# EFFECT OF UMMB FEEDING ON BLOOD GLUCOSE AND FREE FATTY ACID LEVELS IN POSTPARTUM BUFFALOES

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**ABSTRACT:**

A study was undertaken to observe the variation in blood glucose and free fatty acid levels in postpartum buffaloes during winter and summer seasons. Twenty seven freshly calved buffaloes were selected and they were divided into two groups. In the experimental group, UMMB was supplemented and the animals were observed for the manifestation of first behavioral estrus up to 60 days postpartum. There was non significant (P = 0.05) variation of blood glucose between experimental and control groups during both the seasons. However, the plasma free fatty acids were significantly (P= 0.05) higher in summer season and there was no significant variation of plasma free fatty acid levels by UMMB feeding during both the seasons.

**KEYWORDS:** UMMB, Biochemical, blood glucose, free fatty acid, buffalo

## INTRODUCTION:

The reproductive failure is one of the most serious problems in bovines resulting in low milk production. Prolonged calving interval, higher age at first calving, delay in occurrence of postpartum estrus, subsequent estrus and seasonal stress are mainly responsible for poor reproductive efficiency in bufalloes . The factors leading to manifest failure of typical symptoms of estrus followed by ovulation are still unknown in buffaloes (Roberts, 1971). Of the environmental stressors that affect the reproductive efficiency, adverse effects of heat stress are most dramatic and best documented. The negative energy balance during early lactation reduces ovarian function by suppressing gonadotropin release (Dobson and Alam, 1987). Blood glucose and plasma free fatty acids can give a picture of the nutritive status of the animal. The present investigations was undertaken to study the variation in the blood glucose and free fatty acids level in different seasons and by UMMB feeding in buffaloes.

## MATERIALS AND METHODS

Twenty-seven freshly calved normal Murrah buffaloes of different age and parity were randomly selected for the present study. Out of which fifteen winter calved (November to February) and twelve summer calved (April to June) buffaloes were selected to study the onset of postpartum ovarian activity. In summer season, group Ia (experimental) and group Ib (control) comprised of 9 and 3 animals, respectively and in winter season group IIa (experimental) and IIb (control) had 10 and 5 animals respectively. The animals were provided standard ration as per practice followed at the dairy farm. Animals were observed for heat signs and per rectal palpation of the genitalia was done starting from the first week after calving till 60 days postpartum. Parading the vasectomized bull in the morning and evening did estrus detection.

UMMB (urea molasses multi nutrient blocks) was provided as the additional feed supplement to the experimental groups of animals in both the seasons. The major components of UMMB lick are; urea (10%,), a source of fermentable nitrogen; molasses (35%), a source of soluble carbohydrates; and Groundnut cake 10%, rice bran (oiled) 16%, rice bran (Deoiled) 7%, cement 10%, and Salt 2%. Upto four weeks after calving, the animals were kept in separate pens and UMMB access to them was 24 hrs. Thereafter, the animals were shifted to loose housing system and access to UMMB block was limited to 16 hours besides the standard feeding schedule followed at the dairy farm throughout the study. UMMB consumption was calculated by subtracting the left over block weight from the total block weight offered daily.

Blood glucose concentration was estimated by GOD/POD method using AUTOPAK KIT. Glucose estimation was done within 3 hours of the collection of blood samples. Free fatty acid concentration was estimated by Lowery and Tinsley method (1976).The data obtained were analyzed statistically according to Snedecor and Cochran (1976).

**RESULTS AND DISCUSSION:**

**(1) Acceptability and consumption of UMMB:**

Animals were having 24 hours access to UMMB lick after calving. The animals slowly got accustomed to UMMB licking in around 3-5 days. However, the amount of the block licked varied. Initially the animals licked only 50-450 gm UMMB per day. After 7-10 days each animal started taking 700-800 gm of the lick per day. However, Florendo et al. (1995) reported 300-450 gm UMMB consumption per day, which resulted in increased straw intake, milk yield and fat (Kunju, 1988). This variation in the results of this study may be due to difference in feed, season and place of investigation.

**(2) Blood glucose in relation to factors affecting onset of postpartum ovarian activity:**

**a) Effect of season:** The average glucose concentrations in summer and winter control group were 48.88 ± 1.06 and 51.71 ± 1.32 mg/dl, respectively (Table 1). There was a non-significant variation of blood glucose during both the seasons in postpartum buffaloes. Payne (1971) also reported that there was no significant seasonal variation of blood glucose in postpartum buffaloes.

**b) Effect of UMMB:** The average glucose concentrations in supplemented and control group in winter were

**Table 1. Average concentration of blood glucose (mg/dl) in postpartum buffaloes calved in summer and winter season and supplemented with UMMB.**

| Postpartum period (weeks) | Season of calving | | | |
|---|---|---|---|---|
| | Summer | | Winter | |
| | Group I (a) (9) | Group I (b) (3) | Group II (a) (10) | GroupII (b) (5) |
| 0 | 44.92 ± 1.52 | 45.26 ± 1.45 | 43.43 ± 2.36 | 43.20 ± 1.93 |
| 1 | 47.98 ± 1.66 | 45.63 ± 1.82 | 56.06 ± 4.14 | 54.66 ± 2.71 |
| 2 | 49.74 ± 1.50 | 50.27 ± 5.37 | 50.26 ± 1.85 | 49.72 ± 2.75 |
| 3 | 50.78 ± 1.53 | 48.80 ± 2.60 | 51.96 ± 5.67 | 52.40 ± 4.70 |
| 4 | 52.74 ± 1.92 | 49.10 ± 1.75 | 52.56 ± 1.87 | 53.74 ± 3.38 |
| 5 | 53.22 ± 1.30 | 44.50 ± 4.75 | 61.36 ± 2.20 | 49.68 ± 3.59 |
| 6 | 54.47 ± 1.59 | 51.65 ± 2.71 | 63.45 ± 4.55 | 58.76 ± 2.35 |
| 7 | 53.42 ± 2.72 | 53.28 ± 1.55 | * | * |
| 8 | 56.35 ± 5.15 | 52.65 ± 1.85 | * | * |
| Overall mean ± S. E | 50.89 ± 0.67 | 48.88 ± 1.06 | 52.87 ± 1.26 | 51.72 ± 1.32 |

Group (a) UMMB supplemented (b) control

52.87 ± 1.26 and 51.71 ± 1.32 mg/dl, respectively. The corresponding values for summer were 50.89 ± 0.67 and 48.88 ± 1.06 mg/dl. There was non-significant variation of blood glucose levels between experimental and control groups during both seasons, although the glucose levels in control group were lower. The nutritional deficiency and summer stress may be the cause of anoestrus in control group of animals. Pillai et al. (1981) reported that deficiency of glucose and nutritional state was associated with lack of proper estrus activity in buffaloes and the postpartum increase in blood glucose concentration was a physiological phenomenon that might be vital for subsequent ovarian activity.

**c) Effect of parturition:** The concentrations of the glucose were minimum on the day of calving in both experimental and control group of animals. Thereafter, the levels showed a rising trend during the lactation phase. Quyam et al . (1990) and Bhat (1999) also reported that blood glucose levels at 60 days prepartum declined from 59.34 ± 0.91 mg/dl to 35.57 ± 0.36 mg/dl at calving . Thereafter , the levels started regaining to their prepartum values. Rowlands et al. (1975) found a significant positive correlation of blood glucose in buffaloes as lactation progressed. However Patel et al. (2010) reported that glucose level in HF declined upto 15 day of post partum and then started regaining to nearly normal values after day 75 post partum . Similarly Khastiya et al. (2007) reported significantly higher blood glucose and total protein in anoestrus bufalloes.

**(3) Plasma free fatty acids in relation to factors affecting onset of postpartum ovarian activity:**

**a) Effect of season:** The average free fatty acid concentrations in summer and winter control group were 45.81 ± 0.74 and 30.37 ± 1.03 mg/dl, respectively (Table 2). The plasma free fatty acid levels were significantly

**Table 2. Average concentration of free fatty acids (mg/dl) in postpartum buffaloes calved in summer and winter season and supplemented with UMMB.**

| Postpartum period (weeks) | Season of calving | | | |
|---|---|---|---|---|
| | Summer | | Winter | |
| | Group I (a) (9) | Group I (b) (3) | Group II (a) (10) | GroupII (b) (5) |
| 0 | 48.85 ± 2.09 | 51.49 ± 2.01 | 32.36 ± 1.41 | 33.82 ± 1.94 |
| 1 | 44.88 ± 2.48 | 49.15 ± 1.73 | 27.09 ± 1.22 | 32.29 ± 2.10 |
| 2 | 44.19 ± 2.34 | 47.29 ± 1.80 | 27.04 ± 1.46 | 31.89 ± 2.34 |
| 3 | 41.55 ± 2.01 | 47.07 ± 0.99 | 26.23 ± 1.54 | 31.65 ± 3.90 |
| 4 | 40.72 ± 3.00 | 44.63 ± 1.81 | 23.77 ± 1.21 | 28.00 ± 3.00 |
| 5 | 38.04 ± 2.41 | 44.26 ± 0.69 | 22.56 ± 1.69 | 28.15 ± 3.06 |
| 6 | 36.41 ± 2.29 | 43.35 ± 0.58 | 17.75 ± 3.15 | 27.08 ± 2.96 |
| 7 | 38.90 ± 4.49 | 42.92 ±1.22 | * | * |
| 8 | 39.29 ± 8.79 | 40.31 ±1.89 | * | * |
| Overall mean ± S. E | 41.85 ± 0.96 | 45.81 ± 0.74 | 26.25 ± 0.71 | 30.37 ± 1.03 |

($p<0.05$) higher in summer buffaloes than winter. These results were similar to earlier reports of Freeman and Manning ( 1976 ). This was due to mobilization of lipid reserves by stress hormones during hot conditions.

**b) Effect of UMMB:** The average free fatty acid concentrations during summer in supplemented and control groups were 41.85 ± 0.96 and 45.81 ± 0.71 mg/dl, respectively. The corresponding values for winter season were 26.25 ± 0.71 and 30.37 ± 1.03 mg/dl. There was non-significant ($p>0.05$) variation of plasma free fatty acid levels between supplemented and control groups during both seasons. But, the free fatty acid levels were lower in UMMB supplemented animals. However, Sharma et al (1998) reported that the serum free fatty acids were higher in pre- and postpartum period irrespective of plan of nutrition and their levels remained high for first 4 weeks postpartum and thereafter decreased as lactation progresses

**c) Effect of parturition:** Free fatty acid concentrations were significantly ($p<0.05$) higher on the day of calving in both experimental and control group of animals. Thereafter, these levels gradually decreased in the lactation phase in both the seasons, which was in agreement with Kalsi ( 1982)and Bagha and Gangwar, (1992). The increased level of free fatty acids at peripartum period and subsequent decrease with progression of lactation. can be explained from the fact that chronic somatomammotrophin hormone is present in the maternal serum during late pregnancy in many species including ruminants (Curie et al, 1977 ; Hayden et al, 1979) and it is assumed to be important in regulating maternal nutrients to the fetus and possibly important for growth of fetus (Reeves, 1987).

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