

STATEMENT I

Present investigation deals with physiological studies on applications of Seaweed fertilizers to crop plants. Although common seaweeds are applied as manures and liquid fertilizers to grow vegetables and ornamentals. Not much is understood about their physiological effect on plants. Hence, an attempt has been made in the present study to investigate such parameters in an economically important vegetable crop *Trigonella foenum-graecum*. Germination, growth and biochemical changes in *Trigonella foenum-graecum* treated with different seaweed concentrate are analyzed and reported with reference to the Hoagland treatment. Thus, this work represents an original contribution in the field of agriculture and organic farming using seaweed fertilizers. This work has not been submitted for the award of any degree in any institute.

STATEMENT II

The present investigation embodies studies on fertilizer properties of seaweeds and their effect on seed germination, seedling growth and biochemical aspects in a vegetable crop *Trigonella foenum-graecum*. This work is original and ^{reports} certain new findings. The current issues of journals, reviews, articles, text books and monograph have been extensively referred and correlated. The source of information gathered has been listed in the last part of the dissertation, 'Bibliography'. Every attempt has been made to keep the references work upto date.



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EFFECT OF SEAWEED EXTRACTS (SWE) ON GERMINATION OF *TRIGONELLA FOENUM-GRAECUM* SEEDS

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ABSTRACT

Effect of aqueous extracts of three seaweeds viz. *Ulva fasciata*, *Sargassum ilicifolium* and *Gracillaria corticata* was tested on germination of fenugreek seeds. Fresh extracts of all seaweeds promoted seed germination.

Key words : Seaweeds, Seed germination, *Trigonella foenum-graecum*

Beneficial effects of seaweed extract on seed germination and establishment have been reported in okra (Beckett and van Staden, 1989), beet (Wilczek and Ng, 1982) and lettuce (Moller and Smith, 1999). During present study three seaweeds viz. *Ulva fasciata*, *Sargassum ilicifolium* and *Gracillaria corticata* were employed for evaluating their effect on germination of *Trigonella foenum-graecum* (fenugreek) seeds.

Fresh seaweeds were collected from Malvan and Kunakeshwar along west coast of Maharashtra, during November 2006 to January 2007. The samples (100g) were blended in mixer and the extract was filtered. The volume of filtrate was adjusted to 100 ml by adding distilled water. This filtrate was designated as 100% seaweed extract (SWE).

Samples of seaweeds were dried in sun and ground to a fine powder, of which 50g was boiled in 50 ml distilled water and filtered through muslin cloth. The volume of the filtrate was made up to 50 ml (100% SWE).

Simultaneously, 50 g dried powder was soaked in 50 ml distilled water for two days and

filtered through muslin cloth to obtain 100 % SWE. The three types of extracts were stored at 4°C and diluted at various concentrations whenever required.

Seeds of fenugreek, *Trigonella foenum-graecum* L. were surface sterilized (0.1 % HgCl₂) and soaked in different SWE concentrations for one hour. The treated seeds were washed thoroughly in distilled water and kept for germination in sterilized petri plates lined with filter paper. Seeds soaked in distilled water served as the control. Hoagland nutrient medium [KNO₃ (1M 6.0mls), Ca(NO₃)₂ * 4H₂O (1M 4.0mls), NH₄ H₂ PO₄ (1M 2.0mls), MgSO₄ * 7H₂O (1M 1.0mls) and N (224ppm), K (235ppm), Ca (160ppm), P (62ppm), S (32ppm), Mg (24ppm)] was employed as one of the treatments. The petri plates were kept in dark for germination and number of germinated seeds were recorded.

Fresh SWEs up to 50 - 60% concentration promoted seed germination. At higher concentration % germination declined and completely inhibited at 100% SWEs of all algae. Treatment with Hoagland nutrient medium exhibited 100% seed germination.

Even at the lower concentration of 5%, *Ulva* and *Sargassum* SWEs promoted seed germination when the extract was prepared by boiling dry seaweeds. With *Sargassum* SWE treatment 100% germination was recorded for all the concentrations upto 50%. Similar results were observed with SWEs prepared by soaking seaweed powder.

Hong et al (2007) and Demir et al. (2006) also reported similar results. According to Jennings (1968) green and brown algae contain gibberelic acid, which plays an important role in seed germination. Thus non-toxicity and growth promoting effect of seaweed concentrates indicated their possible use as bio-fertilizer in agriculture.

Acknowledgment

We express our gratitude to Dr. G.B. Dixit,

Head of the Botany Department for providing laboratory facilities and useful suggestions.

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