

Nili-Ravi Buffalo II. Energy and Protein Requirements of 9-12 Months Old Calves

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ABSTRACT

This study was aimed to investigate the influence of varying levels of protein and energy on the growth performance of Nili-Ravi buffalo male calves of 9 to 12 months of age. Thirty-six Nili-Ravi buffalo male calves of same weight were randomly assigned to nine experimental rations. Rations were formulated to test three levels of each of protein and metabolisable energy {low 80%, medium 100% and high 120% of NRC (2001)}. Non-significant differences in feed consumption were observed across all experimental diets. The crude protein (CP) intake increased with the increase in CP content in rations. Decrease in live weight gain and feed efficiency were observed with the increase in energy level in the rations. Non-significant differences in weight gain and feed efficiency were observed among the calves fed rations with varying levels of CP. The results indicated that CP requirements for growth of buffalo male calves (9-12 months of age) may be same as suggested by NRC (2001) for Holstein Friesian calves.

Key Words: Buffalo calves; Energy; Protein

INTRODUCTION

In the absence of proper beef breed in the country, it is necessary to rear buffalo calves for quality beef production. Study of nutritional requirements of buffalo male calves is necessary as the NRC (2001) standards suggested for Holstein Frisian 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); Sengar and Joshi (1986); Baruah et al. (1988). Sengar et al. (1985) reported that growth rate and feed efficiency were not significantly different in buffalo male calves fed rations with CP levels 100 and 80 percent and energy level 100 percent of NRC (1976). Baruah et al. (1988) reported that 75% protein feeding than NRC had no significant effect on growth response. Since the adequate information on the nutritional requirements of growing buffalo male calves is lacking, present study was conducted to determine the protein and energy requirements of growing (9-12 months age) buffalo male calves.

MATERIALS AND METHODS

Thirty-six buffalo male calves of same age (9 to 12 months age) and weight (Av. 145 kg) were used for this experiment. 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. Average daily DM consumption in calves fed rations A to I were 2.28, 2.44, 2.08, 2.43, 2.14, 2.34, 2.38, 2.10 and 2.49 kg, respectively (Table II). Daily DM intake g kg^{-1} metabolic body weight ($W_{0.75}$) per day for calves fed rations A to I were 58.17, 60.40, 56.20, 59.86, 55.62, 59.46, 59.00, 55.59 and 62.70, respectively (Table III). Non-significant differences in DM intake were observed among different treatment combinations. These findings were in an agreement with Sengar and Joshi (1986), who reported non-significant differences in DM intake in buffalo male calves fed different levels of CP and 100% TDN. Average daily CP consumption in calves fed, ration A to I were 325, 286, 217, 419, 306, 288, 457, 341 and 355 g, respectively. The CP consumed g kg^{-1} of metabolic body weight per day was 8.29, 7.08, 5.86, 10.32, 1.95, 7.26, 11.33, 9.03 and 8.94 in calves fed rations A to I, respectively (Table III). The differences of CP intake differed significant ($P < 0.01$) across treatments. The CP consumption increased with the increase in the level of CP content in rations. Energy level in the ration significantly ($P < 0.05$) influenced the CP intake. The CP intake decreased with the increase in ME level in the rations. The calves fed rations A to I consumed 6.47, 7.17, 6.28, 6.60, 6.08, 6.89, 6.26, 5.81 and 7.06 ME M cal/calf/day. The energy intake significantly ($P < 0.05$) differed across experimental diets.

Weight gain. Statistically significant ($P < 0.05$) differences in live weight gains were observed among the calves fed different rations. Varying levels of energy in the rations significantly ($P < 0.05$) influenced the

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
DM%	89.86	89.85	89.68	90.04	89.86	89.72	89.09	89	89.86
CP%	12.82	10.50	9.13	15.57	12.82	11.05	17.80	14	12.82
ME 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, crude protein and metabolisable energy intake by calves

Items	Diets								
	A	B	C	D	E	F	G	H	I
DM consumed/calf/day (Kg)	2.28	2.44	2.08	2.43	2.14	2.34	2.38	2.10	2.49
DM consumed g/Kg W ^{0.75} /day	58.17	60.40	56.20	59.86	55.62	59.46	59.00	55.59	62.70
ME consumed/calf/day (Mcal)	6.47	7.17	6.28	6.60	6.08	6.89	6.26	5.81	7.06
ME consumed KCal/Kg W ^{0.75} /day.	165	177	170	162	158	173	155	154	178
CP consumed/Calf/day (g)	325	286	217	419	306	288	457	341	355
CP consumed(g/Kg W ^{0.75} /day).	8.29	7.08	5.86	10.32	7.95	7.26	11.33	9.03	8.94

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)	447	463	164	500	381	349	470	393	385
Av. Daily Feed Consumed (kg)	2.54	2.72	2.32	2.69	2.39	2.61	2.67	2.33	2.77
Feed Efficiency	5.72 ^{bc}	5.94 ^b	4.30 ^c	5.39 ^{bc}	6.50 ^b	7.74 ^a	5.90 ^b	5.95 ^b	7.28 ^a

Means with different superscript differed significantly at $p > 0.05$

weight gain. Decreased live weight gains were observed with the increasing levels of energy. The present results were in agreement with Baruah (1988) who observed non-significant differences in growth rate in buffalo male calves fed rations with CP levels 100 and 80% with ME level of 100% of NRC (1976).

Feed efficiency. The feed required to gain one Kg live weight was 5.72, 5.94, 14.30, 5.39, 6.50, 7.74, 5.90, 5.95 and 7.28 kg in calves fed ration A to I, respectively (Table III). Different levels of energy significantly ($P < 0.05$) influenced the feed efficiency. The feed efficiency decreased ($P < 0.05$) with the increase in energy level from lower to higher, however it decreased ($P < 0.05$) with increase in energy level from medium to high energy.

Calves fed ration 4 (100% CP and 80% ME of NRC, 2001) gained maximum with best feed efficiency than other rations. The data revealed that buffalo male calves (9-12 months age) and average live weight of 145 kg consumed 419 g CP and 6.60 M cal of ME for maximum live weight gain of 500 g/calf/day. The results indicated that CP requirement for buffalo male calves (9-12 months age) is same as suggested by NRC (2001) for Holstein Frisian cattle, whereas the ME requirements are 20% lower than those suggested by NRC (1976) for cattle.

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