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Effect of rumen protected fat supplementation on recovery of body weight during Post-Partum period in early lactating Murrah buffaloes

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Abstract

Eighteen early lactating Murrah buffaloes were randomly divided into three groups to study effect of rumen protected fat supplementation on recovery of body weight during post partum period. Control group T1 was fed with a basal diet without bypass fat and treatment groups T2 and T3 were supplemented with bypass fat @ 100g/day/animal and 150g/day/animal, respectively. Body weights of experimental animals were recorded in morning before feeding at starts of experiment and thereafter at monthly interval during experimental period. Total body weight gain during experimental period were 24.50, 25.20 and 28.33 kg in treatment groups T1, T2 and T3 respectively. The body weight Were in increasing trend up to the end of experiment, higher in rumen protected fat supplementation groups but statistical analysis of data revealed the nonsignificant effect on body weight change. The effect of interaction of treatments and period were also found to be nonsignificant. So, rumen protected fat supplementation showed nonsignificant effect on body weight recovery during post partum period in lactating Murrah buffaloes.

Keywords: Rumen protected fat/bypass fat, Post-Partum period, body weight recovery, early lactation and Murrah buffaloes

Introduction

Most of the animals in developing countries including India are fed on agriculture by-products and low quality crop residues, which have got inherent low nutritive value and digestibility. The shortage of feed resources coupled with their poor nutritive value is of major concern to low productivity of dairy animals. High producing buffaloes in early lactation do not consume sufficient dry matter to support maximal production of milk (Goff and Horst, 1997) [2]. Demand for energy is very high during early stage of lactation but supply is not commensurate with demand due physiological stage or limited intake may affects production potential of animal in the whole lactation length (Sirohi *et al.* 2010) [7]. Hence, during early lactation, dairy animals are often forced to draw on body reserves to satisfy energy requirements (negative energy balance); this leads to substantial loss in body weight which adversely affects production, resulting in lower yield (Kim *et al.* 1993) [3]. Cereal grains and fats plays an important role as source of energy in the ration of high yielding dairy animals for optimum productivity but due to use of cereals for human consumption and monogastric animals the alternate source of energy in dairy ration is supplemental fat (Saijpaal *et al.* 2010) [6]. And inclusion of unprotected fat in dairy ration is limited to 3% of dry matter (DM) intake, beyond which digestibility of DM and fibre are reduced (NRC, 2001) [4]. Wadhwa *et al.* (2012) [9] reported that the body weight of the animals improved in the rumen protected fat supplemented group as compared to the control group (551 vs. 508, kg), though the differences were nonsignificant. So, the present work was under taken to study the effect of rumen protected fat supplementation on recovery of body weight during post partum period in early lactating Murrah buffaloes.

Materials & Methods

The experimental feeding trial was conducted for a period of 12 weeks at Buffalo Farm, Department of Livestock Production Management, LUVAS, Hisar. Hisar city is situated in semi-arid region and climatic condition is sub-tropical in nature. Geographically, Hisar is situated at 29° 10' N latitude, 75° 40' E longitude and at 215.2 Meters altitude.

Selection and maintenance of animals

Eighteen healthy female Murrah buffaloes, between 1st to 4th lactation stage were selected. The health of animals was good without any illness. All the animals were dewormed and disinfested for ecto-parasites before start of the experiment adopting standard protocol. The animals were maintained under is managerial conditions and similar husbandry practices except the different feeding treatments.

Experimental design

These animals were divided randomly into 3 groups based on their milk production (average milk yield of 8.6 litres) and the average 23 days post-partum following factorial completely randomized design (FCRD) shown in table 1.

Feeding and watering

During the entire study period, the animals were given seasonal green fodder (Maize) and concentrates mixture to meet their protein and energy requirement for growth as per ICAR standards (Ranjhan, 1998) [5]. In addition, experimental groups T₂ and T₃ provided with bypass fat @100g/animal/day and @150g/animal/day respectively shown in table 2. Bypass fat was added and mixed in concentrate mixture uniformly in everyday and fed individually to each animals of treatment group. The roughage: concentrate ratio of the diet was kept 60:40. Animals were given *ad-lib* fresh water throughout the experimental period. Before formulation of rations, the feed ingredients were analyzed (AOAC, 2005) [1] for proximate composition (Table 3). The concentrate mixture of basal diet (T₁) was formulated by using 25, 15, 20, 10, 27, 2 and 1 kg of maize, GNC, barley, mustard cake, wheat bran, mineral mixture and salt, respectively. The Ingredient of concentrate

mixture is presented in table 4.

Observations

Body weight change

Body weights of experimental animals were recorded in morning before feeding at starts of experiment and thereafter at monthly interval during experimental period.

Statistical analysis

Data obtained were subjected to statistical analysis as per Snedecor and Cochran (1994) [8] using Completely Randomized Design (CRD). All the data were subjected to ANOVA using the General Linear Models procedure of SPSS software. The mean differences among different treatments were separated by Duncan's multiple range tests. Consequently, a level of ($P < 0.05$) was used as the criterion for statistical significance.

Results and Discussion

Body weight change

The overall mean values of body weight of experimental buffaloes at beginning of experiment were 539.17, 546.67, 537.50 kg and at the end of experiment body weight were 563.67, 566.67, 565.83 kg in treatment groups T₁, T₂ and T₃ respectively (Table 5). Total body weight gain during experimental period were 24.50, 25.20 and 28.33 kg in treatment groups T₁, T₂ and T₃ respectively. The body weight were in increasing trend up to the end of experiment, higher in rumen protected fat supplementation groups but statistical analysis of data revealed that period had nonsignificant effect on body weight change. The effect of interaction of treatments and period were also found to be nonsignificant.

Table 1: Experimental design

Treatments	T ₁	T ₂	T ₃
No. of animals	6	6	6
Average days post partum	23.6	23.8	24.5
Milk yield (Kg.)	11.41	11.13	11.21

Table 2: The details feeding plan of animals in different treatments

No.	Group	Treatment
1.	T ₁ (control)	Seasonal green fodder + wheat straw + conventional concentrate mixture
2.	T ₂	Seasonal green fodder + wheat straw + conventional concentrate mixture +100 gram bypass fat/day/animal.
3.	T ₃	Seasonal green fodder + wheat straw + conventional concentrate mixture +150 gram bypass fat/day/animal.

Table 3: Chemical composition of feed ingredient (on DM basis)

Ingredients	DM	CP	CF	EE	Ash	OM	NFE
Wheat straw	95.00	2.85	35.61	1.02	12.97	87.03	47.55
Green maize	23.00	7.71	28.30	3.11	9.11	90.89	51.77
Maize	88.08	9.13	2.52	3.44	2.83	97.17	70.16
Ground nut cake(GNC)	93.47	40.23	9.43	9.05	8.9	91.10	25.86
Barley	93.80	10.03	8.03	1.86	4.35	95.65	75.73
Mustard cake	90.20	35.10	6.97	8.31	9.94	90.06	39.68
Wheat bran	88.60	14	7.99	4.3	93.64	6.36	59.79

Table 4: Ingredient of concentrate mixtures

Ingredient (kg/100kg)	Quantity
Maize	25
Groundnut cake(GNC)	15
Barley	20
Mustard cake	10
Wheat bran	27

Mineral mixture	2
Salt	1
Total	100

Table 5: Mean values of body weight change (in kg) at monthly intervals under different dietary treatment during experimental period.

Periods	T1	T2	T3	Mean
0.	539.17±21.15	546.67±26.16	537.50±20.40	539.38±15.93
I.	549.17±20.95	555.83±29.28	541.67±21.66	548.88±16.19
II.	555.00±20.93	559.17±30.56	557.50±22.64	557.22±14.78
III.	563.67±23.19	566.67±28.21	565.83±20.91	563.05±16.08
Total gain (kg)	24.50±5.73	25.20±4.65	28.33±10.85	26.01±4.26

Each value is an average of six observations.

The finding of present study revealed that there was better recovery of body weight during post partum period on supplementation of rumen protected fat to lactating Murrah buffaloes but difference were non significant as compare to control.

These result are in agreement with Wadhwa *et al.* (2012) ^[9] who reported that Body weight of the animals improved considerably in the group supplemented bypass fat supplemented group as compared to the un-supplemented group (551 vs 508, kg), but the differences were non-significant.

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