Effect of Fenugreek (*Trigonella foenum-graecum* L.) Seed on Feed Intake and Water Intake of Konkan Kanyalgoats

ABSTRACT

Fenugreek (Trigonella foenum-graecum L.) is a medicinal herb with various bioactive compounds that may influence the nutritional intake of livestock. This study aims to investigate the effect of fenugreek seed supplementation on the feed and water intake of Konkan Kanyal goats.Eighteen Konkan Kanyal kids (3 months old) were divided into six treatment groups and fed fenugreek seeds (FS) viz., T_0- (Control) Basal ration(Soybean straw 40% + Green maize 20% +concentrate mixture 40%), T_1- Basal ration +0.75 % FS, T_2- Basal ration +1.5 % FS, T_3- Basal ration + 2.25 % FS, T_4- Basal ration + 3% FS and T_5- Basal ration + 3.75 % FS. The average feed intake(g/d) was higher in T_5(1216.10) than T_0 (1095.66), T_1 (1119.60), T_2 (1152.20), T_3(1177.13), T_4 (1203.16). The average water intake (ml/d) of kids was 904.33 in T_0, 911.66 in T_1, 913.66 in T_2, 920.33 in T_3, 925.66 in T_4 and 930.33in T_5.Therefore, it is concluded that addition of 3.75 per cent fenugreek seed with basal ration had significant ($P<0.05$) incremental effect on the feed intake (1216.10 g/day) and, water intake (930.33 ml/day).

Key words: Konkan Kanyal goats, Fenugreek seeds, Feed intake, Water Intake

INTRODUCTION

A multipurpose animal, goats are important to the economy and nourishment of the nation's landless, small-scale and marginal farmers. A sizable portion of the population in rural areas has engaged in the business of raising goats. With the growing demand for organic food and the ban on the use of some antibiotics, as well as concerns about hazardous residual effects and cost effectiveness in livestock feed, finding alternative feed additives has become a need. Herbal feed additives may affect feeding patterns, promote the growth of beneficial microorganisms in the rumen, or stimulate the secretion of various digestive enzymes, which may improve nutrient utilisation efficiency or stimulate the milk secreting tissue in the mammary glands, resulting in improved dairy animal productivity and reproduction (Bakshi and Wadhwa, 2000). A medicinal herb may have antibacterial, immunostimulant, coccidiostatic, anthelmintic, antiviral or antioxidative effects (Uegaki*et al*., 2001). Fenugreek seeds have been found to have a chemical

composition of 93.65 per cent dry matter, 24.15 per cent crude protein, 5.5 per cent ether extract, 7.1 per cent crude fibre, 59.15 per cent NFE and 4.1 per cent total ash.The polysaccharide galactomannan is abundant in fenugreek seeds. Saponins, which are found in 4-8 percent of fenugreek, have health-promoting effects. Fenugreek seeds are known for their high nutritional value, containing essential amino acids, vitamins, and minerals. The supplementation of fenugreek in the diet of Konkan Kanyal goats could potentially enhance their overall nutrient intake, leading to improved health and productivity. This is particularly crucial for a breed like the Konkan Kanyal, which is adapted to local agro-ecological conditions but may benefit from dietary improvements to maximize growth and milk production. The study aims to assess how fenugreek affects feed intake and water consumption. Understanding these parameters helps in evaluating the feed efficiency of goats when supplemented with fenugreek. Improved feed efficiency can lead to better growth rates and milk yields, which are essential for the economic viability of goat farming in the Konkan region. Fenugreek's role as a natural feed additive aligns with sustainable agricultural practices. By potentially reducing methane emissions through its effects on rumen microbiota, fenugreek can contribute to more environmentally friendly livestock management practices. So, with the aforementioned in mind, the current investigation has been presented to investigate the influence of fenugreek seed on Konkan Kanyal kids feed intake and water intake and to determine the optimum degree of fenugreek seed inclusion as a feed supplement.

MATERIALS AND METHODS

The study was conducted from 16 February to 16 May 2022. Green maize was made available from fodder unit of instructional livestock farm of Department of Animal Husbandry and Dairy Science. The ingredients for concentrate mixture include groundnut cake, maize crumbles, mineral mixture, salt, fenugreek seed and Soybean straw were purchased from Dapoli market.Twenty Konkan Kanyal kids (3 monthsold) of average body weight were used for 90 days feeding trial. Kids were assigned to Six groups asT_0- Control (No fenugreek seed) Basal diet (Soybean straw 40%+Green maize 20%+concentrate mixture 40%), T_1- Basal diet + FS (Fenugreek seed) @ 0.75 per cent of concentrate mixture, T_2- Basal diet + FS @1.5 per cent of concentrate mixture, T_3- Basal diet + FS @2.25 per cent of concentrate mixture, T_4- Basal diet+ FS @3 per cent of concentrate mixture and T_5- Basal diet+ FS @3.75 per cent of concentrate

mixture.Kids were maintained in groups as per treatment. During the experimental period, measured quantity of respective experimental feed was provided to each animal every morning and evening and the left over was weighed next morning to calculate daily feed consumption.Daily water intake (ml) &daily feed consumption (kg) of kids was recorded during experimental period at 8.00 am, as offered subtracted from remaining in 24 hrs.All data generated were subjected to analysis of variance (ANOVA) using the general linear model (GLM) procedure of SAS (2008). Means were separated using least significant difference (LSD) test of the same package. Thus, experimental data was collected, compiled and analyzed by Randomized Block Design (Snedecor and Cochran, 1994).

RESULTS AND DISCUSSION

Feed intake

The average daily feed intake was recorded in experimental period illustrated in Table 4.3 and graphically depicted in Fig.3. The average feed intake of kids in control T_0 was (1095.66), T_1 (1119.60), T_2 (1152.20), T_3 (1177.13), T_4 (1203.16) and T_5 (1216.10) gram per day. The higher average daily feed intake observed in treatment T_5 i.e., 1216.10 g while lower in treatment T_0 i.e., 1095.66 g. The result indicated that the average daily feed intake in treatment T_5 was significantly higher followed by treatments T_4, T_3, T_2, T_1 and lower in treatment (T_0). In present study significant difference was observed among all treatment groups.Average feed intake of kids was significantly ($P<0.05$) higher in fenugreek seed supplemented groups than control (Table 1). The results in present study are comparable with Balgees*et al.*(2013) who studied effect of fenugreek seeds supplementation on feed intake of Nubian goats. They recorded feed intake g/day as 546.30 (Control), 1083.3 (Fenugreek seed 5%), 1231.8 (Fenugreek seed10%), 1318.3 (Fenugreek seed 15%). Al-Sherwany (2015) also reported that supplementation of fenugreek seeds in Hamdani ewes resulted in significantly ($P<0.05$) higher daily feed intake. It is observed from the result that feed intake increased as per increase in addition of fenugeeek seed which may be firstly due to the saponins content in fenugreek seeds, which increased feed intake (Ismail 2000).Secondly, the boosting effect of fenugreek seeds supplementation might also be attributed to the fact that fenugreek seeds increase the appetite for food (Borca*et al.*, 2000). Although Abo El-Nor (2007) suggested that fenugreek seeds may influence hypothalamus gland to stimulate hungriness centre in the brain and increase the desire for eating.Balgees*et al.* (2016) reported that there was a highly significantdifference($P\leq0.001$)in feed intakebetween the control

and treatedgroups.While the feed intake was enhancedsignificantly($P \leq 0.001$) with increasing thelevel of fenugreek seeds.

Water Intake

Water intake in animals depends upon the season, environmental condition, physiological condition of animal, type of ration given to the animal and DM intake.The average water intake of kids assigned as control T_0 was 904.33, T_1 911.66, T_2 913.66, T_3 920.33, T_4 925.66 and T_5 930.33 ml per day. The higher average daily water intake observed in treatment T_5 i.e., 930.33 ml while lower in treatment T_0 i.e., 904.33 ml. In present study significant difference was observed in each treatment. Significantly higher water intake was observed in T_5 (930.33) ml/day followed by T_4 (925.66), T_3 (920.33), T_2 (913.66), T_1 (911.66) and T_0 (904.33).The average water intake of kids significantly ($P<0.05$) higher in fenugreek seed supplemented groups than control (Table 2).

The results of present study are having higher values for water intake ml/day as compared to results obtained by Sonar (2019) who studied production performance of Osmanabadi doe's on supplementation of crushed fenugreek (*Trigonella foenum-graceum* L.) seed and observed , average daily water intake over an experimental period was 5.60, 5.90, 6.30, 6.90 and 6.10 lit/day/doe in treatment T1 {dry fodder + concentrate (Control)}, T2 {dry fodder + 95% concentrate + 5% crushed fenugreek}, T3{ dry fodder + 90% concentrate + 10% crushed fenugreek}, T4{dry fodder + 85% concentrate + 15% crushed fenugreek} and T5 {dry fodder + 80% concentrate + 20% crushed fenugreek} group of doe's respectively. The significant differences were observed at 5% level of significance. The water intake was increased gradually among treatmentgroups under successive period of investigation and reported that there wassignificant differences in water intake of doe's supplemented with fenugreek crushed seeds.

CONCLUSIONS

Contemplating the findings of present study, it could be concluded that addition of fenugreek seeds at 3.75 per cent level as feed additive in complete feed could be a viable proposition to improve the feed and water intake in goats. Further, supplementation of fenugreek seeds as feed additive could be a practically viable strategy that can be adopted to improve performance of goats and to have sustainable goat production.

Disclaimer (Artificial intelligence)

Option 1:

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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TABLES

Table 1: Average daily feed intake during experimental period (DM basis)

Treatments	Average feed offered (g/day)	Average feed leftover (g/day)	Average feed intake (g/day)	Total feed intake for 90 days (kg)
T_0	1250	154.34[a]	1095.66[f]	98.61
T_1	1252.6	133.00[b]	1119.60[e]	100.76
T_2	1255.2	103.00[c]	1152.20[d]	103.70
T_3	1257.8	80.67[d]	1177.13[c]	105.94
T_4	1260.5	57.34[e]	1203.16[b]	108.29
T_5	1263.1	47.00[e]	1216.10[a]	109.45
SE±	-------	3.85	3.85	--------
CD (5%)	-------	12.17	12.15	---------

Figures having different superscripts differed from each other

Table 2: Average daily water intake during experimental period (ml/d)

Treatments	Average water offered (ml)	Average water leftover (ml)	Average water intake (ml)
T_0	2000	1095.66^{a}	904.33^{f}
T_1	2000	1088.33^{b}	911.66^{e}
T_2	2000	1086.33^{b}	913.66^{d}
T_3	2000	1079.66^{c}	920.33^{c}
T_4	2000	1074.33^{d}	925.66^{b}
T_5	2000	1069.66^{e}	930.33^{a}
SE±	-------	1.45	1.45
CD (5%)	-------	4.59	4.59

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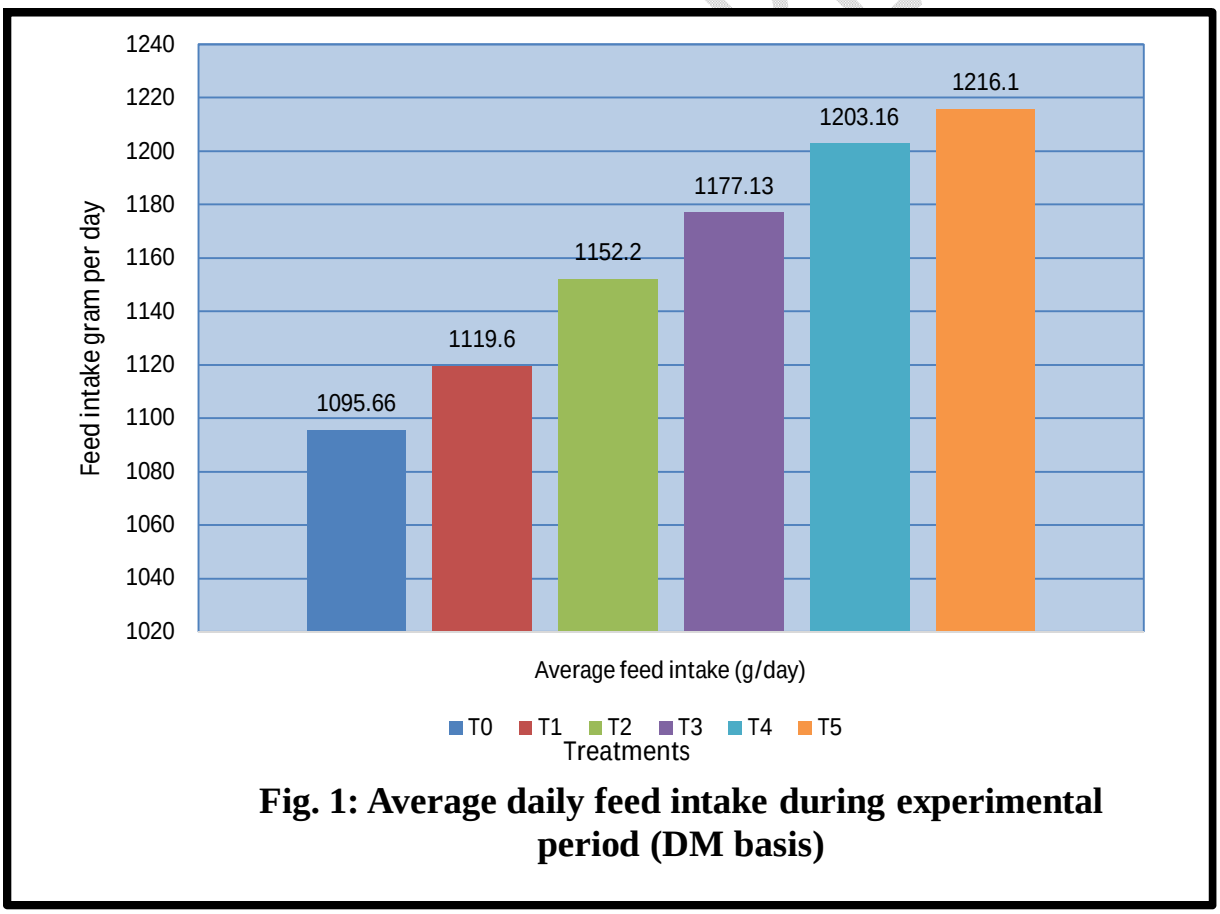

Fig. 1: Average daily feed intake during experimental period (DM basis)

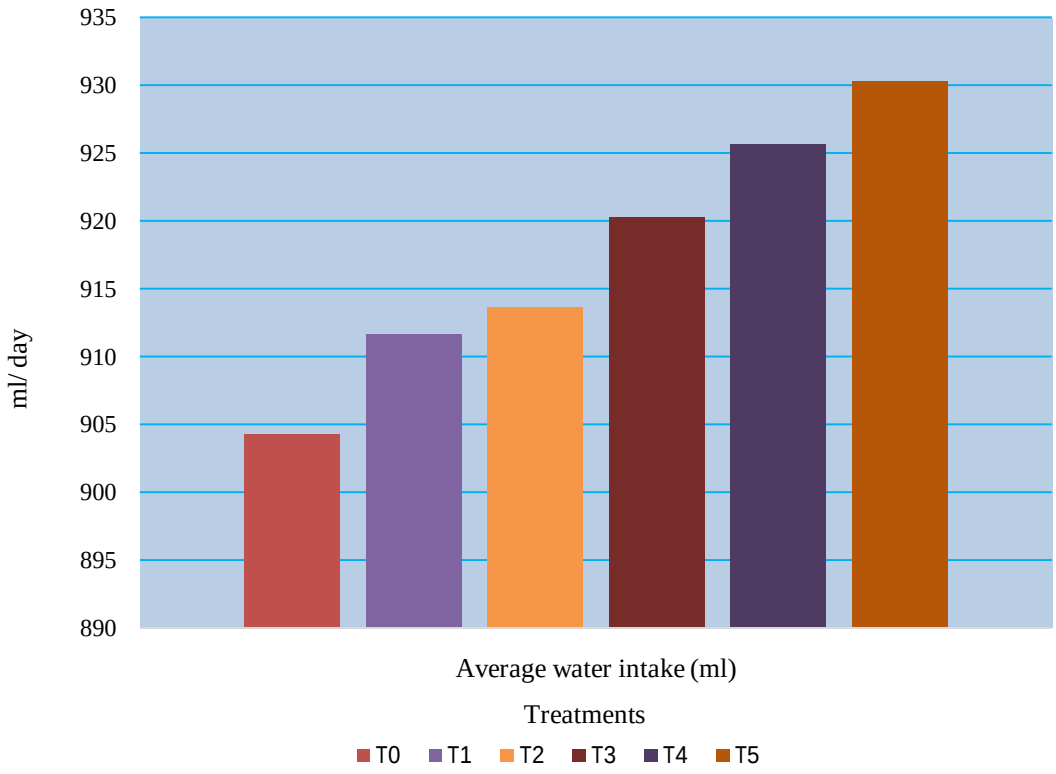

Fig. 2: Average daily water intake during experimental period (ml/d)