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EFFECT OF SEAWEED LIQUID FERTILIZER OF *HYPNEA VALENTIAE* (TURNER) MONTAGNE (RED ALGAE) ON *PENNISETUM GLAUCUM* (L.) R.BR

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ABSTRACT

The present study has been made to investigate the effect of Seaweed Liquid Fertilizer (SLF) of *Hypnea valentiae* (Turner) Montagne on seed germination, shoot length, root length, and biochemical content of *Pennisetum glaucum* (L.) R.Br. The Seaweed Liquid Fertilizer prepared from *Hypnea valentiae* (Turner) Montagne was observed to have the positive effect on the shoot and root length of *Pennisetum glaucum* (L.) R.Br. The biochemicals such as total carbohydrates, proteins, lipids and phenols were increased when the *Pennisetum glaucum* (L.) R.Br. treated up to 10% of Seaweed Liquid Fertilizer. The seed germination, shoot length, root length and biochemical content were maximum at 10% SLF. From the present study, it can be concluded that *Hypnea valentiae* (Turner) Montagne can be used as biofertilizer for the growth of *Pennisetum glaucum* (L.) R.Br.

KEYWORDS: SLF, *Hypnea valentiae*, *Pennisetum glaucum*, Seaweed, Fertilizer.

INTRODUCTION

Seaweeds or marine macro algae are the renewable living resources of the marine ecosystem that supply oxygen to the biosphere, are a source of food, feed, medicine, fertilizer and chiefly for economically important phycocolloids in many parts of the world (Bhakuni and Rawat, 2005). Seaweeds are incomparable source of minerals, macro elements and trace metals. Mineral content in seaweeds compared to land and animal products is generally higher concentration and the essential minerals and trace elements needed for human nutrition are also present in seaweeds. From the literatures it was observed that seaweeds are valuable sources of protein, vitamins, and minerals which are essential for human nutrition.

The nutritional properties of seaweeds are not yet noted and they are usually estimated from their chemical composition alone (Mabeau and Fleurescence, 1993). Compared to land plants, the chemical composition of seaweeds has been poorly investigated and most of the available information deals only with traditionally used seaweeds (Watanabe and Nisizawa, 1984). The chemical composition of seaweeds varies with species, habitats, maturity and environmental conditions (Villares *et al.*, 2001). The chemical content such as polysaccharides, proteins, lipids, calcium, phosphorous, iron, iodine and vitamin-C contents were estimated in *Gracilaria*, *Hypnea* and *Ulva* species. In CMFRI, studies were carried out on the chemical composition of the marine algae growing in the vicinity of Mandapam (Lozano *et al.*, 2003).

In the present day world, the seaweed fertilizers are often found to be more successful than the chemical fertilizers. In India, large quantity of macroscopic marine algae has been utilized directly as manure or in the form of compost by coastal peoples. Besides their application as Farm Yard Manure (FYM), Liquid extract obtained from seaweeds popularly known as SLF/LSF has recently gained much interest as foliar spray for inducing faster growth and yield in cereal crops, vegetables, fruits,

orchards and horticultural plants (Reddy *et al.*, 2004). Hence, the present study was carried out to find out the effect of Seaweed Liquid Fertilizer of *Hypnea valentiae* (Turner) Montagne.

MATERIALS AND METHODS

Collection of sample

Hypnea valentiae (Turner) Montagne, a red seaweed shows much attention in the recent years due to native vegetation. *Hypnea valentiae* (Turner) Montagne was collected from Rasthakadu coast, Kanyakumari district in the south east coast of Tamil Nadu, India during the month of October, 2025. Samples were rinsed with marine water to remove debris and epiphytes. The entire epiphytes were removed using soft brush. In the laboratory, the seaweeds are again washed in freshwater and stored in refrigerator for further analysis (John Peter Paul and Shri Devi, 2014).

Selection and Surface Sterilization of Seeds

Pennisetum glaucum (L.) R.Br. is one of the important cereals and cultivated in almost all the states in India. Therefore, *Pennisetum glaucum* (L.) R.Br. was selected in the present study. About 100 seeds the test plant immersed in a beaker of water. The seeds which floated on the surface of water were removed. The seeds which sunk to the bottom of the beaker were selected for the study. The selected seeds were washed in running tap water for 5 minutes and rinsed with distilled water for 5 minutes. After washing, the seeds were sterilized by keeping in 0.1% mercuric chloride for 5 minutes. The surface sterilized seeds were washed in distilled water and rinsed 5 times for 5 minutes each (Jeanin *et al.*, 1991). The surface sterilized and rinsed seeds were employed for the present study.

Preparation of Seaweed Liquid Fertilizer

Air dried plant sample was finely ground with mortar and pestle and 10g was weighed on electronic balance. 100ml distilled water was added. The mixture was incubated for two days (48h). Thereafter, the extract was filtered through What-man No.1 filter paper. Now, the extract was made up into 100ml with distilled water (10%). From this, various concentrations of extract were prepared using distilled water in the following manner.

Percentage of Conc.	Extracts (ml)	Distilled water (ml)
Control	-	100
2.5%	25	75
5.0%	50	50
7.5%	75	25
10%	100	-

Bio Assay

Ten seeds were germinated in shade using Petri plates at room temperature (33°C) for each treatment. For each treatment, 10 seeds were placed in sterilized Petri plates on Whatman No.1 filter paper and 5ml of aqueous extractions (2.5%, 5.0%, 7.5% and 10%) were added on the first day. Controls were treated with an equal volume of distilled water (Joshi *et al.*, 1996). The same volume of extracts and distilled water were added on subsequent days on daily basis (Susseelama and Venkataraju, 1994). The treatments were replicated three times in a completely randomized manner. Followed by total carbohydrates (Dubois *et al.*, 1956), total proteins (Lowry *et al.*, 1951), total lipids (Folch *et al.*, 1957) and total phenols (Sadasivam and Manickam, 1992) were also estimated. The results obtained were tabulated and presented in the figures.

RESULTS AND DISCUSSION

Effect of SLF of *Hypnea valentiae* (Turner) Montagne on *Pennisetum glaucum* (L.) R.Br.

The Seaweed Liquid Fertilizer of *Hypnea valentiae* (Turner) Montagne was used as base for *Pennisetum glaucum* (L.) R.Br. Germination of seed was observed on 4^{th} day and frequency of germination was found to be 100% in control and all treatments (Table-1)

This treatment resulted in stimulation of shoot and root growth. Average shoot length in control was found to be 4.9cm (100%). The minimum stimulation of shoot length was recorded 5.2cm in 2.5% concentration of SLF (6.12%). Followed by the shoot growth was increased to 5.8cm in 5.0% (18.36%) and 6.4cm in 7.5% (30.61%). When the concentration of SLF increased to 10%, the maximum stimulation of shoot length was reached to 6.9cm (40.81%). Average root length in control was found to be 6.8cm (100%). The minimum stimulation of root length was observed 7.1cm in 2.5% concentration of SLF (4.41%). Followed by the root growth was increased to 7.7cm in 5.0% (13.23%) and 8.2cm in 7.5% (20.58%). When the concentration of SLF increased to 10%, the maximum stimulation of root length was reached to 9.1cm (33.82%).

Table 1: Effect of Seaweed Liquid Fertilizer of *Hypnea valentiae* (Turner) Montagne on shoot and root length of *Pennisetum glaucum* (L.) R.Br.

Treatment	Seed germination (%)	Shoot length (cm)	Increased Shoot length (%)	Root length (cm)	Increased root length (%)
Control	100	4.9±0.03	-	6.8±0.10	-
2.5%	100	5.2±0.07	6.12	7.1±0.09	4.41
5.0%	100	5.8±0.03	18.36	7.7±0.11	13.23
7.5%	100	6.4±0.11	30.61	8.2±0.06	20.58
10%	100	6.9±0.08	40.81	9.1±0.12	33.82

As shown in Table-2, total carbohydrates content in control was 140mg/gm, followed by increasing trend of carbohydrates was observed in 2.5% (161mg/g), 5.0% (183mg/g), 7.5% (192mg/g) and 10% (199mg/gm). Total protein content in control was 112mg/gm, followed by 2.5% (137mg/g), 5.0% (148mg/g), 7.5% (165mg/g) and 177mg/gm in 10%. Total lipid in control was found to be 62mg/g. The amount of lipid in 2.5% was 72mg/g, followed by increasing trend was observed to 88mg/g (5.0%), 91mg/g (7.5%) and 96mg/g (10%). Total phenol content in control was 51mg/gm, followed by increasing trend of phenols was noted in 2.5% (59mg/g), 5.0% (67mg/g), 7.5% (80mg/g) and 10% (84mg/gm). When the concentration of Seaweed Liquid Fertilizer of *Hypnea valentiae* (Turner) Montagne was increased, all the phytochemicals content was increased.

Table 2: Effect of Seaweed Fertilizer of *Hypnea valentiae* (Turner) Montagne on different Biochemicals of *Pennisetum glaucum* (L.) R.Br.

Biochemicals (mg/g)	Concentration of Plant Extracts				
	Control	**2.5%**	**5.0%**	**7.5%**	**10%**
Total Carbohydrates	140*	161*	183*	192*	199*
Total Proteins	112*	137*	148*	165*	177*
Total Lipids	62*	72*	88*	91*	96*
Total Phenols	51*	59*	67*	80*	84*

* An average of Triplicates

The utilization of seaweeds in agriculture and horticulture has a long history. Ancient Greeks and Chinese applied seaweed mulches to the soil. Some of the commercially available liquid seaweed like Cytex, Goemer GA 14, Kelpak 66, Maxicrop sea crop 16, Seaspray, Seamac, Seamagic-3 etc. The *Pennisetum glaucum* (L.) R.Br. seeds soaked with lower concentrations (2.5%) of the *Hypnea valentiae* (Turner) Montagne extracts showed lower rate of germination, while the higher concentrations (10%) of the extracts showed rapid germination. The increased germination percentage at high concentrations may be due to the presence of some growth promoting substances such as IAA and IBA, Gibberellins, cytokinins, micronutrients, vitamins and amino acids in *Hypnea valentiae* (Turner) Montagne extracts. The present findings coincide with those of earlier studies made in *Cajanus cajan* (Mohan *et al.*, 1991), Maize and Ragi (Rajkumar and Subramanian, 1999), *Vigna catajung* and *Dolichos biflorus* (Anantharaj and Venkatesalu, 2001). Statistically significant differences were observed for shoot length, root length, fresh and dry weight. A positive response was observed at 10% SLF of *Hypnea valentiae* (Turner) Montagne soaked seedlings.

CONCLUSION

From the present study, it is concluded that Seaweed Liquid Fertilizer prepared from the red seaweed *Hypnea valentiae* (Turner) Montagne can be applied to the important crop plant *Pennisetum glaucum* (L.) R.Br showed better results in all aspects of germination, growth and biochemical concentration. It is probably due to the presence of growth promoting hormones and nutrients in more quantities in the red seaweed, Seaweed Liquid Fertilizer can be applied to various crop plants in order to enrich the nutrient content of the soil and intern to increase the growth and yield of cultivable plants.

REFERENCES

1. Bhakuni, D.S. and Rawat, D.S. (2005). Bioactive Marine Natural Products. New Delhi, Anamaya Publishers.
2. Mabeau, S. and Fleurence, J. (1993). Seaweed in food, products: Biochemical and nutritional aspects. *Trends in Food Sci. Technol.*, 4: 103-107.
3. Watanabe, T. and Nisizawa, K. (1984). The utilization of wakame (*Undaria pinnatifida*) in Japan and manufacture of "Haiboshi Wakame" and some its biochemical and physical properties. *Hydrobiologia*, 116/117: 106-111.
4. Villares, R., Puente, X. and Carballeira, A. (2001). *Ulva* and *Enteromorpha* as indicators of heavy metal pollution. *Hydrobiologia*, 462: 221-232.
5. Lozano, G., Hardisson, A. and Lafuente A.J. (2003). Lead and cadmium levels in coastal benthic algae (seaweeds) of Tenerife, Canar Islands. *Environ. Int.*, 28: 627-631.
6. Reddy, M.P., Zaidi, S.H., Vasuki, S. and Subba Rao, S.V. (2004). Seasonal variation in iodine content of promising iodine yielding seaweeds of Indian coast. *Seaweed Research Utilisation*, 26: 159-166.

7. John Peter Paul, J. and Shri Devi, S.D.K. (2014). Effect of Seaweed Liquid Fertilizer of *Gracilaria dura* (Ag.) J. Ag. (Red Seaweed) on *Pennisetum glaucum* (L.) R.Br. in Thoothukudi, Tamil Nadu, India. *Indo American Journal of Pharm Research*, 4(4): 2183-2187.
8. Jeanin, I., Lescure, J.C. and Gandry, J.F. (1991). The effect of aqueous seaweeds sprays on the growth of maize. *Bot. Mar*, 34: 469-474.
9. Joshi, R.K., Prasad, D., Rawat, M.S.M. and Pant, G. (1996). Allelopathic effect of aqueous extracts of leaves of *Fraxinus micrantha* L. on crops. *Allelopathy Journal*, 3(2): 255-260.
10. Susseelama, M. and Venkataraju, R.R. (1994). Effect of *Digera maricatamart* extracts on the germination and seedling growth of groundnut. *Allelopathy Journal*, 1(1): 53-57.
11. Dubois, M., Gilles, K.A., Hamilton, J.K., Rebe, P.A. and Smith, F. (1956). Calorimetric method for determination of sugars and related substance. *Anal Chem.*, 28: 350.
12. Lowry, N., Rosenbrough, J., Farr, A.L. and Randall, R.J. (1951). Protein measurement with the folin phenol reagent. *J. Biol. Chem.*, 193: 265-275.
13. Folch, J., Lees, M. and Sloane, S.G.H. (1957). A Simple Method for the Isolation and Purification of Total Lipids from Animal Tissue. *Journal of Biological Chemistry*, 226: 497-509.
14. Sadasivam, S. and Manickam, A. (1992). Biochemical method for agriculture science, Willey, Eastern Ltd. Pp.105.
15. Mohan, V.R., Venkataraman, K.V., Murugeswari, R. and Muthuswami, S. (1994). Effect of crude and commercial seaweed extracts on seed germination and seedling growth in *Cajanus cajan* L. *Phykos*, 33(1/2): 47-51.
16. Rajkumar, I.S. and Subramanian, S.K. (1999). Effect of fresh extracts and seaweed liquid fertilizers on some cereals and millets, *Seaweed Res. Utiln.*, 21(1/2): 91-94.
17. Anantharaj, M. and Venkatesalu, V. (2001). Effect of seaweed liquid fertilizer on *Vigna catajung. Seaweed Res. Utiln.*, 23(1/2): 33-39.