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Faecal parasitic load of weaned Beetal kids fed total mixed ration under stall-fed

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Abstract

A trial was conducted to evaluate the effect of dry and fresh fodder based Total Mixed Ration (TMR) feeding on faecal parasitic load under stall-feeding. For investigation, 23 weaned Beetal kids were utilized and, and their faecal parasitic load was estimated using the Modified McMaster Technique. The selected kids were randomly distributed in three treatment groups on basis of average body weight, gender and age. The experimental diets offered to kids were as follows: 1) Conventional feeding method (control group) 2) Hay based TMR (T₁) 3) Fresh fodder based TMR (T₂). The results when transformed logarithmically showed a declining trend in shedding of parasitic eggs in faeces of animals fed T₁ (Hay based TMR) group as comparison to control and T₂ group. Parasitic eggs shed per gram of faeces (PEG) were found to differ significantly at day 90 ($P<0.05$). Similarly, oocysts shed per gram of faeces (OPG) values at day 90 and 120 vary significantly ($P<0.05$) being lowest for T₁ group as comparison to control and T₂ groups.

Keywords: Total mixed ration, Beetal kids, stall feeding, OPG, PEG

Introduction

Goats (*Capra hircus aegarius*) have been associated with mankind since the domestication of animals. The socio economic importance of goats is greatest in developing nations, where they fulfill socio economic, cultural and recreational needs. Improvement in goat production can lead to immense improvement of socio-economic status of many farmers.

Among various goat breeds, Beetal is an important goat breed of the Punjab region of India and Pakistan which is used for meat as well as milk production. However, due to decreased allocation of land for fodder cultivation, day to day increase in the cost of concentrate feed ingredients, shrinkage of pasture land, urbanization and increasing demand, goat production is shifting to stall-fed production system characterized by zero grazing in most parts of the world (Kumar, 2007) [2]. Under intensive farming, roughages and concentrates are fed separately which often lead to utilization of large amount of easily digestible concentrates over roughages causing severe digestive disorders. This imbalanced feeding may adversely affect health status and productivity of goats (Kumar *et al.*, 2014) [6].

Goats are very fond of leguminous fodders. They do not relish fodder like sorghum/maize silage or straw. Some of the common green roughages liked by goats are: lucerne, berseem, napier grass, green arhar, cowpea, etc. Moreover, in India mostly northern parts when leguminous fodders like berseem are served at a time goats eat in large amount which causes scours and increases the faecal parasitic load. This is a more matter of concern particularly under stall-fed conditions.

Therefore, feeding of basal diet in form of Total Mixed Ration (TMR) could be an important management manipulation as poor feeding under stall-fed is affecting the health status of goats to a great extent. The term total mixed ration (TMR) or complete ration (CR) is defined as a quantitative mixture of all dietary ingredients, blended thoroughly without giving any choice to the animal for selection of any specific ingredient (Kishore *et al.*, 2017) [7]. TMR feeding reduces the digestive disorders and results in ruminal steady state condition. It acts as an effective vehicle to render some specific medicines to animals, especially to control the infections caused by parasites. However, contradictory reports are available in the literature with regards to effect of complete feed/Total Mixed Ration (TMR) on the faecal parasitic load of small ruminants. Therefore, this study was conducted to see the effect of Total Mixed Ration on health status and faecal parasitic load of Beetal kids under stall-fed.

Materials and Methods

Experimental details

The following experiment was conducted at Goat Research Farm, Department of Livestock Production Management, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana 141004, Punjab, India during November 2018 to March 2019.

IAEC Approval: Approved for the experimental trial.

Selection of animals and experimental design

Before the beginning of trial, weaned Beetal kids were weighed and examined for any abnormal health condition in November, 2018. A total number of minimum 23 weaned kids were taken and randomly distributed in three treatment groups on basis of average body weight, gender and age. The selected Beetal kids were put in the adaptation trial under stall-fed for about 15 days. During this period, the feeding requirements of all the kids were standardized.

Methodology

The selected Beetal kids were allocated to three groups. The selected groups were further sub-grouped for the feeding purposes. The basal diet of each kid was formulated as per recommendations (NRC 2007) [3]. Diet of each animal under study was reviewed and formulated at fortnightly interval. Feeding of all the kids was done by taking dry matter requirement as 4% of body weight. The kids were fed ration containing Roughage: Concentrate in the ratio of 60:40 on the DM basis (Malisetty *et al.* 2014) [4]. Further, feed requirement for each pair was calculated for animals of all the groups.

Feeding schedule of kids under Control group: The kids under the control group were fed basal diet as per routine conventional method in which green fodder and concentrate were fed separately.

Feeding schedule of kids under T1 and T2: The kids under the treatment groups T1 and T2 were fed basal diet based on dry fodder based TMR and fresh fodder based TMR, respectively. The available fresh fodder was dried for hay making to be incorporated in basal diet as dry fodder based TMR.

Health status

Prompt daily observations for any variation in routine behavior were made in the morning and evening hours to ascertain health status. Morbidity of animals, if any, was recorded daily and treated accordingly. Physiological parameters like respiration rate, pulse rate and rectal temperature were recorded randomly.

Faecal parasitic load

Monthly variations in faecal parasitic load in terms of parasitic eggs per gram (PEG) and oocyst per gram (OPG) were calculated by using the Modified McMaster Technique (Soulsby 2005) [5]. Three gram faeces was weighed and soaked in some quantity of saturated salt solution until they are sufficiently soft. Then 42 ml of saturated salt solution is added and poured through a fine sieve. After thorough shaking sample was withdrawn by means of a wide pipette and run into the McMaster's counting chamber, filling all the spaces. The number of parasitic eggs/oocyst within each ruled area, multiplied by 100, represented the number of OPG/PEG of the faeces of the sample.

Statistical analysis

Data recorded was calculated as Mean \pm S.E., one-way analysis of variance (ANOVA) and two way ANOVA to test the difference between treatments with Tukey's comparison test. The collected data was analysed using SAS software.

Results and discussion

Health status

Physiological responses of the animals were recorded randomly. The physiological responses in terms of rectal temperature, respiration rate and pulse rate were within normal physiological limits.

Parasitic eggs shed per gram of faeces (PEG)

Monthly variations in number of parasitic eggs shed per gram (PEG) of faeces are shown in Table 1. Mean number of oocysts shed per gram of faeces of naturally coccidia infected kids of individual groups during the whole experiment were transformed logarithmically and are presented in Fig. 1. The data recorded revealed a first increase from day 0 to day 30 and after that a declining trend in shedding of parasitic eggs in faeces of animals fed T1 (Hay based TMR) group as comparison to control and T2 group in which zig-zig observations were recorded. However, the variations in PEG between groups were statistically non-significant. The percent decline in shedding of parasitic eggs in 1g of faeces was recorded more in T1 (63.89%) and T2 (41.94%) over the control (31.17%) group.

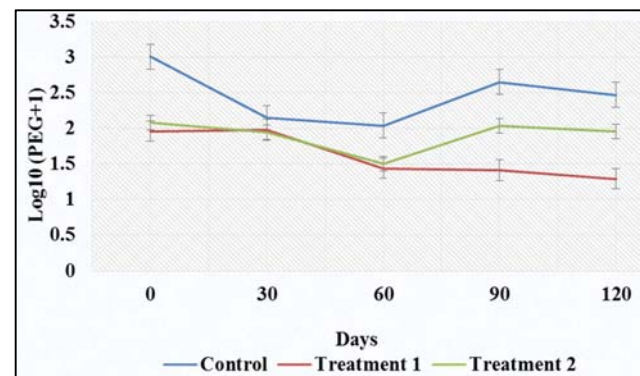


Fig 1: Monthly mean number of PEG in faeces of Beetal kids sorted by groups

Oocysts shed per gram of faeces (OPG)

Similarly, monthly variations in number of oocysts shed per gram (OPG) of faeces are shown in Table 1 and Fig. 2. This figure depicted a first increase in OPG of control and T2 groups and then a continuous declining trend. However, OPG of T1 group revealed a declining trend from day 0 to day 90 and increasing trend for day 90 to day 120 of the study period. OPG values at day 90 and 120 vary significantly ($P < 0.05$) being lowest for T1 group as comparison to control and T2 groups. For the rest of study trial, OPG values didn't differ significantly among the groups. Examination of faecal samples also revealed that TMR feeding (hay or fresh fodder based TMR) kept the shedding of oocysts towards lower count compared with control.

These results for parasitic eggs shed per gram of faeces (PEG) and oocysts shed per gram of faeces (OPG) in kids fed balanced feed in form of total mixed ration either as T1 and T2 group were supported by Garga *et al.* (2013) [1] which observed intensity of infection as faecal egg counts ranged

from 80 to 280 and 20 to 120 g⁻¹ of wet faeces before and after feeding of balanced rations. By feeding balanced rations

to the animals, average eggs/g faeces were reduced from 168 to 81.

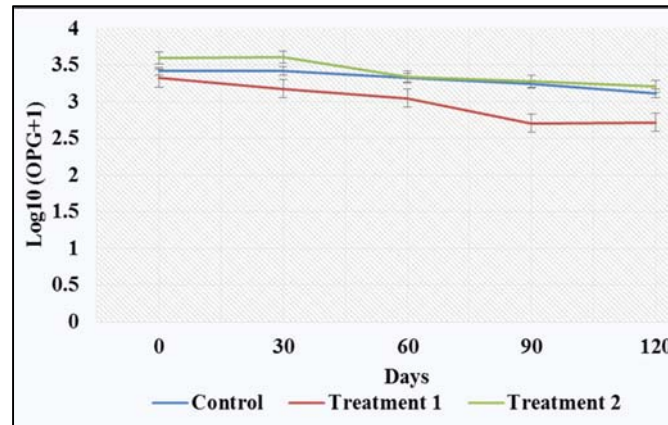


Fig 2: Monthly mean number of OPG in faeces

Table 1: Parasitic eggs shed per gram of faeces (PEG) and oocysts shed per gram of faeces (OPG) in kids fed with different experimental diets

Particulars	C	T ₁	T ₂	P value
PEG at day 0	1283.33 ± 297.12	600 ± 206.559	1033.33 ± 436.399	0.35
PEG at day 30	1366.67 ± 679.542	666.67 ± 257.768	650.00 ± 303.04	0.46
PEG at day 60	983.33 ± 491.54	400.00 ± 200	550.00 ± 270.493	0.48
PEG at day 90	1550.00 ^a ± 488.365	366.67 ^{ab} ± 196.073	600.00 ^c ± 206.559	0.05
PEG at day 120	883.33 ± 304.868	216.67 ± 116.667	600.00 ± 211.345	0.14
OPG at day 0	3150.00 ± 916.42	2750 ± 896.196	4166.67 ± 600.925	0.47
OPG at day 30	3883.33 ± 1478.607	2033.33 ± 655.066	5066.67 ± 655.066	0.24
OPG at day 60	2516.67 ± 742.256	1150.00 ± 120.416	2600.00 ± 727.095	0.20
OPG at day 90	2050.00 ^a ± 504.48	583.33 ^b ± 132.707	2033.33 ^{ab} ± 305.141	0.01
OPG at day 120	1783.33 ^{ab} ± 501.609	600 ^b ± 136.626	1966.67 ^a ± 382.681	0.04

Values have been presented as Mean ± Standard Error; Means bearing different superscripts in a row differ significantly

Conclusion

It is concluded that Total Mixed Ration feeding resulted in improved health status and survivability of weaned Beetal kids under stall-fed conditions. Upon offering of hay based TMR to Beetal kids, the shedding of parasitic eggs and oocysts were towards lower side.

Acknowledgments

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