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ARTICLE

EFFECT OF SGLF AND SLF (LIQUID FERTILISERS) ON THE GERMINATION OF *VIGNA UNGUICULATA*

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Abstract

Modern agricultural practices with the use of chemical fertilizers and pesticides resulted increase in food production and harmfully affect the sustainability of man and environment. So the application of biofertilizers for sustainable crop productivity has been promoted. Liquid fertilizers derived from seaweeds and sea grasses were used as biofertilizers. In the present study there was an attempt to made to find out the effect of sea grass liquid fertilizer (SGLF) from *Syringodium isoetifolium*, seaweed liquid fertilizer (SLF) from *Spatoglassum asperu*m and combined liquid fertilizer obtained from *Spatoglassum asperum* and *Syringodium isoetifolium* on the germination of *Vigna unguiculata*. The seeds of *V. unguiculata* were treated with different concentrations of liquid fertilizers (10%, 20%, 30%, 40% and 50%). The germination rate was maximum in seeds treated with10% concentration and was minimum in seeds treated with 50% concentration. 98% seed germination was observed in combined SLF & SGLF at 10% concentration. 97% germination was observed in 10% seagrass (*Syringodium isoetifolium*) liquid fertilizer treated seeds. 95% germination was observed in 10% seaweed (*Spatoglassum asperum*) liquid fertilizer treated seeds. Among these fertilizers, the combined SLF & SGLF was found to be more effective on germination when compared to SLF and SGLF applied individually. 10% concentration is more effective and highly significant than other concentrations of treatment.

Keywords: SLF, SGLF, *Syringodium isoetifolium*, *Spatoglassum asperum*

Introduction

India is an agricultural country. Ocean is the store house of minerals and nutrients. During raining and irrigation, the nutrients and minerals are flowing along with water and reached to the ocean. These nutrients are taken by the water plants and become flourished. Seaweeds and seagrasses are used as biofertilizers in large scale. Our coastal areas are abundant in the presence of algal diversity. Utilization of sea grasses as sea grass liquid fertilizers (SGLF) and seaweeds as seaweed liquid fertilizers (SLF) enhanced the growth and development of land plants. It is one of the best methods to get lost nutrients from the ocean to the land. In agriculture, seaweed extracts are known to enhance seed germination and plant growth. Seaweed liquid fertilizer contains bio-organic substance like auxins, gibberellins, trace elements, vitamins amino acids and micro nutrients (Bhosle et al., 1975; Mohan et al., 1994).

Seaweed liquid fertilizer are found to be superior to farmyard manure and chemical fertilizers because of the presence of high amount of organic matter, which helps in moisture retaining capacity and minerals in the soil level available to the plants (Aitken and Senn, 1965). In the present investigation, a comparative study was made to examine the effect of sea grass liquid fertilizer (SGLF) from *Syringodium isoetifolium* and seaweed liquid fertilizer (SLF) from Spatoglassum asperum and combined liquid fertilizer obtained from *Spatoglassum asperum* and *Syringodium isoetifolium* on germination of *Vigna unguiculata*.

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Materials and Methods

The seaweed, *Spatoglassum asperum* and seagrass, *Syringodium isoetifolium* were collected from Leepuram coast of Kanyakumary district.

***Seaweed – Spatoglassum asperum* J. Agardh**
Spatoglassum asperum is a pheophycean algae used for the preparation of seaweed liquid fertilizer (SLF).

Sea grass - Syringodium isoetifolium (Ascher) Dandy
Syringodium isoetifolium (Ascher) Dandy was a submerged marine monocot plant material come under the family potomagetonaceae used for the preparation of sea grass liquid fertilizer (SGLF).

Preparation of seaweed liquid fertilizer (SLF) and sea grass liquid fertilizer (SGLF)
The seaweeds and sea grasses were collected and washed thoroughly with running tap water to remove the epiphytes,

Spatoglassum asperum

Syringodium isoetifolium

sand particles and other waste materials. Extracts were prepared by the method of Bhosle et al., (1975). Then 1000 gm of material cut in to small pieces and boiled separately with 1000ml of distilled water for 1 hour and filtered. The filtrate was 100% concentration.

Plant material used for experimental studies

Vigna unguiculata was taken for the present study. It is a dicotyledonous plant comes under the Family Leguminoseae (Sub- Family- Papilionaceae). The viable seeds of *Vigna unguiculata* were obtained from Agricultural College, Vellayani, Thiruvanathapuram.

Selection of seeds- Tetrazolium seed viability test

Tetrazolium test is commonly used for the study of germination potential and viability of seed. In this test, living cells are made visible by the reduction of an indicator dye. The indicator used in the tetrazolium test, which is a colourless solution of tetrazolium salt (2, 3, 4-triphenyl tetrazolium) is imbibed by the seed which later on interferes with the reduction process of living cells. This makes it possible to distinguish the red colour living parts of seeds, from the colourless dead ones. In addition to this completely unstained non-viable seeds, partially stained seeds will also appear. A sample of 50 seeds in 4 duplicates was taken for test.

Seed plates are prepared in a container and they were submerged in tetrazolium solution and placed in dense warm place at 40 °C for 8 hours till the red colour appeared. Soon after the appearance of red colour, tetrozolium solution was removed and the seed plates were submerged in water. The seeds were examined through the dissection microscope. The seeds showing 90% viability were selected for investigation

Pesticide treatment

The seeds were surface sterilized with 0.02% mercuric chloride and washed with tap water and finally with distilled water.

Germination percentage

The experimental seeds are soaked with different concentrations of liquid fertilizers for 24 hours. After the seeds were sown in pots and were regularly watered. The effect of seaweed and sea grass liquid fertilizer on germination percentage of Vigna unguiculata was calculated by using the following formula,

Germination percentage =

$$\frac{\text{Number of seeds germinated X 100}}{\text{Total number of seeds}}$$

Results and Discussion

The results on the germination percentage of V*igna unguiculata* treated with seaweed liquid fertilizer (SLF), sea grass liquid fertilizer (SGLF) and combined effect of SLF & SGLF are presented in Table –I.

In the present investigation, the germination rate of control seeds of *V. unguiculata* was 85%. An increase in germination rate was observed in *V. unguiculata* seeds treated with 10% combined seaweed and sea grass (*Spatoglassum asperum* and *Syringodium isoetifolium*) liquid fertilizer. A 98% of germination was observed in combined SLF & SGLF at 10% concentration. 97% germination was observed in 10% seagrass (*Syringodium isoetifolium*) liquid fertilizer treated seeds. 95% germination was observed in 10% seaweed (*Spatoglassum asperum*) liquid fertilizer treated seeds. At higher concentrations (ie.,20%, 30%,40% and 50%) , the germination percentage gradually declined. A decrease of germination rate was observed in 50% concentration when compared to 10%, 20%, 30% and 40% concentrations. Among these fertilizers, the combined SLF & SGLF (Spatoglassum asperum and *Syringodium isoetifolium*) liquid fertilizer is more effective on germination when compared to seaweed (*Spatoglassum asperum*) liquid fertilizer and sea grass (*Syringodium isoetifolium*) liquid fertilizer.

The result revealed that the germination rate was maximum in seeds treated with10% concentration and was minimum in seeds treated with 50% concentration. Increased

Table 1. Effect of seaweed liquid fertilizer (SLF), sea grass liquid fertilizer (SGLF) and combined effect of SLF & SGLF on germination of *Vigna unguiculata*.

Concentrations	Germination percentage		
	Spatoglassum asperum(SLF)	*Syringodium isoetifolium* (SGLF)	Combined SLF & SGLF
Control	85 ± 4.27	85 ± 4.32	85 ± 2.21
10%	95 ± 3.01	97 ± 5.23	98 ± 3.57
20%	90 ± 2.23	91 ± 2.36	95 ± 6.07
30%	87 ± 4.65	88 ± 9.21	92 ± 2.02
40%	85 ± 4.11	86 ± 6.12	89 ± 5.27
50%	80 ± 3.97	82 ± 4.21	84 ± 3.29

rate of seed germination at low concentration in the present study is in consonance with the earlier results of Aitken and Senn (1965), Mohan et al., (1994) and Anantharaj and Venkatesalu, (2001), Asir and Saravana (2004), Sobithabai et al., (2005), Renuka Bai et al., (2008) Veeragurunathan (2009), Sobithabai et al., (2010), Delfin et al., (2010), Femila et al., (2010) and Sivasankari et al., (2006) and it may be due to the presence of Gibberellins (Anatharaj and Venkatesalu, 2001).

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