



ISSN Print: 2618-060X
 ISSN Online: 2618-0618
 NAAS Rating (2026): 5.20
 IJRA 2026; 9(10): 550-554
www.agronomyjournals.com
 Received: 30-07-2026
 Accepted: 25-09-2026
 Published: 09-10-2026

Shashank B Jaggali

Department of Soil Science,
 College of Agriculture, Navile,
 Keladi Shivappa Nayaka
 University of Agricultural and
 Horticultural Sciences,
 Shivamogga, Karnataka, India

BC Dhananjaya

Department of Soil Science,
 College of Agriculture, Navile,
 Keladi Shivappa Nayaka
 University of Agricultural and
 Horticultural Sciences,
 Shivamogga, Karnataka, India

Sankalpa CP

Department of Soil Science,
 College of Horticulture,
 Mudigere, Keladi Shivappa
 Nayaka University of
 Agricultural and Horticultural
 Sciences, Shivamogga,
 Karnataka, India

Prakash Kerure

Department of Vegetable
 Science, College of Horticulture,
 Hiriya, Keladi Shivappa Nayaka
 University of Agricultural and
 Horticultural Sciences,
 Shivamogga, Karnataka, India

Yamuna BG

Department of Agronomy,
 College of Agriculture,
 Chamarajanagara, University of
 Agricultural Sciences, Mandya,
 Karnataka, India

Corresponding Author:

Shashank B Jaggali

Department of Soil Science,
 College of Agriculture,
 Navile, Keladi Shivappa
 Nayaka University of
 Agricultural and
 Horticultural Sciences,
 Shivamogga, Karnataka,
 India

Potassium rate and application timing influence growth, yield and seed quality of fenugreek (*Trigonella Foenum-Graecum* L.) on an acidic Alfisol

Shashank B Jaggali¹, BC Dhananjaya², Sankalpa CP³, Prakash Kerure⁴, Yamuna BG⁵

DOI: <https://www.doi.org/10.33545/2618060X.2026.v9.i10g.6844>

ABSTRACT

Fenugreek (*Trigonella foenum-graecum* L.) is an important seed spice which is poorly defined and the optimum K rate and schedule for acidic Alfisols are unknown. A field experiment was conducted in Rabi 2025-26 on an acidic, medium-K Alfisol at Shivamogga, Karnataka, India, in a randomized complete block design with eight treatments and three replications: an absolute control, a package of practice (PoP; 40 kg N + 20 kg P₂O₅ ha⁻¹ with farmyard manure at 7.5 t ha⁻¹) and PoP with 20, 40 or 60 kg K₂O ha⁻¹, each applied as a single basal dose or in two equal splits (basal and 30 days after sowing). Growth, yield attributes, yield and seed quality increased with K up to 40 kg K₂O ha⁻¹ and were generally lower at 60 kg. The 40 kg split treatment produced the tallest plants (46.53 cm), most pods plant⁻¹ (28.13), highest seed yield (14.11 q ha⁻¹, 69.4% above PoP without K) and stover yield (20.23 q ha⁻¹) and the highest seed protein (19.59%), fat (6.45%) and fibre (8.06%). Its agronomic efficiency (14.45 kg seed kg⁻¹ K₂O) was almost double that of the 60 kg treatments (7.10-7.53). Splitting raised seed yield numerically at every rate but significantly only at 20 kg K₂O ha⁻¹; at 40 kg, split and basal doses gave on-par seed yield, although the split dose gave significantly higher seed protein and fibre. Rate thus mattered more than timing, which refined efficiency at the optimum. Application of 40 kg K₂O ha⁻¹ in two equal splits, with the recommended N and P, is the most productive and K-efficient practice for fenugreek on comparable soils.

Keywords: Fenugreek, Potassium, Split application, Seed yield, Seed quality, Agronomic efficiency

1. Introduction

Fenugreek (*Trigonella foenum-graecum* L.) is a leguminous seed spice valued for its bioactive compounds and used in the food, pharmaceutical and fodder industries (Kandil *et al.*, 2017; Kaur *et al.*, 2021) [1, 2]. India is the largest producer, with about 0.13 million ha and 0.12 million t but average productivity is only 9.46 q ha⁻¹ (1 q = 100 kg) (DES, 2021) [3] well below the crop's potential reflecting largely empirical and unbalanced fertilizer use. Potassium (K) activates enzymes, drives phloem loading and regulates plant water relations and so governs yield and produce quality in legumes (Römheld *et al.*, 2010) [4]. Yet K nutrition of fenugreek has received far less attention than nitrogen and phosphorus (Mehta *et al.*, 2012) [5] and recommendations are often extrapolated from other pulses.

Reported K responses of fenugreek are inconsistent. A ten-treatment trial on a Karnataka Alfisol recorded the highest seed yield and quality at the highest K rate tested 45 kg K₂O ha⁻¹ (Ajay *et al.*, 2026) [6], whereas a Polish study combining K, rhizobial inoculation and induced water deficit found no significant K effect (Żuk-Golaszewska *et al.*, 2015) [7]. Neither study treated the schedule of application as a factor. We therefore compared a single basal dose with two equal splits of the same total K at three rates (20, 40 and 60 kg K₂O ha⁻¹) on an acidic, medium-K Alfisol of the Southern Transitional Zone of Karnataka to identify the most agronomically efficient K rate and schedule for growth, yield attributes, seed yield and seed quality of fenugreek.

2. Materials and Methods

2.1 Site, soil and treatments

The experiment was conducted in the Rabi season of 2025-26 at the College of Agriculture, Navile, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga, Karnataka, India (13.97° N, 75.57° E; 569 m above mean sea level). The soil was an acidic sandy loam Alfisol (pH 5.32; electrical conductivity 0.127 dS m⁻¹; organic carbon 3.64 g kg⁻¹) with medium available N, P₂O₅ and K₂O (296.5, 45.8 and 285.7 kg ha⁻¹, respectively) determined by standard methods (Jackson, 1973; Subbaiah *et al.*, 1956) [8, 9]. A randomized complete block design with eight treatments and three replications (net plot 2.9 × 2.3 m) was used. Treatments were T₁, absolute control; T₂, package of practice (PoP; 40 kg N + 20 kg

P₂O₅ ha⁻¹ with farmyard manure at 7.5 t ha⁻¹); and T₃-T₈, PoP + 20, 40 or 60 kg K₂O ha⁻¹ each applied as a single basal dose (T₃, T₅, T₇) or in two equal splits at sowing and 30 days after sowing (DAS) (T₄, T₆, T₈). In all fertilized treatments N was applied in two splits (basal and 30 DAS).

2.2 Crop management and observations

A local landrace of fenugreek was hand-dibbled at 45 × 30 cm spacing (74,074 plants ha⁻¹) and managed with standard irrigation, hand weeding at 20 DAS and a prophylactic spray of emamectin benzoate 5% SG against aphid (*Aphis craccivora*). Plant height was recorded and branches plant⁻¹ and dry matter were recorded destructively on five plants per plot at 30 DAS, 60 DAS and harvest; fresh and dry weight of the net-plot crop were recorded at harvest on an area basis. At harvest, pods plant⁻¹, pod length, test weight (1000-seed weight) and seed and stover yield were determined. Seed crude protein was estimated from total N by the micro-Kjeldahl method ($N \times 6.25$; Piper, 1966) [10], crude fat by Soxhlet extraction (AOAC, 2005) [11] and crude fibre by acid-alkali digestion (Sadasivam *et al.*, 1992) [12].

2.3 Statistical analysis

Data were subjected to analysis of variance for a randomized complete block design (Gomez *et al.*, 1984) [13] and treatment means were compared using the critical difference (CD) at $P = 0.05$; means

differing by less than the CD are described as on par. Harvest index (%) was calculated as $\frac{\text{seed yield}}{\text{seed yield} + \text{stover yield}} \times 100$. The increase in seed yield over T₂ (%) and the agronomic efficiency of K (AE; kg additional seed per kg K₂O applied, relative to T₂) were computed from treatment means.

3. Results

3.1 Growth and dry matter production

Plant height and branches plant⁻¹ did not differ among treatments at 30 DAS, but K significantly and progressively improved both from 60 DAS onward (Table 1). At harvest, the tallest plants (46.53 cm) and the most branches (6.02 plant⁻¹) were recorded in T₆ (40 kg K₂O ha⁻¹, split) on par with T₅ (basal) for both traits; T₈ was significantly shorter than T₆ and T₁ had the lowest values. Dry matter accumulation followed the same pattern, being highest at harvest in T₆ (5.34 g plant⁻¹) on par with T₅ (5.10 g plant⁻¹) (Table 2). Fresh and dry weight of the crop at harvest were highest in T₆ (34.10 and 3.96 q ha⁻¹) significantly exceeding T₅ and lowest in T₁ (12.74 and 1.44 q ha⁻¹).

Table 1. Effect of graded levels of potassium on plant height and branches plant⁻¹ of fenugreek

Treatment	Plant height (cm)			Branches plant ⁻¹		
	30 DAS	60 DAS	At harvest	30 DAS	60 DAS	At harvest
T ₁ : Control	16.53	29.87	30.13	2.80	4.10	4.30
T ₂ : PoP	16.60	32.27	36.07	2.93	4.50	4.62
T ₃ : PoP + 20 K ₂ O (B)	19.13	36.13	38.13	3.27	4.88	4.92
T ₄ : PoP + 20 K ₂ O (S)	18.87	37.60	39.00	3.30	4.90	4.95
T ₅ : PoP + 40 K ₂ O (B)	22.27	42.13	45.60	3.83	5.68	5.75
T ₆ : PoP + 40 K ₂ O (S)	20.53	43.93	46.53	3.67	5.70	6.02
T ₇ : PoP + 60 K ₂ O (B)	21.00	39.80	41.60	3.47	5.27	5.30
T ₈ : PoP + 60 K ₂ O (S)	19.73	40.87	42.13	3.60	5.30	5.36
<i>SEm</i> [±]	2.51	1.70	1.39	0.25	0.28	0.12
CD ($P = 0.05$)	NS	5.12	4.17	NS	0.83	0.35

T₁, absolute control; T₂, PoP (package of practice: 40 kg N + 20 kg P₂O₅ ha⁻¹ with farmyard manure at 7.5 t ha⁻¹); T₃-T₈, PoP + 20, 40 or 60 kg K₂O ha⁻¹ as a single basal dose (B; T₃, T₅, T₇) or in two equal splits at sowing and 30 DAS (S; T₄, T₆, T₈). DAS, days after

sowing; *SEm*[±], standard error of the mean; CD, critical difference; NS, non-significant.

Dry matter, destructive sampling of five plants per plot (per-plant values). Fresh and dry weight, net-plot values at harvest expressed per hectare. Treatments as in Table 1.

Table 2. Effect of graded levels of potassium on dry matter accumulation and fresh and dry weight of fenugreek

Treatment	Dry matter (g plant ⁻¹)			Crop at harvest (q ha ⁻¹)	
	30 DAS	60 DAS	At harvest	Fresh weight	Dry weight
T ₁ : Control	0.43	1.00	1.95	12.74	1.44
T ₂ : PoP	0.54	1.25	2.95	18.84	2.19
T ₃ : PoP + 20 K ₂ O (B)	0.61	1.45	3.56	22.69	2.63
T ₄ : PoP + 20 K ₂ O (S)	0.65	1.53	3.72	23.58	2.75
T ₅ : PoP + 40 K ₂ O (B)	0.87	1.96	5.10	32.84	3.78
T ₆ : PoP + 40 K ₂ O (S)	0.83	2.07	5.34	34.10	3.96
T ₇ : PoP + 60 K ₂ O (B)	0.75	1.76	4.27	27.80	3.16
T ₈ : PoP + 60 K ₂ O (S)	0.70	1.68	4.46	28.89	3.30
<i>SEm</i> [±]	0.10	0.07	0.12	0.28	0.05
CD ($P = 0.05$)	NS	0.21	0.37	0.85	0.16

(continued on next page)

3.2 Yield attributes and yield

K significantly influenced all yield attributes (Table 3). Pods plant⁻¹ was highest in T₆ (28.13), on par with T₅ (24.93) and T₇ (23.00) and lowest in T₁ (12.20). Pod length and test weight were also highest in T₆ (8.73 cm; 10.50 g) and lowest in T₁ (6.50 cm; 7.57 g). Seed yield ranged from 6.98 q ha⁻¹ in T₁ to 14.11 q ha⁻¹ in T₆, which was on par with T₅ (13.39 q ha⁻¹) and significantly higher than both 60 kg treatments (T₇, 12.59; T₈, 12.85 q ha⁻¹). Relative to T₂ (8.33 q ha⁻¹), seed yield increased by 7.2, 27.7, 60.7, 69.4, 51.1 and 54.3% in T₃-

T₈, respectively (Table 4). Stover yield followed a similar trend, being highest in T₆ (20.23 q ha⁻¹) and lowest in T₁ (14.96 q ha⁻¹).

3.3 Seed quality

Seed crude protein, fat and fibre were significantly influenced by K (Table 3) and all peaked in T₆ (19.59, 6.45 and 8.06%, respectively), compared with 14.03, 4.24 and 6.25% in T₁. Relative to T₂, T₆ increased protein, fat and fibre by 31.7, 40.2 and 22.3%. T₆ was on par with T₅ for fat but significantly exceeded it for protein and fibre. Protein was significantly lower at 60 kg (17.03-17.30%) than at 40 kg (18.89-19.59%).

Table 3. Effect of graded levels of potassium on yield attributes, yield and seed quality of fenugreek

Treatment	Yield attributes			Yield (q ha ⁻¹)		Seed quality (%)		
	Pods plant ⁻¹	Pod length (cm)	Test wt. (g)	Seed	Stover	Protein	Fat	Fibre
T ₁ : Control	12.20	6.50	7.57	6.98	14.96	14.03	4.24	6.25
T ₂ : PoP	13.07	7.07	8.27	8.33	15.76	14.87	4.60	6.59
T ₃ : PoP + 20 K ₂ O (B)	18.67	7.20	8.90	8.93	16.61	15.67	5.15	7.01
T ₄ : PoP + 20 K ₂ O (S)	19.93	7.27	9.20	10.64	17.40	16.13	5.48	7.25
T ₅ : PoP + 40 K ₂ O (B)	24.93	8.47	10.10	13.39	20.03	18.89	6.28	7.55
T ₆ : PoP + 40 K ₂ O (S)	28.13	8.73	10.50	14.11	20.23	19.59	6.45	8.06
T ₇ : PoP + 60 K ₂ O (B)	23.00	7.80	9.33	12.59	18.77	17.03	5.96	7.60
T ₈ : PoP + 60 K ₂ O (S)	21.00	8.20	9.63	12.85	18.27	17.30	6.14	7.72
SE _m [±]	1.78	0.22	0.19	0.39	0.36	0.16	0.08	0.12
CD (P = 0.05)	5.41	0.66	0.57	1.19	1.08	0.47	0.24	0.35

Test wt., weight of 1000 seeds. Seed quality: crude protein, crude fat and crude fibre content of seed. Treatments as in Table 1.

3.4 Response to K rate and schedule

Seed yield, stover yield and seed quality rose to 40 kg K₂O ha⁻¹ and were lower at 60 kg, indicating a plateau (Fig. 1; Tables 3 and 4). Splitting increased seed yield over the corresponding basal dose at ev-

ery rate, by 19.1% (T₄ vs T₃), 5.4% (T₆ vs T₅) and 2.1% (T₈ vs T₇), but the difference was significant only at 20 kg K₂O ha⁻¹. At 60 kg, splitting did not increase pods plant⁻¹ or stover yield (both numerically lower in T₈ than T₇). AE was highest in T₆ (14.45 kg seed kg⁻¹ K₂O) roughly double that of T₇ and T₈ (7.10 and 7.53 kg kg⁻¹) (Table 4). Harvest index increased with K supply from 31.8% in T₁ to 41.3% in T₈; T₆ recorded 41.1%.

Table 4. Harvest index, increase in seed yield over T₂ and agronomic efficiency of applied K in fenugreek

Treatment	K ₂ O applied (kg ha ⁻¹)	Harvest index (%)	Seed yield increase over T ₂ (%)	Agronomic efficiency (kg seed kg ⁻¹ K ₂ O)
T ₁ : Control	0	31.8	-16.2	-
T ₂ : PoP	0	34.6	-	-
T ₃ : PoP + 20 K ₂ O (B)	20	35.0	7.2	3.00
T ₄ : PoP + 20 K ₂ O (S)	20	37.9	27.7	11.55
T ₅ : PoP + 40 K ₂ O (B)	40	40.1	60.7	12.65
T ₆ : PoP + 40 K ₂ O (S)	40	41.1	69.4	14.45
T ₇ : PoP + 60 K ₂ O (B)	60	40.2	51.1	7.10
T ₈ : PoP + 60 K ₂ O (S)	60	41.3	54.3	7.53

Harvest index = $\frac{\text{seed yield}}{\text{seed yield} + \text{stover yield}} \times 100$. Agronomic efficiency = (seed yield of treatment - seed yield of T₂)/K₂O applied; not applicable to T₁ and T₂, which received no K. Treatments as in Table 1.

4. Discussion

Growth responded to K only from 60 DAS, suggesting that K became yield-limiting once the crop entered active vegetative and reproductive growth, consistent with improved growth under adequate K in safflower (Malik *et al.*, 2016) [14], chickpea (Zaki *et al.*, 2013) [15] and soybean (Dixit *et al.*, 2011) [16]. Positive responses to K have likewise been reported in fenugreek (Godara *et al.*, 2012; Meena *et al.*, 2015; Awasthi *et al.*, 2020) [18, 19, 17], faba bean (Mona *et al.*, 2011) [20] and other crops (Sahar *et al.*, 2015) [21]. The response to rate clearly outweighed the response to schedule: moving from 0 to 40 kg K₂O ha⁻¹ in two splits raised seed yield by 69.4% whereas splitting rather than basal application at 40 kg added 5.4%, which was

not significant. Even so, the split dose consistently tracked or exceeded the basal dose at 40 kg and gave significantly higher fresh and dry weight, protein and fibre, in line with the expectation that supplying K closer to crop demand improves its use. Splitting was most beneficial at the lowest rate where seed yield rose by 19.1% and gave no benefit for pods plant⁻¹ or stover yield at 60 kg. Timing is therefore a secondary lever that sharpens efficiency near the optimum rather than a substitute for adequate supply.

Seed yield did not increase beyond 40 kg K₂O ha⁻¹ and was significantly lower in both 60 kg treatments than in T₆ while AE was nearly halved, so the additional K was not converted into yield. This indicates that the crop's K requirement on this medium-K Alfisol was met at about 40 kg K₂O ha⁻¹ as plateau responses have been reported for

soybean (Farhad *et al.*, 2010) [22] and castor (Polara *et al.*, 2010) [23]. Ajay *et al.* (2026) [6] recommended 45 kg K₂O ha⁻¹ but that was the highest rate they tested, so a plateau or decline beyond the optimum could not be detected in their trial; differences in soil K status and rates tested may also contribute to the contrast. The absence of a K effect reported by Żuk-Golaszewska *et al.* (2015) [7] may reflect the confounding water deficit imposed in that study rather than the absence of a K requirement. Our results come from one season and one location and rates between 40 and 60 kg K₂O ha⁻¹ were not tested. Yield attributes responded in line with the role of K in phloem loading during pod filling (Mengel *et al.*, 2001) [24], as in earlier work on

fenugreek (Ram *et al.*, 2000; Nehra *et al.*, 2002; Datta *et al.*, 2017) [26, 27, 25] and other pulses (Srinivasarao *et al.*, 2003 [28]; Nanjundappa and Manure, 2002 [29]; Gupta *et al.*, 2007 [30]; Hussain *et al.*, 2011 [31]; Sahay *et al.*, 2013 [32]; Abed, 2017) [33]. The increases in seed protein, fat and fibre likely reflect K's roles in N assimilation, photosynthate translocation and vegetative development, respectively, as reported for chickpea (Asgharali *et al.*, 2005) [34], pigeon pea and mustard (Tiwari *et al.*, 2012) [35] and black gram (Kurahde *et al.*, 2014) [36]. Because crude protein is calculated from seed N, the protein response is linked to the concurrent N response under adequate K supply (Adsure *et al.*, 2018) [37].

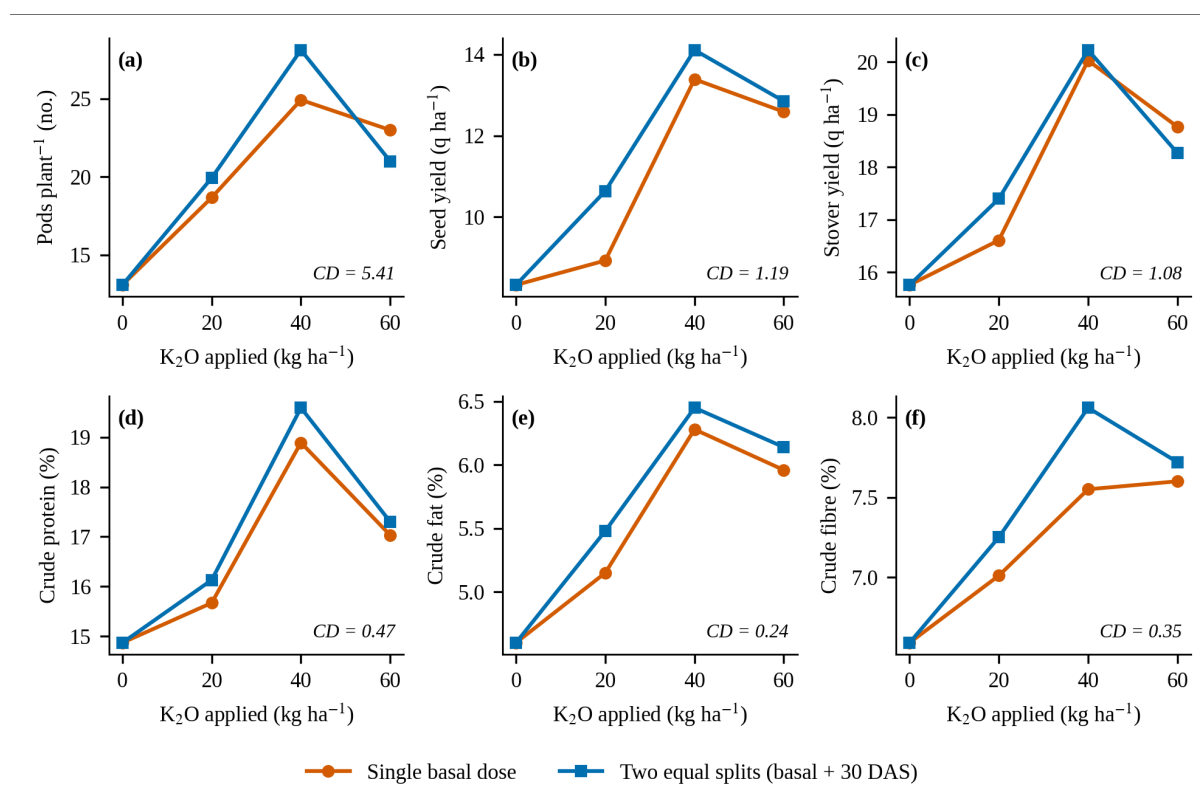


Figure 1. Response of fenugreek to K₂O rate and schedule of application: (a) pods plant⁻¹, (b) seed yield, (c) stover yield and seed (d) crude protein, (e) crude fat and (f) crude fibre. Both lines originate from T₂ (PoP without K, 0 kg K₂O ha⁻¹); the absolute control (T₁) is not shown. CD, critical difference at *P* = 0.05 (Table 3). DAS, days after sowing.

5. Conclusions

Application of 40 kg K₂O ha⁻¹ in two equal splits (basal and 30 DAS), together with the recommended N and P, gave the highest growth, yield attributes, seed (14.11 q ha⁻¹) and stover yield, seed protein, fat and fibre and the highest agronomic efficiency of K (14.45 kg seed kg⁻¹ K₂O) in fenugreek on an acidic, medium-K Alfisol. Raising the rate to 60 kg K₂O ha⁻¹ did not improve performance. Splitting increased seed yield numerically at every rate but significantly only at 20 kg, so the main gain came from the rate and timing refined it. Forty kg K₂O ha⁻¹ in two splits is recommended for comparable Alfisols of the Southern Transitional Zone of Karnataka; multi-location, multi-season evaluation with an economic analysis would strengthen this recommendation.

Acknowledgements

The author gratefully acknowledges the College of Agriculture, Navile, Keladi Shivappa Nayaka University of Agricultural and Horticultural Sciences, Shivamogga, for providing the experimental facilities used in this study.

References

- Kandil AA, Sharief AE, Eloksh II. Effect of sowing dates and plant densities on growth and yield of fenugreek (*Trigonella foenum-graecum* L.). Middle East J Agric Res. 2017;6(1):30-39.
- Kaur R, Arora S, Kumar S. Phytochemical and pharmacological profile of fenugreek (*Trigonella foenum-graecum* L.): a review. J Pharmacogn Phytochem. 2021;10(4):889-894.
- DES. Agricultural Statistics at a Glance 2021. Directorate of Economics and Statistics, Department of Agriculture and Farmers Welfare, Ministry of Agriculture, Government of India; 2021.
- Römhild V, Kirkby EA. Research on potassium in agriculture: needs and prospects. Plant Soil. 2010;335(1):155-180.
- Mehta RS, Anwer MM, Aishwath OP, Meena RS. Growth, yield and quality of fenugreek (*Trigonella foenum-graecum* L.) as influenced by nitrogen, phosphorus and bio-fertilizers. Indian J Hortic. 2012;69(1):94-97.
- Ajay, Veeranagappa P, Unniannikrishnan V, Singh D, Rahul, Abhishek A, Shivam. Evaluating the influence of graded levels of potassium on growth, yield, quality and economics of fenugreek. Indian J Hortic. 2026;83(1).
- Żuk-Golaszewska K, Wierzbowska J, Bieńkowski T. Effect of potassium fertilization, rhizobium inoculation and water deficit on the yield and quality of fenugreek seeds. J Elem. 2015;20(2):513-524.
- Jackson ML. Soil Chemical Analysis. Prentice Hall of India, New Delhi; 1973.
- Subbaiah BV, Asija GL. A rapid procedure for the estimation of available nitrogen in soils. Curr Sci. 1956;25:259-260.

10. Piper CS. Soil and Plant Analysis. Hans Publishers, Bombay; 1966.
11. AOAC. Official Methods of Analysis, 18th edn. Association of Official Analytical Chemists, Gaithersburg, MD; 2005.
12. Sadasivam S, Manickam A. Biochemical Methods for Agricultural Sciences. Wiley Eastern Limited, New Delhi; 1992.
13. Gomez KA, Gomez AA. Statistical Procedures for Agricultural Research, 2nd edn. John Wiley and Sons, New York; 1984.
14. Malik AA, Suryapani S, Ahmad J, Umar S. Growth behaviour of safflower under different potassium levels. J Agric Sci. 2016;16(3):550-557.
15. Zaki NM, Ahmed AG, Mohamed MH, Tawfik MM, Hassanein MS. Effect of skipping one irrigation and potassium fertilization on growth and yield of chickpea plants. World Appl Sci J. 2013;27:557-561.
16. Dixit AK, Tomar DS, Saxena A, Kaushik SK. Assessment of potassium nutrition in soybean for higher sustainable yield in medium black soils. J Indian Inst Sci. 2011;26:7-11.
17. Awasthi NK, Naik SN, Singh D, Tarunendu S. Effect of potassium on growth and yield of different varieties of fenugreek (*Trigonella foenum-graecum* L.). Ann Agric Res. 2020;41(3):1-6.
18. Godara AS, Gupta US, Ravindra S, Mehta RS. Effect of different combinations of organic and inorganic nutrient sources on productivity and profitability of fenugreek (*Trigonella foenum-graecum*). Int J Seed Spices. 2012;2(2):34-37.
19. Meena JK, Kumar S, Maji S, Kumar M, Kumar D. Studies on effect of biofertilizers with chemical fertilizers on growth, yield and quality of fenugreek (*Trigonella foenum-graecum* L.). Int J Agric Sci. 2015;11(1):198-200.
20. Mona AM, Sabah MA, Rehab AM. Influence of potassium sulphate on faba bean yield and quality. Aust J Basic Appl Sci. 2011;5(3):87-95.
21. Sahar M, Tayeb SN. The effect of different levels of humic acid and potassium fertilizer on physiological indices of growth. Int J Biosci. 2015;5(2):99-105.
22. Farhad ISM, Islam MN, Hoque S, Bhuiyan MSI. Role of potassium and sulphur on the growth, yield and oil content of soybean (*Glycine max* L.). J Plant Sci. 2010;3(2):99-103.
23. Polara KB, Sakarvadiah HL, Babariya NB, Parmar KB. Effect of potassium and zinc on yields and nutrients uptake by castor. Asian J Soil Sci. 2010;4(2):304-307.
24. Mengel K, Kirkby EA. Principles of Plant Nutrition, 5th edn. Springer, Dordrecht; 2001.
25. Datta N, Hore JK. Effect of nitrogen, phosphorus and potassium on growth and yield of fenugreek (*Trigonella foenum-graecum* L.). J Crop Weed. 2017;13(3):55-60.
26. Ram D, Verma JP. Effect of levels of phosphorus and potash on the performance of seed yield of 'Pusa Early Bunching' fenugreek (*Trigonella foenum-graecum* L.). Indian J Agric Sci. 2000;70(12):866-868.
27. Nehra KC, Sharma HS, Agarwal HR. Response of fenugreek (*Trigonella foenum-graecum* L.) to phosphorus and potassium. Ann Biol. 2002;18:43-45.
28. Srinivasarao C, Masood A, Ganeshamurthy AN, Ali M. Potassium requirement of pulse crops. Better Crops Int. 2003;17(1):8-11.
29. Nanjundappa G, Manure CR. Influence of phosphorus and potassium levels on yield and quality of fodder cowpea (*Vigna unguiculata* L. Walp). Mysore J Agric Sci. 2002;36:104-106.
30. Gupta BR, Tiwari R, Tiwari TP, Tiwari KN. Maximizing yield, nutrient use efficiency and profit in summer black gram. Field Crops Res. 2007;91(3):22-23.
31. Hussain F, Malik AU, Haji MA, Malghani AL. Growth and yield response of cultivars of mung bean (*Vigna radiata* L.) to different potassium levels. J Anim Plant Sci. 2011;21(3):622-625.
32. Sahay N, Singh SP, Sharma VK. Effect of cobalt and potassium application on growth, yield and nutrient uptake in lentil (*Lens culinaris* L.). Indian J Agric Res. 2013;36(3):259-262.
33. Abed RD. Effects of genotypes and potassium rates on some of cowpea traits heritability. Asian J Crop Sci. 2017;9:11-19.
34. Asgharali M, Athernadeem, Asif T, Mumtazhussain. Effect of different potash levels on the growth, yield and protein contents of chickpea. Pak J Bot. 2005;39:523-527.
35. Tiwari DD, Pandey SB, Dubey MK. Effect of potassium application on yield and quality characteristics of pigeon pea (*Cajanus cajan*) and mustard (*Brassica juncea* L. Czern) crops in central plain zone of Uttar Pradesh. e-ific Int Potash Inst. 2012;3:16-24.
36. Kurhade PP, Sethi HN, Zadode RS. Effect of different levels of potassium on yield, quality, available nutrient and uptake of black gram. Int J Agric Sci. 2014;11(1):175-178.
37. Adsure VK, Mane SS, Supekar SJ. Effect of graded levels of potassium on yield and major nutrient uptake of black gram. Int J Chem Stud. 2018;6(2):2980-2982.

How to cite this article: Jaggali SB, Dhananjaya B, CP S, Kerure P, BG Y. Potassium rate and application timing influence growth, yield and seed quality of fenugreek (*Trigonella Foenum-Graecum* L.) on an acidic Alfisol. *International Journal of Research in Agronomy*. 2026;9(10):550-554. doi: <https://www.doi.org/10.33545/2618060X.2026.v9.i10g.6844>