

## COMPARATIVE EFFICIENCY OF CALF STARTER AND CONVENTIONAL RATIONS IN BUFFALO SUCKLING CALVES

F. Ahmad, M. A. Jabbar<sup>1</sup>, I. Ahmad<sup>2</sup>, M. Rafique and I. Ahmad<sup>3</sup>

*Livestock Production Research Institute, Bahadurnagar, Okara.* <sup>1</sup>*University of Veterinary and Animal Sciences, Lahore.* <sup>2</sup>*Livestock Services Training Centre, Bahadurnagar, Okara.* <sup>3</sup>*Research Institute for Physiology of Animal Reproduction Bhunkey, Kasur, Pakistan*

### ABSTRACT

Twenty-four buffalo calves, having similar age and initial body weight, were divided into two groups with equal number of calves of both sexes in each group to study the effect of calf starter ration on feed intake and weight gain. Calf starter and conventional dairy rations with crude protein 18% and total digestible nutrients 75–80% along with green fodder were offered ad libitum to calves of respective groups for a period of 113 days. The average daily feed intakes were 0.95 and 0.57 kg, average daily weight gains were 0.47 and 0.34 kg and feed conversion ratio averaged 2.00 and 1.70 in calf starter and conventional groups respectively. On the overall performance, calf starter group was found better than the conventional ration.

**Key words:** Calf starter, conventional ration, weight gain, feed conversion ratio,

### INTRODUCTION

Pakistan is deficient in animal proteins to feed large human population, which present is estimated at 139.02 million heads. According to international recommendations, the per capita consumption of proteins should be 60.00 gm, out of which 27.40 gm should come from animal source. The per capita availability of animal proteins in 1990 was only 17.40 gm (Anonymous, 1990) and still there is shortage of 10.0 gm for human consumption (Anonymous, 2002).

At livestock farms, calf mortality is a major problem. Sharma and Jain (1979) reported that 27.7% mortality in Murrah buffalo calves occurred from birth to 6 months of age. Calves are mostly kept underfed due to high milk prices. Malnutrition results in reduced vigor, poor immune system, suppressed vitality and more prone to disease, ultimately leading to death of calves.

Early consumption of dry feed by young calves is desirable to support rapid rumen development and enable early weaning. Early weaning of calves contributes to early development of ruminal microbial activity because of accelerated intake of dry feed (Anderson *et al.*, 1987a). Adequate microbial population seems to be present very early in rumen of calves and subsequent microbial development is stimulated by increased dry feed consumption (Anderson *et al.*, 1987b).

Intake of colostrum by neonatal calves and early transition to calf starter are two important factors in successful calf rearing programme (Franklen *et al.*, 2003).

Calf starter ration is a mixture of grains, protein feeds, minerals, vitamins and antibiotics. Misra and Singh (1993) has suggested that good calf starter should be nutritious, highly digestible, palatable enough, rich in energy contents and should contain approximate 18–20% crude Protein and less than 7% fiber because low level of fibrous material benefits starter intake and calf growth and high quality calf starter is critical to successful early weaning of calves. Calf starter ration improves the health of calves and reduces the stress of weaning and also reduces the growth depressing factors. It reduces the chances of diarrhea in calves as conventional ration causes mostly digestive problems due to high fiber contents. Mehra *et al.* (1990) reported that buffalo calves consumed more calf starter ration and utilized it more efficiently with more gains in body weight. The present experiment was undertaken to study the growth rate and feed conversion ratio in buffalo calves fed calf starter and conventional rations.

### MATERIALS AND METHODS

The present trial was conducted on 24 buffalo calves aged 45 days on the average and kept at the Livestock Experiment Station, (LES) Bahadurnagar (Okara). The calves were randomly divided into two groups A and B, with 12 calves (6 male and 6 female calves) in each group. All experimental animals had approximately same age and live weight at the beginning of experiment. Group A was given starter ration, while group B was offered

conventional dairy ration (the ration which was being fed to the animals of dairy farm at LES, Bahadurnagar) *ad libitum*. Composition of both rations is given in Table 1.

All the calves of both groups took milk by nipple feeding twice a day up to three months of age as routine practices at dairy farm. Green fodder and fresh water were also provided round the clock. The measured quantities of calf starter ration and conventional ration were offered in the morning and the left over was weighed next day to determine the feed intake. Deworming and vaccination against Foot and Mouth disease and Hemorrhagic Septicemia were done to all the animals in the beginning of trial.

**Table 1: Composition (%) of calf starter and conventional rations**

Ingredients	Calf starter	Conventional ration
Maize	40	--
Cotton seed meal	28	--
Wheat bran	10	13
Rice polishing	--	10
Maize gluten 20%	--	20
Maize gluten 30%	10	20
Sunflower meal	--	15
Molasses	10	20
Mineral mixture	2	2
Total	100	100
Dry matter (%)	88.10	85.30
Crude protein (%)	18.01	18.00
Total digestible nutrient (%)	76.50	75.00
Crude fiber (%)	5.75	11.72

One-week adjustment period was given to the animals of both the groups to make the animal habitual to new feeding regimes. Body weights of animals of both the groups were recorded in the beginning of trial and then at fortnightly interval till the completion of the trial, which lasted for 113 days. The growth rate of animals was computed by the differences of these two recorded body weights. Similarly, feed conversion ratio (FCR) for calves of the two groups and economics of both rations were also worked out. The chemical analysis of both the ration was done by the method of (Anonymous, 1980) and statistical analysis was done by using T Test (Steel and Torrie, 1981).

### Feed intake

The average daily ration intake in calves of both groups A and B was 0.95 and 0.57 kg respectively (Table 2). Analysis of variance revealed that difference between two groups was statistically non-significant. However, the results obtained by Quigley *et al.* (2000) are not in

accordance with this study who reported 0.378 kg average daily intake when Holstein bull calves were fed on calf replacer containing non-spray dried hydrolyzed red blood cells (SDHRBC) along with calf starter for 28 days only. This may be due to different feeding regime and breed or climatic differences.

### Weight gain

The average daily weight gain in calves of groups A and B was 0.47 and 0.34 kg, respectively (Table 2). Analysis of variance revealed that weight gain of the calves of group A was significantly higher than that of group B. Thorat and Nagpaul (1982) observed similar daily weight gain (0.404 kg) in Murrah buffalo calves when calf starter was given *ad libitum* along with conventional whole milk. Dry matter intake of calf starter ration seemed adequate for expected intake (Roy, 1980). Fiems *et al.* (1989) also observed similar values (0.40 kg) of growth rate in Belgian White Blue male calves fed on milk replacer and calf starter ration. However, the results obtained by Sekhon *et al.* (1984) are not in accordance with this study. They observed 0.23 kg growth rate in buffalo calves fed on calf starter along with raw milk.

### Feed conversion ratio

Feed conversion ratio in calves of group A and B was 2.00 and 1.70, respectively (Table 2). Analysis of variance revealed that FCR of the values of group A was significantly higher ( $P < 0.05$ ) than that of group B. The results of Wijayasinghe *et al.* (1984) are in accordance with this study. They obtained FCR value of 2.26 in Holstein calves fed on high fat milk replacer and calf starter ration. Similarly, Tahir and Iqbal (1992) reported same FCR values (2.17) in buffalo calves fed on milk @ 10% of body weight and calf starter along with green fodder. However, the results of Quigley *et al.* (2000) showed higher FCR values (3.10) in Holstein calves than the results of the present study. This may be due to breed difference or climatic variation. In this study, calf starter had greater feed intake and weight gain than the calves fed on conventional ration.

### Economics

Cost per kilogram of gain and total feed cost for the calves fed on calf starter were higher than the calves fed on conventional ration. But the net profit was almost the same in both groups. Cost of feed used to get one kg gain was Rs. 17/- and 10.20 and the cost of total feed used during the trial was Rs. 909.50 and 388/- in groups A and B, respectively. Income of the animals in terms of weight gain, calculated on their book values (@ Rs. 35/- per kg live weight basis), was Rs. 1872.50 and 1330/- for groups A and B, respectively, and net profit was almost same

**Table 2: Comparative performance of experimental rations**

Parameters	Group A	Group B
Average age of calves (days)	45	45
Initial body weight (kg)	48.50	46.0
Final body weight (kg)	102	84
Total weight gain (kg)	53.50	38.0
Average daily weight gain (kg)	0.47	0.34
Average daily ration intake (kg)	0.95	0.57
Feed conversion ratio	2.00	1.70
Cost of one kg ration (Rs.)	8.50	6.00
Cost of ration for gaining one kg live weight (Rs.)	17.00	10.20
Cost of ration used during the feeding trial (Rs.)	909.50	388.50
Income from the sale of animals @ 35/- per kg (Rs.)	1872.50	1330.00
Net profit (Rs.)	963.00	942.00

(Rs. 963/- and 942/-) in groups A and B, respectively. As calves fed on calf starter ration had greater gain and FCR values, they would grow faster, attain maturity earlier, become successful replacement of the future herd and would have more productive span in their life than the calf fed on conventional dairy ration.

### Conclusions

In this study, significantly higher weight gain and FCR was recorded in calves fed on calf starter ration. Also, there was no evidence of diarrhea in calves kept on calf starter compared with the other group. So on the basis of results of this present study, calf starter ration was found better in terms of weight gain and FCR. Thus, it may be used to feed the calves up to 6 months of age to enhance the growth and to reduce the weaning stress at weaning time. However, different levels of crude protein and difference sources of cereal grains in the calf starter ration are needed to be studied in further experiments.

### REFERENCES

- Anderson, K. L., T.G. Nagaraja and T.L. Morrill, 1987a. Ruminant metabolic development in calves weaned conventionally or early. *J. Dairy Sci.*, 70: 1000.
- Anderson, K. L., T.G. Nagaraja, T.L. Morrill, T.B. Avery, S.J. Galitzer and J.E. Boyer, 1987b. Ruminant microbial development in conventionally or early weaned calves. *J. Anim. Sci.*, 64: 1215.
- Anonymous, 1980. Official Method of Analysis. 13<sup>th</sup> Ed. Association of Official Agricultural Chemists, Washington DC, USA.
- Anonymous, 1990. Economic Survey Report, Economic Advisory Wing, Finance Division, Government of Pakistan, Islamabad.
- Anonymous, 2002. Economic Survey Report, Economic Advisory Wing, Finance Division, Government of Pakistan, Islamabad.
- Fiems, L.O., E. Vanopdenbosch, C.V. Boncque, Y. Vanoillie and B.G. Cottyn, 1989. Effect of purified immunoglobulins or pooled colostrum on performance of rearing calves. *Anim. Feed Sci. Technol.*, 26: 347-356.
- Franklen S.T., D.M. Amoral-phillips, J.A. Jackson and A.A. Cambell, 2003. Health and performance of Holstein calves that suckled or were hand fed colostrum and were fed one of three physical forms of starter. *J. Dairy Sci.*, 86: 2145-2153.
- Mehra, U.R., K. C. Tripathi, K. Nath and S.K. Ranjhan, 1990. Effect of limited milk intake on growth rate and ruminal development of newly born buffalo calves. *Nutr. Abst. Rev.*, 49: 1380.
- Misra, A.K. and D. Singh, 1993. Rearing of calf. A scientific approach. *Indian Dairyman*, 64: 526-529.
- Quigley, J.D., C.A. Jaynes, M.L. Miller, E. Schanus, H. Chester-Jones, G.D. Marx and D.M. Allen, 2000. Effects of hydrolyzed spray dried red blood cells in milk replacer on calf intake, body weight gain and efficiency. *J. Dairy Sci.*, 83(4): 788-794.
- Roy, J.H.B., 1980. *The Calf*, 4th Ed. Butterworths, Boston, USA.
- Sekhon, B.S., R.S. Gill and M.S. Bhuller, 1984. Effect of quality of milk on the mortality and growth rate of weaned buffalo calves. *Indian J. Dairy Sci.*, 37(4): 373-377.
- Sharma, K.N.S. and D.K. Jain, 1979. *Dairy Handbook* Karnal, India, P. 256.

- Smith, N.E. and R.L. Baldwin, 1984. Growth, health and blood glucose concentrations of calves fed high glucose and high fat milk replacers. *J. Dairy Sci.*, 67(12): 2949-2956.
- Steel, R.G.D. and J. H. Torrie, 1981. Principles and Procedures of Statistics. A biometrical approach. 2<sup>nd</sup> Ed. McGraw Hill Book Com. Inc, New York, USA.
- Tahir, I. and J. Iqbal, 1992. Raising of buffalo calves on different schedules of whole milk. 13<sup>th</sup> Annual Report, Livestock Production Research Institute, Bahadurnagar, Okara, pp: 62-63.
- Thorat, S.B. and P.K. Nagpaul, 1982. Studies on growth rate and economics of rearing crossbred and buffalo female calves. *World Rev. Anim. Prod.*, 18(1): 65-71.
- Wijayasinghe, M.S., N.E. Smith and R.L. Baldwin, 1984. Growth, health and blood glucose concentrations of calves fed high-glucose or high fat milk replacers. *J. Dairy Sci.*, 67: 2949- 2956.