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Effect of Different Feeding Ingredient under Field Condition on Reproductive Performance and its Validation in High Yielding Murrah Buffaloes at Farm Level

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A B S T R A C T

The present experiment was carried out to establish scientific rational of high yielding buffaloes under field condition, effect of these most common field feeding practices on reproductive performance of Murrah buffaloes under farm condition. The experiment was carried out in three different phases designated as Phase I, II and III. In phase-I, collection of data and feed samples from the field, in phase II chemical analysis of feed and fodder samples collected from farmers, and phase III (n=12) post-partum buffaloes were selected and divided into two groups, 6 animals in each group one as a control group (T_0) and other as a treatment group (T_1). Control group was fed as per the ICAR (2013) feeding standard and in treatment group feed was offered two times a day 1 hr. before the milking time i.e. 5.00 AM and 4.00 PM and each buffalo were fed 3 kg gram churi, 1.5 kg cotton seed cake, 1.5 kg wheat dalia, 10 kg green fodder and 1 kg wheat straw in each time for 3 month. Significant results were found in the treatment group i.e. the lesser service period ($p < 0.05$) and lower services per conception ($p<0.01$) compared to control group. There was higher conception rate in treatment group (83.33%). It's clearly indicated that the feeding of higher energy and protein in the ration, results in buffaloes of treatment group was bred earlier, lower service per conception and higher conception rate.

Introduction

High milk yield during early lactation of the buffaloes create a challenge in meeting the animals' energy requirements. This period is characterized by a substantial decline in feed intake lipid mobilization leading to elevated plasma NEFA and hepatic triglycerides (TRG) content and protein mobilisation. The resulting negative energy balance impairs reproduction. Post-partum fertility has a profound impact on the economic viability of dairy industry. Among various factors, peri-parturient disorders have been recognized as the most important factors influencing fertility. Lowered reproductive performance concomitant to steadily increasing milk production is a main concern for dairy industry world over. Numerous studies have reported that reproductive performance is compromised, primarily through delayed ovarian activity and reduced conception rates, by the demands of high milk yield (Nebel and MsGilliard, 1993; Beam and Bulter, 1999). Improved reproductive performance and reduced incidence of reproductive disorders,

in order to resume normal fertility after parturition, adequate balance of protein, energy, trace minerals and antioxidant vitamins must be maintained after parturaration. High level of concentrate feeding to buffaloes decreased the incidence of reduced days to first observed estrus and decreased services/conception (Jukola *et al.*, 1996; Kim *et al.*, 1997).

Materials and Methods

The study was carried out in three different phases designated as Phase I, II and III. In phase-I, collection of data and feed samples from the field. Forty buffaloes (≥18 litres milk) were identified and their owner's interviewed to get the required information, were every possible feed sample were collected for chemical analysis. Length and Heart girth of each animal was measured to calculate the body weight. The collected data were made into tabular form through the various calculating process. The price of various ingredients was calibrated to calculate daily feeding cost, similarly to study the nutritional requirement of the buffaloes and body weight of the animals were calculated by using Shaeffer's formula (Sastry *et al.*, 1982):

Body weight (kg) = {[(Heart girth in inches)^2 × (length of body in inches)] / 300) × 0.4356}

In phase II chemical analysis of feed and fodder samples collected from farmers were further subjected to chemical analysis. The feed was dried to constant weight at 100 0C and ground (1 mm) using a Willey mill. The ground samples were stored in air-tight plastic bags for further analysis. Chemical analysis of feed was done according to AOAC (2005).

Dry Matter: A representative sample of feed ingredients was weighed in moisture cup and kept overnight in a hot air oven at 100 ºC. Dried samples were weighed and DM calculated as follows

Weight of the sample after oven drying / Fresh weight of the sample

Crude Protein: Crude protein in the feed sample was estimated by the Kjeldahl method. Transferred an exactly weighted quantity of sample in the Kjeldahl flask with 25ml conc. H_2SO_4 in presence of digestion mixture (K_2SO_4 and $CuSO_4$ in the ratio of 9:1) over a digestion unit.

After completion of digestion, the contents were cooled and transferred to 250 ml volumetric flask and total volume was made up to the mark with distilled water. Distillation was carried out by using micro-Kjeldahl apparatus. 10ml of digested sample was taken in distillation unit and added 10 ml of 40% NaOH. Washed with a small quantity of DW and closed the receiving. Steam distilled the content and collected about 50 ml distillate in previously kept 10ml of 2% boric acid. The distillate was titrated against standard N/100 H_2SO_4. The crude protein content in the sample was calculated by multiplying nitrogen content with 6.25.

Ether Extract: A known quantity of ground and dried feed sample was taken in an extraction thimble and extracted for 6hr with petroleum ether (40-60°C boiling points) in soxhlet apparatus having a pre-weighed round bottom receiver flask.

The flask containing ether extract was cooled after removing excess petroleum ether and weighed. The difference in weight gave the amount of ether extract in the sample and was expressed on a per cent basis. (Volume of H_2SO_4× Normality of H_2SO_4×0.014×D × 6.25) / Weight of the sample. Crude fiber: Determine separately the sample moisture by heating in an oven at 105 °C to constant

weight then cooled in a desiccator. Weighted about 2 g sample and transfer it into spotless one litre beaker then added 200 ml of 1.25% sulphuric acid, place on a hot plate and allowed to reflux for 30 minutes, from the onset of boiling. After every five minutes the contents were shacked. After boiling for 30 minutes removed the beaker from the hot plate and filter through a muslin cloth, wash the residue with hot water till it is free from acid. Transfer the material to the same beaker and added 200 ml of 1.25% NaOH solution, again reflux the contents for 30 minutes. Filter again through the muslin cloth with the help of vacuum or suction pump and wash the residue with hot water till it free from alkali. Transferred the total residue to a crucible and place it in a hot air oven, allow drying to a constant weight at 80- 110˚C and recording its weight. Ignite the residue in a muffle furnace at 550-600˚C for 2-3 h, cool and weight again. The loss of weight due to ignition is the weight of crude fibre.

$$\text{Crude fibre (\%)} = \frac{\text{Weight of crude fibre}}{\text{Original weight of the sample}} \times 100$$

In phase III twelve post-partum high yielding buffaloes maintained at Animal farm of ICAR-Central Institute for Research on Buffaloes were selected for the present study. These buffaloes were selected on the basis of equal milk yield into two groups of 6 animals in each group (Table 1). Control group (C) was kept on organized farm feeding management (concentrate mixture, Green feed, and wheat straw). and Treatment group (T) feed was offered two times a day 1 hr. before the milking time i.e. 5.00 AM and 4.00 PM and each buffalo were fed 3 kg gram churi, 1.5 kg cotton seed cake, 1.5 kg wheat dalia, 10 kg green fodder and 1 kg wheat straw in each time, proximate analysis of feed and fodder are shown in Table 1. The experiment was conducted for 3 months. Feed intake of the individual animal was recorded.

Table.1 Chemical analysis of feed and fodder given to the treatment group of buffaloes

Feed	**DM %**	**CP%**	**CF %**	**EE%**	**NFE%**
Conc. Mixture	89.87	20.71	7.63	4.43	58.57
Oat green fodder	21.64	7.90	41.70	2.44	38.99
Wheat straw	92.56	3.22	31.78	0.85	55.4
Treatment ration (conc.)	90.90	19.96	9.88	4.37	56.69

Table.2 Mean±SE of the effect different feeding ingredient under field condition on reproductive performance of Murrah buffaloes at farm level

Item	Control (T_0)	Treatment (T_1)
Total DMI (qtls)	13.97±0.012[a]	14.6±0.011[b]
Days to first heat (DFH), days	81±19.17	59.33±15.11
Days to first service	138.50±15.83	91.6±11.87
Number of service per conception	2.5±0.22	1.67±0.2 1
Conception rate	66.66	83.33

Means within a group in the same column with different letters differ significantly.

After parturition, all experimental animals were observed for different reproductive parameters of buffaloes were recorded which includes days to first heat (DFH), days to first service, service per conception, conception rate. First heat (DFH), days to first service, service per

conception, conception rate were analyzed by descriptive statistics for experimental groups.

Results and Discussion

The effect of feeding on reproductive performance parameters is shown in Table 2. There was no significantly difference between the mean number of days taken to express first heat (DFH) of treatment group (59.33±15.11) as well as control group (81±19.17) but the value of treatment group were higher than the control group. The least square means of service period in treatment group (91.6±11.87) was significantly ($p < 0.05$) lesser days than control group (138.50±15.83). Wongsrikeao and Taesakul (1984) reported that improved nutrition reduced the postpartum service period in Swamp buffalo cows. Treatment group (1.67±0.2 1) of buffalo had significantly ($p<0.01$) lower services per conception that of control group (2.5±0.22). There was higher conception rate in treatment group (83.33%) as compared to control group (66.66%). Qureshi *et al.*, (1998) found similar results in Nili-Ravi buffaloes show higher conception rate in feeding higher intake energy and protein in respective of other group.

Results clearly indicate that the feeding of high energy and protein in ration resulted in required lesser days to first heat, bred earlier, lower service per conception and higher conception rate as compared to control group buffaloes

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