Effect of accelerated feeding in the growth performance and carcass quality in native kids

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ABSTRACT

A trial was conducted to evaluate the effect of accelerated feeding method in the growth and carcass studies of native goat kids. Thirty male country goat (non – descriptive) kids at the age of 30 - 45 days were selected for this study. The kids were divided into two groups, control and treatment groups, each consist of 15 kids. The control group kids were fed with concentrate feed consisting of 15% crude Protein (CP), 75% Total Digestible Nutrient (TDN), CO4 grass as a sole green fodder and sorghum stover, bengal gram and groundnut tops as a dry fodder. The treatment group kids were fed with concentrate feed containing 21% crude Protein (CP), 75% Total Digestible Nutrient (TDN), C_O4 grass and C_OFS 29 grass as a green fodder and sorghum stover, bengal gram and groundnut tops as a dry fodder. In addition the treatment group kids were fed with supplements such as TANUVAS mineral mixture, probiotics, baking soda and Groviplex®, Ostovet®, Brotone®. The study was conducted for a period of 6 months. The body weight of kids was recorded at fortnight intervals. Parameters such as average feed intake per goat, average total body weight gain, average daily body weight gain and cost of production per kg live weight gain were studied.

The kids were slaughtered at the end of study period and carcass parameters like pre slaughter weight, carcass weight, dressed weight and weights of blood, head, feet, stomach with contents, lungs, heart, kidney, spleen, liver and skin were studied. After analysis of data, significant ($P< 0.01$) difference was noticed between control group and treatment group in terms of final body weight (C -13.28±0.10 kg, T - 17.00±0.06 kg), average total body weight gain (C -6.74 ±0.09 kg, T - 9.98±0.10 kg), average daily body weight gain ($P< 0.05$) (C - 0.04±0.08 kg, T - 0.06±0.09 kg) and cost of production per kg live weight gain (C – Rs.98.15±0.15, T – Rs.72.48±0.12) . There was also highly significant difference ($P < 0.01$) was noticed in carcass quality in terms of pre slaughter weight (C -13.28±0.10 kg,

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T - 17.00±0.06 kg), carcass weight (C - 6.25±0.10kg, T - 8.00±0.02 kg), dressed weight (C -5.70±0.15 kg, T - 7.55±0.14 kg), dressing percentage (C - 42.22±0.13%, T - 47.06±0.12%), head (C - 1.13±0.22 kg, T - 1.25±0.02 kg) and stomach (C - 5.10±0.26 kg, T - 6.35±0.2kg). Thus it is concluded that, accelerated feeding significantly improves the body weight gain and carcass yield in native goat kids with low production cost per kg live weight gain.

Key Words: Accelerated feeding, native kids slaughter studies.

INTRODUCTION

Goats are important species of livestock in India. They contribute greatly to the agrarian economy, especially in areas where crop and dairy farming are not economical, and play an important role in the livelihood of a large proportion of small and marginal farmers and landless labourers (Meenakshi Sundaram *et al.,* 2012**).** Their contribution to economy through production of milk, meat, fiber, skin and manure etc., are substantial constituting above 5.4% of GNP of agricultural sector (Sivakumar., 2013). According to FAO (2004), goat contributed about 475 MT of meat worth Rs.4,750 crores to the Indian economy. The demand for goat meat is progressively increasing as Indian consumers prefer goat meat among all and there is no taboo against consumption of chevon. The number of goats available for slaughter is comparatively higher in India; however, the meat yield per animal is lower than the world average as with 11% of the world livestock it only contributes 2.13% of the total meat produced (Sivakumar., 2013). Therefore, it is important to enhance the growth and carcass yield of goats through valuable interventions. Accelerated feeding is one of the interventions to improve the growth and carcass yield. 104, 106 and 117 g/d of average daily gain were observed in goats which were fed with diets containing 11.2, 12.7 and 15.1% of CP, respectively (Lu and Potchoiba., 1990). With this background the current study was formulated to test the hypothesis that increasing the crude protein level in the diet of country goats will improve the growth and carcass quality of kids.

MATERIALS AND METHODS

Experimental design

Thirty numbers of early weaned male native kids (non – descriptive) at the age of 30-45 days were divided into two group viz., control group and treatment group (Accelerated feeding). Each group consists of 15 kids. Duration of the study was six months.

Feed formulation

A ration was formulated for control and treatment group under study as given in table 1.

Table 1.

Ingredients (%)	Ration for treatment group of kids (Accelerated Feeding group)	Ration for control group of kids (Conventional feeding group)
Maize	46.4	15
Soya bean Meal	44.5	-
Dry fish	5	-
DCP	0.7	-
Salt	1.5	0.5
Oil cake	1.8	10
Allzyme	0.1	
Pulses	-	37
Wheat bran	-	35
Mineral mixture	-	2.5
	100	100

Housing management

All the kids both control and treatment group were reared under intensive system where the kids are allowed in a run space during day time and confined in a wooden slatted floor house during night.

Feeding management

All the kids were fed with cow milk (diluted with water at 1:1 ratio boiled and cooled) at the dose of 250-750 ml per kid per day depending upon their body weight till the age of 75 days. All the kids were given access to hygienic ad libitum water throughout the day through automatic waterer.

Control group

The control group kids were fed with concentrate feed consisting of 15% crude Protein (CP), 75% Total Digestible Nutrient (TDN), C_O4 grass as a sole green fodder and and sorghum stover, bengal gram and groundnut tops as a dry fodder.

Treatment group

The accelerated feeding group kid were fed with concentrate feed containing 21% crude Protein (CP), 75% Total Digestible Nutrient (TDN), CO4 grass and COFS 29 grass as a green fodder and sorghum stover, bengal gram and groundnut tops as a dry fodder. In addition, the accelerated feeding group kids were fed with TANUVAS

mineral mixture @ rate of 10 g/day /kid; baking Soda at the rate of 3g/day/kid to prevent bloat; probiotics at the rate of 5 g/ day/kid (Each gram contains *Streptococcus faecalis* T -110 ($2X10^8$) 20 mg, *Bacillus mesentericus* TO-A ($2X10^6$) 20 mg, *Clostridium butyricum* TO -A ($2X10^6$) 20 mg and lactose 40 mg) to improve rumen function; Groviplex®, Ostovet®, Brotone® a cocktail of vitamin B complex, calcium, growth promoter at the rate of 5 ml/ day/ kid along with concentrate feed as a feed supplements.

Health care

Both the control and treatment group kids were given the same health cover like deworming and vaccination during the study period. During the study period, fecal samples were collected once in month and sent for screening of parasitic load. Common parasite detected in the fecal samples was *Schistosoma* sp. Based on the result the kids were dewormed using Ivermectin oral suspension at the rate of 0.02 mg/kg body weight once in a month.

Slaughter studies

At the end of the experiment, the animals were subjected to overnight fasting, recorded for their empty live weight and humanely slaughtered by the severance of carotid arteries and jugular veins. Slaughtering was carried out in a research abattoir at the Department of Meat Science, Madras Veterinary College and University Research Farm (TANUVAS).

After slaughter, the heads were removed at the atlanto-occipital joint, while the fore and hind legs were removed at the carpal and tarsal joints respectively. The animals were skinned while suspended by their achilles tendon. Carcass and non-carcass components were weighed immediately after slaughter. The heart, liver, spleen, kidney and lungs were weighed together and designated as pluck. The non-carcass components such as head, skin and feet were also weighed and designated as offal. The weight of digestive contents (gut fills) was computed as the difference between full and empty digestive tract (rumen and intestines). Prior to skinning and the removal of the visceral organs from the carcass, the oesophagus was tied with nylon string to prevent contamination of carcass by the gut contents. Visceral fats were removed and weighed. The carcasses were weighed immediately after dressing which was designated as hot carcass weight. Each carcass was split longitudinally to left and right halves. Each half was further split into fore and hind quarters using a carcass splitting saw and finally expressed as percentages of each tissue per whole carcass weight.

The amount of non-carcass components such as offal (head, legs and skin) was determined as a percentage of slaughter weight. The gut fill was recorded as percentages of total weight of gut (rumen and intestine including their contents) and the viscera (rumen and intestines) were reported as percentages of total weight of gut (including their contents) while the pluck (heart, liver, kidney and lungs) were weighed and recorded as percentages of carcass weight. The compositions of visceral fat, subcutaneous fat, inter-muscular fat as well as fat in pluck (heart, liver, kidney, and lungs) were recorded as percentages of total trimmable fats.

Collection and analysis of data

All the kids were weighed at fortnight interval. The average intake of concentrate feed, green and dry roughages by the kids were recorded daily. The carcass parameters such as pre slaughter weight, carcass weight, dressed weight and weights of blood, head, feet, stomach with contents, lungs, heart, kidney, spleen, liver and skin were also studied. The accumulated data were analyzed by 't' test using Graphpad prism software.

RESULTS AND DISCUSSION

Feeding high quality protein rich diet with added supplements for enhanced growth, feed efficiency and carcass quality is called accelerated feeding. Accelerated milk feeding system have been commonly used in calf rearing by supplementing high quantity of milk than conventional feeding for increased growth rate and earliest first calving. However, in goats accelerated feeding has been tried with either increasing the energy level of concentrate feed or protein level of concentrate feed. Saeed Ahmed Abbasi et al. (2012) have studied the effect of different dietary energy levels on the growth performance of Kamori goat kids. He concluded that high energy ration is cost effective and positively affects on weight gain and dressing percentage age of goat kids. So it can be used for increasing meat production. Liméa *et al.* (2009) have studied the growth performance and carcass quality of indigenous Caribbean goats under varying nutritional densities i.e. different protein content of the concentrate diet. Thus increasing the energy or protein level in the diet of goat kids consequently increases the growth and carcass quality. The current study was formulated to test the hypothesis that increasing the crude protein level in the diet of country goats will improve the growth and carcass quality of kids.

Proximate analysis of feed and fodder

The proximate analysis of concentrate feed, green fodder and dry fodder used in the study were given in table 2 and 3.

Table 2 : Proximate analysis of concentrate feed

Proximate analysis (%)	Concentrate ration for control group of kids	Concentrate ration for treatment group of kids
Moisture	15.18	11.08
Crude protein	15.18	21.02
Crude fiber	15.31	15.14
Ether Extract	2.58	2.58
Total ash	8.57	8.50
AIA	0.87	0.88
NFE	51.79	54.94

Table 3
Proximate analysis of green and dry fodder

Proximate analysis (%)	Sorghum dry fodder	Black gram tops dry fodder	Ground nut tops dry fodder	COFS29 grass	CO4 grass
Moisture	36.52	10.87	13.44	59.76	75.88
Crude protein	4.26	5.71	9.74	6.81	7.73
Crude fiber	28.06	50.38	33.31	24.28	27.71
Ether Extract	2.38	0.60	1.44	2.66	2.25
Total ash	10.41	6.60	6.39	14.56	13.99
AIA	-	-	1.56	-	-
NFE	54.89	36.71	49.12	50.19	48.32

Average feed intake

The average daily feed intake per goat during the study period is given in table 4. From the table it is evident that the kids of both the groups have taken almost similar quantity of feed and fodder throughout the study period.

Table 4
Average feed intake per goat in both control and treatment groups (n = 30)

Age	Concentrate (g) (Mean ± SE)	Green fodder (kg) (Mean ± SE)	Dry fodder (kg) (Mean ± SE)
60- 75 days	100	0.60± 0.05	0.20± 0.20
90 – 105 days	100	0.72± 0.04	0.25±0.02
120 – 135 days	100	0.76± 0.04	0.27± 0.03
150 – 165 days	100	0.84±0.04	0.28±0.10
180 – 195 days	100	1.20±0.08	0.42±0.18
210- 225 days	100	2.0±0.08	0.49±0.17

Body weight of kids

The fortnight body weight of kids under control and treatment group were given in table 5. From the table it is evident that the treatment and control group have almost equal weight at the start of the trial. However, the increased body weight in the treatment group is apparent during the course of the study.

Table 5
Body weight of kids

Age in days	Control (n=15)	Treatment (n=15)
	Body weight (kg) (Mean ± SE)	Body weight (kg) (Mean ± SE)
45 days	6.92±0.09	7.022±0.06
60 days	7.02±0.08	7.41±0.06
75 days	7.25±0.70	7.79±0.06
90 days	7.63±0.08	8.15±0.07
105 days	8.05±0.08	8.43±0.07
120 days	7.58±0.98	8.12±0.07
135 days	8.03±0.10	8.71±0.07
150 days	9.13±0.11	10.23±0.07
165 days	9.54±0.11	11.25±0.07
180 days	11.22±0.11	12.9±0.07
195 days	12.81±0.10	14.47±0.06
210 days	13.28±0.10	15.31±0.06
225 days	14.8±0.12	17.0±0.06

Production parameters

The growth parameters of the control and treatment group were given in table 6. Significantly higher total body weight gain (C - 6.74 ±0.09 kg,T - 9.98±0.10 kg) and daily body weight gain weight (C - 0.04±0.08 g, T - 0.06±0.09 g) was noticed in the treatment group fed with concentrate having 21% crude protein level than control group. Bhakt *et al.* (1987) also reported higher growth rate with increasing dietary crude protein level in the diet of goats and observed maximum growth rate fed with dietary crude protein level of 25% in indigenous Bihar goats. Significantly higher average daily weight gain was noticed in the treatment group kids i.e. 0.06±0.09 kg/day/kid than control group 0.04±0.08 kg/day/kid. Liméa *et al.* (2009) also reported that feeding diet containing 20.9% crude protein at 140g/kid/day, 240g/kid/day and 340g/kid/day significantly improve the average daily weight gain indigenous

Caribbean goats. The cost of feeding per kg live weight gain was significantly lower in the treatment group (Rs.72.48±0.12) than control group (Rs.98.15±0.15). Thus, accelerated feeding i.e. feeding high protein diet to kids improves its growth performance with significant reduction in the production cost.

Table 6
Production parameters and economics

Parameters	Control	Treatment
No. of kids per treatment	15	15
Initial body weight (kg) (30 - 45 days of age)	6.92±0.09	7.02±0.06^{NS}
Final body weight (kg) (210 - 225 days of age)	13.28±0.10	17.00±0.06**
Average total body weight gain (kg)	6.74 ±0.09	9.98±0.10**
Average daily body weight gain (kg/day/kid)	0.04±0.08	0.06±0.09*
Cost of production per kg live weight gain (Rs.)	98.15±0.15	72.48±0.12**

* - Significant (P<0.05), ** - Significant (P<0.01), ^{NS} - Not significant (P>0.05)

Slaughter studies

The carcass parameters studied were given in table 7. From the table, it is evident that the carcass quality of the accelerated feeding group kid was significantly higher than the control group kids. The high protein diet fed kids had significantly higher pre slaughter weight 17.0±0.06 kg, carcass weight 8.00±0.02 kg, dressed weight 7.55±0.14 kg and dressing percentage 47.06±0.12% than control group kids fed with convention feed with 15% dietary crude protein level. Limea *et al.* (2014) also found that the carcass weight and the dressing percentage of Creole kids improved with the progressive addition of concentrate with 20.9% crude protein at the rate of at G100 - 140g/kid/day, G200 - 240g/kid/day and G300 - 340g/kid/day. He also stated that the greater dressing percentage for G200 and G300 animals was probably due to better body development. Thus, accelerated feeding with high dietary crude protein level improves the carcass quality and body development in goats.

Table 7
Slaughter studies
Age of the carcass: 225 days

Parameters	Control (n=15) (Mean ± SE)	Treatment (n=15) (Mean ± SE)
Pre slaughter weight (kg)	14.8±0.12	17.0±0.06**
Carcass weight (kg)	6.25± 0.10	8.00±0.02**
Dressed Weight (kg)	5.70±0.15	7.55±0.14**
Dressing percentage (%)	42.22±0.13	47.06±0.12**
Blood (kg)	0.41±0.22	0.46±0.31 NS
Head (kg)	1.13±0.22	1.25±0.02**
Feet (kg)	0.51±0.29	0.52±0.27 NS
Stomach (kg)	5.10±0.26	6.35±0.2**
Lungs (kg)	0.25±0.02	0.28±0.21 NS
Heart (kg)	0.07±0.003	0.07±0.00 NS
Kidney (kg)	0.11±0.10	0.09±0.01 NS
Spleen (kg)	0.03±0.00	0.03±0.00 NS
Liver (kg)	0.27±0.25	0.28±0.00 NS
Skin (kg)	1.18±0.04	1.28±0.57 NS

* - Significant (P<0.05)
** - Significant (P<0.01)
NS - Not significant (P>0.05)

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