HAEMATO-BIOCHEMICAL PROFILE IN REPEAT BREEDING CROSS-BRED COWS

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ABSTRACT: A total of 18 lactating multiparous cows (4-6 years aged) were selected from the out patients at the Addl. Block Animal Health Center, Matiali Block, Jalpaiguri, West Bengal, India and divided into three group, *i.e* normally cyclic (C), repeat breeder (RB) and post partum anoestrous (A). Blood samples were collected from all these cows for haematological and biochemical parameters. Erythrocyte sedimentation rate (ESR) and total leukocyte count (TEC) count were higher (P<0.05) in repeat breeder and anoestrous cows compared to cyclic ones; however the Hb and PCV values were low (P<0.05). Serum glucose and protein levels were low (P<0.05) repeat breeding cows than the normally cyclic cows. The results indicate that there may not be any specific haemato-biochemical marker for common reproductive disorders in cows.

Key Words: Haematological, Biochemical, Repeat breeder cows, Serum protein.

INTRODUCTION

Productive and reproductive performance is one of the important factors for determining the profitability of the dairy farmers. Sub-fertility in cows is an important hindrance to dairy farmers (Albin *et al.* 1989, Jainuddin and Hafez 1993). The knowledge of haematological values is useful in diagnosing various pathological and metabolic disorders, which can adversely affect the productive and reproductive performance of cows, resulting in great economic losses to dairy farmers (Pyne and Maira 1981, Dutta *et al.* 1988). The causes of sub-fertility are managemental (Shamsuddin *et al.* 1988), type of service, uterine infection, oestrus detection, nutritional, and immune status. Fat, one of the nutrients apparently enhanced postpartum reproductive performance by increasing the energy status of the animals and thus stimulated the ovarian follicular growth and luteal functions (Highshoe *et al.* 1991, Wehrman *et al.* 1991). Anoestrus, repeat breeder, endometritis, and repeated conception failure are most important reproductive disorders encountered in West Bengal causing considerable economic losses. The present project was therefore designed to

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investigate various haematological and serum biochemical profiles of cows having reproductive problems.

MATERIALS AND METHODS

A total of 18 lactating multiparous cows (Sahiwal cross bred, 4-6 years old, body weight 250 - 350 kg) were selected from the out patient at the Addl. Block Animal Health Center, Matiali Block, Jalpaiguri, West Bengal and divided into three groups *i.e* normally cyclic (C), repeat breeder (RB) and post partum anoestrous (A). The animals with a corpus luteum on one of the ovaries were considered as cyclic animals, while cows suffering from postpartum anoestrus of more than 90 days included in A.

Farmers normally maintained their cows on rice straw, mustered oil cakes, wheat bran and cut-and-carry grass/limited grazing on roadside/community land as forage. 10 ml blood was collected from each cow by jugular vein puncture using 10 ml plastic syringe. Half the blood sample was kept with heparinized tube for routine haematological examination. Rest of the sample was taken in vials for collection of serum.

Total erythrocyte count (TEC), Haemoglobin percentage (Hb%), Packed cell volume (PCV), Erythrocyte sedimentation rate (ESR) and Total leukocyte count (TLC) were carried out by standard methods described by Coles (1986) and Sastry (1989).

Serum samples were analysed for glucose (Mayne 1994), total protein (Keller 1991) and albumin (Tietz 1994) by using Emark auto analyzer kits with the help of Microlab 200. Globulin was determined as the deference between total protein and albumin concentration in the serum. Data were analyzed (Snedecor and Cochran 1989) using the General Linear Model (SPSS 1997).

RESULTS AND DISCUSSION

Haematological indices

The mean values of various haematological indices in cyclic, repeat breeding and post partum anestrous cows are given in Table 1. TEC ($10^6/\mu l$), HB (g/dl) and PCV (%) values was highest (P<0.05) in normally cyclic cows compared to repeat breeding and post partum anestrous cows. The mean values of ESR were significantly higher (P<0.05) in problem groups than in control group. The TEC ($10^3/\mu l$) differ (P<0.05) amongst the group and highest value was noted in repeat breeder cows.

Lower Hb indicates anaemia and its values are significantly low in all problem groups compared to cyclic cows. Baqi and Rahman (1981) showed low Hb in anoestrus cows. The cows in the present study were the outpatients at the Veterinary hospital, and may have been suffering from gastrointestinal parasites causing anaemia and hyproteinaemia (Murthy *et al.* 1975).The PCV(%) was significantly decreased only in problem groups to cyclic cows. PCV is another index of anaemia as explained by Baqi and Rahman (1981) and Islam *et al.* (1999). ESR is generally high in chronic infection and malnutrition (Dutta *et al.* 1991; Islam *et al.* 1999). A significantly higher TEC was recorded in problem cows compared to normally cyclic cows. Leukocytosis may occur as a result of infection in the body. The degree of leukocytosis depends upon several factors including nature of the causative agent, severity of infection, resistance of animal and localization of inflammatory response (Benjamin 1978).

Table 1 : Haematological indices of repeat breeding cows.

Attributes	C	RB	A	Pooled SE
Total Erythrocyte Count (10^6/µl)	6.89^a	6.11^c	6.36^b	0.11
Haemoglobin (g/dl)	9.64^a	9.29^b	9.13^b	0.07
Packed Cell Volume (%)	31.2^a	28.4^b	27.8^b	0.44
Erythrocyte Sedimentation Rate (mm/24 hrs)	8.1^b	9.2^a	8.9^{ab}	0.23
Total Leukocyte Count (10^3/µl)	9.26^c	9.96^a	9.62^b	0.16

C- Normally Cyclic; RB- Repeat Breeder; A- Post Partum Anestrous; Figures in different superscripts in a row differ significantly (P<0.05).

Table 2 : Serum Biochemical indices of repeat breeding cows.

Attributes	C	RB	A	Pooled SE
Serum Glucose (mg/dL)	49.2^a	42.8^b	42.4^b	0.94
Serum Total Protein (g/dL)	5.71^a	5.52^c	5.62^b	0.12
Serum Albumin (g/dL)	2.81^a	2.71^b	2.77^{ab}	0.11
Serum Globulin (g/dL)	2.89^a	2.82^b	2.83^b	0.04
Albumin : Globulin	0.97	0.96	0.98	0.02

C- Normally Cyclic; RB- Repeat Breeder; A- Post Partum Anestrous; Figures in different superscripts in a row differ significantly (P<0.05).

Serum Biochemical indices

Serum biochemical constituents in cyclic, repeat breeding and post-partum anestrous cows are given in Table 2. The mean concentration of serum glucose (mg/dL) was higher (P<0.05) in normally cyclic cows compared to problem cows but the values were comparable among the problem groups. Serum total protein (g/dL), albumin (g/dL) and globulin (g/dL) were highest (P<0.05) in normally cyclic cows than other two groups but the albumin : globulin ratio was unaffected.

Parmer *et al.*(1986) also reported higher level of glucose during the luteal phase in repeat breeders. This can be comparable with the present findings. El- Belely (1993) suggested that altered level of glucose might be the reason for reduced luteal functions in repeat breeding cows. Higher blood glucose concentrations directly increased the progesterone production by increasing the pulse and mean concentration

of LH (Richards *et al.* 1989) or indirectly stimulate prolonged progesterone release during early luteal phase by increasing insulin level (Mc Ardle and Holtorf 1989). Poor energy status in repeat breeders due to hypoglycemia could be the reason for impaired hypothalamic hypophyseal ovarian axis and reduced ovarian activities (Joe Arosh *et al.* 1998).

Significantly lower (P<0.05) concentration of plasma total protein in the repeat breeding cows in comparison with the normally cycling cows is comparable to the findings of El-Belely (1993), Burle *et al.* (1995) and Jani *et al.* (1995). However Gandotra *et al.* (1993) and Ramakrishna (1996) observed no significant variation in the protein levels between normally cycling and repeat breeding cows. Low level of plasma protein resulted in the deficiency of certain amino acids required for the biosynthesis of gonadotropins and gonadal hormones (Vohra *et al.* 1995) and Joe Arosh *et al.* 1998) might cause reproductive hormonal disturbances in animals leading to inactive ovaries (Roberts 1971). Kaitenbach and Dunn (1980) suggested that progesterone played a regulatory role in the synthesis of specific amino acids. This might be the reason for increased demand for protein and amino acids for GnRH and LH synthesis during early luteal phase of the cycle. The repeat breeding cows showed significantly lower (P<0.05) concentration of albumin when compared to normally cycling cows. This finding is in agreement with the report of Ramakrishna (1996). This high level of albumin in normally cycling cows revealed increased demand for amino acids and protein for the biosynthesis of GnRH and LH to initiate ovulation.

The plasma globulin levels in repeat breeders were significantly lower (P<0.05) in comparison with normally cycling cows irrespective of days of the cycle. It may be suggested that globulin functioning as a carrier protein for copper, altered the biosynthesis of specific coenzymes, thus the steroidogenesis during early luteal phase of the cycle in repeat breeding cows.

CONCLUSION

The results indicated that there may not be any specific haemato-biochemical marker for specific reproductive problems in cows. Non-specifically ESR and TLC count were high in all reproductive disorders in the cows; however the Hb and PCV values were low. Serum glucose and protein levels were low in repeat breeding cows than the normally cyclic cows.

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