National Journal of Multidisciplinary Research and Development
ISSN: 2455-9040
Impact Factor: RJIF 5.22
www.nationaljournals.com
Volume 3; Issue 1; January 2018; Page No. 01-03

Effect of seaweed *Hypnea musciformis* (Wulf) Lamour. Extract on biochemical variation and growth of *Vigna unguiculata* (L.) Walp.

[1] Sheeja P Parayil, [2] Neethu AR
[1] Assistant Professor, PG and Research, Department of Botany, SN College, Nattika, Kerala, India
[2] PG Student, PG and Research, Department of Botany, SN College, Nattika, Kerala, India

Abstract
Use of chemical fertilizers make very harm to the environment, which result in severe health problems. The present study showed that sea weed species can become potential source of fertilizers. All parameters of study showed higher values than the control for the treatment of lowest concentration of sea weed extract (1g/ml). It was also clear that too much concentration of SLF have reduced effects. This encourages the utilization of seaweeds as natural fertilizers.

Keywords: *Hypnea musciformis*, *Vigna unguiculata*, vigour index, growth index, sea weed liquid fertilizer

1. Introduction
In human history the invention of agriculture is one of the great revolutions. Pollution and contamination of soil is a main problem today we face. The use of chemical fertilizers make our environment toxic. Bio fertilizers can solve this problem in many ways. Because they can improve the soil by increasing water holding capacity, which will be helpful for enhancing seed germination, and they can secrete growth promoting substances. Sea weeds are macrophytes, they live attached the rocks and other hard substrata in coastal areas by means of holdfast. Have no true roots, true stem and true leaves. The importance of seaweeds as manure has been recognized for a long time in other countries; However in India very little information is available on the beneficial effects of sea weeds to improve crop growth [1, 2]. Newton (1951) reviewed the use of seaweeds as manure by ancient Romans and the method of sea weed application from whole and chopped sea weeds as well as liquid supplements and extracted preparations [3]. Plants responses to seaweed applications are of different types. They show higher yields, increased resistance and better seed germination etc. The present study was carried to reveal the effect of seaweed liquid fertilizer (SLF) of *Hypnea musciformis* on the growth and biochemical characteristic of *Vigna Unguiculata*.

2. Materials and Methods
2.1 Collection of seaweeds
The fresh seaweeds were collected from Thikkodi, Kerala. After collection washed with sea water for removing adhered sand. Then washed with tap water.

2.2 Preparation of seaweed extract
After draining off the water the collected seaweeds were dried at 45^{o}c in oven. Then powdered. SLF were prepared by following the method of Gandhiyappan and Perumal [4]. All the SLF were labelled and stored in refrigerator for further use. From this different concentrations of the extract 1g/ml, 2g/ml, 3g/ml and 4g/ml were prepared.

2.3 Selection of crop plant
Vigna unguiculata belongs to the family Fabaceae. Seeds were collected from Kerala Agriculture University, Mannuthy. They were tested for their viability and purity.

2.4 Parameters studied
2.4.1 Germination studies [5, 6, 7, 8]
Germination studies include germination percentage, radicle and hypocotyl length, vigour index, phytotoxicity, growth index, fresh weight and dry weight of seedlings, phytomass and productivity

2.4.2 Biochemical analysis [9]
Chlorophyll estimation were done on the seventh day of the experiment.

2.4.3 Phytochemical analysis [10]
Phytochemical analysis of tannins, alkaloids, steroids, saponins and glycosides were done.

3. Results & Discussion
The percentage of seed germination was varied from 96.6% to 100%. Control, 2g/ml and 3g/ml concentrations showed 100% germination.1g/ml and 4g/ml showed only 96.6% germination. The hypocotyl and radicle length were maximum in 1g/ml concentration treated seedlings. And length decreased with increasing concentration. Hypocotyl length varied from 4.963cm (4g/ml) to 9.566cm (1g/ml). Radicle length varied from 6.353cm (4g/ml) to 12.636cm (1g/ml). Vigour index was maximum in 1g/ml treated seedlings. Varied from 1093.12 (4g/ml) to 2144.71(1g/ml). The maximum growth index value observed in 1g/ml and minimum observed in 4g/ml concentration of SLF. Maximum

phytomass, productivity, amount of $chl_{a,,}chl_b$ and total chlorophyll content were observed in 1g/ml and minimum in 4g/ml concentration of SLF.

Preliminary phytochemical analysis of five different chemical compounds (tannins, alkaloids, steroids, saponins and glycosides) were tested in three different extracts of *Hypnea musciformis*. Thus out of 15 tests for the presence or absence of the above compounds, eight tests gave positive results and the remaining seven gave negative results. The eight positive results showed the presence of tannins, alkaloids, steroids, saponins and glycosides. Among three different extracts aqueous extract showed the presence of maximum number of compounds. Next to that is methanol.

Gourav kumar and Dinabandhu sahoo [11] reported that the effect of lower concentration of SLF of *Sargassum wightii* enhanced the percentage of germination and growth yield of *Triticum aestivum.* Increased chlorophyll content was also recorded in a study conducted by Asir selin kumar *et al* [12]. Lower concentration of SLF enhanced the rate of seed germination in green chillies and turnip and also germination percentage was also increased [13]. SLF of *Sargassum wightii* and *Hypnea musciformis* at lower concentration increased photosynthetic pigments, biochemical constituents such as soluble proteins, and starch of *Cyamopsis tetragonoloba* [14].

4. Tables

Table 1: Effect of *Hypnea musciformis* on seed germination of *Vigna unguiculata*

concentration	Radicle length (cm)	Hypocotyl length (cm)	Seedling length (cm)	Seed germination %	Vigour index
control	9.726	8.64	18.366	100	1836.6
1g/ml	12.636	9.566	22.202	96.6	2144.71
2g/ml	7.833	6.4	14.233	100	1423.3
3g/ml	7.893	7.103	14.996	100	1499.6
4g/ml	6.353	4.963	11.316	96.6	1093.12

Table 2: Effect of *Hypnea musciformis* on chlorophyll pigments of *Vigna unguiculata*

concentration	chla	chlb	Total chlorophyll content
control	0.039	0.012	0.051
1g/ml	0.067	0.016	0.083
2g/ml	0.007	0.014	0.021
3g/ml	0.034	0.020	0.054
4g/ml	0.029	0.011	0.040

Table 3: Preliminary phytochemical analysis of crude extract of *Hypnea musciformis*

Phytochemical content	water	methanol	chloroform
tannins	+++	-	-
alkaloids	+++	-	-
steroids	-	+++	++
saponins	++	-	+++
glycosides	++	++	-

Absent –
Less +
Average++
High+++

5. Conclusions

Seaweed liquid fertilizer (SLF) is a natural, water soluble bioactive compound derived from marine macro algae. The present study was an attempt to analyse the effect of seaweed *Hypnea musciformis* belongs to Rhodophyta on the germination of *Vigna unguiculata.* Four different concentrations were used. At a lower concentration Hypnea showed maximum growth of seedlings. While seeds treated with higher concentrations showed inhibited growth. So it can be concluded that seaweed species can be used as potent source of fertilizers. Present findings encourage the application of such sea weeds as natural fertilizers. They can act as alternatives to synthetic plant stimulants and further study is necessary to recompense the constraints.

6. References

1. Bhosle NB, Untawale AG, Dhargalkar VK. Effect of sea weed extracts on the growth of *Phaseolus vulgaris* L. Indian Journal of Marine Science. 1975; 4:208-210.
2. Vijayalakshmi A, Lakshmanan KK. Impact of seaweed extracts SM3 on winged bean vegetative parts. Ad. Plant. Sci. 1988; 1:229-231.
3. Newton. Seaweed utilization. Sampson Low, London. 1951; 188.
4. Gandhiyappan K, Perumal. Growth promoting effect of sea weed liquid fertilizer *Enteromorpha intestinalis* on the *Sesamum indicum* L. Sea weed Res. Utilin, 2001; 26(1&2):23-25.
5. Chou CH, Muller CH. Allelopathic mechanism of *Archostathylous glandulosa* var. Amer. Midl. Naturalis. 1972; 324-347.
6. Vilasini G. Mutagenic studies in *Lathyrus sativus* L. Ph.d. Thesis. Osmania University, 1978.
7. Sharma AK, Saran. Effect of salinity on germination and seedling growth in Black gram. Neobotanica. 1992; 2:52-57.
8. Erulan V, Soundarapandian P, Thirumaran G, Ananthan. Studies on the effect of *Sargassum polycystum* extract on the growth and biochemical composition of *Cajanus cajan* (L). Mil sp. American- Eurasian J Agric & Environ. Sci. 2009; 6(4):392-399.
9. Shirlaw DWS, Gilchrist DW. A practical course in agriculture Chemistry; Pergaman pub. London. 1967; 122-130.
10. Harborne JB. Phytochemical methods; A guide, Modern techniques of plant analysis, Third Edn. Chapman and Hall, London, 1998.
11. Gourav kumar, Dhinabandhu sahoo. Effect of seaweed liquid extract on the growth and yield of *Triticum aesivum var. pusa gold*, Journal of Applied Phycology. 2011; 23:251-255

12. Asir selin kumar R, Saravan babu S. Studies on the effect of seaweed extract on *Oryza sativa Var*.senescence. Sea weed research and utilization association. 2004; 26(1-2):171-175
13. Dhargalkar VK, Untawale AG. Some observations of the effect of SLF on higher plants, Indian journal of Marine science. 1980; 12:210-214
14. Thambiraj J, Lingakumar, Paulsamy. Effect of liquid sea weed fertilizer prepared from *Sargassum wightii* and *Hypnea musciformis* on the growth and biochemical constituents of the pulse, *Cyamopsis tetragonoloba* L. Journal of research in agriculture. 2012; (1):65-70.