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Correlation of glucose concentration in crossbred cows reaching to estrus during ovsynch protocol

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Abstract

Increase in blood glucose concentration stimulate circulating insulin which causes an earlier resumption of cyclicity by causing the cow to release the more GnRH and have more LH in the system, which is stimulatory to the ovary. The proposed investigation was conducted at Livestock Farm, Adhartal, Jabalpur (M.P.) and Department of Veterinary Physiology & Biochemistry, College of Veterinary Science & A.H., NDVSU, Jabalpur (M.P.). Six Crossbred cows were selected from the Livestock Farm, Adhartal. Estrus was induced in the animals by using Ovsynch protocol. The blood was collected on day 0, 7, 10, 20 and immediately the mean values of glucose were measured at 0,7,10 and 20 days interval in Crossbred cows was done by using glucometer. In normal cyclic Crossbred cows the mean blood glucose level 59.17 ± 1.22 (mg/dl) was lower than the mean blood glucose level 63.83 ± 1.47 (mg/dl) on the day of induced estrus (day 10). Highly significant difference ($P < 0.01$) were found within group.

Keywords: Glucose, GnRH, Estrus, Ovsynch, Crossbred cows

Introduction

Nutrition plays a crucial role in regulating reproductive hormones and follicular development in cattle. Glucose is a primary energy source for certain animal tissues. It is essential metabolite for tissues growth, maintenance and biochemical pathways in the animal body. The glucose is the critical nutrient and also is a coordinator of the endocrine mechanisms controlling homeorhesis (Lucy *et al.*, 2014). Follicular development occurs through the signalling and interaction of gonadotrophins and metabolites like glucose. Reduced blood glucose levels in repeat breeder cows may be due to instability between hepatic output and peripheral uptake of the glucose or defects in the endocrine regulatory mechanisms, which influence ovarian cyclicity. Abnormal functioning of hormone-producing organs may influence glucose levels. This paper will specifically focus on the glucose concentration in animal reaching to estrus during ovsynch protocol in crossbred cows.

Materials & Methods

The proposed investigation was conducted at Livestock Farm, Adhartal, Jabalpur (M.P.) and Department of Veterinary Physiology & Biochemistry, College of Veterinary Science & A.H., NDVSU, Jabalpur (M.P.). Six Crossbred cows were selected from the Livestock Farm, Adhartal for the experiment after per rectal examination. Estrus was induced in the animals by using Ovsynch protocol comprises of GnRH (10 µg)-PGF₂α (25 mg) GnRH (10 µg) was given on day 0, 7 & 9 respectively and A.I. was performed on day 10 (induced estrus). Blood samples were collected on day 0, 7, 10 & 20 and immediately glucose estimation was done by using glucometer. Clearance of this experimental study was taken from the Institutional Animal Ethics Committee. Statistical analysis of glucose at different days was done using CRD as per the method describe by Snedecor and Cochran (1994) [8].

Result and Discussion

The mean values of glucose were measured at 0, 7, 10 and 20 days interval in Crossbred cows.

Table 1: Mean plasma concentration of glucose in Ovsynch protocol

Parameters	Mean ± SE			
	Day 0	Day 7	Day 10	Day 20
Glucose (mg/dl)	59.17 ^c ±1.22	62.67 ^{ab} ±2.33	63.83 ^a ±1.47	60.50 ^{bc} ±1.23

Mean values with different superscripts in a row vary significantly ($P < 0.01$)

In normal cyclic Crossbred cows the mean blood glucose level 59.17 ± 1.22 (mg/dl) was lower than the mean blood glucose level 63.83 ± 1.47 (mg/dl) on the day of induced estrus (day 10). Highly significant difference ($P < 0.01$) were found within group. The present findings are in agreement to the findings of Shrivastava and Kharche (1989) [7] who reported the mean glucose 66.65 mg/dl during estrus. Mc. Cluse (1965) [5] observed that low level of blood glucose in anestrus buffaloes may be an indication of subnormal energy status. Low energy status affects the follicular development resulting in follicular atresia and anestrus. LeRoy *et al.* (2008) [2] concluded that glucose and insulin were the most likely molecules to exert an effect on hypothalamic GnRH secretion, which is stimulatory to the ovary. Caesar *et al.* (2017) [1] reported that the mean blood glucose level increased significantly on the day of induced estrus from 60.33 ± 2.04 (mg/dl) to 69.83 ± 1.08 (mg/dl) during heatsynch protocol in Sahiwal cows. Moonmaneea and Yammuen-arta (2015) [6] reported increased estrous activity in ewes synchronized to estrus may result from increased size of follicle and sufficient production of glucose during the follicular development. Lucy (2016) [4] draw the attention on the restoration of ovarian cyclicity, the process that may be directly affected by blood glucose level.

Conclusion

The concentrations of plasma glucose are correlated positively with the energy balance, Low energy status affects the follicular development resulting in follicular atresia and anestrus. Increase in glucose concentration during estrus in cows might be due to increased metabolic activity of animal.

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