



Efficacy of different concentrate to roughage ratio on growth performance of Osmanabadi kids in Marathwada region

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Goat has tremendous potential to be projected as the 'Future Animal' for rural prosperity. Goat is generally portrayed as a 'poor man's cow'. But that seems to be an understatement. In Maharashtra, the risk of crop failure is high and the economical status of farmers has been sticking down day-by-day. The percentage of organized goat farming is low compared to those reared by small scale and landless farmers. The goat's contribution at the macro level to the country's gross domestic product is nonsignificant. Goats and sheep are mainly kept by the poor farmers and distressed women in extensive system under ranged condition without any supplementation. This system of production causes reduced growth rate and poor reproductive performance, which in turn results in severe economic losses. Osmanabadi goats are native to the Latur, Tuljapur and Udgir taluka of Osmanabad district of Maharashtra, from where they derive their name. They are also fairly widespread in Karnataka and the Nizamabad district of Andhra Pradesh. Most of the small farmers from Maharashtra rear goats by keeping animals free for grazing on local grass only. These local grasses may not have essential and adequate amount of nutrients to support additional requirement of goats required during different phases of life of goat, which provides only energy. But for optimum growth performance, it is necessary to give supplementation to goats from their available resources which are economical to farmers. By feeding good quality concentrate we can satisfy requirement of both protein and energy. Increasing concentrates in goat diets results in increased live-harvest weights, as well as increased carcass weights (Ryan *et al.* 2007). Goats fed high-concentrate diets appear to have more muscling (Johnson and McGowan 1998). However, reports on the

nutrient requirements are scanty and very little information is available particularly on the contribution of dietary protein and energy to the performance of growing kids under farm conditions and the cost benefit of feeding additional concentrates has not been fully explored in goat-production systems and needs to be evaluated. The quality and quantity of concentrate fed to growing kids has got very much importance for their maintenance and weight gain. Many farmers in India rear goats for the purpose of meat production. So the rapid gain in weight of kids is very essential. Feeding goats only on roughages is not sufficient for optimum weight gain. Supplementation of concentrate is required for faster weight gains, but it should also be economical. So it is necessary to decide the adequate level of concentrate for faster growth rate.

The Osmanabadi kids of same size and age were selected randomly from the ILFC, Goat Unit maintained at CoVAS, Udgir. All the kids were 6 months old and of same physiological condition. All the kids were dewormed before the start of research work as per the standard schedule. The study was conducted on 21 Osmanabadi kids. The selected goats were randomly distributed into three treatment groups (7 kids each), viz. T0, T1 and T2.

The observations recorded were growth parameters (body weight, body weight gain), body parameters (height at wither, height at hip, chest girth, body length), feed parameters (Average fodder intake, average fodder left over), body condition score and economics of feeding ratio.

The differences among the treatments within the experiment were determined by the data generated, using Randomized Block Design (RBD). The simple statistical methods were used for calculating the cost of production,

Table 1. Experimental design

Treatment group	Feeding treatment based on DM requirement (50% at morning + 50% at evening)
T0	50% concentrate + 50% roughages
T1	35% concentrate + 65% roughages
T2	20% concentrate + 80% roughages

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economics of feeding; body condition score (BCS) was estimated as per Villaquiran *et al.* (2007). A scale of 1 to 5 point was used. The BCS of 1 is an extremely thin kid with no fat reserves and the BCS of 5 is a very over conditioned kid. The BCS of every animal was studied by palpation of different body parts (lumbar region, rib region and sternum) at the 1st and 90th day of the experiment.

The statistically calculated average means and standard errors for average body weight of Osmanabadi kids during the present investigation for T0, T1 and T2 were 13.99 ± 0.79 , 13.35 ± 0.64 and 12.96 ± 0.48 kg, respectively. Hence, it is evident concluded that, the supplementation of concentrate mixture along with roughages in the feeding management of Osmanabadi kids resulted in heavier body weight which was in direct proportionate relation with the amount of concentrate mixture fed. The results obtained in present trial are in agreement with Chaturvedi *et al.* (2010), Kumaravel *et al.* (2016), Hozza *et al.* (2013), Vidya *et al.* (2012). The average cumulative body weight gain of Osmanabadi kids during the present investigation for T0, T1 and T2 were 0.95 ± 0.07 , 0.78 ± 0.08 and 0.59 ± 0.05 kg, respectively. The trend of body weight gain observed in the present study was in positive linear correlation with the amount of concentrate feed consumed by the kid. The findings and the conclusions drawn from the present experiment are in close association with the reports of Solanki *et al.* (2009) and Ahmad *et al.* (2014). The average body length of Osmanabadi kids during the present investigation for T0, T1 and T2 were 20.20 ± 1.07 , 20.43 ± 0.92 and 20.14 ± 0.90 inches, respectively. The measurements for body length of Osmanabadi goat kids recorded in the present investigation are similar to that reports of the Jagdale *et al.* (2012).

The height at withers of Osmanabadi kids during the present investigation for T0, T1 and T2 were 21.65 ± 0.93 , 21.35 ± 0.97 and 21.22 ± 0.95 inches, respectively. The measurements for height at withers of Osmanabadi goat kids recorded in the present investigation are similar to that reports of the Das *et al.* (2002), Gadade (2004), Jagdale (2012) and Chaturvedi *et al.* (2010). The average height at hip of Osmanabadi kids during the present investigation for T0, T1 and T2 were 23.04 ± 0.92 , 22.80 ± 0.90 and 22.59 ± 0.88 inches, respectively. The measurements for height at hip of Osmanabadi goat kids recorded in the present investigation are similar to that reports of the Das *et al.* (2002) and Nikam *et al.* (2012).

The average chest girth of Osmanabadi kids during the present investigation for T0, T1 and T2 were 20.92 ± 1.03 , 21.16 ± 0.95 and 20.71 ± 0.92 inches, respectively. The measurements for chest girth of Osmanabadi goat kids recorded in the present investigation are similar to that reports of the Nikam *et al.* (2012) and Gadade (2004).

The average weekly fodder intake of Osmanabadi kids during the present investigation for T0, T1 and T2 were 2562.51 ± 37.27 , 2491.37 ± 35.66 and 2476.29 ± 35.45 g, respectively. It can be concluded that, stall feeding and the supplementation of concentrate mixture or nutritional enrichment of regular diet of Osmanabadi goat kids resulted

in the improvement in voluntary fodder intake, however the rate of intake remained in positive linear correlation up to the 50% amount of concentrate feed consumed on dry matter requirement basis of Osmanabadi goat kids, the conclusion is in close association with the findings of Jabbar *et al.* (2008).

The average weekly fodder leftover by Osmanabadi kids during the present investigation for T0, T1 and T2 were 437.49 ± 37.27 , 508.72 ± 35.66 and 523.71 ± 35.45 g, respectively. It can be concluded that, stall feeding and the supplementation of concentrate mixture or nutritional enrichment of regular diet of Osmanabadi goat kids results in the reduction in fodder leftover, however the rate of fodder leftover remained in negative linear correlation up to the 50% amount of concentrate feed consumed on dry matter requirement basis of Osmanabadi goat kids, the conclusion is in close association with the findings of Jabbar *et al.* (2008) in either way. The cumulative BCS of Osmanabadi kids during the present investigation for T0, T1 and T2 were 1.13 ± 0.12 , 0.80 ± 0.11 and 0.69 ± 0.09 BCS, respectively. The improvement in the body condition score of the experimental kids from different treatment groups was observed. Further, the supplementation of concentrate mixture in the regular diet of the Osmanabadi goat kids improves the general health and the vitality. The findings are in close agreement with Beura *et al.* (2014).

It was also noted that, there were linear positive improvement in body condition score as per the amount of concentrate feed supplemented which is in close agreement with Hozza *et al.* (2013) and Chichame (2016). The observation reported by Meshram (2014) regarding the positive correlation of body weight with body condition score is in the close concurrence with the findings of the present investigation.

The cost of rearing the kids for the entire period of 90 days for the present experiment was calculated by taking into consideration the market value of the kids at 1st day of the experiment, cost of concentrate supplement fed, total amount of roughages consumed by kid, etc. The cost of kids on first day of experiment was calculated on the live weight basis considering the market rates of ₹ 270/kg of live weight. As the concentrate mixture utilized for present experiment was prepared at feed mill of CoVAS, Udgir, the cost of concentrate mixture is calculated by considering the cost of feed ingredients, manpower required for feed preparation along with the electricity required for the processing. The calculated cost of concentrate mixture resulted as ₹ 17.00/kg.

Gross profit per kid was calculated by subtracting the cost of production per kid for 90 days from the market value of the kid at the end of present experiment on live weight basis. Considering the final live weights of the experimental kids recorded at the end of present study as 17.06, 15.94 and 14.89 kg, with the market value on live weight basis as ₹ 4606.20, 4303.80 and 4020.30 and the gross average profit calculated was ₹ 1542.20, 1250.10 and 961.20 for T0, T1 and T2 treatment groups, respectively. Net profit was

calculated by subtracting the cost of feeding from the average gross profit as ₹ 1117.40, 940.81 and 755.94 obtained from T0, T1 and T2 treatment groups, respectively. From the overall records it is calculated that average profit per kg live weight was ₹ 65.49, 59.02 and 50.76 for T0, T1 and T2 treatment groups, respectively. The economics of the present investigation is in positive correlation and the in agreement with findings of Yadav and Khan (2011).

The findings of the present study are in agreement with the findings of Das (2009) who reported that, feeding of concentrate at higher level in growing kids is economically profitable. Hence, creation of awareness regarding scientific feeding practice will definitely help in improving the productivity of goats and income of the farmers in concurrence to the reports of Tanwar and Khem Chand (2011).

SUMMARY

In Osmanabadi goats kids, stall feeding is the most economic and comfortable method of feeding management. The overall growth performance in Osmanabadi goat kids was enhanced by supplementation of concentrate mixture with regular roughage feeding. Further, in Osmanabadi goats, there was positive linear correlation of chest girth, height at withers, body length, height at hip with BCS, body weight and the age. The supplementation of concentrate mixture along with roughages in the feeding management of Osmanabadi kids resulted in heavier body weight. The trend of improvement in different growth and body parameters of Osmanabadi goat kids showed positive linear correlation with the amount of concentrate feed consumed by the kid. The supplementation of concentrate mixture with regular roughages in Osmanabadi goat kids improved the level of fodder intake. Stall feeding and the supplementation of concentrate mixture or nutritional enrichment of regular diet of Osmanabadi goat kids results in the improvement in voluntary fodder intake, however the rate of intake remained in positive linear correlation up to the 50% amount of concentrate feed consumed on dry matter requirement basis in Osmanabadi goat kids. Positive linear correlation of concentrate supplementation with voluntary fodder intake ultimately resulted in reduced fodder leftover and thereby the fodder wastage.

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