ECONOMICS OF RAISING JERSEY X ASSAM LOCAL CROSSBRED CALVES AT DIFFERENT LEVELS OF PROTEIN IN CALF STARTER

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ABSTRACT

Aim of the present investigation was to evaluate the economics of raising Jersey X Assam local crossbred calves reared under three different calf starters containing three different DCP levels. Twelve new born crossbred calves of either sex were randomly divided into three groups and reared under three different calf starters containing three different DCP levels of 20 (group I), 22 (group II) and 24 (group III) per cent with 75-76 per cent TDN. . The experimental calves were offered whole milk, green fodder and calf starter as per standard feeding schedule (ICAR, 1991). The calves of group I showed significantly (P<0.05) better body weight gain than group II and group III. The total cost of feeding the calves during the whole experiment period was Rs. 3901.03, 3947.92 and 3934.15 and cost of feeding per kg weight gain was Rs. 100.02, 102.01 and 110.82 in the dietary treatments groups I, II and III respectively. The total cost of feeding was highest in group III due to incorporation of more amount of ground nut cake and soya bean. The lowest cost of feeding in group I may be due to lower intake of milk, and calf starter and lower cost of the calf starter. From the results, it can be inferred that the Jersey x Assam local crossbred calves reared with calf starter containing 20 per cent DCP and 75-76 TDN along with green fodder and limited amount of whole milk would be economical for the optimum performance.

Key words: Calf starter, crossbred, economics, digestible crude protein, total digestible nutrients.

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INTRODUCTION

The crossbreeding has been adopted as a national policy for enhancing milk production of indigenous cattle. The crossbred calves so produced have a higher growth potential and early maturity, if optimum amount of protein, energy, minerals and vitamins are provided. However, shortage of quality and quantity of feeds and fodder lead to undernourishment of calves during early period resulting in poor performance during subsequent production cycle. Besides, in traditional calf rearing system, the calves are allowed to suckle the milk from their dams for nearly the whole lactation period. This practice involves the feeding of a large quantity of milk which is logically not required. Some concentrate mixture has been suggested for calves along with restricted milk feeding which is termed as calf starter or starting ration. It does not hamper the growth of the calves as compared to the milk feeding (Saikia *et al*. 1988). It also helps in faster development of the rumen. . In an earlier experiment, Sahoo *et al.* (2001) advocated accelerated adoption of pre-weaned calves to solid feeds for increased ruminal metabolic activity. Quality and quantity of protein has been a limiting factor in a calf starter as cost of feed is a major component in the total cost of rearing calves. During the past several years considerable research has been conducted to determine the optimum protein level in calf starter for proper growth. NRC (2001) recommended 20 per cent crude protein in calf starter. Hill et al. (2001) substantiated that 18 per cent crude protein diets were adequate for calves. Drackley *et al*. (2003) found that the calf starter containing 22 per cent protein was more efficient than 18 per cent protein. Considering these facts, the present study has been undertaken to evaluate the cost of feeding the crossbred (Jersey X Assam local) calves with different levels of protein from birth to thirteen weeks of age.

MATERIALS AND METHODS

The investigation was carried out at Instructional Livestock Farm, College of Veterinary Science, Guwahati, Assam. Twelve new born crossbred (Jersey x Assam local) calves of either sex were randomly divided into three groups. These three groups of calves were offered conventionally formulated calf starter with different levels of digestible protein, group-I (20 per cent), group-II (22 per cent) and group-III (24 per cent) with 75-76 per cent total digestible nutrient (Table 1.). The calves were dewormed before the commencement of the feeding experiment. Immediately after birth, colostrums of its own dam were fed to each calf for three days at the rate of 10% of body weight. The experimental calves were offered whole milk, green fodder and calf starter as per standard feeding schedule (ICAR, 1991). Calf starter and green fodder were offered from second week onwards in two equal halves at 8.00 am and 3.00 pm. All the calves had free access to water. Green fodder was offered *ad libitum* to each calf. The left over of fodder and milk replacer were collected and weighed to find out intake of each calf. Samples of fodder and calf starter were collected for proximate analysis (AOAC, 1990). Weekly body weight of the calves was recorded and their gain in body weight was calculated. Records of daily intake of whole milk, fodder and calf starter by the individual calves were maintained up to thirteen weeks of age.

Cost of whole milk, fodder and calf starter were calculated. Weekly consumption of whole milk, fodder and calf starter and their cost were calculated for each treatment up to 13 weeks of age. Finally, total feed cost per kg body weight gain was estimated for each treatment.

The data recorded on all the parameters were analysed statistically as suggested by Snedocor and Cochran (1968). Significance was tested at 1% and 5% level by calculating the critical difference for comparison of means.

RESULTS AND DISCUSSION

The average weekly cost of feeding the calves has been presented in table 3. The average cost of feeding the calves at the beginning and at the end of the experiment ranged from Rs. 347 $\pm$ 1.30, 348.50 $\pm$ 0.21 and 348.10 $\pm$ 0.74 to 164.80 $\pm$ 1.52, 175.70 $\pm$ 1.91 and 183.76 $\pm$ 0.04 in the group I, II and III respectively. Significant difference ($P<0.01$) among the treatments were observed in the weekly average cost of feeding. The average per kg cost of calf starter, whole milk and fodder, their intake, total cost of feeding, total body weight gain of the calves and cost of feeding per kg body weight gain have been presented in table-4. The per kg cost of calf starter was highest in calf starter of group III and was lowest in group I, as it had more amount of ground nut cake and soya bean, the costlier ingredients of the rations. The per kg cost of these two items were Rs. 16.85 and 17.85 respectively (Table 1). It was also observed that the total body weight gain of the calves differed significantly ($P<0.01$) among the three groups. Calves under group I, fed on calf starter containing 20 per cent DCP gained significantly higher body weight compared to those under group II and III fed on calf starter containing 22 and 24 per cent DCP. The highest body weight gain achieved with the lowest DCP level in group I was probably due to better utilization of dietary protein as the available carbohydrate content was higher (60.06 % NFE) in the calf starter of group I as compared to the other two groups (58.88 and 55.56%). Moreover, crude fiber level in the calf starter of group I was lower than that of group II and III. Similar finding were reported by Pathak *et al.* (1982) and Gupta *et al.* (1992) in crossbred calves and male buffalo calves.

The total cost of feeding the calves during the whole experiment period was Rs. 3901.03, 3947.92 and 3934.15 and the cost of feeding per kg weight gain was Rs. 100.02, 102.01 and 110.82 in the dietary treatments groups I, II and III respectively. The total cost of feeding was highest in group III due to incorporation of more amount of ground nut cake and soya bean. The lowest cost of feeding in group I may be due to the lower cost of the calf starter. In all the groups, the feed cost reduced abruptly when whole milk was stopped after 9th week of age, since milk was the costliest item among the all feed components. In the present study, it was found that the cost of feed constituted more than 60 per cent of the total expenditure for rearing the calves up to 3 months of age. Puri and Malik (1963) reported that feed was the major item accounting for about 82 per cent of the total gross cost. Krishna Mohan *et al*. (1987) observed that cost of feeding each crossbred calf up to 3 months of age was increased as the level of milk feeding was increased. They concluded that it was economical to feed crossbred calves on lowest level of milk along

with *ad lib*. hay and calf starter. Hill *et al.* (2001) suggested 18 per cent protein in the calf starter. Saikia *et al.* (1988) reported less cost per weight gain for crossbred calves reared on partial milk feeding or on skim milk as compared to calves reared on whole milk up to 90 days of age.

It can be concluded that the Jersey x Assam local crossbred calves reared with calf starter containing 20 per cent DCP and 75-76 TDN along with green fodder and limited amount of whole milk would be economical for the optimum performance.

Table 1. Ingredients, composition and cost of calf starters and fodder

Ingredients	**Calf starter**			**Hybrid Napier**	**Cost of ingredients (Rs /Kg)**	**Whole milk**
	I	**II**	**III**			
Maize	39	37	33		9.28	
Wheat bran	22	18	18		9.85	
Deoiled GNC	20	22	26		16.85	
Soya bean	16	20	20		17.85	
Mineral Mixture	2	2	2		21.70	
Salt	1	1	1		3.80	
DCP (%)	20	22.14	23.6			
TDN (%)*	75.91	76.03	75.46			
Composition						
DM	90.41	91.07	92.15	25		
CP	22	24	26	11.50		
EE	3.73	3.44	3.67	2.20		
CF	4.67	4.87	4.98	25.9		
NFE	60.06	58.88	55.56	44.50		
Total ash	11.54	10.81	11.79	15.90		
Cost per kg feed item (Rs)	12.18	12.65	12.95	0.20		20.00

Mineral mixture contains: Ca: 23.6%, P: 11.4%, Cu: 1800ppm, Co: 300ppm, Mn: 510ppm, Iodine: 1000ppm, S: 0.75%, Fe: 0.24%.*Calculated value.

Table 2. Chemical composition of Whole milk

Whole milk	Total solids (per cent)	Fat (per cent)	SNF (per cent)	Protein (per cent)
	12.45	4.14	8.24	3.11

Table 3. Average weekly cost of feeding of calves

Age in week	Group I	Group II	Group III
1	347.00±1.29[a]	348.50±0.21[b]	348.10±0.74[b]
2	415.07±0.35[a]	426.15±1.15[b]	422.64±1.41[b]
3	471.90±1.49[a]	472.22±1.23[b]	477.50±0.68[b]
4	445.51±0.66[a]	451.76±1.52[b]	447.69±1.80[b]
5	389.92±0.27[a]	389.67±0.99[a]	389.52±1.23[a]
6	403.34±0.41[a]	407.91±0.70[a]	402.55±0.70[a]
7	343.67±1.89[a]	345.57±1.59[b]	345.48±0.21[b]
8	255.81±0.51[a]	261.15±1.29[b]	262.65±0.10[b]
9	271.61±0.87[a]	280.85±0.37[b]	282.70±0.59[b]
10	107.74±0.36[a]	116.31±0.18[b]	117.62±0.29[b]
11	113.94±0.55[a]	125.09±0.30[b]	114.30±0.07[a]
12	112.75±0.56[a]	132.45±0.06[b]	138.o3±0.03[b]
13	164.80±1.52[a]	175.70±1.19[b]	183.76±0.04[b]

Table 4. Economics of feeding of calves.

Group	Calf starter			Whole milk			Fodder		Total	Total	Cost of	
	Cost/ Kg (Rs)	Intake (Kg)	Cost of feeding (Rs)	Cost/ Kg (Rs)	Intake (Kg)	Cost of feeding (Rs)	Cost/ Kg (Rs)	Intake (Kg)	Cost of feeding (Rs)	cost of feeding (Rs)	weight gain (Kg)	feeding /Kg wt gain
I	12.18	73.8	944.65	20.00	147.0	2940.0	0.20	81.9	16.38	3901.03	39.63 ± 0.12^{a}	100.02
II	12.65	76.8	971.52	20.00	148.0	2960.0	0.20	82.0	16.40	3947.92	38.70 ± 0.08^{b}	102.01
III	12.95	75.5	977.73	20.00	147.0	2940.0	0.20	82.1	16.42	3934.15	35.50 ± 0.10^{c}	110.82

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