STUDY ON METABOLIC PROFILE OF REPEAT BREEDER, POST PARTUM ANESTROUS AND NORMAL CYCLIC SAHIWAL COWS

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ABSTRACT

This study was conducted with the aim to investigate comparative metabolic profile of repeat breeder, post partum anestrous and normal cyclic Sahiwal cows. A total of 18 Sahiwal Cows having body weight 300 to 400 kg, second to fifth lactation and age between four to nine years, were divided into three groups (Normal Cyclic, Repeat breeder and Anestrous); each group comprised of 06 animals. Blood samples were collected aseptically and serum was separated by centrifugation at 3000 rpm for 10 minutes to analyze the glucose (mg/dl), total protein (g/dl), calcium (mg/dl), phosphorus (mg/dl). The results of present study revealed that serum glucose level of normal cyclic cows was significantly higher than post partum anestrous animals. The normal cyclic animals also had significantly higher calcium and phosphorus level as compared to the anestrous and repeat breeder animals. These results indicate that higher incidence of repeat breeding and anoestrous in Sahiwal cows has been attributed to a decrease in circulation of glucose, total protein, calcium and phosphorus.

Keywords: Anestrous, Repeat breeder, Glucose, Total Protein, Calcium, Phosphorus

Repeat breeding and anestrous are the major problems in dairy cattle that affects fertility and in turn incurs great economic loss to farmers. Mineral imbalance or deficiencies may cause different reproductive disorders in cattle (Das *et al.* 2002). The deficiency of a particular element may influence the level of other elements in the body fluid and the functional characteristics of endocrine glands, especially the hypophyseal-gonadal axis (Bhaskaran and Abdullakhan 1981). Several investigation have indicated a direct relationship between nutrients and the number of services per conception (Mc Donald 1961). Therefore the present study was conducted with the aim to investigate comparative metabolic profile of repeat breeder, post partum anestrous and normal cyclic Sahiwal cows.

A total of 18 Sahiwal Cows with a history of repeat breeding (RB), anoestrus and normal cycling (NC) Sahiwal Cows were selected from ILFC, College of Veterinary Science & Animal Husbandry, DUVASU, Mathura. The ages of experimental animals were between four to nine years with body weight from 300 to 400 kg and having second to fifth lactation. The selected animals were divided into three groups (Normal cyclic, Repeat breeder and Post partum anestrous); each group comprised of 06 animals. Gynaecological examination was carried out through rectal palpation aided by ultrasonography machine to register the reproductive status and/or disorders. The group I cows were the normal fertile animals which conceived at first or second breeding and exhibiting signs of oestrus, evidenced by the presence of Graffian follicle/Corpus luteum on the ovary. The group II cows were the animals that had been bred three or more times without conception and free from any detectable abnormalities in their ovaries and uteri on palpation and having nearly regular inter-oestrous interval. The group III cows were the animals that had smooth and inactive ovaries with apparently normal genitalia without any palpable abnormalities on per- rectal examination. Blood sample (10 ml) was collected from each cow on the same day as gynaeco-clinical examination. Serum was separated by centrifugation at 3000 rpm for 10 minutes. The serum samples were used immediately for glucose

estimation. The samples which were not able to be analysed on the same day of collection were stored in a deep freeze at -20°C till analysis was performed for minerals (until 72 hours after collection of blood). The serum samples were analyzed for the glucose, total protein, calcium, phosphorus. Glucose (mg/dl), total protein (g/dl) inorganic phosphorus (mg/dl) and calcium (mg/dl) were estimated by semi auto chemistry analyzer by using kits supplied with a Span Diagnostic Ltd. Statistical analysis was done as per standard method.

Serum metabolic constituent«s concentrations (mean Ø SE) in normal cyclic, repeat breeder and Post partum anestrous Sahiwal cows are presented in Table 1. The results in present study revealed that that serum glucose level of normal cyclic cows was significantly ($P<0.05$) higher than post partum anestrous animals. The serum glucose was reported to be an important factor which modulates reproduction and the same at lower level is postulated as the cause for decreased fertility rate as well as for non cyclicity (Yadav *et al.*, 1995). In agreement to the present findings, Reddy *et al.* (2012) documented that the mean concentration of serum glucose was higher in normally cyclic cows compared to non-cyclic cows.

In the present study, the serum total protein concentration was higher in the normal cyclic animals than in the anestrous and repeat breeder animals, but the difference was non-significant ($P>0.05$). Ramakrishina (1996) also observed no significant variation in the protein levels between normally cycling and repeat breeding cows. Whereas, Sabasthin *et al.* (2012) observed that the total protein values observed were significantly lower in the repeat breeding animals compared to the regularly cycling cows. The results in the present study indicated that calcium concentration was significantly higher ($P<0.01$) in normal cyclic than anestrous and repeat breeder animals. Akhtar *et al.* (2014) also reported that mean calcium concentrations were significantly lower in repeat breeder animals than normal cyclic animals. El-Shahata and Maatyb (2010) found that calcium plays a key part in improving the number and size of ovarian preovulatory follicles as well as the ovulation rate. Low calcium level in acyclic animals might be due to failure to maintain normal calcium level as a result of some metabolic disturbances or due to an increased calcium excretion. In the present study, The normal cyclic animals had significantly ($P<0.05$) higher phosphorus level as compared to the anestrous and repeat breeder animals. Burle *et al.* (1995) also pointed out significantly lower inorganic phosphorus concentrations in repeat breeder crossbred cows. Deficiency of phosphorus influences the level of the pituitary and ovarian hormones and thereby produces the aberrations in the normal reproductive rhythm. Muneer *et al.* (2013) concluded that dietary supplementation was essential in postpartum crossbred cows. In conclusion, High incidence of repeat breeding and anoestrous in Sahiwal cows has been attributed to a decrease in circulation of glucose, total protein, calcium and phosphorus.

TABLE1. METABOLIC PROFILE (MEAN ± SE) OF NORMAL CYCLIC, REPEAT BREEDER AND POST PARTUM ANESTROUS SAHIWAL COWS

Metabolic Profile	Normal Cyclic	Repeat breeder	Anestrous
Glucose (mg/dl)	$73.7^{a} \pm 10.69$	$50.28^{ab} \pm 6.15$	$42.58^{b} \pm 6.73$
Total Protein (g/dl)	$8.20^{c} \pm 1.09$	$5.20^{c} \pm 0.93$	$6.58^{c} \pm 1.04$
Calcium (mg/dl)	$11.66^{d} \pm 1.18$	$6.91^{e} \pm 1.09$	$6.31^{e} \pm 0.71$
P (mg/dl)	$6.22^{f} \pm 0.48$	$4.4^{g} \pm 0.55$	$3.97^{g} \pm 0.63$

Values with different superscripts within rows differ significantly

a vs b; F=3.988 (P<0.05)
d vs e; F=8.338 (P<0.01)
f vs g; F=4.606 (P<0.05)

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REFERENCES

Akhtar, M.S., Farooq, A.A., Lodhi, L.A., Muhammad, S.A., Ayaz, M.M., Lashari, M.H., Murtaza, S., Hussain, I., Irshad, M., Hussain, M. and Raza, M.A. (2014). Studies on serum macro and micro minerals status in repeat breeder and normal cyclic Nili-Ravi buffaloes and their treatment strategies. *African J.of Biotec.*,**13 (10):** 1143-1146.

Bhaskaran, B. and Abdullakhan, C.K. (1981). Role of blood serum inorganic phosphorus in post parturient anoestrous cows. *Livestock Adviser*, **9:** 33-36.

Burle, P.M., Mangle, N.S., Kothekar, M.D. and Kalorey, D.R. (1995). Blood biochemical profiles during various reproductive states of Sahiwal and Jersey x Sahiwal cattle. *Livestock Advisor,* **20(7)**:13-20.

Das S, Bandopadhya S K, Basu S, Ghosh B B and Dattagupta R. (2002). Blood mineral profile of normal cyclic and repeat breeder crossbred cows under rural condition. *Indian J. Anim. Reprod.,* **23**:167-169.

El-Shahata, K.H. and Maatyb, A.M.A. (2010). The effect of dietary supplementation with calcium salts of long chain fatty acids and/ or l-carnitine on ovarian activity in Rahmani ewes. *Anim. Reprod. Sci.,* **117(1):**78-82.

Mc Donald, (1961). Proc IV Int. Congress Animal Report. p 679 - 681.

Muneer, S., Rao, S.K. and Raju, K.G.S. (2013). Serum biochemical profiles and body condition score in crossbred cows affected with postpartum anestrum. *Theriogenology,* **3 (1):**21-24.

Reddy, V.B.M., Karthik, A. and Sasikala, P. (2012). A Field Level Studies on Selected Serum Biochemical Constituents in Cyclic, Non-Cyclic and Endometritic Crossbred Cows. *In.J.of Sci. Res. Public.,* **2:** 2250-3153.

Sabasthin, A., Kumar, V.G., Nandi, S. and Murthy, V.C. (2012). Blood haematological and biochemical parameters in normal cycling, pregnant and repeat breeding buffaloes (Bubalus bubalis) maintained in isothermic and isonutritional conditions. *Asian Pac. J. Reprod.,***1(2):** 117-119.

Yadav, N.K., Lohan, J.S., Singh, B. and Chand, D. (1995). Studies on some serum constituents in anoestrous buffaloes. *Indian J. Anim. Res.,* **29(1):** 85-88.