABSTRACT: The effect of SLF of *Sargassum wightii* was tested at different concentrations (control, 5%, 10%) on growth and yield parameters of brinjal. The seaweed application will be useful now for achieving higher production. Recent seaweed extracts as liquid fertilizers has come in the market for a simple reason that they contain many growth promoting hormones like auxins, gibberellins, trace elements, vitamins, amino acids and micro nutrients. The seaweed extract was found effective in increasing the biomass growth of roots and shoots, number of leaves, flowers and fruits, maturity time and yield. The findings of the present study is investigation show that the low level concentration of SLF enhance that the growth and yield than that higher concentration and control.

KEYWORDS: Seaweed liquid fertilizers, productivity, growth, yield.

I. INTRODUCTION

Seaweeds are marine macro algae which form an important component of the marine living resources of the world. The first Indian to study the seaweed as manure for vegetable and field crops was Thivy (1961). Seaweed extract contain major and minor nutrients, amino acids, vitamins, cytokinins, auxins and absciscic acid like growth promoting substances (Moony and van staden,1986). Seaweed represents an alternative to conventional chemical fertilizer. Commercial use of liquid extracts obtained from seaweeds is successfully used as for several crops (Bokill k. k, Mehta, v. c, datar, p. s). The growing agriculture practices need more fertilizers for higher yield to satisfy food for human beings. The seaweed extracts contain plant growth hormones, regulators, promoter, carbohydrates, amino acids, antibiotics, auxins, gibberellins and vitamins consequently which enhance the yield and quality wh ich are induce the yield of crops, seed germination resistant to frost, fungal and insect attacks (Erulan et al., 2009). The present study intends to investigate the effect of seaweed liquid fertilizer (SLF) prepared from Sargassum on seed germination, growth, productivity of vegetable crop.

II. MATERIALS AND METHODS

A. Study area:

The study area of the sample collection was Visakhapatnam. Visakhapatnam lies on the east coast of India between latitudes17^0 14^l 30^{ll} and 17^0 45^l and longitudes 83^0 16^l 25^{ll} and 83^0 21^l 30^{ll} with vast resources of marine algal species.

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B. Collection of sample:

The seaweed sample Sargassum was collect from the coast of Visakhapatnam. The algal sample was handpicked and washed thoroughly with seawater to remove all the impurities, sand particles and epiphytes, transported to the laboratory and washed thoroughly using tap water to remove the salt on the surface of the sample. The algal material was spread on blotting paper to remove excess water. They were shade dried. The dried seaweed is finally pulverized in the commercial grinder and powdered seaweed samples are used for further analysis.

C. Preparation of seaweed liquid fertilizer:

The seaweed liquid fertilizer is prepared by the method Ramarao (1990). The seaweed powder was added with distilled water in a ratio 1:20(w/v) and autoclaved at 120^0 15 1bs/sq for min. hot extract was filtrate through double layered cheese cloth. The filtrate was taken and stored refrigerator. The extract was used to prepare different concentration of SLF by adding distilled water.

D. Seed soaking:

The seaweed liquid fertilizer was prepared with different concentration that is 5%, 10%. Then the sowing seeds were soaked in particular concentration of SLF and control for 12 hrs. Then the seeds sowed and observed for germination and early growth. The weeds were removed regularly and watering was done daily for the test plants.

E. Analysis:

Plants from each treatment were randomly drawn for various analyses. The grown parameter including germination percentage, fresh and dry weight, roots length and shoot length was calculated. Foliar application was done in once in five days for the test plants.

F. Statically analysis:

Data was analysed statistically using ANOVAs for CRD. All the measurements were triplicates.

III. RESULTS AND DISCUSSIONS

The physic chemical properties of the extract of seaweed Sargassum wightii have been analyzed. The extract contained macro nutrients like nitrogen, phosphorus, potassium, magnesium, calcium and micro nutrients like iron, manganese, zinc, copper and growth hormones like cytokinin, auxin and their values are given table.1.

The seaweed extract was found in effective in increasing the growth and yield in the low level of SLF (5% conc.). Maximum seed germination of brinjal was observed in low conc. (5% conc.) of SLF and minimum germination rate was reported high conc. (10%onc.) and control. The highest shoot length (86.3), root length (23.1), number of leaves

(12), number of flowers (12), fresh weight(150), dry weight(28.50) were recorded in the plants with low conc. of SLF. The SLF treatment increased the growth parameters when compared to the control. Similar results were obtained at low conc. of SLF from stoecheospermum marginatum on brinjal. Seaweed liquid fertilizers were found superior then chemical fertilizer because of the presence of high levels of organic matter Aitkin and Senn (1965). The growth parameters and yield parameters were recorded in the plants treated with SLF. This observation is in conformity with the earlier report on the promotional effect of *Zizypus mauratiana* with crude extract of seaweed. Increased yield in banana, potato, oranges, ground nut. Similar trend was also observed in bhendi, tomato, okra and cow pea.

The present study revealed that the foliar treatments using extract from *Sargassum wightii* exhibits promising effects on growth and yield characteristics of the test plant brinjal. The growth promoting properties of the seed treatment using

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seaweed extract improves the quality of the soil and increase the crop yield. This study also confirms that use of SLF is a wise eco friendly technique to enhance crop production.

Table.1: Mineral compositions of seaweed extract Sargassum wightii:

Macro nutrients (mg/g dry weight)		Micro nutrients (mg/g dry weight)		Plant growth hormones (µg/g dry weight)	
Nitrogen	174.02	Iron	8.74	cytokinin	370.86
Phosphorus	45.56	Manganese	5.69	Auxin	274.52
Potassium	72.83	Zinc	1.81		
Magnesium	65.71	Copper	1.71		
Calcium	83.25				

The results obtained from the growth and yield parameters of brinjal treated with different concentrations of SLF Sargassum wightii and control are presented table 2 and 3.

Table.2: Effect of seaweed extract, Sargassum wightii on the growth of brinjal

Parameters	**Control**	**Low conc. (5%)**	**High conc. (10%)**
Shoot length	69.58±0.440	86.3±0.251	73.24±0.110
Root length	19.5±0.4	23.1±0.1	20.4±0.20
No. of leaves	8±0.4	12±0.4	10±0.4
No. of flowers	8.0±0.5	12.0±0.57	10.0±1
Fresh weight	134.23±0.3	150±0.45	143±0.73
Dry weight	19.12±0.2	28.50±0.4	23.17±0.25

Table.3: Effect of seaweed extract, Sargassum wightii on the yield of brinjal

Parameters	**Control**	**Low conc. (5%)**	**High conc. (10%)**
No. of fruits	8.0±1	12.0±0.5	10.0±0.5
Fruit fresh weight	46.83±1.8	53.56±0.3	48.32±0.1

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Fruit dry weight	1.10±0.05	1.37±0.01	1.23±0.02

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