

COMPARATIVE STUDY ON THE EFFECT OF SEED GERMINATION ACTIVITY OF SEAGRASS EXTRACTS WITH PLANT HORMONES ON GREEN GRAM (*PHASEOLUS RADIATA* L)Dominic Sahaya Rajan R.*¹, Stella C.² and Siva J.² and Gokila S.³¹Matha College of Arts and Science College, Vaanpuram, Manamadurai – 630 606, Tamil Nadu, India.²School of Marine Sciences, Department of Oceanography and Coastal Area Studies, Alagappa University, Karaikudi-630 003, Tamil Nadu, India.³MMM College of Health Sciences, Chennai-600107.

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ABSTRACT

Background: Aim: To find out the influence of seed germination activity on *Phaseolus radiata* L by seagrass extracts, gibberellic acid and naphthalene acetic acid. **Materials and Method:** The present study was conducted during rabi season 2016-2017 using healthy seeds of green gram. Grouped into five different strata including control group. The parameters include the number of seeds germinated, percentage of germination after 12 days, % Survival after 14 days, the seeding height, shoot length, root length, root/shoot ratio and thickness (width length) of young leaf of survived plant were measured and compared. **Result:** Seed germination or plant growth was justified on the basis of parameters such as percentage of germination, survival, seedling height, shoot length, root length, root/shoot ratio and thickness of young leaf^[22] **Conclusion:** The seed germination activity of seagrass extracts (*Thalassia hemprichii*) with gibberellic acid and naphthalene acetic acid on *Phaseolus radiata* L have been studied at 50ppm and 100ppm. Foliar applications of seagrass extracts and gibberellic acid 50 ppm were found to be superior in seed germination by measurement of parameters like percentage of germination, survival, seedling height, shoot length, root length, root/shoot ratio and width of young leaf.

KEYWORDS: Gibberellic acid, Naphthalene acetic acid, *Thalassia hemprichii*, *Phaseolus radiata* L.**INTRODUCTION**

Organic farming is providing as a remedy to cure ills of modern chemical agriculture.^[1] Organic fertilizers have contributed for deposition of residues, improving physical and chemical properties of soil.^[2] Organic matter improves physical properties of soil.^[3,4] Therefore, application of organic fertilizer has received great attention.^[5] Nutrient management through organic resources is very much essential for various crops.^[6] Among organic sources as supplemental fertilizer, seaweed extract has been used.^[7] Application of seaweed extract enhances seed germination and seedling vigour.^[8-10] Green gram or mung bean (*vigna radiata* L) is the third most food legumes grown and consumed in india^[11] and is a good source of carbohydrates, proteins, minerals and its protein quality is similar to or better than other legumes^[12,13] (*chick pea*, black gram, peas, *pigeon pea* etc).

The effect of seaweed and seagrass liquid fertilizers on the chlorophyll content of *zeamays* has been studied.^[14] *Thalassia hemprichii* was recorded from Krusadai and Rameshwaram Island.^[15] The importance of seagrasses

were reported.^[16-19] The uses of plant growth regulators can modify and control the growth and development of vegetable crops.^[20,21]

MATERIALS AND METHODS

The present study was conducted at Matha College of arts and science, Manamadurai during rabi season 2016-2017 with an objective to find out the influence of seed germination activity on *Phaseolus radiata* L by seagrass extracts, gibberellic acid and naphthalene acetic acid. Healthy seeds of green gram of equal size were selected and were soaked in water and kept in refrigerator for 5 hours. From these, healthy seeds of equal size were chosen out of which 50 seeds each soaked in distilled water, gibberellic acid 50 ppm and seagrass extract 50 ppm, gibberellic acid 100 ppm and seagrass extract 100 ppm, NAA 50 ppm and seagrass extract 50 ppm and naphthalene acetic acid 100 ppm and seagrass extract 100 ppm. The seeds soaked were taken out of each solution and washed with distilled water. Germination and survival were noted after 12 days and 14 days respectively. By noting survival of the plants after 12 days, they were taken out of the soil. The seeding height,

shoot length, root length, root/shoot ratio and thickness (width length) of young leaf of survived plant were measured.

RESULTS AND DISCUSSION

Seed germination or plant growth was justified on the basis of parameters such as percentage of germination, survival, seedling height, shoot length, root length, root/shoot ratio and thickness of young leaf.^[22] The average values of these parameters shown in table 1. The root/shoot ratio is one of the measures of overall health of the plants and it was determined. Root/shoot ratio dry weight for root/dry weight for top of plant. The dry weight was measured by keeping 50 fresh plantlets in oven first at 70°C and later at 100°C to obtain a constant weight. It can be seen from table that there is change in the root: shoot ratio over control (water) with shows change in overall growth of the plant. In this presentation the root: shoot ratio has increased for both gibberellic acid and seagrass extract 100 ppm as compared to control treatment.

Increase in this ratio came from greater root size and not from a decrease in shoot weight. Vigour index was determined using equation vigor index % germination (root length in mm), (shoot length in mm). The higher

value of Vigour index at 50 ppm of gibberellic acid and seagrass extract as compared to control. The use of phytohormone is becoming increasingly important in agricultural and horticultural practices for many cultivated plants.^[23] Its use in pre-sowing seed treatment plays an important role in regulating germination and vigour.^[24] Gibberellic acid greatly enhanced the percentage of germination and seedling vigour.^[25] This may be attributed to the stimulation of the expression of enzymes increased affecting both the physiological and metabolic activities within the seeds.^[26] Also gibberellic acid is effective in overcoming dormancy thereby, causing rapid germination of seeds.^[27] In this study naphthalene acetic acid and seagrass extract was not very effective. Exogeneous application of naphthalene acetic acid observed at very low concentration increased percentage germination ability of the seeds used. According to the study, presents of gibberellic acid with seagrass extracts (50 ppm) affects positively the germination ability of the seeds used, especially when added before planning. This study discovers the phytochemical content of seeds of *Phaseolus radiata* L used in this study, it also helps in getting the phytochemical characteristics of the species, obtaining improved seed vigour, increasing seed germination.

Table 1: Effect of seagrass extracts, gibberellic acid and naphthalene acetic acid on growth parameters of green gram.

Parameters	Effect of following solutions on different growth parameters				
	Control	GA ₃ + SGE (50 ppm)	GA ₃ + SGE (100 ppm)	NAA + SGE (50 ppm)	NAA + SGE (100 ppm)
Germination seed number	50	50	50	50	50
% Germination after 12 days	61	82	69	64	62
% Survival after 14 days	71	88	80	76	72
Seedling height(cm)	6.8	8.0	7.4	7.2	7.0
Root length (cm)	2.4	3.2	3.0	2.8	2.6
Shoot length (cm)	5.0	6.8	6.5	6.0	5.8
Root/shoot	0.40	0.68	0.66	0.62	0.60
Vigour index	4012	6488	6462	6430	6410
Width of young leaf (cm)	0.4	0.9	0.7	0.6	0.5

CONCLUSION

In this study, the root: shoot ratio has increased for both gibberellic acid and seagrass extract (50 ppm), gibberellic acid and seagrass extract(100 ppm), naphthalene acetic acid and seagrass extract (50 ppm) and naphthalene acetic acid and seagrass extract (100 ppm) as compared to control treatment. The use of phytohormone is becoming increasingly important in agricultural and horticultural practices for many cultivated plants. Gibberellic acid greatly enhanced the percentage of germination, seedling vigour, physiological and metabolic activities within seeds. In this study naphthalene acetic acid and seagrass extract was not very effective. From this study we found out the phytochemical content of seeds of *Phaseolus radiata* L used in this study, it also helps in getting the phytochemical characteristics of species obtaining improved seed vigour and increasing seed germination. It

may be concluded that seagrass extract with phytohormone mixture could serve as cost effective eco-friendly product for sustainable agriculture, but their level should be appropriate to enhance growth and productivity.

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