

Effect of Different Energy Based Rations on Growth Performance of Jamunapari Kids

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Abstract:

The experiment was conducted on 12 Jamunapari kids of about three months of age up to 180 days of age to study the "Effect of Different Energy Based Rations on Growth Performance of Jamunapari Kids". The kids were randomly distributed into four groups with three sub groups comprising of three kids in each to serve as replicates. Kids were fed as per treatments viz. T₀ (control) comprising of Maize 50 %, wheat bran 29 %, soybean 12 %, Gram husk 6 %, minerals mix 2 %, Common Salt 1 %, T₁ comprising of Maize 25 %, Oat 25 %, wheat bran 29 %, soybean 12 %, Gram husk 6 %, minerals mix 2 %, Common Salt 1 %, T₂ comprising of Maize 25 %, Barley 25 %, wheat bran 29 %, soybean 12 %, Gram husk 6 %, minerals mix 2 %, Common Salt 1 %, T₃ comprising of Barley 25 %, Oat 25 %, wheat bran 29 %, soybean 12 %, Gram husk 6 %, minerals mix 2 %, Common Salt 1 %. Maize, barley and oat were ground to half grain before mixing in ration. Kids were allowed for grazing every day in the morning at 7.00 to 9.00 am., and in the afternoon at 3.00 to 5.00

pm. Kids were allowed experimental ration as per treatment at 9:00 am.in the morning and in the evening at 5: pm after grazing. The concentrate was offered to the kids individually in plastic pans and fresh drinking water was available at all time. Results revealed that inclusion of maize and maize along with barley significantly increased body weight, gain in weight and feed conversion ratio of kids. However there was a non-significant effect of treatments on feed consumption

Key words: Jamunapari kids, Performance, Growth, Ration, Energy

Introduction:

Goat is a multi-functional animal and plays a significant role in the economy and nutrition of landless, small and marginal farmers in the country. Goat rearing is an enterprise which has been practiced by a large section of population in rural areas. Goats are among the main meat-producing animals in India, whose meat (chevon) is one of the choicest meats and has huge domestic demand. Besides meat, goats provide other products like milk, skin, fiber and manure. Goats are important part of rural economy, particularly in the arid, semi-arid and mountainous regions of the country. With more than 124 million population, goats account for more than 25 per cent of the total livestock in the country, (Singh and Kumar, 2007).

The Indian Jamunapari goat is one of the ancestors of the American Nubian. They were derived from crossing Jamunapari from India and Egyptian Zaraibi with native English goats. Jamnapari (or Jamunapari) is a breed of goat originating from Indian subcontinent ,(Rout, *et. al.* 2008). Jamunapari (Jamnapari), a dual purpose (milk and meat) goat breed, mainly found in the undulated land of Chakarnagar between the ravines of Jamuna (Yamuna) and Chambal rivers in Etawah district of Uttar Pradesh, India, (Acharya, 1982).

If land resources are not enough for grazing of goats, total mixed ration is provided to the animals. In this system of

production, the goats are raised under intensive system of production fed on total mixed ration having dry roughages and concentrate (energy and protein sources) with little supplemented green fodder. In this system, the total mixed ration is formulated as per need of the animal based on nutrient specifications of the available dry roughages and concentrate feedstuff. This will provide balanced diet to the growing animals and will conserve the energy wasted by the goats during grazing. The cereal concentrates are those feeds which are low in fiber and high in energy, (Pasha, 2006). Nutrition is important for a variety of reasons. Animals need the proper nutrition for growth and maintenance, and to provide energy for work and vital functions. Animals Producers must know what ration is appropriate for a specific animal and how to provide a balanced ration, (Chahal *et.al.* 2008). Energy is used for basal metabolic processes, body heat, physical activity, tissue maintenance and growth, fat deposition, and lactation. Excess energy is stored as fat. Energy in feedstuffs is contained primarily in the carbohydrate and fat fractions. Proteins can also supply energy when fed in excess or in times of severe malnutrition. (Machen, 2000).

Materials and methods:

The study was carried out at Goats farm of Sundersan School of Animal Husbandry and Dairying, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad Uttar Pradesh, India, on 12 Jamunapari kids of about three months of age which were randomly divided into four groups with three kids in each to serve as replicates. The kids were of about three months of age with an average live body weight of 6.65 – 9 kg. They were purchased from the local market. The kids of each pen were fed one of four dietary treatments (concentrate mixture) for a period of 90 days (March to May) under Allahabad conditions. In the study four rations were evaluated

on 12 Jamunapari kids during 90 days of period. The rations evaluated divided into treatments *viz.* T₀ (control): Ration containing, Maize 50 %, Wheat bran 29 %, Soybean 12 %, Gram Husk 6 %, Minerals mix 2 % and Common Salt 1 %, T₁:Ration containing Maize 25 %, Oat 25 %, Wheat bran 29 %, Soybean 12 %, Gram husk 6 %, Minerals mix 2 % and Common Salt 1 %, T₂: Ration containing Maize 25 %, Barley 25 %, Wheat bran 29 %, Soybean 12 %, Gram husk 6 %, Minerals mix 2 % and Common Salt 1 %, T₃: Ration containing Barley 25 %, Oat 25 %, Wheat bran 29 %, Soybean 12 %, Gram husk 6 %, Minerals mix 2 % and Common Salt 1 % .(Table 1) Maize, Barley and Oat were ground to half grain before mixing in ration. Jamunapari kids were randomly distributed into four groups *i.e.* T₀ (control) and three treatments T₁, T₂ and T₃. with three sub-groups comprising of three kids in each to serve as replicates. Kids were allowed for grazing every day in the morning at 7 to 9 am., and in the afternoon at 3 to 5 pm. Kids were allowed experimental ration as per treatment at 9:00 am.in the morning, and in the evening at 5: pm after grazing. The fresh drinking water was available at all time. All the kids were dewormed before commencement experiment. The data in body weight and feed intake were recorded fortnightly to determine weight gain and feed conversion ratio (FCR) (Naji, 2006). The data were analyzed statistically. (Snedecar and Cochran , 1994).

Table1. Ingredients and nutrient composition of experimental rations (NRC 2012).

Ingredients (%)	Treatment			
	T ₀	T ₁	T ₂	T ₃
Maize	50	25	25	-----
Oat	-----	25	-----	25
Barley	-----	-----	25	25
Wheat Bran	29	29	29	29
Soybean	12	12	12	12

Gram husk	6	6	6	6
Mineral mixture	2	2	2	2
Common salt	1	1	1	1
Total	100	100	100	100
Nutrient composition				
Dry matter %	85.65	85.90	85.90	86.15
Crude protein (%)	15.09	14.95	14.96	14.82
ME (Kcal/kg)	3080	2037	3780	2802

Result and discussion:

1. Fortnightly average body weight (kg.) of Jamunapari kids in different treatments:

At first fortnight of age the highest body weight of kids was recorded in T₀ (8.56) followed by T₂ (8.55), T₃ (8.38) and T₁ (8.19) kg. At second fortnight of age the highest body weight of kids was recorded in T₂ (9.44) followed by T₀ (9.44), T₃ (8.99), T₁ (8.84) kg. At third fortnight of age the highest body weight of kids was recorded in T₀ (10.60) followed by T₂ (10.42), T₃ (9.57), and T₁ (9.53) kg. At fourth fortnight of age the highest body weight of kids was recorded in T₀ (11.78kg) followed by T₂ (11.49), T₁ (10.34) and T₃ (10.15) kg.

At fifth fortnight of age the highest body weight of kids was recorded in T₂ (12.73) followed by T₀ (12.66), T₁ (11.15), and T₃ (10.76) kg. At sixth fortnight of age the highest body weight of kids was recorded in T₂ (14.55) followed by T₀ (13.56), T₁ (11.91), and T₃ (11.41) kg. Irrespective of treatment the Average body weight of kids in T₀, T₁, T₂ and T₃ was 11.10, 9.99, 11.19 and 9.87 kg., respectively, Irrespective of treatments average body weight per kids in first, second, third, fourth; fifth and sixth fortnight were 8.42, 9.17, 10.03, 10.94, 11.82 and 12.85 kg., respectively.

The differences were significant. Results showed that maize and barley in ration caused significant increase in growth resulting in higher body weight; however it was so in kids of T₂ compared to control and kids of T₁ and T₃ fortnightly body weight of kids of control were not significantly different for kids of T₂. Average fortnightly body weight of kids of T₃ was also at par with kids of T₁ as the differences were not significant at 5% level. In general highest average body weight per kids was observed in T₂ followed by T₀, T₁ and T₃. Differences in average fortnightly body weight of Jamunapari kids of control (T₀) were significantly different 5% level with kids of T₁ and T₃. Also differences in body weight of kids in T₂ were significantly different 5% level with T₁ and T₃. Average fortnightly body weight of kids in T₂ had significantly higher body weight than kids in T₁ and T₃. Results revealed that inclusion of barley in ration along with maize increased body weight of kids compared to oat and barley. **(Table2).**

2. Average fortnightly weight gain (kg) of Jamunapari kid in four different treatments:

At first fortnight of age the highest gain in weight of kids was recorded in T₂ (0.818) followed by T₀ (0.783), T₃ (0.618) and T₁ (0.593) kg. At second fortnight of age the highest gain in weight of kids was recorded in T₂ (0.895) followed by T₀ (0.876), T₁ (0.626) and T₃ (0.613) kg. At third fortnight of age the highest gain weight of kids was recorded in T₀ (1.131) followed by T₂ (0.980), T₁ (0.708) and T₃ (0.573) kg. At fourth fortnight of age the highest gain in weight of kids was recorded in T₀ (1.180) followed by T₂ (1.070), T₁ (0.778) and T₃ (0.581) kg. At fifth fortnight of age the highest gain in weight of kids was recorded in T₂ (1.240) followed by T₀ (0.876), T₁ (0.784) and T₃ (0.537) kg. At sixth fortnight of age the highest gain in weight of kids was recorded in T₂ (1.152) followed by T₀ (0.926), T₁ (0.827) and T₃ (0.556) kg. Irrespective of treatment the average gain in weight of kids in T₀, T₁, T₂ and T₃ was 0.962, 0.719, 1.025 and 0.579

kg., respectively. Irrespective of treatments average gain in weight per kids in first, second, third, fourth, fifth and sixth fortnight was 0.703, 0.725, 0.847, 0.902, 0.854 and 0.865 kg., respectively. The highest average fortnightly gain in weight per kid was recorded in T₂ (1.025) followed by T₀ (0.962), T₁ (0.719) and T₃ (0.579) kg., and the differences in these values of weight gain were found significant indicating thereby a significant effect of treatments on weight gain of kids. Results indicate that kids under T₂ group registered significantly highest weight gain compared to other treatments. However gain in weight of kids in T₂ group was found at par with gain in weight of kids in T₀ group because of non-significant difference between the treatments. Similarly the differences in weight gain of T₁ and T₃ groups were also non-significant being at par. Results revealed that inclusion of barley in ration along with maize increased body weight of kids compared to oat and barley. **(Table 3).**

3. Average fortnightly feed consumption of kids (kg.) :

At first fortnight of age the highest feed intake of kids was recorded in T₃ (0.920) followed by T₀ (0.910), T₁ (0.905) and T₂ (0.890) kg. At second fortnight of age the highest feed intake of kids was recorded in T₀ (0.975) followed by T₂ (0.955), T₃ (0.925) and T₁ (0.880) kg. At third fortnight of age the highest feed intake of kids was recorded in T₃ (0.980) followed by T₂ (0.960), T₁ (0.928) and T₀ (0.900) kg. At fourth fortnight of age the highest feed intake of kids was recorded in T₃ (1.145) followed by T₀ (1.050), T₁ (1.045) and T₂ (1.010) kg. At fifth fortnight of age the highest feed intake of kids was recorded in T₃ (1.450) followed by T₀ (1.425), T₁ (1.410) and T₂ (1.320) kg. At sixth fortnight of age the highest feed intake of kids was recorded in T₀ (1.470) followed by T₃ (1.465), T₂ (1.425) and T₁ (1.370) kg. Irrespective of treatment the average feed intake of kids in T₀, T₁, T₂ and T₃ was 1.121, 1.089, 1.093 and 1.147 kg., respectively, Irrespective of treatments average feed intake of kids in first, second, third, fourth; fifth and sixth fortnight was 0.906, 0.933,

0.942, 1.062, 1.401 and 1.432 kg., respectively. Irrespective of treatments average feed intake of kids in first, second, third, fourth, fifth and sixth fortnightly was 0.906, 0.933, 0.942, 1.062, 1.401 and 1.432 kg., respectively, and the differences in these values were significant at 5% level. It is obvious that with the increase in age the feed consumption also increases. In general highest average feed intake of kids was observed in T₃ (1.450) followed by T₀ (1.425), T₁ (1.410) and T₂ (1.320) kg., and the differences in these values were found non-significant. The results indicate that treatments did not influence feed consumption of the kids. (Table 4).

4. Average fortnightly feed conversion ratio (FRC) of Jamunapari kid in four different treatments:

At first fortnight of age the highest feed conversion ratio of kids was recorded in T₁ (1.52) followed by T₃ (1.48), T₀ (1.16) and T₂ (1.08) kg. At second fortnight of age the highest feed conversion ratio of kids was recorded in T₃ (1.50) followed by T₁ (1.40), T₀ (1.11) and T₂ (1.06) kg. At third fortnight of age the highest feed conversion ratio of kids was recorded in T₃ (1.71) followed by T₁ (1.31), T₂ (0.97) and T₀ (0.79) kg. At fourth fortnight of age the highest feed conversion ratio of kids was recorded in T₃ (1.97) followed by T₁ (1.34), T₂ (0.94) and T₀ (0.88) kg. At fifth fortnight of age the highest feed conversion ratio of kids was recorded in T₃ (2.70) followed by T₁ (1.81), T₀ (1.62) and T₂ (1.06) kg. At sixth fortnight of age the highest feed conversion ratio of kids was recorded in T₃ (1.63) followed by T₁ (1.77), T₀ (1.58) and T₂ (1.23) kg. Irrespective of treatment the average feed conversion ratio of kids in T₀, T₁, T₂ and T₃ was 1.19, 1.52, 1.05 and 1.99 kg., respectively, Irrespective of treatments average gain in weight per kids in first, second, third, fourth; fifth and sixth fortnight was 1.31, 1.26, 1.19, 1.28, 1.79 and 1.80 kg., respectively. The differences in average fortnightly feed conversion ratio of kids, between treatments were significant. The best average fortnightly feed conversion ratio of kids was

recorded in T₂ (1.05) followed by T₀ (1.19), T₁ (1.52) and T₃ (1.99) kg., and the differences in these values of average fortnightly feed conversion ratio of kids due to treatments were significantly different at 5% level. However the differences in average fortnightly feed conversion ratio of Jamunapari kids in T₀ (control) were not significantly different from kids of T₂ being at par. Differences in average fortnightly feed conversion ratio of kids between T₁ and T₃ were significantly different. (Table 5).

Conclusion

Based upon the findings of the study it may be concluded that ration maize along with barley has respectively increased body weight, gain in weight and feed conversion ratio of kids. However it was found at par with ration containing maize only.

Table 2. Fortnightly Average body weight (kg.) per kids

Fortnightly	Treatments				Average
	T0	T1	T2	T3	
first	8.56	8.19	8.55	8.38	8.42
second	9.44	8.84	9.44	8.99	9.17
third	10.60	9.53	10.42	9.57	10.03
fourth	11.78	10.34	11.49	10.15	10.94
fifth	12.66	11.15	12.73	10.76	11.82
sixth	13.56	11.91	14.55	11.41	12.85
Average	11.10	9.99	11.19	9.87	

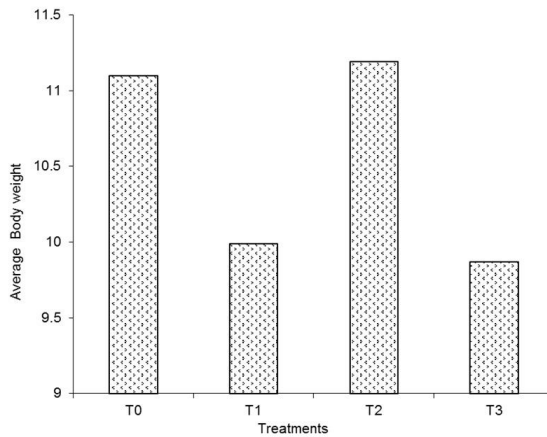


Fig.1. Fortnightly Body weight of kids in different treatments (kg).

Table 3. Fortnightly average gain in weight (kg.) of kids in four different treatments.

Fortnightly	Treatments				Average
	T0	T1	T2	T3	
First	0.783	0.593	0.818	0.618	0.703
Second	0.876	0.626	0.895	0.613	0.725
Third	1.131	0.708	0.980	0.570	0.847
Fourth	1.180	0.778	1.070	0.581	0.902
Fifth	0.876	0.784	1.240	0.537	0.854

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Sixth	0.926	0.827	1.152	0.556	0.865
Average	0.962	0.719	1.025	0.579	

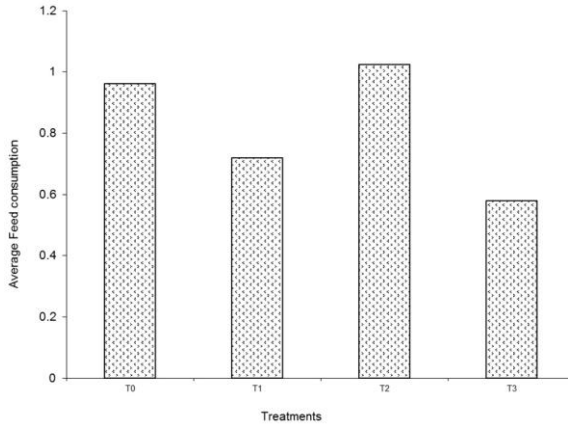


Fig.2. Fortnightly gain in weight of kids (kg).

Table 4. Fortnightly Average Feed intake of kids (kg.) in different four treatments:

Fortnightly	Treatments				Average
	T0	T1	T2	T3	
First	0.910	0.905	0.890	0.920	0.906
second	0.975	0.880	0.955	0.925	0.933
third	0.900	0.928	0.960	0.980	0.942
fourth	1.050	1.045	1.010	1.145	1.062
fifth	1.425	1.410	1.320	1.450	1.401
sixth	1.470	1.370	1.425	1.465	1.432
Average	1.121	1.089	1.093	1.147	

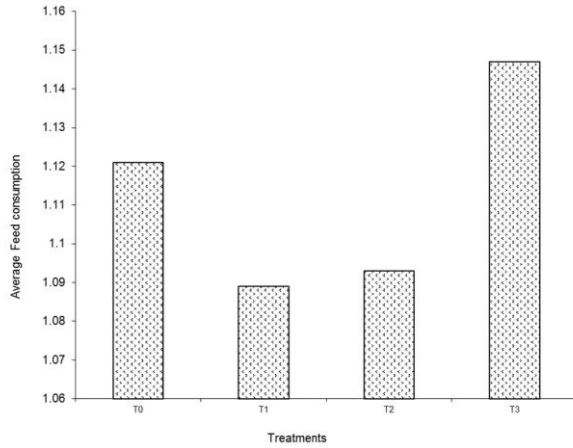


Fig.3. Fortnightly feed intake of Kids (kg).

Table 5 .Average fortnightly feed conversion ratio (kg.) of kids in four different treatments.

Fortnightly	Treatments				Average
	T0	T1	T2	T3	
first	1.16	1.52	1.08	1.48	1.31
second	1.11	1.40	1.06	1.50	1.26
third	0.79	1.31	0.97	1.71	1.19
fourth	0.88	1.34	0.94	1.97	1.28
fifth	1.62	1.81	1.06	2.70	1.79
sixth	1.58	1.77	1.23	2.63	1.80
Average	1.19	1.52	1.05	1.99	

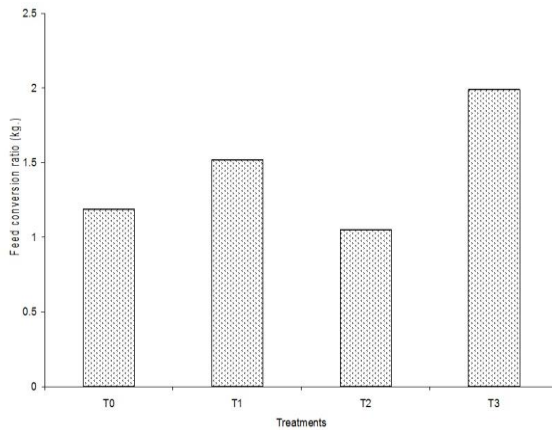


Fig.4. Average fortnightly feed conversion ratio (kg.)

Table 6. Average values different parameters:

Parameters	Treatments				Result
	T ₀	T ₁	T ₂	T ₃	
Average Initial body weight (kg.)	7.78	7.60	7.73	7.76	NS
Average body weight of kids at sixth fortnightly of age (kg.)	13.56	11.91	14.55	11.41	S
Average weight gain of kids at sixth fortnightly of age (kg.)	0.926	0.827	1.152	0.556	S
Average feed intake of kids at sixth fortnightly of age (kg.)	1.121	1.089	1.093	1.147	NS
Average feed conversion ratio (FCR) of kids (kg.)	1.19	1.52	1.05	1.99	S
*Coast of feed /kg. gain (INR)	23.46	27.58	25.08	29.21	

INR: Indian Rubes

*Cost of feed per kg., gain in weight (feed efficiency) was minimum in T₀ (23.46 INR.) followed by T₂ (25.08 INR.), T₁ (27.58 INR.) and T₃ (29.21 INR.).

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