Indian Journal of Advanced Botany (IJAB)
ISSN: 2582-9475 (Online), Volume-1 Issue-1, April 2021

Study of Influence of Vermicompost on the Growth Parameters of Fenugreek (Trigonella Foenum Groecum) Seeds

D. Sharmila, L. Jeyanthi Rebecca

Abstract: ***Vermicomposting is a process of manuring with the organic decomposition products produced by earthworms and related microbes. Vermicompostis considered better compost compare to chemical compost due to its biocompatible composition.Thepresent study deals with the effects of vermicompost on growth, plant components and also the morphological characteristics of the Fenugreek (Trigonellafoenumgroecum) plant. The seedlings were grown on various composition of the vermicompostranging from 20% - 100% with soil. The morphological properties and physical analysis indicated a proportionate positive variation with regards to different concentration.***

Keywords: ***Vermicompost, Trigonellafoenumgroecum, germination, Thermophilic, plant growth, morphological analysis.***

I. INTRODUCTION

The advent of green revolution has increased both the quality and quantity of the food by means of advanced biotechnological processes and technologies but as time passed mankind is facing many unprecedented problems due to this. Presently there is an understanding about the need to go back to natural forms of manuring. [1]. The long-termuse of inorganic fertilizers have drastically changed the soil conditionand it must be stopped as early as possible. Organic manures help in rejuvenating the soil fertility by adding nutrients and also microbes.Vermicompost contains higher level of organic matter and micronutrients, microbial and enzyme activities which is an excellent fertilizer and soil conditioner.[2, 3]. A number of reports have indicated that Many experiments have conclusively shown that earthworms can increase the yield of cereals in temperate countries [4]. Many field experiments indicated the positive effects of earthworms on agriculture [5, 6, 7, 8, 9].The positive role of vermicompost and vermiwash on fenugreek plant crop is reported by Ali et al, 2018. The present report deals with effect thestofvermicompost on somegrowth parameters of fenugreek plants.

Manuscript received on 31 March 2021 | Revised Manuscript received on 05 April 2021 | Manuscript Accepted on 15 April 2021 | Manuscript published on 30 April 2021.

***** Correspondence Author

***D. Sharmila,** Asst. Professor, Department of Industrial Biotechnology, Bharath Institute of Higher Education and Research, Chennai-600073. Email.id. sharmibiotechnology@gmail.com

L. Jeyanthi Rebecca, Professor and Head, Department of Industrial Biotechnology, Bharath Institute of Higher Education and Research, Chennai-600073.

II. MATERIALS AND METHOD

Fenugreek (*Tigonellafoenumgraecum*) seeds obtained from the local seed farm at Chennai, India. Before using seeds, they were first washed thoroughly so as to remove any kind of dirt and contaminating agents that might be present. Vermicompost and red soil, which is needed for the experiment was also obtained from a local farm. The experiment was conducted in a block design in 6 transparent disposable glass including 5 treatments and 1 control as mentioned below:

Glass Cup 1: 20% vermicompost + 80% red soil (Sample 1)

Glass Cup 2: 40% vermicompost + 60% red soil (Sample 2)

Glass Cup 3: 60% vermicompost + 40% red soil (Sample 3)

Glass Cup 4: 80% vermicompost + 20% red soil (Sample 4)

Glass Cup 5: 100% vermicompost (Sample 5)

Glass Cup 6: 100% red soil (Control)

The fenugreek seeds were soaked in water for one day and fifty seeds were sowed in each transparent cups. The experimental seeds were kept under observation with normal sunlight and proper irrigation. Within two days the sprouts were visible and were continuing to grow. Proper irrigation and sunlight helped in the germination of the seeds, and as a result, within 8-9 days the seeds grew into plants with green leaves and long roots. Various study parameters such as percentage germination of seeds, root length, shoot length, wet weights and dry weights of shoots etc. were tabulated and results analyzed.

III. GERMINATION PERCENTAGE

The formula used to calculate the percentage of germination is mentioned below:

% G= No. of germinated seeds/Total No. of sown seeds X100

IV. RESULTS AND DISCUSSION

The positive role of various proportions of vermicompost on germination percentage of *Trigonellafoenumgroecum*is shown in Table 1. Table 2 indicates the root and shoot lengths of

*Trigonellafoenumgroecum*plantsdue to the influence of vermicompost and Table 3 indicates the fresh and dry weights of plants. Figure 1and Figure 2, indicted the growth and germination of seeds and lengths of roots and shoots of fenugreek plant grown under various concentrations of vermicompost, respectively. There arearlier reports on the positive role of vermicompost and vermiwash on fenugreek plant crop [10, 11, 12] Our results on the germination pattern of seeds and saplings also indicated a very positive results with reference to the increasing concentrations of Vermicompost.

TABLE 1: Changes in the germination of seeds and germination percentage of *Trigonellafoenumgroecum* (fenugreek)

Concentration	Number of seeds sown	Number of seeds germinated	Germination percentage (G %)
Control 100% soil	50	26	52%
Sample 1 20% compost	50	28	56%
Sample 2 40% compost	50	30	60%
Sample 3 60% compost	50	37	74%
Sample 4 80% compost	50	40	80%
Sample 5 100% compost	50	48	96%

Thus with the increasing concentration of vermicompost the germination of the fenugreek seeds increases.

Fig 1: Growth and germination of fenugreek plant with different concentration of vermicompost.

EFFECT OF VERMICOMPOST ON THE LENGTH OF*Triognellafoenumgroecum*(FENUGREEK)

TABLE 2: Changes in the root and shoot length of fenugreek plant

Concentration	Root Length(cm)	ShootLength(cm)	TotalLength(cm)
Control 100% soil	3.5	5.7	8.2
Sample 1 20% compost	4	6	10
Sample 2 40% compost	5.5	6.2	11.7
Sample 3 60% compost	6.5	6.8	13.3
Sample 4 80% compost	7	7.5	14.5
Sample 5 100% compost	9	8.1	17.1

It was observed that the root and shot lengths of fenugreek seedlings increased correspondingly with the increase in amount of vermicompost.

Fig 2: Fenugreek plant grown under various ratios of vermicompost.

THE FRESH AND DRY WEIGHT OF FENUGREEK (*Trigonellafoenumgraecum)*PLANT Corresponding to ratio of vermicompost

TABLE 3: Changes in the fresh and dry weights of fenugreekplants Corresponding to ratio of vermicompost

Concentration	Fresh weight (g)	Dry weight (g)
Control 100% soil	0.46 g	0.03g
Sample1 20% compost	0.60 g	0.05 g

Sample 2 40% compost	0.76 g	0.06 g
Sample 3 60% compost	0.85 g	0.07 g
Sample 4 80% compost	0.90 g	0.08 g
Sample 5 100% compost	1.0 g	0.09 g

V. CONCLUSION

Thus thepresent study indicated the positive role of vermicomston the various yield parameters of fenugreek plant compared to plants grown in plain soilIt can also be said that the more the concentration of compost, more the growth of the plant occurs. The use of vermicompost increases the length of the roots and shoots of the plants and also it increases the germination percentage of the plant.

REFERANCES

1. S. P. Wani, K.K. Lee. Biofertilizers for sustaining cereal crop production. In: S. Kannaiyan (Ed.) Biotechnology of Biofertilizers, 2002, Narosha Publishing House, New Delhi.
2. C. A. Edwards, P. J. Bohlen. The Biology and Ecology of Earthworms.Chapman and Hall. London, New York, 1996, pp375.
3. J. Domininguez, C. Edwards. A comparison of Vemicomposting and composting. *Bio cycle*Vol. 38, 1997. [CrossRef]
4. C. A. Edwards, J. R. Lofty JR. Effects of earthworm inoculation upon the root growth of direct drilled cereals. ApplEcol 17, 1980, pp. 533-543. [CrossRef]
5. O. Lavelle, A.V. Spain. Soil ecology.Kluer Academic Publications.2001, Dordecht /Boston/ London, pp 634. [CrossRef]
6. P. Sivakumar, S. Ayyappa. Effect of Coir Pith Industry Waste Vermicompost Prepared Using Eiseniafetida on Growth of Vegetable Crop of Radish (*Raphanussativus*).Int. J. Curr. Res. Biosci. Plant Biol. Vol. 4(9), 2017, pp. 54-58 [CrossRef]
7. P. Kaur, M. Bhardwaj, I. Babbar .Effect of vermicompost and vermiwash on growth of vegetables.Res. J. Anim. Vet. Fish. Sci.Vol. 3(4), 2015, 9-12.
8. HrudaRanjanSahoo., MadhuchhandaSahoo., MayeetreyeeBaboo, Nibha Gupta. Effect of red laterite soil and vermicompost on growth and development of chilli and brinjal grown under polypot conditions.Trop. Plant Res. Vol. 2(3), 2015, pp. 172 - 174.
9. K. Chitrapriya, S. Asokan, R. Nagarajan.Estimating the level of phosphate solubilising bacteria and azotobactor in the vermicompost of *Eudriluseugeniae* and *Perionyxexcavatus* with various combinations of cow-dung and sawdust.Int. J. Scient. Res. Public. Vol. 4(10), 2013, pp. 1 - 6.
10. Tadayyon, Ali, Mehdi Naeimi, Mohammad, Pessarakli, Mohammad.Effects of vermicompost and vermiwashbiofertilizers on fenugreek (*Trigonellafoenumgroecum*) plant.Communications in Soil Science and Plant Analysis.Vol. 49, 2018, pp.1-10. [CrossRef]
11. D. K. Jagtap, R. B. Gaikwad, U.G. Thakare, UG, P. G. Jakhi. Effect of vermiwash and Gibberellic acid on seed germination in Fenugreek (*Triognellafoenumgroecum*)**.**Int. J. Biotech Biosci,Vol 3 (4), 2013, pp. 230-234
12. A. Vijayalakshmi, R.Karthiyayini. Effect of vermicompost on biochemical content of two Indian green leafy vegetables.Int J of Pharm Sci and Res, Vol. 9(10), 2018, pp. 4446-4450.