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Nili-Ravi Buffalo III. Energy and Protein Requirements of 12–15 Months Old Calves

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ABSTRACT

The experiment was conducted to study the growth response in buffalo male calves (12 to 15 months of age having average weight 160 kg). Thirty-six buffalo male calves were randomly assigned to nine experimental rations with three levels of CP and ME (80, 100 and 120% of NRC, 2001) for 56 days. Each calf was also fed 5 kg green berseem daily and 0.5 kg wheat straw. The average daily weight gain in calves fed rations A to I, was 678, 670, 728, 598, 648, 549, 710, 679 and 572 g; daily feed consumption 2.98, 3.20, 3.39, 3.00, 3.16, 3.24, 3.11, 3.18 and 3.28 kg and feed efficiency 4.43, 4.82, 4.67, 5.07, 4.89, 5.90, 4.38, 4.71 and 5.76, respectively. The calves fed ration C (80% CP and 120% ME of NRC, 2001) gained maximum weight and consumed maximum feed per day. Different levels of CP in the rations significantly ($P<0.05$) influenced the weight gain. Significant ($P<0.05$) differences in feed efficiency were observed among low and high energy rations. It was concluded that CP requirements of buffalo male calves are 20% lower than those suggested by NRC (2001) for cattle. However, the energy requirements are 20% higher than those suggested by NRC (1976) for cattle.

Key Words: Nili Ravi; Buffalo calves; Protein; Energy; Growth response

INTRODUCTION

Nutrition of buffalo male calves is of immense importance as it plays an important role in the onset of puberty in calves raised for breeding and it influences the quantity and quality of beef produced by the calves. The information available on the nutrients requirements of buffalo male calves for growth is limited.

Protein and energy are two important constituents of a ration for dairy and beef animals. Study of nutritional requirements of buffalo male calves is necessary as the NRC standards suggested for cattle may not be adequate for buffalo male calves. Lower crude protein (CP) requirements for buffalo male calves than NRC (1976) for cattle have been reported by Sengar *et al.* (1985) and Baruah *et al.* (1988).

The metabolisable energy (ME) requirements for buffalo male calves are same as suggested by NRC (1976) (Sengar *et al.,* 1985). Kumar *et al.* (1981) observed significant differences in daily growth rate in buffalo male calves fed rations with different protein energy levels and reported highest growth rate in animals fed low protein and high energy. However, adaptation to the nutrient requirement standards recommended for cattle by NRC (2001) for buffalo does not seem wise, unless proved by the research. The information on nutrient requirements of buffalo is limited. The present study was conducted to investigate the effect of feeding different levels of protein and energy on growth performance of buffalo male calves.

MATERIALS AND METHODS

Thirty-six buffalo male calves (12-15 months of age) and similar live weight (Av. 160 kg) were randomly divided into nine groups of four calves each. The formulation of rations (Table I), procedures (AOAC, 1990), and the data analysis (SAS, 1998; Steel & Torrie, 1984) was similar as described earlier (Basra *et al.,* 2003).

RESULTS AND DISCUSSION

Intake. The feed consumption increased ($P<0.05$) with the increasing level of ME in the rations. The differences due to different levels of protein in the rations were statistically non-significant. The calves fed ration C (80% CP and 120% ME) consumed maximum feed. Varying levels of energy significantly ($P<0.05$) influenced the total DM intake. The average CP consumed/calf/day was 566, 521, 492, 651, 591, 543, 715, 650 and 605 g with rations A to I, respectively, where as CP consumed g kg^{-1} of metabolic body weight per day was 15.29, 13.73, 12.77, 17.44, 15.75, 14.22, 18.45, 16.71 and 15.90, respectively (Table II).

Weight gain. The calves fed rations A to I gained 38.00, 37.50, 40.75, 33.50, 36.25, 30.75, 39.75, 38.00 and 32.00 kg weight in 56 days, with average daily weight gain of 676, 670, 728, 598, 648, 549, 710, 679 and 572 g, respectively (Table III).

Different levels of CP in the rations significantly (P<0.05) influenced the weight gain. The calves fed ration C (80% CP and 120% ME of NRC, 2001) gained maximum. These observations were in an agreement with Kumar *et al*. (1981), Sengar and Joshi (1986) and Baruah *et al*. (1988) who reported higher growth rate in buffalo male calves fed low protein and high energy ration. The calves fed ration C gain maximum and this ration proved best.

Feed efficiency. The feed efficiency of rations A to I was 4.43, 4.82, 4.67, 5.07, 4.89, 5.90, 4.38, 4.71 and 5.76, respectively (Table III). Varying levels of ME in the rations significantly (P<0.05) influenced the feed efficiency. Significant (P<0.01) differences in feed efficiency were observed among low and high energy rations.

CONCLUSION

The CP requirement of buffalo male calves (12-15 months) are 20% lower than those suggested by NRC (2001), however, the energy requirements are 20% higher than those suggested by NRC (2001) for Holstein Frisian.

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Table I. Experimental diets

Ingredients	Diets								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
Barley grains	40	40	27	40	40	23	35	38	40
Maize grains	41	46	60	35	41	60	30	40	41
Cotton Seed Meal	4	4	1	10	4	1	17	2	4
Maize Gluten (30%)	7	2	1	9	7	5	10	12	7
Molasses	7	7	10	5	7	10	7	7	7
Mineral Mixture	1	1	1	1	1	1	1	1	1
Dry matter (%)	89.86	89.85	89.68	90.04	89.86	89.72	89.09	89	89.86
Crude protein (%)	12.82	10.50	9.13	15.57	12.82	11.05	17.80	14	12.82
Metabolisable energy K cal./Kg	255.12	263.72	270.42	245.10	255.12	264.34	234.06	245.10	255.12

Table II. Dry matter (DM), crude protein (CP) and metabolisable energy (ME) intake by calves

Items	Diets								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
DM consumed/calf/day (Kg)	3.95	4.15	4.28	3.97	4.08	4.18	4.04	4.13	4.23
DM consumed g/Kg $W.^{0.75}$/day	106.73	109.37	111.09	106.62	108.73	109.44	104.26	106.20	111.15
ME consumed/calf/ day (Mcal)	9.95	10.81	11.44	9.70	10.43	10.92	9.63	10.29	10.71
ME consumed KCal/Kg $W.^{0.75}$/day.	269	285	297	260	278	286	249	265	281
CP consumed/Calf/day (g)	566	521	492	651	591	543	715	650	605
CP consumed (g/Kg $W.^{0.75}$/day).	15.29	13.73	12.77	17.44	15.75	14.22	18.45	16.71	15.90

Table III. Weight gain, feed consumption and feed efficiency of calves

Items	Diets								
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**
Av. Daily Wt. Gain (gm)	678	670	728	598	648	549	710	679	572
Av. Daily Feed Consumed (Kg)	2.98	3.20	3.39	3.00	3.16	3.24	3.11	3.18	3.28
Feed Efficiency	4.43	4.82	4.67	5.07	4.89	5.90	4.38	4.71	5.76