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## Effect of micronutrients on seed production of fenugreek (*Trigonella foenum graecum* L.)

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**Abstract**

The experiment was carried out during *rabi* season of 2019-20 consisted of eleven treatments with three replications laid out in randomized block design. The effect of different micronutrient on fenugreek crop showed that treatment T<sub>6</sub> (RDF+Fe@2%) exhibited highest values for seed yield (12.32 q/ha), number of seeds per pod (18.73) and root length (18.97 cm). The other treatment *viz.*, T<sub>5</sub> (RDF+Fe@1%) showed maximum values for number of leaves per plant and number of pods per plant which is 210.73 and 102.20 respectively. Treatment T<sub>7</sub> (RDF+Mn@0.1%) showed maximum values for fresh weight and dry weight of plant which is 93.31 and 39.51 respectively. Treatment T<sub>4</sub> (RDF+B@0.40%) showed maximum value for plant height which is 89.47 cm, T<sub>9</sub> (RDF+Mo@0.01%) showed maximum value for pod length which is 11.95 cm. T<sub>1</sub> (RDF+Zn@0.05%) showed maximum values for number of branches per plant *i.e.*, 7.00 and T<sub>11</sub> (RDF) test weight which is 11.27 g.

**Keywords:** fenugreek, micronutrients, yield

**Introduction**

Fenugreek (*Trigonella foenum graecum* L.) belongs to family fabaceae having chromosome number 2n=16 is an aromatic herbaceous plant grown in India as *rabi* season crop. India is among one of the largest producer and exporter of this spices throughout the world. Almost all plant parts including leaf, tender stem and seeds are commonly used for consumption by the people in their daily diet.

The mineral nutrition elements plays essential roles such as constituent of cell structures and cell metabolites, in cell osmotic relations and turgor related processes, energy transfer reactions, enzyme catalyzed reactions and plant reproduction. Micronutrients like zinc, iron, boron, manganese, copper, molybdenum etc. leads to significant changes in growth parameters like plant height, number of pods, root nodulation and other changes like higher seed yield, seed germination, increase in phosphorus uptake etc. Although application of organic manure have also been incorporated in recent times to provide balanced nutrition to the crop plants, but that may be beneficial only in terms of low yield levels. For acquiring the higher yield potential, supplementation of micronutrients are extremely essential. In order to study the effect of different micronutrients the present investigation has been proposed to study the effect of micronutrients on growth and seed yield of fenugreek crop.

**Materials and Methods**

The present investigation was conducted at Research farm of Krishi Vigyan Kendra, Raipur during *rabi* season of 2019-20. The experiment was laid out in Randomized Block Design (RBD) with three replications. The experimental material was consisted of eleven treatments *viz.*, T<sub>1</sub> (RDF+Zn@0.05%), T<sub>2</sub> (RDF+Zn@0.20%), T<sub>3</sub> (RDF+B@0.10%), T<sub>4</sub> (RDF+B@0.40%), T<sub>5</sub> (RDF+Fe@1%), T<sub>6</sub> (RDF+Fe@2%), T<sub>7</sub> (RDF+Mn@0.10%), T<sub>8</sub> (RDF+Mn@0.40%), T<sub>9</sub> (RDF+Mo@0.01%), T<sub>10</sub> (RDF+Mo@0.03%) and T<sub>11</sub> (RDF) as control. The observations were recorded for various growth and yield parameters *viz.*, plant height, number of branches per plant, number of leaves per plant, number of pods per plant, number of seeds per pod, pod length, root length, fresh weight of plant, dry weight of plant, days to 50% flowering, seed yield and test weight. The data was recorded from five randomly selected plants where averaged to obtain mean value for all the treatments.

## Results and Discussion

The data recorded for various growth characters of fenugreek crop under the influence of different treatments and are presented in table 1.

### Plant height (cm)

Maximum plant height was recorded at the time of maturity was 89.47cm followed by 86.53 cm for treatments T<sub>4</sub> (RDF+B@0.40%) and T<sub>8</sub> (RDF+Mn@0.40%) respectively. Whereas, minimum plant height was recorded for T<sub>11</sub> (RDF) which is 65.87cm. It was also observed that for each micronutrient the greater plant height was recorded for higher dose as compared to lower of same micronutrient. Similar, results were obtained by Patra and Bhattacharya (2009) [5].

### Number of branches per plant

Treatment T<sub>1</sub> (RDF+Zn@0.05%) and T<sub>2</sub> (RDF+Zn@0.20%) resulted in maximum number of branches per plant 7.00 and 6.73 respectively. Whereas, minimum number of branches per plant was obtained for T<sub>7</sub> (RDF+Mn@0.10%) and T<sub>10</sub> (RDF+Mo@0.03%) having values 4.93 for both the treatments. Similar results were reported by Pirzad *et al.* (2013) [6] in case of spice (anise).

### Number of leaves per plant

Maximum number of leaves per plant was observed for T<sub>5</sub> (RDF+Fe@1%) which is 210.73 which was significantly different from all the other treatments. Whereas, minimum number of leaves per plant was observed in T<sub>9</sub> (RDF+Mo@0.01%) *i.e.*, 72.60. Similar results were obtained by Chibba *et al.* (2007) [2] and Mahorkar *et al.* (2008) [4].

### Days to 50% flowering

Days to 50% flowering ranged from 47.66 to 59.66. T<sub>6</sub> (RDF+Fe@2%) was recorded with least number of days to 50% flowering *i.e.*, 47.66 whereas, treatment T<sub>11</sub> (RDF) was recorded with longest duration for 50% flowering *i.e.*, 59.66. There was no significant difference was observed among all the treatments for this character.

### Number of Seeds/Pod

The average number of seeds per pod varied from 13.00 to 18.73. Maximum number of seeds per pod was recorded in treatment T<sub>6</sub> (RDF+Fe@2%) *i.e.*, 18.73 followed by T<sub>2</sub> (RDF+Zn@0.20%) which is 17.93. Whereas, minimum number of seeds per pod was observed in T<sub>11</sub> (RDF) which is 13. Similar results were reported by Lal *et al.* (2015) [3].

### Number of Pods/Plant

The average number of pods per plant varied from 49.53 to 102.20 recorded at the time of maturity. The highest number of pods per plant was recorded in treatment T<sub>5</sub> (RDF+Fe@1%) followed by T<sub>4</sub> (RDF+B@ 0.40%) *i.e.*, 102.20 and 86.93 respectively. Whereas, T<sub>11</sub> (RDF) was recorded with least number of pods per plant *i.e.*, 49.53. Treatment T<sub>5</sub> was significantly different from rest of the treatments. Similar results were obtained by Shabanzadesh and Galavi (2011) [7] and Lal *et al.* (2015) [3].

### Pod Length (cm)

At the time of harvesting average pod length varied from 9.12 cm to 11.95 cm. Maximum pod length was observed in treatment T<sub>9</sub> (RDF+Mo@0.01%) 11.95 cm followed by T<sub>2</sub> (RDF+Zn@0.20%) *i.e.*, 11.34 cm, whereas, minimum pod length was recorded in T<sub>11</sub> (RDF) which is 9.12 cm.

### Root Length (cm)

The average root length at the time of maturity varied from 11.70 cm to 18.97 cm. Maximum root length was recorded in treatment T<sub>6</sub> (RDF+Fe@2%) *i.e.*, 18.97 cm followed by T<sub>8</sub> (RDF+Mn@0.40%) which is 18.32 cm, whereas, the minimum root length was recorded in treatment T<sub>1</sub> (RDF+Zn@0.05%) *i.e.*, 11.70 cm.

### Fresh weight of plant (g)

The average fresh weight recorded at the time of maturity varied from 13.74 g to 93.31 g. Maximum fresh weight was recorded in treatment T<sub>7</sub> (RDF+Mn@0.10%) *i.e.*, 93.31 g followed by T<sub>9</sub> (RDF+Mo@0.01%) which is 68.31 g, whereas, the minimum fresh weight was recorded in treatment T<sub>4</sub> (RDF+B@0.40%) which is 13.74 g followed by T<sub>3</sub> (RDF+B@0.10%) *i.e.*, 19.03 g.

### Dry Weight of plant (g)

The average dry weight recorded at the time of maturity varied from 8.63 g to 39.50 g. Maximum dry weight was recorded in treatment T<sub>7</sub> (RDF+Mn@0.10%) *i.e.*, 39.50 g followed by T<sub>9</sub> (RDF+Mo@0.01%) *i.e.*, 27.71 g, whereas, the minimum dry weight was recorded in treatment T<sub>4</sub> (RDF+B@0.40%) *i.e.*, 8.63 g followed by T<sub>8</sub> (RDF+Mn@0.40%) which is 13.59 g.

### Test weight (g)

The average test weight varied from 9.73 g to 11.87 g. Maximum test weight was recorded in T<sub>11</sub> (RDF) *i.e.*, 11.87 which is closely followed by T<sub>1</sub> (RDF+Zn@0.05%) *i.e.*, 11.27 g, whereas, the minimum test weight was recorded in treatment T<sub>3</sub> (RDF+B@0.10%) which is 9.73 g followed by T<sub>6</sub> (RDF+Fe@2%) *i.e.*, 10.53g.

### Seed Yield (q/ha)

The average seed yield varied from 4.92 q/ha to 12.32 q/ha. Maximum seed yield was recorded in treatment T<sub>6</sub> (RDF+Fe@2%) *i.e.*, 12.32 q/ha followed by T<sub>8</sub> (RDF+Mn@0.40%) which is 10.13 q/ha. Whereas, the minimum seed yield was recorded in T<sub>11</sub> (RDF) *i.e.*, 4.92 q/ha.

The above result showed that most of the growth and yield parameters different doses of iron showed maximum effect as compared to other micronutrients. The spray of T<sub>6</sub> (RDF+Fe@2%) recorded highest seed yield number of seeds per pod and root length whereas, T<sub>5</sub> (RDF+Fe@1%) recorded maximum number of leaves and highest number of pods per plant. This was due to iron has essential role involved in enzyme components in electron transfer and cytochromes. It is reflective oxidizes from Fe<sup>+2</sup> to Fe<sup>+3</sup> during electron transport (Beinfalt and Van der Mark 1993) [1]. Iron is necessary for the synthesis of chlorophyll and plays a crucial role in ferredoxin, flavoprotein and respiration (Verma 2007) [8].

### Conclusion

It can be concluded from our investigation on "Effect of Micronutrients on Seed Production of Fenugreek (*Trigonella foenum graecum* L.)"

- The highest seed yield was obtained for micronutrient spray of T<sub>6</sub> (RDF+Fe@2%) as well as maximum values for seeds per pod and root length.
- Treatment T<sub>5</sub> (RDF+Fe@1%) showed maximum values for number of leaves per plant and number of pods per plant.

- Treatment T<sub>7</sub> (RDF+Mn@0.10%) showed maximum values for fresh weight and dry weight of plant.
- Treatment T<sub>1</sub> (RDF+Zn@0.05%) showed maximum values for number of branches per plant, treatment T<sub>4</sub>

(RDF+B@0.40%) showed maximum value for plant height, treatment T<sub>9</sub> (RDF+Mo@0.01%) showed maximum value for pod length and treatment T<sub>11</sub> (RDF) showed maximum values for test weight *i.e.*, 11.87 g.

**Table 1:** Effect of micronutrients in growth and yield parameters of fenugreek

S. No.	Treatments	Plant height (cm)	No. of branches/plant	No. of leaves/plant	Days to 50% flowering	No. of pods/Plant	No. of seeds/pod	Pod length (cm)	Root length (cm)	Fresh weight of plant (g)	Dry weight of plant (g)	Test Weight (g)	Seed Yield (q/ha)
1	T <sub>1</sub> =RDF+Zn@0.05%	80.47	7.00	120.47	54.33	76.67	16.53	9.93	11.70	26.60	14.09	11.27	8.92
2	T <sub>2</sub> =RDF+Zn@ 0.20%	83.27	6.73	106.53	53.33	72.73	17.93	11.34	17.97	23.15	17.47	10.97	6.70
3	T <sub>3</sub> =RDF+B@0.10%	85.13	4.87	82.27	54.67	57.73	15.80	9.67	15.43	19.03	14.46	9.73	8.62
4	T <sub>4</sub> =RDF+B@0.40%	89.47	5.13	86.13	53.33	86.93	15.20	10.10	14.03	13.74	8.63	11.20	8.18
5	T <sub>5</sub> =RDF+Fe@1%	69.27	5.93	210.73	52.00	102.20	15.67	9.89	12.48	42.10	20.51	10.63	9.42
6	T <sub>6</sub> =RDF+Fe@2%	71.80	5.27	106.93	47.67	58.73	18.73	11.11	18.97	49.26	20.08	10.53	12.32
7	T <sub>7</sub> =RDF+Mn@0.10%	76.87	4.93	92.04	55.00	58.20	17.07	11.18	15.61	93.31	39.51	11.17	8.71
8	T <sub>8</sub> =RDF+Mn@0.40%	86.53	5.33	80.87	53.00	59.00	16.20	9.65	18.32	49.38	13.59	10.83	10.13
9	T <sub>9</sub> =RDF+Mo@0.01%	81.80	5.73	72.60	53.00	71.33	16.53	11.95	15.46	68.31	27.71	10.80	8.32
10	T <sub>10</sub> =RDF+Mo@0.03%	72.53	4.93	78.53	54.33	51.60	17.53	10.17	17.35	31.76	18.83	11.20	9.27
11	T <sub>11</sub> =RDF as control	65.87	5.53	75.80	59.67	49.53	13.00	9.12	15.81	30.62	17.65	11.87	4.92
12	C.D.	8.22	1.15	5.13	N/A	10.19	2.15	1.28	1.39	0.8	1.03	N/A	2.37
13	SE(m)	2.76	0.39	1.73	3.32	3.43	0.72	0.43	0.47	0.271	0.35	0.59	0.80
14	SE(d)	3.91	0.55	2.44	4.70	4.85	1.02	0.61	0.66	0.38	0.49	0.84	1.13
15	C.V.	11.97	11.98	2.96	10.73	8.77	7.64	7.22	5.16	1.16	3.10	9.42	15.91

## References

1. Bienfait HF, Van der Mark F. Phytoferritin and its Role in Iron Metabolism. Academic Press, New York 1993, 111-123.
2. Chhibba IM, Nayyar VK, Kanwar JS. Influence of mode and source of applied iron on fenugreek (*Trigonella corniculata* L.) in a typical ustochrept in Punjab, India. International Journal of Agriculture and Biology (Pakistan) 2007;2(9):254-256.
3. Lal G, Singh B, Mehta RS, Maheria SP. Performance of fenugreek (*Trigonella foenum graecum* L.) AS Influenced by Sulphur and Zinc, Int. J Seed Spices 2015;5(1):29-33.
4. Mahorkar VK, Meena HR, Jadhao BJ, Panchbhai DM, Dod VN, Peshattiwari PD. Effect of micronutrients and humic acid on growth and leaf yield of fenugreek. Plant Archives 2008;8(1):303-306.
5. Patra PK, Bhattacharya C. Effect of different levels of boron and molybdenum on growth and yield of mung bean [*Vigna radiata* (L.) Wilczek (cv. Baisakhi Mung)] in Red and Laterite Zone of West Bengal. Journal of Crop and Weed 2009;5(1):111-114.
6. Pirzad AR, Tousi P, Darvishzadeh R. Effect of Fe and Zn foliar application on plant characteristics and essential oil content of anise (*Pimpinella anisum* L.). Iranian J Crop Sci 2013;15(1):Pe12-Pe23.
7. Shabanzadesh SH, Galavi M. Effect of micronutrients foliar application and irrigation regimes on agronomic traits and yield of black cumin (*Nigella sativa* L.). Environmental stresses in crops Sci 2011;4(1):1-9.
8. Verma V. Textbook of Plant Physiology. Published by Ane, Book Pvt. Ltd. New Delhi, India 2007, 205-234.