ECONOMICS OF RUMEN BYPASS FAT FEEDING ON COST OF MILK PRODUCTION, FEEDING AND REALIZABLE RECEIPTS IN LACTATING JAFFRABADI BUFFALOES

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ABSTRACT

Twenty four lactating Jaffrabadi buffaloes were randomized and blocked into four groups to receive commercial rumen bypass fat at 0, 10, 20 and 30 g/kg milk production besides meeting their nutrient requirements at ICAR 1985 feeding standards from calving to 180 day. All the buffaloes irrespective of group received bypass fat prior to calving 150 g day. Cost of feeding, cost of milk production, realizable receipts at farm and market prices were calculated and analyzed. Daily feed costs (Rs/head) in T1, T2, T3 and T4 were 96.56±3.80, 111.09±4.23, 106.61±4.58 and 117.47±4.76 respectively and it was statistically lower ($P<0.05$) in control than those in T2, T3 and T4 which were at par. Daily realizable receipts from sale of milk (Rs/head/day) on prevailing from price and on local market price were 128.58±8.86, 159.21±13.39, 122.94±11.27 and 140.97±7.29 and 205.73±14.17, 254.73±21.58, 196.71±18.03 and 225.54±11.67, respectively. Treatment groups did not differ significantly. Daily return over feed cost (Rs./Head) were 32.02±7.46, 48.12±9.90,16.33±7.51 and 23.49±3.35 on farm prevailing price and 109.17±12.48, 143.65±17.91, 90.09±14.13 and 108.07±7.45 on local market price for T1, T2, T3 and T4 group respectively. Costs of milk production (Rs./lit.) during the entire experiment period were 15.25±0.85, 14.30±0.84, 17.95±1.43 and 16.73±0.32 in T1, T2, T3, T4 group of buffaloes differences being non significant. This finding indicated that 10 g supplementation of commercial bypass fat per kg milk production has significant realizable benefit as compared to other levels of supplementation of bypass fat.

Keywords: bypass fat, economics of feeding, Jaffrabadi buffalo, cost of milk production

INTRODUCTION

Ruminant production in country is based on crop residues due to shortage of green fodder and concentrates, hence, they fail to derive sufficient energy from these rations for productive purposes, resulting in lower production. This is true in early lactation in high producing buffaloes since the consumption is limited resulting in negative energy

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balance. High energy density rations containing rumen protected fats is a solution, though this advantageous feeding practice is not adopted widely under Indian conditions.

Rumen protected fats such as oil seeds, casein-formaldehyde protected fat, crystalline fat, fatty acyl amide's hydrogenated tallow or triglycerides and calcium salts of long chain fatty acids (LCFA-Ca) are commonly used. LCFA-Ca are relatively less degradable in rumen (Elmeddah *et al*., 1991) and have the higher intestinal digestibility, besides serving as an additional source of calcium (Anonymous, 2002). Therefore, an experiment was conducted to find out the effect of bypass fat feeding on milk production economics in lactating Jaffrabadi buffaloes.

MATERIALS AND METHODS

Twenty four lactating Jaffrabadi buffaloes (1-4 lactation, average body weight of 650 kg and 6 to 8 liter average milk production of previous lactation) from the buffalo herd of Cattle Breeding Farm of Junagadh Agricultural University, Junagadh were randomized and blocked into four groups of six each. All the experimental buffaloes were individually offered a basal diet of 10 Kg. seasonal green and mature pasture grass hay *ad lib*. Concentrate mixture and cottonseed meal (50:50 w/w) were offered to meet protein requirements (ICAR, 1998). Commercial bypass fat (MAGNAPAC) was provided to buffaloes 0,10 g, 20 g and 30 g/kg milk yield in T1, T2, T3 and T4, respectively. Bypass fat was offered 150 g to all the buffaloes ,irrespective of group prior to 15 days of calving. In all the buffaloes experimental differentiation of supplemental fat was initiated in the second week of lactation and continued up to 180 days of lactation. Since all the experimental animals were not available at a time, they were introduced in the experiment phase wise after calving. Cost of feeding and economics of milk production was worked out at farm prices as well as prevailing market prices and analyzed (Snedecor and Cochran, 1994). FCM was calculated according to Rice *et al.* (1970).

RESULTS AND DISCUSSION

Mean total milk and FCM production (kg/day) during the experimental period were 6.43±0.44 and 6.63±0.49 in T1, 7.96±0.67 and 8.5±0.72 in T2, 6.15±0.56 and 6.86±0.64 in T3 and 7.05±0.36 and 7.99±0.48 in T4, respectively. Treatment differences were non significant ($P>0.05$) with regard to milk and FCM production, indicating higher level of bypass supplementation had no additional advantage.

Average daily cost of feeding (Rs/day) and cost of milk production per liter of lactating Jaffrabadi buffaloes are given in Table 1. Overall feed cost per day (Rs) per buffalo was 96.56±3.80, 111.09±4.23, 106.61±4.58, 117.47±4.76 in T1, T2, T3 and T4 group respectively. Control feeding was significantly ($P<0.05$) lower compared to T2, T3 and T4 which were at par.

Realizable receipts from sale of buffalo milk was calculated based on prevailing farm prices which was Rs 20/liter and also based on the prevailing market price during time of the experiment which was Rs 32/liter. During the entire experiment period realizable receipts per day per buffalo based on the milk price of Rs 20 per liter is given in Table 1. Mean realizable receipts (Rs/day) for the entire period were 128.58±8.86, 159.21±13.39, 122.94±11.27 and 140.97±7.29

respectively, for T1, T2, T3 and T4 with non significant differences. Mean return over feed cost (Rs/buffalo) was 32.02±7.46, 48.12±9.90, 16.33±7.51 and 23.49±3.35, respectively ,for T1, T2, T3 and T4, the means being significant (P<0.05). T1, T3 and T4 were at par while T1 and T2 were at par.

Considering the market price of milk, mean realizable receipt for per day per animal was Rs 205.73±14.17, 254.73±21.58, 196.71±18.03 and 225.54±11.67 in T1, T2, T3 and T4, respectively. Mean daily return over feed cost at market price were 109.17±12.48, 143.65±17.91, 90.09±14.13 and 108.07±7.45 in T1, T2, T3 and T4, respectively, and the differences were non significant Considering the cost of milk production during entire experimental period overall means were 15.25±0.85, 14.30±0.84, 17.95±1.43 and 16.73±0.32 for T1, T2, T3 and T4 groups, respectively. All the treatments were at par (Table 1).

Cost of feeding was 15.04%, 10.40% and 21.66% higher in T2, T3 and T4 groups of animals, respectively compared to control. At farm price, realizable receipts were higher by 23.82% for T2 group of animals and 9.64% for T4 group of animals, However T3 group of animals realized lesser than 4.34% realizable receipt as compared to control. Return over feed cost was 50.28% higher in T2 group of buffaloes at farm prices. However it was lower by 49% and 26.64% in T3 and T4 compared to control. Considering market price similar trend was observed in terms of realizable receipt as well as return over feed cost.

Cost of milk production was 6.22% lower in T2 group of buffaloes compared to T1 group of buffaloes. When bypass fat was offered at higher level, cost of milk production increased by 17.70% and 9.70% in T3 and T4 groups of animals, respectively.

Net returns during the entire experimental period under four treatment groups is given in Table 2. In the present experiment it is evident that T2 group of buffaloes yielded higher returns over feed cost and also higher realizable receipts both at farm and market price. The net return per buffalo under T2 group was Rs. 4409.41 and Rs. 7752.75 at farm and market price determination. Supplementing higher levels of bypass fat at 20 g, 30 g per liter of milk production did not have any positive economic benefits. Costs of feeding cited by different research worker pertain to those respective periods during which experiment was conducted. Any comparison in terms of economics of feeding may not complement present findings.

Garg *et al*. (2002) reported increase income of Rs 10.18 on feeding 1 kg protected fat and protein supplement per cow per day. Garg *et al*. (2007) observed an increase in net daily income by 4.92% and 11.20% by feeding 0.5 kg and 1 kg bypass fat and protein supplementation to lactating cows compared to control. Cost of feeding per kg milk and kg FCM production were Rs. 7.65 and 7.41 and 7.33 and 6.90, respectively in cross bred cows that were offered control and by pass diets (Shankpal *et al*., 2009). Vidhate *et al*. (2006) observed that by feeding bypass fat 150 g per day to cross bred cows, milk production though decreased, proportionate increase in fat content exhibited additional benefits of Rs. 18.21/animal/ day.

Bhorania (2009) reported that daily feed cost (Rs. Per head) in T1 and T2 was 87.63±3.17 and 95.34±1.87, respectively and was statistically higher (P<0.05) in T2 than T1 group, when commercial bypass fat was offered as a supplement compared to unfed group. The data on daily realizable receipt from sale of milk (Rs. Per head)

Table 1. Economics of feeding of experimental animals.

Treatment	Daily feed cost (Rs/head)	Realizable receipts at farm prevailing price (Rs 20 / liter)	ROFC at farm Prevailing price (20 Rs / liter)	Realizable receipts at local market price (Rs 32 / liter)	ROFC at local market price (32 Rs / liter)	Cost of milk production (Kg/day)
T1	96.56^{c}±3.80	128.58±8.86	32.02^{ab}±7.46	205.73±14.17	109.17±12.48	15.25±0.85
T2	111.09^{ab}±4.23	159.21±13.39	48.12^{a}±9.90	254.73±21.58	143.65±17.91	14.30±0.84
T3	106.61^{abc}±4.58	122.94±11.27	16.33^{b}±7.51	196.71±18.03	90.09±14.13	17.95±1.43
T4	117.47^{a}±4.76	140.97±7.29	23.49^{b}±3.35	225.54±11.67	108.07±7.45	16.73±0.32
S.Em.±	4.35	10.49	7.44	16.79	13.52	0.94
C.D. at 5%	12.85	NS	21.95	NS	NS	NS
C.V. %	9.89	18.64	60.77	18.64	29.39	14.41

Means in a column with different superscripts differ significantly ($P<0.05$), NS: Non-significant.

ROFC=Return over feed cost.

Table 2. Net return during experimental feeding.

Sr. No.	Particular	T1	T2	T3	T4
1	Total Feed cost (Rs./Head)	17464.72	20218.38	19403.02	21379.54
2	Realizable Receipt from sale of milk (Rs./Head) 32 Rs.	37442.86	46360.86	35801.22	41048.28
3	Realizable Receipt from sale of milk (Rs./Head) 20 Rs.	23401.56	28976.22	22375.08	25656.54
4	Return over feed cost (Rs./ Head) 32 Rs.	19778.14	26142.48	16398.2	19668.74
5	Return over feed cost (Rs./ Head) 20 Rs.	5936.84	8797.84	2972.06	4277.00
6	Difference in ROFC over control – 32 Rs.	-	+6164.34	-3579.94	-309.40
7	Difference in ROFC over control – 20 Rs.	-	+2821	-2964.78	-1659.89
8	Saving in feed cost due to improved service period over control (Rs./ Head)	-	1588.41	1105.61	-946.28
9	Net Deference Rs. 32	-	7752.75	-2474.32	-1255.68
10	Net Deference Rs. 20	-	4409.41	-1859.16	-2606.17

was 168.51±12.6 and 197.04±11.29 in T1 and T2 groups, respectively and the treatment group differed (P<0.05) from each other. Accordingly, the daily return over feed cost (Rs. per head) was 80.88±7.27 and 101±6.50 in T1 and T2 groups, respectively. The same was significantly higher (P<0.05) in T2 as compared to T1 group. The present findings are in consonance with the above scientific reports.

CONCLUSION

In present experiment, higher level of bypass fat at 20 g and 30 g did not seem to have any positive effect on daily realizable receipt and return over feed cost and cost of feeding per liter of milk production. Supplementation of 10 g bypass fat per liter per day was found to be effective in terms of realizable receipt and ROFC in lactating Jaffrabadi buffaloes.

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