Asian J. Med. Biol. Res. 2016, 2 (2), 357-360; doi: 10.3329/ajmbr.v2i2.29082

Asian Journal of
Medical and Biological Research
ISSN 2411-4472 (Print) 2412-5571 (Online)
www.ebupress.com/journal/ajmbr

Short Communication

Effect of milk replacer on kid performance among small holder farmers

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Received: 07 June 2016/Accepted: 23 June 2016/ Published: 30 June 2016

Abstract: An experiment was conducted with 15 Black Bengal kids of both sexes (in 3 groups) were fed two different milk replacer using ingredient shotti (T_1), skim milk (T_2) and no milk replacer- kids with mother, termed as control group (T_0) at Southern agro trade, Subarnachar, Noakhali. The average total DM intake and milk dry matter intake were not significantly differed among the treatment group. Total dry matter intake was not affected by intake of liquid milk replacer or goat milk. The CP intake were ranged from 19.97 to 20.93 g/d. Total CP intake was not significantly differed among the group but T_1 group was slightly higher(0.42 g/d) than T_0 and T_2. The amount of protein intake (g/d) was followed NRC (1985) recommendation. DMI from concentrate (g/d), DMI from green grass (g/d) and DMI from percent live weight were not significantly differed among the treatment groups. The average daily gain was not significantly ($P>0.05$) differed among the treatment group. The average growth rate (57.42 – 61.20 g/d) of all kid of Black Begal goat was lower than the Angora goats (115.00-125.00 g/d) and Alpine goats (153.00-258.00 g/d). Dry matter (DM) digestibility (%) was significantly ($p<0.05$) higher (74.45) in T_1 group compare to other groups. CP digestibility was numerically higher in T_1 group than other three groups. The digestibility of nutrient depends on physiology of kids, particularly the development and capacity of the digestive tract. The lower growth rate might be genetic characteristics of Black Bengal goat.

Keywords: shotti; skim milk; live weight change; feed conversion efficiency

1. Introduction

Milk is an essential feed for newborn kids. The milking period may be lasting only 3-4 weeks or up to 5-6 months (Morland-fehr, 1981; Morland –fehr *et al.*, 1982). Black Bengal goat is highly prolific. Having multiple birth in 70% cases (Devendra and Burns, 1983). The scavenging nature of Black Bengal goats cannot be relied on to produce adequate nutrient for optimum sustainability of kids. Thus it is important to ensure adequate feeding of kids in order to enhance the productivity of stocks. The increasing feed need to minimize the mortality of kids produced by inadequate production of milk by the dam (Awah, 198; Akinsoyinu, 1985; Ayoade, 1987; Ademosun, 1988). Generally the Black Bengal is poor milk producer 108-135g/d (Hussain, 1999). Mother's milk is the ideal food for new born kids. The causes for poor mothering could be nutritional stress or genetic inability to produce milk to support kids (Shelton, 1981). In such cases, orphan twin and triplet kids would be raised successfully using milk replacer.

2. Materials and Methods

2.1. Location

The present trial was carried out at Southern agro trade, Subarnachar, Noakhali.

2.2. Animals and design

Fifteen Black Bengal kids of both sexes at average 15 days of age were used in the milk replacer trial. The kids were suckled their mother since birth until 10±2 days of age, then they were separated from their dams. At beginning of the trial, the individual average body weight (kg) of kid was 1.78±0.30. The kids were housed in an individual pens with a layer of straw bedding. There were three treatments with five replications. The groups were a) kids with mother (T0), b) using ingredient shotti (T_1), c) using skim milk (T_2). Under T_0, kids were separated their mother except suckling time.

2.3. Feed ingredients and milk replacer preparation

The locally available feed ingredients were used to formulate the milk replacer. The ratio of different ingredient of 100g dry milk replacer was presented in Table 1.

100g feed mixed with worm fresh clean water then it was boiled for five minutes and after boiling it was cooled then pour into bottle feeder and fed. Milk replacer was prepared at 100g mixture/1 litre worm water and then boiled it at least five minutes and again cooled at 35-37^0 C, and then it was suckled to the kids.

2.4. Feeding and animal management

Kids were suckled five times in a day, 7.00 A.M, 10.00 A.M, 1.00 P.M, 6.00 P.M and 10.00 PM, respectively in a control (T_0) group. The others two treatments of milk replacers were fed five times in a day followed by (T_0) group. Milk intake was determined by marking scale with bottle feeder before and after drinking. After onset the experiment, the kid starter and soft green grass were provided at 27th and 36th days, respectively. Kid starter (CP-26.5% and M/D- 11.23) and green grass (DM-20.50; CP-11.28; ADF 24.85 and ash -16.98) were given thrice a day at 7.00A.M., 1.00 P.M and 8.00 P.M, respectively. Kid's weight was recorded weekly before feeding. The sample of milk replacers, kid starter, green grass and refusal were taken during growth and intake trial. On the day 60 of the experiment, metabolism trial was carried out during 4th days with five animals per group. The faeces and urine were collected every morning before the animals were fed during metabolic period. In order to minimize the loss of nitrogen, 100 ml 6N H_2SO_4 was added to the bucket for urine collection. The quantity of urine collected for each animal was measured by using a graduated measuring cylinder. The 10% of the bulk was taken and frozen until require for analysis.

2.5. Chemical analysis

The compositions of feed sample and faeces, and nitrogen for the urine samples were analyzed by using the AOAC (1995).

2.6. Statistical analysis

The result of feed intake, digestibility and growth were analyzed by one way ANOVA using computer software package of SPSS (11.0 versions).

3. Results and Discussion

3.1. Nutrient intake

The nutrients intake of different group of kids was presented in Table 2. The average total DM intake and milk dry matter intake were not significant among the treatment group. Total dry matter intake was not affected by intake of liquid milk replacer or goat milk. The ranged of crude protein (CP) intake were from 19.97 to 20.93 g/d. Total CP intake was not significant difference among the group but T_1 group was slightly higher than T_0 and T_2. The amount of protein intake (g/d) was followed NRC (1985) recommendation. The other parameters such as DMI from concentrate (g/d), DMI from green grass (g/d) and DMI from percent live weight were not significantly different with the treatment groups.

3.2. Live weight change and feed conversion efficiency

The data on live weight gain and feed conversion efficiency are presented in Table 3. The average daily gain was not significant (P>0.05) difference among the treatment group. The average growth rate (57.42 – 61.20 g/d) of all kid of Black Begal goat was lower than the Angora goats (115.00-125.00 g/d) (Sahlu *et al*., 1992) and Alpine goats (153.00-258.00 g/d) (Andrighetto *et al*., 1994). The lower growth rate might be genetic characteristics of Black Bengal goat. The live weight gain and feed conversion efficiency were not significantly (p>0.01) different with the treatment groups.

3.3. Nutrient utilization

The digestibility and N-utilization data are presented in Table 4. Dry matter (DM) digestibility (%) was significantly ($p<0.05$) higher (74.45) in T_1 group compare to other groups. CP digestibility was numerically higher in T_1 group than other three groups. The digestibility of nutrient depends on physiology of kids, particularly the development and capacity of the digestive tract (Roy, 1980 and Thivend *et al*., 1980). All feeds were consumed in to abomasums through esophageal groove in new born kids. The esophageal groove was reflex continues to function for several months until continuous milk feeding. The post natal development of the ruminant's stomach is related to live weight, age and diet (Sanz Sampelayo *et al.*, 1987). The Nitrogen retention percentage was not significantly ($P>0.05$) different in the treatment groups but higher values found in T_1 group. The nitrogen requirements of growing goat kids depend on nitrogen sources, level, growth rate and body composition.

Table 1. Feed composition of different milk replacer (g/100g).

Ingredient	Composition-1	Composition-2
Shotti	19	-
Skim milk	-	70
Soybean meal	64	-
Maize ground		20
Soybean oil	15	7
Salt	1	1
DCP	0.5	1.5
Vit-min. Premix	0.5	0.5
Total	100	100

Table 2. Effect of different milk replacer on nutrients intake.

Parameters	Treatments (Mean ± SE)			SED	Level of sig.
	With dam (T_0)	Composition-1 (T_1)	Composition-2 (T_3)		
Concentrate DM intake (g/d)	42.79±1.67	43.21±0.89	42.32±1.57	1.44	NS
Green grass DM intake (g/d)	11.99±.67	12.32±0.11	12.51±0.37	0.46	NS
Milk DM intake (g/d)	35.11±3.21	36.43±0.91	36.96±1.98	2.11	NS
Total DM intake (g/d)	89.89	91.96±1.88	91.79±3.12	2.88	NS
DM intake (% live weight))	1.56±0.12	1.62±0.09	1.69±0.13	0.13	NS
Total CP intake (g/d)	20.93±0.87	21.98±0.85	19.97±0.93	0.88	NS

NS= Non significant, DM= Dry Matter intake, CP= Crude Protein

Table 3. Effect of different milk replacer on an average daily gain (ADG) and feed conversion efficiency (FCE).

Parameters	Treatments (Mean ± SE)			SED	Level of sig.
	With dam (T_0)	Composition-1 (T_1)	Composition-2 (T_3)		
Initial Live weight (kg)	1.72 ± 0.23	1.69 ± 0.19	^{b}1.94 ± 0.16	0.34	NS
Final Live weight (k.g)	5.94 ± 0.34	6.00 ± 0.19	5.96 ± 0.33	0.51	NS
Average Daily Gain (g/d)	^{b}60.29 ± 3.78	61.2 0± 3.11	57.42 ± 3.46	3.84	NS
FCE (kg feed DM/kg gain)	0.95 ± 0.06	0.99 ± 0.07	1.09 ± 0.05	0.09	NS

NS= Non significant, FCE= Feed Conversion Efficiency

Table 4. Effect of different milk replacer on nutrients digestibility and N balance.

Parameters	Treatments (Mean ± SE)			SED	Level of significance
	With dam (T_0)	Composition-1 (T_1)	Composition-2 (T_3)		
DM digestibility (%)	^{a}69.12 ±3.33	^{b}74.45 ±2.12	^{a}69.98 ±2.43	2.34	*
CP digestibility (%)	75.12±1.98	79.43±1.78	76.12±2.42	2.98	NS
OM digestibility (%)	72.23±3.78	74.43±2.90	75.43±1.98	3.31	NS
N retention (%)	65.43±2.67	68.79±3.23	63.74±4.21	3.65	NS

NS= Non significant, *P<0.05 DM= Dry Matter, CP= Crude Protein, OM= Organic Matter, N= Nitrogen

4. Conclusions

Based on the present findings, feed intake, body weight gain, FCE and nutrient utilization in kids fed two milk replacers were similar to those in the control suckled group. So according to the cost of rearing and other management practices milk replacer may help profitable kid rearing in Bangladesh.

Acknowledgements

The author feels proud to express his deepest sense of gratitude and profound appreciation to his respected Head, Goat and Sheep Research Division, BLRI, Savar, Dhaka for his scholastic and constructive guidance, affectionate feelings, worthy inspiration and generous help in carrying out of the research work. The author sincerely desires to expresses the deepest sense of gratitude, appreciation, indebtedness and best regards to all the co author of this research work.

Conflict of interest

None to declare.

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