



Influence of gibberellic acid on growth and quality of fenugreek (*Trigonella foenum-graecum* L.)

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Abstract

Gibberellic acid (GA₃) at 50 ppm, 75 ppm, 100 ppm and 125 ppm was sprayed to fenugreek at 40 and 60 days after sowing. GA₃ @ 100 ppm promoted growth and produced highest yield (12.60 q ha⁻¹), followed by GA₃ @ 75 ppm (12.05 q ha⁻¹) which, however, was at par with GA₃ @ 100 ppm. Among quality parameters, carbohydrate was highest (45%) with GA₃ @ 125 ppm whereas, crude protein content was highest (29.33%) with GA₃ @ 75 ppm. The highest oleoresin content (0.3%) and highest essential oil content (2.8%) was recorded with GA₃ @ 100 ppm.

Fenugreek (*Trigonella foenum-graecum* L.) belongs to the family *Fabaceae*. It is one of the important seed spice crop, indigenous to Western Asia and Southern Europe and is now cultivated mainly in India, Pakistan, France, Argentina and North African countries. Among all the factors, crop management is very important to get the desired yield. Gibberellins have spectacular effect in various processes of plant growth and development including responses to light and temperature, flowering and fruit formation. Hence, the present experiment was conducted to find out the suitable concentration of gibberellic acid (GA₃) which will be beneficial for promoting growth and yield of fenugreek.

The experiment was laid during *rabi* 2006 in a Randomized Block Design having 5 treatments replicated three times. Plot size were 1.5 × 2 m and seeds was sowed in 30 × 20 cm spacing. The treatments included GA₃ at 50 ppm, 75 ppm, 100 ppm and 125 ppm and an untreated control.

All the treatments were sprayed twice at 40 and 60 days after sowing (DAS). Recommended package of practices was followed. All the observations on growth were recorded at complete maturity of the crop and the observations on yield and yield components were recorded after harvesting and threshing of the crop.

Considerable improvement in the growth was obtained with GA₃ @ 100 ppm and GA₃ @ 75 ppm. Among the treatments, GA₃ (100 ppm) registered the highest yield (12.60 q ha⁻¹). Regarding vegetative growth parameters, plants treated with GA₃ @ 100 ppm was found superior than the other treatments, whereas, the treatment GA₃ @ 75 ppm was at par with the GA₃ @ 100 ppm. The better performance of GA₃ at 100 ppm over the other treatments was possibly because of its better efficacy in promoting vegetative and reproductive parameters. Similar results were reported by

Table 1. Effect of GA3 treatments on plant height, days to 50% flowering, days to 50% pod initiation, number of primary branches plant⁻¹, pod plant⁻¹, pod length (cm), seeds pod⁻¹ and seed yield

Treatments	Plant height (cm)	Days to 50% flowering	Days to 50% pod initiation	Number of primary branches plant ⁻¹	Pod plant ⁻¹	Pod length (cm)	Seeds pod ⁻¹	Seed yield (q ha ⁻¹)
GA3 -50 ppm	74.00	57.66	70.33	8.66	67.00	9.33	14.00	10.77
GA3 -75 ppm	81.00	53.00	67.00	7.33	71.00	10.33	15.33	12.05
GA3 -100 ppm	79.00	50.33	64.33	9.33	73.00	11.66	17.33	12.60
GA3 -125 ppm	75.00	53.66	66.66	10.66	69.00	10.66	17.00	11.88
Untreated control	73.00	59.00	71.33	7.33	66.00	8.66	13.00	10.14
CD (P<0.05)	0.52	0.84	0.88	0.30	0.52	0.30	0.44	0.23

Table 2. Effect of GA3 treatments on crude protein, carbohydrate, oleoresin, essential oil, test weight and harvest index

Treatments	Crude protein (%)	Carbohydrate (%)	Oleoresin (%)	Essential oil (%)	Test weight (g)	Harvest index (%)
GA3 -50 ppm	25.66	40.33	0.24	0.26	10.66	39.00
GA3 -75 ppm	29.33	43.33	0.26	2.60	13.33	43.00
GA3 -100 ppm	28.00	42.33	0.30	2.80	14.33	44.66
GA3 -125 ppm	29.00	45.00	0.29	2.50	12.00	41.00
Untreated control	26.00	40.00	0.23	2.20	9.66	39.00
CD (P<0.05)	0.75	0.40	0.004	0.04	0.35	0.48

Shahine *et al.* (1992). With regard to quality attributing parameters, carbohydrate was highest (45%) with GA3 @ 125 ppm whereas crude protein content was highest (29.33%) with GA3 @ 75 ppm. Highest oleoresin content (2.8%) was recorded with GA3 @ 100 ppm, which also recorded significantly higher test weight and harvest index.

From the above findings, it may be concluded that application of GA3 registered better vegetative growth, yield and quality attributing characters compared to the other treatments.

Among the concentrations, GA3 @ 100 ppm sprayed twice at 45 and 60 DAS proved to be the best and further increment in the concentration of chemical may not be effective under new alluvial zones of West Bengal.

References

- Shahine A H, El Desouky S A, Abd El Dayem H M & Wanas A 1992 Response of fenugreek (*Trigonella foenum-graecum* L.) and pea (*Pisum sativum* L.) to foliar spray with some growth regulators. Ann. Agril. Sci. Moshtohor 30: 755-775.