



ISSN: 2456-2912
VET 2021; 6(6): 26-28
© 2021 VET
www.veterinarypaper.com
Received: 18-09-2021
Accepted: 21-10-2021

Priyanka A Dahiwale
Department of Animal Husbandry
and Dairy Science, Mahatma Phule
Krishi Vidyapeeth, Rahuri, Dis.
Ahmednagar, Maharashtra, India

DK Deokar
Department of Animal Husbandry
and Dairy Science, Mahatma Phule
Krishi Vidyapeeth, Rahuri,
Ahmednagar, Maharashtra, India

PS Sakhare
Department of Animal Husbandry
and Dairy Science, Mahatma Phule
Krishi Vidyapeeth, Rahuri,
Ahmednagar, Maharashtra, India

SD Mandakmale
Department of Animal Husbandry
and Dairy Science, Mahatma Phule
Krishi Vidyapeeth, Rahuri,
Ahmednagar, Maharashtra, India

YG Fulpagare
Department of Animal Husbandry
and Dairy Science, Mahatma Phule
Krishi Vidyapeeth, Rahuri,
Ahmednagar, Maharashtra, India

CA Nimbalkar
Department of Animal Husbandry
and Dairy Science, Mahatma Phule
Krishi Vidyapeeth, Rahuri,
Ahmednagar, Maharashtra, India

Corresponding Author:
Priyanka A Dahiwale
Department of Animal Husbandry
and Dairy Science, Mahatma Phule
Krishi Vidyapeeth, Rahuri, Dis.
Ahmednagar, Maharashtra, India

Effect of feeding a rumen modifier on body weight gain in crossbred heifers

Priyanka A Dahiwale, DK Deokar, PS Sakhare, SD Mandakmale, YG Fulpagare and CA Nimbalkar

DOI: <https://doi.org/10.22271/veterinary.2021.v6.i6a.393>

Abstract

The effect of feeding a rumen modifier [mixture of neem seed powder (*Azadirachta indica*), fennel seed (*Foeniculum vulgare*), harad (*Terminalia chebula*), at the rate of DMI of heifers, RM-3] along with dry fodder (soybean straw), green fodder (lucerne) and concentrate mixture. The performance of crossbred heifers was studied. Twenty one crossbred heifers divided into three groups were assigned to three treatments, basal diet (control, T₁), basal diet supplemented with RM-3 at the rate of 2% of dry matter intake (DMI) (T₂) and basal diet supplemented with RM-3 at the rate of 4% of DMI (T₃) for a period of 120 days. The diet was comprised of concentrate and roughage in 50:50 ratio. The heifer from all the treatments not only maintained their bodyweight but did indicate an increase in body weight over the experimental period. This means the ration provided to them was adequate to fulfil their nutritional demand. Total body weight gain over an experimental period was 62.57 kg, 109.00 kg 101.57 kg in T₁, T₂ and T₃ respectively. This indicated that rumen modifier with concentrate mixture – II promote a higher growth rate in heifers. However, there was more weight gain under T₂ treatments. The average daily body weight gain was 0.52, 0.91, and 0.85 kg per day in T₁, T₂ and T₃ treatments, respectively. It is concluded that the rumen modifier (RM-3) along with concentrate mixture can be used as a feed additive to increase weight of crossbred heifers and improve immune status without affecting animal performance.

Keywords: Heifers, growth performance, body weight, rumen modifier, plant secondary metabolites

Introduction

Use of plant origin feed additives to improve the performance of the animals is now been considered as desirable replacement of other feed additives like chemical, antibiotics, nitrate etc. because of less risk of toxicity in the animal and no residual effect in animal produce.

The use of plant origin additive containing plant secondary metabolites (PSM) have preference in animal feeding because of their natural occurrences. The most commonly tested PSMs are tannins, saponins and essential oils (EOs). Essential oils are used as a feed additive for rumen manipulation and the results are encouraging in terms of inhibition in methane production during feed fermentation in rumen. However, methane reduction is generally associated with adverse effect on feed digestibility.

The shortage of feed and fodders as well as diversion of agricultural by-products towards industry, which primarily were used as a animal feed, make the livestock production more challengeable. Modern approaches offer incredible opportunities to make livestock sector more profitable by getting better output in term of milk and meat. The changing perspectives in animal as well as human nutrition towards chemical feed additives, their side-effects and increasing focus on natural products as feed additives has drawn attention of researchers towards the additives of natural origin containing secondary metabolites. The highly specific antimicrobial activity of plant secondary metabolites (PSM) is being exploited in ruminant nutrition to modulate rumen fermentation for decreasing methane production. Thereby use of feed supplements in the microbial and functional form can offer a solution to some extent to combat the problems faced by livestock owners.

Materials and methods

The present experiment was conducted in the shed of research cum development project, Mahatma Phule Krishi Vidyapeeth Rahuri, Ahmednagar, Maharashtra India.

Twenty one crossbred heifers was selected on the basis nearness to age and body weight. Selected experimental crossbred heifers was divided into three groups (seven heifers in each group) and will be fed as per treatment. The selected heifers was tested under different treatment by adopting “Randomized Block Design” (RBD).

Treatment details

The dietary treatments will be as below:

T1 – Dry fodder + concentrate mixture (control)

T2 – Dry fodder + concentrate mixture + rumen modifier

(RM-3) @ 2% of DMI, respectively.

T3 – Dry fodder + concentrate mixture + rumen modifier (RM-3) @ 4% of DMI, respectively.

(Note: Dry fodder and concentrate was provided on the basis of body weight as per thumb rule)

Experimental diet

The seed kernel of neem (*Azadirachta indica*) contains bitter principles like nimbin, nimbidin and azadirachtin. Dried fruits of hirda (*Terminalia chebula*) are rich in tannins, whereas seeds fennel (*Foeniculum vulgare*) are rich in essential oils. The parts were dried, well ground and powdered to prepare a blend. The concentrate mixture consist of maize grains, 30; cottonseed cake, 20; wheat bran, 24; turchuni, 23; mineral mixture, 2; common salt, 1%.

Table 1: Chemical composition of feedstuffs (% DM) basis

Particulars	Hirada Seed powder	Neem Seed powder	Fennel Seed powder	Concentrate mixture
Crude Protein	19.37	14.63	13.97	19.29
Ether Extract	2.46	2.02	2.26	4.06
Organic Matter	90.69	90.12	92.62	89.28
Dry Matter	93.02	95.03	93.93	90.97
Ash	9.33	9.86	3.43	10.16
N.D.F.	41.63	57.99	39.39	26.82
A.D.F.	12.30	23.73	24.03	11.09

Result and discussion

Growth performance of Heifers

Bodyweight increase and gain in body measures were used to evaluate the growth performance of heifers fed various rumen modulator diets. Table 2 summarises the findings in this regard.

Table 2 shows that there was a substantial difference in weight increase between the different treatment groups. T₂ had the highest average end weight gain, followed by T₃ and T₁. The T₁ treatment group had the lowest weight gain,

indicating that the influence of varied concentrate mixture feeding on heifer body weight gain was substantial (Table 2). In the T₁, T₂, and T₃ groups, the initial body weights were 153.57, 153.14, and 154.29 kg, respectively, while the end body weights were 216.14, 262.57, and 255.86 kg, respectively. Treatment T₂ (109.00 kg) had the highest total gain in body weight, followed by T₃ (101.57 kg) and T₁ (62.57 kg). T₂ (0.91 kg) had the highest average daily weight gain, followed by T₃ (0.85 kg) and T₁ (0.52 kg).

Table 2: Effect of different feeding treatment on body weight gain (kg)

Treatments	Average initial weight (kg)	Weight gain kg/day/heifer	Weight gain kg/week/heifer	Period total weight gain (kg)	Average final weight (kg)
T ₁	153.57	0.52	3.65	62.57	216.14
T ₂	153.14	0.91	6.36	109.00	262.57
T ₃	154.29	0.85	5.92	101.57	255.86
“F” test	NS	Sig	Sig	Sig	Sig
SE (M) ±	-	0.08	0.57	9.70	9.43
SE (d)	-	0.11	0.80	13.72	11.34
CD at 5%	-	0.25	1.74	29.88	29.07

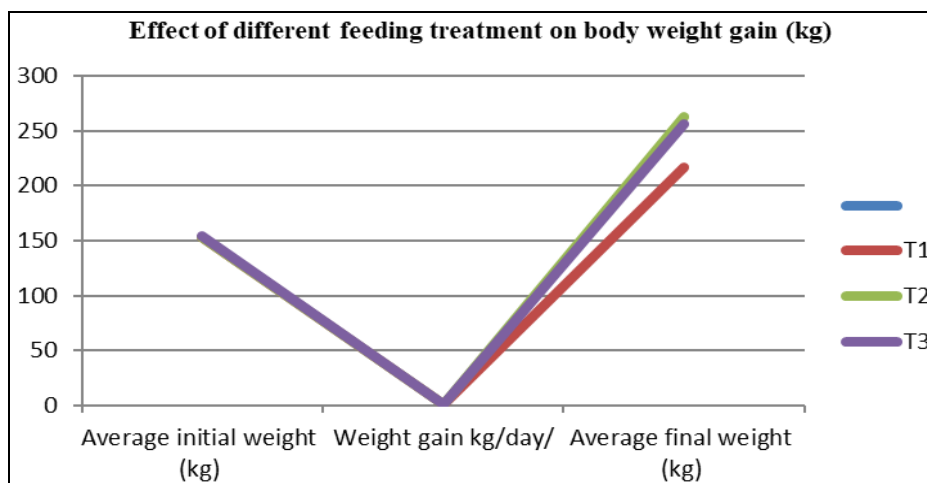


Fig 1: Total body weight gain (kg)

Conclusion

Rumen modifier feeding @ 2% improved body performance leading with the highest utilization of dry matter intake and noticeable digestibility coefficient as compared to the control group. Therefore based on the result of the present study the rumen modifier @ 2% of DMI can be used as a feed additive to increase body weight in ruminants without any adverse effect on animal's health as well as the environment.

References

1. Aruwayo, Maigandi SA. Neem (*Azadirachta indica*) Seed Cake/Kernel as Protein Source in Ruminants Feed. American Journal of Experimental Agriculture 2013;3(3):482-494.
2. Chagas ACS, Vieira LS, Freitas AR, Araujo MRA, Araujo-Filho JA, Aragua WR *et al.* Anthelmintic efficacy of neem (*Azadirachta indica* A. Juss) and the homoeopathic product Fator Vermes1 in Morada Nova sheep. Veterinary Parasitology 2008;151:68-73.
3. Ahmed Mahmoud Abd El Tawab, Mostafa Sayed Abdellatif Khattab, Fatma Ibrahim Hadhoud, Mahmoud Mohamed Shaaban. Effect of a mixture of herbal plants on ruminal fermentation, degradability and gas production. Acta Scientiarum. Animal Sciences 2021;43:48-49.
4. Akaninyene Jack A, Michael Adewumi K, Moyosore Adegbeye J, Daniel Ekanem E, Abdelfattah Salem ZM, Tolulope Faniyi O. Growth-promoting effect of water-washed neem (*Azadirachta indica* A. Juss) fruit inclusion in West African dwarf rams Tropical Animal Health and Production 2020;52:3467-3474.
5. Amlan Kumar Patra, Byeng-Ryel Min, Jyotsna Saxena. Dietary Tannins on Microbial Ecology of the Gastrointestinal Tract in Ruminants 2012. DOI: 10.1007/978-94-007-3926-0_8
6. Arif Innus Inamdar, Lal Chandra Chaudhary, Neeta Agarwal, Devki Nandan Kamra. Effect of *Madhuca longifolia* and *Terminalia chebula* on methane production and nutrient utilization in buffaloes. Animal Feed Science and Technology 2015;201:38-45.
7. Tekeli A, Çelik L, Kutlu HR. Plant Extracts; a New Rumen Moderator in Ruminant Diets. Journal of Tekirdag Agricultural Faculty 2007;4(1):71-79.
8. Ram´irez-Restrepo CA, Barry TN. Alternative temperate forages containing secondary compounds for improving sustainable productivity in grazing ruminants. Animal Feed Science and Technology 2005;120:179-201.
9. Franz Baserb KHC, Windisch W. Essential oils and aromatic plants in animal feeding - a European perspective. A review. Flavour and fragrance 2009. DOI 10.1002/fj.1967.
10. Duygu Budak, Aydan Yılmaz. Effects of Aromatic Plants on Rumen Fermentation Macedonian Journal of Animal Science 2013;3(1):75-80.
11. Faizal Andri, Asri Nurul Huda, Marjuki Marjuki. The use of essential oils as a growth promoter for small ruminants: a systematic review and meta-analysis [version 2; peer review: 2 approved] F1000 Research 2020;9:486.
12. Fasae OA, Aganto TO, Jimoh HO. Nutritional potentialities of neem plant parts as supplementary feed in the ruminant production system. Nigerian Journal of Animal Production 2018;45(3):301-308.
13. Gebrehiwot Tadesse. Rumen Manipulation for Enhanced Feed Utilization and Improved Productivity Performance of Ruminants: A review. Momona Ethiopian Journal of Science (MEJS) 2014;(2):3-17.
14. Hani El-Zaiat M, Othman Alqaisi, Sobhy Sallam M, Waleed Al-Marzooqi S. Effect of increasing doses of neem (*Azadirachta indica*) seed oil on feed intake, nutrients digestibility, ruminal fermentation and nitrogen utilization of Omani sheep, Animal Biotechnology 2021. DOI:10.1080/10495398.2021.1917422.
15. Hossein Jahani-Azizabadi, Mohsen Danesh Mesgaran, Ali Reza Vakili, Kamran Rezayazdi, Majid Hashemi. Effect of various medicinal plant essential oils obtained from semi-arid climate on rumen fermentation characteristics of a high forage diet using in vitro batch culture. African Journal of Microbiology Research 2011;5(27):4812-4819.
16. Hussien Ebrahim, Fasil Negussie. Effect of secondary compounds on nutrients utilization and productivity of ruminant animals: A review. Journal of Agricultural Science and Practice 2020;5(1):60-73.