Paper ID: 401
Theme 2. Grassland production and utilization
Sub-theme 2.1. Quality, production, conservation and utilization

Milk production and nutrient efficiency of lactation goats on diet containing linseed cake, mustard cake and guar korma with urea in concentrates

Manoj Kumar Tripathi*, Prabhat Tripathi, Ravindra Kumar, U.B. Chaudhary, D. L. Gupta, Ramkesh Meena
ICAR-Central Institute for Research on Goats, Makhdoom, Farah, Mathura-281122, India
*Corresponding author e-mail: mktripathi@gmail.com

Keywords: Goat, Guar korma, Mustard oil meal, Protein supplements, Urea

Introduction

Protein supplements, those conventionally used in goat feeding includes oil meals of ground nut, soybean meal, linseed and til etc., which are very costly and their availability is limited for ruminant feeding as these are most used in pig and poultry rations. However, mustard (*Brassica juncea*) oil meal is available in plenty at cheaper prices but their utilization in goat feeding is limited due to its bitterness (Pailan and Singhal, 2007), which arises upon degradation of glucosinolate contents of mustard (Tripathi and Mishra, 2007). Ruminant animals have unique capability of bioconversion of non-protein nitrogen substances into microbial protein, which can also substitute organic protein supplement. Guar korma is another high protein feed resource available at cheaper prices, which can also be used in animal feeding in limited quantities. The use of mustard cake in replacement of linseed cake upto 75% in concentrates of lactating Jamunapari goats have been demonstrated earlier. However, information of guar korma use in goat feeding is in scanty. The level and quality of dietary protein and fat have influence on milk production and quality (Tripathi, 2014) Therefore, present experiment aimed to utilized mustard oil meal, urea and guar korma in replacement of conventional linseed oil cake as protein supplement in concentrate mixture of lactating goats feeding and assess the nutrient utilization efficiency for milk production.

Materials and Methods

Eighteen lactating Barbari goats during their second week of parturition were randomly divided in to three equal groups of nine in each. Each goat received iso-nitrogenous concentrate pellet with 16 % crude protein, the pellet fed to control goats contained linseed oil cake, MOM group contained mustard oil meal, while NPN group contained urea and guar korma as protein sources. The goats were offered *ad-libitum* gram straw, green fodder was available at 2 kg per goat/day, while each goat received 500 g respective concentrate pellet. Experiment lasted for 70 days, during which daily feed intakes were recorded. A metabolic trial was carried out after 35 days of initial feeding for assessing the nutrient efficiency for milk production. Metabolizeable energy of the ingested diet was determined using digestible organic intake. Milk production was recorded at every 7 days by hand milking and a milk analyzer analyzed milk constituents. Samples of feed orts were analyzed as per AOAC (2000).

Results and Discussion

Milk yield of the three groups of goats was similar, which ranged from 711.9 to 755 g/day. Dry matter intake (DMI) during the experiment was different ($P<0.05$) and higher in NPN group of goats, whereas control and mustard, and mustard and NPN groups have the similar daily DMI. However, efficiency (kg DMI/ kg milk) was not different among goat groups, which varied between 1.42 to 1.46 kg (Table 1). Use of different protein sources have influenced the fat level of the diets, control diet have the higher ($P<0.001$) fat content, whereas diets of MOM and NPN groups have the similar fat levels. Protein quality and fat content levels of the diets have been reported in influencing the intake and milk production (Tripathi, 2014). The protein concentrate of ingested diets were similar among three goat groups as the three concentrates were iso-nitrogenous. The daily fat and protein intakes were different ($P<0.05$) among goat groups, however efficiency of fat and protein intakes were not different for milk yield and yield of each g of milk fat and protein. Similarly, metabolizeable energy (ME) content of the diets, daily ME intakes and efficiency of ME for milk production were similar among three goat groups. Lactation goats under present experimental protocols have produced mean daily milk from712 to 756 g, and consumed 1.42 to 1.46 kg diet DM. Lactating Barbari goats consumed 12.995 to 13.31 MJ ME for each kg of milk production. Goats required 1.34 to 1.40 g digestible fat intake and 1.4 to 1.6 g metabolizeable protein intake for each g of milk fat and milk protein production respectively.

Table 1: Effects of different sources of protein in concentrates nutrient use efficiency for milk production

	Goat feeding groups			SEM	P-values
	Control	MOM	NPN		
Live weight (kg)	27.84	26.79	27.62	0.786	0.863
Milk yield (g/day)	711.96	712.08	755.56	45.413	0.913
Milk constituents					
Fat (g/kg milk)	36.27a	24.93b	23.77b	1.877	0.003
Fat yield (g/day)	25.43a	17.59b	17.24	1.612	0.053
Protein (g/kg milk)	30.97	31.04	30.27	0.396	0.708
Protein yield (g/day)	22.20	21.99	22.96	1.454	0.965
Dry matter intake					
g/day	903.50b	999.39ab	1036.61a	22.907	0.039
g/kg milk yield	1.43	1.46	1.42	0.094	0.989
Efficiency of nutrient for milk and milk constituents yield					
Efficiency of dietary fat					
Fat (g/kg diet)	40.28a	28.00b	26.85b	1.524	<0.001
Fat intake (g/day)					
g/day	36.32a	27.86b	27.77b	1.041	<0.001
g/kg milk	115.05	117.45	108.56	7.211	0.886
g/ g milk fat	1.61	1.63	1.65	0.098	0.983
Digested fat intake (g/g milk fat)	1.40	1.34	1.35	0.082	0.963
Efficiency of dietary protein					
Protein (g/kg diet)	119.44	117.75	114.73	1.071	0.198
Protein intake					
g/day	107.75b	117.38a	118.56a	1.833	0.019
g/kg milk	169.62	172.47	163.08	10.702	0.942
g/ g milk protein	5.53	5.54	5.41	0.368	0.989
DP intake (g/g milk protein)	3.75	3.76	3.61	0.244	0.965
MP intake (g/g milk protein)	1.42	1.60	1.60	0.110	0.770
Efficiency of dietary ME					
ME (MJ/kg DM)	9.44	9.32	9.07	0.105	0.362
ME intake (MJ/day)	8.52	9.31	9.37	0.200	0.153
ME intake (MJ/kg Milk)	13.31	13.67	12.95	0.858	0.950

Conclusion

Study have concluded that conventional cakes can be replaced by mustard cake, and with the combinations of urea and guar korma as protein supplement in lactating goats feeding without affecting the efficiency of diet and nutrient for milk production and milk constituents yield. Therefore, mustard cake, and combination of urea and guar korma could have an economic strategy of goat feeding.

References

A.O.A.C. 2000. Official Methods of Analysis, 17th ed. Assoc. Off. Anal. Chem. Int., Gaithersburg, MD, USA.

Pailan, G.H. and K.K. Singhal. 2007. Effect of dietary glucosinolate on nutrient utilization, milk yield and blood constituent of lactating goats. *Small Rumin. Res.*71: 31-37.

Tripathi, M. K. 2014. Effect of nutrition on production, composition, fatty acids and nutraceutical properties of milk. *J. Adv. Dairy Res.* 2:115. doi:10.4172/2329-888X.1000115.

Tripathi, M. K. and A. S. Mishra. 2007. Glucosinolates in animal nutrition, A review. *Anim. Feed Sci. Technol*. 132: 1-27.