Advances in Bioresearch
Adv. Biores., Vol 8 (6) November 2017: 22-24
©2017 Society of Education, India
Print ISSN 0976-4585; Online ISSN 2277-1573
Journal's URL:http://www.soeagra.com/abr.html
CODEN: ABRDC3
DOI: 10.15515/abr.0976-4585.8.6.2224

Advances in Bioresearch

ORIGINAL ARTICLE

Algal Extract as A Plant Growth Promoter

A A Aher and A S Wabale
Department of Botany, Padmashri Vikhe Patil College of Arts, Science and Commerce, Pravaranagar, At/po-Loni kd, Tal- Rahata, Dist – Ahmednagar, Maharashtra, India.
ashwini.aher10@gmail.com

ABSTRACT
Algal extracts are used as nutrient supplement, bio stimulant or bio fertilizer as an alternative to chemical fertilizer in agriculture. The study was setup to evaluate the bio fertilizing efficiency of liquid extract of algae on growth, number of fruits, number of branches and height of okra plant to achieve the objective liquid extract at different concentrations (10%, 15%, 20%, commercial nutrient supplement A to Z and control, DW) were prepared and applied as foliar spray on okra raised in field. Result revealed that 15% algal concentration liquid algal extract showed enhanced growth as compared to other concentrations and control.
Key words- *Bio stimulant, foliar spray, algae, liquid extract.*

Received 26.04.2017 Revised 19.07.2017 Accepted 11.09.2017

How to cite this article:
A A Aher and A S Wabale. Algal Extract as A Plant Growth Promoter.Adv. Biores., Vol 8 [6] November 2017.22-24.

INTRODUCTION

Algae have been reported as fertilizers in the form of extract or compost to promote the growth of many vegetable crops. Many documents reveals the growth promoting potential of algal extract in many crop plants. The algal extracts are not only improve the seed germination and seedling development, but it has proved to be one of the major factor in increasing the plant tolerance to environmental stress [1]. Algae contain protein, amino acids, lipids, alkaloids, phenols, terpenes, vitamins, hormones, minerals, trace elements**,** iodine and bromine. Hence, algae provides a great option to be utilized as a source of food and medicine worldwide. Foliar application of algal liquid concentrates give many beneficial effects on the growth of plants as they contain growth promoting hormones (IAA, IBA and cytokinins) trace elements (Fe,Cu, Zn, Co, Mo, Mn, and Ni), vitamins and amino acids [2]. As India is one of the top two populated country, huge food grain demand is putting tremendous pressure on the agriculture. The farmers are forced to apply chemical fertilizers to increase the agriculture productivity which contributes to environmental contamination leading to many diseases. If the algal weeds are diverted for preparing extract for crop improvements, the environmental pollution can be controlled and agriculture productivity can be improved. In this study, extracts squeezed from the mixture of green and blue green algae were evaluated for the growth promoting potential with selected parameters in okra crop in order to utilize algal biomass for fertilizer.

MATERIALS AND METHODS

About 1 kg of fresh, healthy and disease free algae was collected from Wakadi village Maharashtra, India during Jan. 2016. The sample was washed thoroughly by tap water to remove the extraneous materials and sand particles and drained immediately. Sample was air-dried (26°C) during 2- 4 days. Then, dried algae were grinded to fine powder by mechanical grinder. Algal extract was prepared from the mixture of 10 gm green and blue green algae mixed with 100 ml water and boiled to reduce the content up to 10 ml [3]. Using this extract the algal concentrations of 10%, 15% and 20 % were prepared and used for the foliar application in the feed trial as well as seed treatment. The Seeds of Okra var.F-64 were obtained from local seed shop. Randomized Block Design (RBD) with five treatments viz. T_1 (10%), T_2 (15%), T_3 (20%), T_4 (Commercial nutrient supplement) and T_5 (control) was designed. The treatment was given to the seeds by soaking the seeds overnight in the different concentrations mentioned below. The sowing of

treated seeds was done by digging a hole on the ridges at the distance of 20 cm. The field was irrigated immediately after sowing the seeds and the subsequent irrigation was done after every fourth day. The foliar application of algal extract was started after fifteen days of sowing the seeds and after development of the leaves. This was followed by subsequent application of algal extract and the commercial nutritional supplement on every fifteenth day. Field observations were conducted for Total number of fruits per treatment, total number of branches per plant and total height of the plant in cm at last harvest. The results obtained are presented in table and discussed below.

RESULT AND DISCUSSION

It was reported during the study that, the total plant growth and total yield in the form of number of fruits was greatly influenced by the algal application in okra. Compared to control as well as commercial nutrient formula algal application was found to be most effective in the growth as well as yield of the plant.

Table 1- Effect of freshwater algal extract on the Height of Okra

Plant No.	Height of Plant (cm)					Plant No.	Height of Plant (cm)				
	T_1	T2	T3	T4	T5		T1	T2	T3	T4	T5
1	31	71	60	71	30	14	45	78	49	54	48
2	30	70	55	65	35	15	45	79	50	60	45
3	32	72	60	64	39	16	50	70	51	61	49
4	29	73	56	61	40	17	45	75	50	59	45
5	30	44	51	60	45	18	47	78	51	45	50
6	35	45	50	61	48	19	30	77	41	42	48
7	31	77	49	62	49	20	48	46	45	43	48
8	30	78	41	61	46	21	49	75	41	41	42
9	30	41	45	50	48	22	48	72	50	40	48
10	30	75	45	50	47	23	47	73	50	40	47
11	35	37	46	50	49	24	46	44	51	42	32
12	31	78	47	51	42	25	45	45	41	43	35
13	40	39	48	54	48	Mean	38.36	64.48	48.92	53.2	44.12

The height of the plant is an important parameter to decide total yield from the crop. Hence, total height of each plant was measured in cm and presented in the table 1. Maximum height of the plant was reported in T2 with 64.48 cm and minimum height was reported in T1 with 38.60 cm. There were 17 plants in T2 which have reported height of 70 cm and more, which is showing good effect of algal extract on the height of the plant. However, in rest of the treatment only one plant at T4 reported height of 71 cm. The average height was calculated and it is reported that, T2 has shown maximum average height with 64.48 cm followed by T4 with 53.2 cm. This shows a good difference in these two treatments and superiority of T2 among all treatments. Zodpe *et.al.* [4] have reported the same results as in the present study. They reported the maximum height of the okra plant up to 52.10 cm with foliar application of liquid seaweed fertilizer.

Table 2- Effect of freshwater algal extract on number of branches in Okra

Plant No.	No. of Branches					Plant No.	No. of Branches				
	T_1	T2	T3	T4	T5		T1	T2	T3	T4	T5
1	2	1	2	3	1	14	1	2	1	1	1
2	1	1	1	2	2	15	1	2	1	1	1
3	2	1	2	2	1	16	1	1	2	1	1
4	1	1	1	3	1	17	1	2	2	1	1
5	1	3	1	1	1	18	1	3	2	2	1
6	2	3	1	1	1	19	1	1	1	1	1
7	1	1	2	1	1	20	1	3	1	1	1
8	2	1	1	1	2	21	3	1	2	2	1
9	1	1	1	2	1	22	1	3	1	1	1
10	1	3	2	3	2	23	1	1	2	2	2
11	1	3	1	2	1	24	1	2	1	2	1
12	1	1	1	2	1	25	1	1	2	1	1
13	2	1	2	2	1	Mean	1.28	1.72	1.44	1.64	1.16

The average number of branches per plants was counted at the end of the harvesting. It was reported that, T2 has shown average 1.72 branches followed by T4 with 1.64 branches. It is seen from the table that, there is not much difference in the average number of branches in the plants under treatment.

Table 3- Effect of freshwater algal extract on number of fruits in Okra

Treatment/ Harvest	Number of fruits/harvest											Total
	1	2	3	4	5	6	7	8	9	10	11	
T1	5	13	9	11	11	16	10	12	13	6	5	111
T2	11	15	17	15	12	21	13	14	10	9	9	146
T3	11	14	11	12	12	18	11	10	9	5	5	118
T4	9	12	12	12	14	14	13	12	10	9	6	123
T5	7	12	10	9	9	12	11	10	8	5	5	98

It is seen from table 3 that, T_2 has given maximum number of fruits in all harvesting except 9th harvest where T1 has given maximum fruits. The average yield for T2 for the entire harvest was 146 fruits which is 17.1 % more than its following high yield treatment i.e T4 (commercial application) with 123 fruits. T3 has also shown equal yield as that of T2 on 1st and 5th harvest as well as T4 has shown equal yield to T2 on 10th harvest. The average maximum number of fruits with respect to the harvest were received on 6th harvest with 16.1 fruits, T2 still has more fruits than the average of that harvest with 21 fruits. Hence, from the result it is clear that T2 has proved to be high yielding treatment in the present study. The results are on conformity with the earlier studies conducted by Zodape *et.al.,* [4]. They yielded maximum 163.25 fruits with application of liquid seaweed fertilizer. Divya *et.al,* [5] also reported the yield of fruits around 7.66±0.41 in the study on Influence of seaweed liquid fertilizer of *Ulva lactuca* on the seed germination, growth, and productivity of *Abelmoschus esculentus (L.)*

CONCLUSION

It is concluded from present study that, fresh water algal extract has been good alternative to the commercial nutrients in improving the overall yield in okra plant. Among all the extracts and concentration 15 % concentration of blue green algae was more effective in getting maximum yield from okra plant.

REFERENCES

1. Zhang, X.Z. and Ervin, E.H. (2004), Cytokinin-Containing Seaweed and Humic Acid Extracts Associated With Creeping Bent Grass Leaf Cytokinins And Drought Resistance. *Crop Sci*. **44**: 1737-1745.
2. Bokil K K, Mehta VC & Datar DS (1974), Seaweed as Manure; II Pot Culture Manorial Experiment on Wheat. *Phykos* 13(1): 1-5.
3. Bhosale, N. B., Untawale, A. G. and Dhargalkar, V. K. (1975), Effect of Seaweed Extracts on The Growth of *Phaseolus vulgaris. Indian J. Mar. Sci.* 4: 209-210.
4. Zodape S.T., Kawarkhe V.J., Patolia J.S. and Warade A.D. **(2008)**, "Effect of Liquid Seaweed Fertilizer on Yield And Quality of Okra (*Abelmoschus esculentus* L)" *Journal of Scientific and Industrial Research*, **67**, 1115-1117.
5. Divya K . N., Mary Roja and S.B. Pada (2015), "Influence of Seaweed Liquid Fertilizer of *Ulva lactuca* on the Seed Germination, Growth, Productivity of *Abelmoschus esculentus* (L.)" *International Journal of Pharmacological Research*, 5(2):344-346