The Indian Journal of Veterinary Sciences & Biotechnology *(2017) Volume 12, Issue 4, 49-52*
ISSN (Print) : 2394-0247 : ISSN (Print and online) : 2395-1176, abbreviated as IJVSBT
http://dx.doi.org/10.21887/ijvsbt.v12i4.7679

Submitted : 18-01-2017 ***Accepted : 17-02-2017*** ***Published : 05-05-2017***

Effect of bypass fat supplementation on performance of Growing crossbred calves

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Abstract

The present study was undertaken to evaluate the effect of bypass fat supplementation on weight gain, feed intake and efficiency of feed utilization growing crossbred calves. Eighteen growing crossbred calves 6-7 months of age and 134 kg average body weight were randomly divided into three equal groups viz, Group-T_0 (control), T_1 and T_2 on the basis of age, weight and sex with three male and three female in each group. All the groups received standard concentrate mixture for 13 weeks. The animals in treatment T_1 and T_2 fed on concentrate mixture supplemented with bypass fat @ 30 and 60 g per calf per day, respectively. The average body weight gain, DM intake, TDN and DCP intake by calves from group T_2 was significantly ($P<0.01$) higher than group T_0 and T_1. The efficiency of feed utilization in terms of DM, TDN and DCP intake per kg gain was non significant. The nutrient digestibility was higher for treatment groups supplemented with bypass fat. Thus it was concluded that supplementation of bypass fat @60 g per calf per day was beneficial for improving the overall growth performance of calves.

Key Words: Body Weight, DM Intake, Calf, Digestibility, Bypass Fat

Introduction

Large proportions of bovines in our country are unproductive and exhibiting poor reproductive efficiency. This is mainly due to poor management and feeding of dairy animals. In order to overcome poor reproductive efficiency better feeding regimen is required right from the calf stage. Calf management in a dairy herd is very critical and a vital one because today's calves are going to be the replacement stock in the future. Any lacunae in the calf management will have serious repercussions in the production of the dairy farm in the long run. In most developing countries, heifers are usually raised on poor quality fodders or agricultural by-products with limited amounts of concentrates low in protein and energy. To increase the efficiency of using dietary protein and fat, protected or bypass nutrients are suggested (Garg 1998). Bypass nutrient technology involves feed management through passive rumen manipulation. The growth potential of calves can be fully exploited by incorporating fats in the ration. Few studies have reported positive impact of feeding bypass nutrients on growth and nutrient utilization of buffalo calves (Cruywagen, 2003). Most of the studies on bypass nutrients are conducted either on lactating animals or buffalo calves. Very scanty work is reported on growing cow calf. Keeping these facts in view, the present trial was

planned to study the effect of supplementing bypass fat on growth performance of calves.

Materials and Methods

Eighteen crossbred (Gir × HF, Gir × Jersey) calves (6-7 months) with an average body weight of 134.18 kg were selected from the Livestock Farm of Bombay Gowrakshak mandali, Kandivali, Mumbai. The calves were reared under standard managemental practices for 13 week and distributed randomly into three equal groups on the basis of age, sex, and body weights with three male and three female in each group. The animals in Group-T_0 (Control) fed on standardration with concentrate mixture and roughage. The animals in Treatment 1 fed as T_o and supplemented with bypass fat @ 30 g per calf per day and animals in Treatment 2 fed as T_0 and supplemented with bypass fat @ 60 g per calf per day.The calves from all the experimental groups received para grass (*Urochloamutica*) and soybean straw as a source of roughage. Body weights of animal were recorded weekly and average weekly gain and average daily gain were calculated. Week wise daily feed intake of calves were recorded and presented as daily DM intake, DM intake/100 kg body weight and DM intake/ $W^{0.75}$. Feed efficiency in terms of DM, TDN and DCP intake per kg gain in weight was calculated. Digestibility trial was conducted during last week of experiment to study nutrient utilisation. Taking into consideration the values of digestibility coefficients obtained in trial for various nutrients, the TDN and DCP content of rations and its week wise daily intake by the calves from different experimental groups were calculated. Samples of feeds, feed residues and faeces were analysed for proximate principles (A.O.A.C., 2005). Economics of the feeding of different levels of bypass fat was studied considering total feeding cost per animal per day based on the average consumption of concentrate, para grass, soybean straw and bypass fat supplement and cost per kg gain in weight of crossbred calves of different experimental group was also calculated. The data were analysed by ANOVA (Snedecor and Cochran, 2007) by using Randomized Block Design.

Results and Discussion

Table 1. Overall performances of crossbred calves from different experimental groups

Parameters	Treatment		
	Group T_0	Group T_1	Group T_2
Initial average body weight (kg)	133.88	134.12	134.56
Final body weight (kg)	173.72	177.17	181.83
Total gain in weight (kg)	39.84	43.04	47.27
Average weekly gain in weight (kg)	3.06^a	3.31^a	3.64^b
Average daily gain in weight (kg)	0.438	0.473	0.519
Average DM intake (kg/day)	4.24^a	4.32^a	4.58^b
DM intake(Kg/100kgBW)	2.72^a	2.77^b	2.88^c
DM intake (g/Kg $W^{0.75}$)	96.17^a	97.78^b	102.09^c
Average TDN intake (kg/day)	2.711^a	2.761^a	2.931^b
Average DCP intake (kg/day)	0.374^a	0.408^b	0.452^c
DMI (kg) per kg gain	9.75	9.19	8.90
TDN Intake (kg) per kg gain	6.23	5.88	5.69
DCP Intake (kg) per kg gain	0.859	0.869	0.878

Note: The means having common superscript in the same row do not differ significantly

The data on growth performance in experimental crossbred calves (Table 1) indicated that the average week wise gain in body weight was significantly (P<0.1) higher in group T_2 than group T_1 and T_0 . Findings of the present study are in agreement with Fiorentini *et al.* (2012) who observed higher average daily weight gain and slaughter weight in animals which were supplemented with the protected fat in diet. Similar findings were reported by Gajera *et al.* (2013) in growing Jaffarabadi buffalos. The DM intake per day of crossbred calves in group T_2 was found significantly higher (P<0.01) than group T_0 and T_1. However, DM intake per day of crossbred calves from group T_0 and T_1 was comparable. The DM intake/100 kg body weight of calves in group T_2 was significantly higher (P<0.01) followed by group T_1 and T_0. Among group T_1 and T_0, the DM intake/100 kg body weight of group T_1 was significantly higher than group T_0. The DM intake per kg metabolic body weight ($W^{0.75}$) of group T_2 was significantly higher (P<0.01) than group T_1 and T_0. Findings of the present study corroborated with Shelke *et al.* (2011) who observed significantly higher dry matter intake in Murrah buffaloes supplemented with rumen protected fat and protein. Fiorentini *et al.* (2012) reported similar results in heifers fed with protected fat diet.

The TDN intake of animals in group T_2 was significantly higher (P<0.01) than groups T_1 and T_0. The findings of Thakur and Shelke (2009) also indicated higher TDN intake in Murrah buffalo calves supplemented with Ca salt of soya acid oil fatty acids at 4% of DMI. The DCP intake of Group T_2 was significantly higher (P<0.01) than group T_1 and T_0. The efficiency of feed utilization in terms of DM, TDN and DCP intake per kg gain in weight of crossbred calves was statistically non-significant amongst the treatment groups. The results are in close agreement with the findings of Gajera *et al.* (2013) who observed non significant effect on efficiency of feed utilization in growing Jaffrabadi buffalo heifers supplemented with bypass fat. The digestibility of all the nutrients was higher for treatment groups supplemented with bypass fat as compared to control (Table 2). The higher digestibility of nutrients in treatment groups reflected in higher TDN content of rations in group T_1 and T_2.

Table 2. Average percent digestibility coefficients, TDN and DCP contents for experimental feeds

Parameters	Digestibility Coefficients %		
	Group T_0	Group T_1	Group T_2
Dry Matter	67.45	69.12	70.34
Organic Matter	70.68	72.95	73.86
Crude Protein	65.12	66.54	66.79
Ether Extract	71.42	73.41	76.40
Crude Fibre	62.44	63.23	63.35
Nitrogen Free Extract	68.34	70.45	71.32
TDN %	63.95	65.48	67.25
DCP %	8.81	9.45	9.87

Economics

Considering the average feed and bypass fat supplements offered during the trial, the cost of feeding per animal per day was Rs. 57.12, 59.54 and 61.64 for groups T_0, T_1 and T_2, respectively indicating higher daily cost of feeding for bypass fat supplemented groups. However feeding cost on the basis

of per kg gain in weight it was higher for control (Rs 130.46) as compared to treatment group T_1 (Rs.125.88) and group T_2 (Rs.118.66). Thus it is suggested that the cost per kg gain in weight can be reduced by supplementation of bypass fat @ 60 g per calf per day.

Conflict of Interest: All authors declare no conflict of interest.

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