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Blood mineral profile of normal cyclic and repeat breeder crossbred cows under rural condition

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ABSTRACT

The serum calcium, inorganic phosphorus, copper, zinc, iron and maganese were estimated in 22 repeat breeder and 12 normal cyclic crossbred cows. Repeat breeder cows had significantly lower inorganic P (4.729±0.150 mg/100 ml), Cu (0.96±0.017 µg/ml) and Zn (1.80±0.033 µg/ml) than normal cyclic cows where the levels were 5.513±0.265 mg/100 ml, 0.97±0.023 µg/ml and 2.09±0.057 µg/ml, respectively. Higher serum iorn level was found in the repeat breeders (3.594±0.043 µg/ml) than normal cyclic cows (3.424±0.053 µg/ml). No significant variation however, was found in Ca and Mn between the groups.

Key words : Repeat breeder, crossbred cow, mineral profile

Repeat breeding is one of the major problem in the dairy cows. This condition not only affects the fertility of the cattle to a considerable extent but also incurs great economic loss to the farmers. The incidence of repeat breeding as reported by Singh *et al.* (1981) and Sharma *et al.* (1991) were 22.63% and 51.79%, respectively. Mineral imbalances or deficiency may be a factor responsible for repeat breeding condition. Mineral play an intermediate role in the promotion of action of hormones and enzymes at sub-cellular levels in an integrated fashion (Dhoble and Gupta, 1986). The influence of these minerals on certain enzyme systems may affect reproductive efficiency. The present study was undertaken to compare the levels of Calcium (Ca), inorganic Phosphorus (P), Copper (Cu), Zinc (Zn), Iron (Fe) and Manganese (Mn) in repeat breeder crossbred with the normal cows and also to elucidate the relationship between serum mineral status and repeat breeding condition in dairy cows.

MATERIALS AND METHODS

The study was conducted on 22 repeat breeder crossbred cows attended infertility camps at Bongaon and Gaighata blocks in North 24 Parganas within the jurisdiction of "The Ichhamati Co-operative Milk Producer's Union Ltd." Barasat, West Bengal. Besides, a group of 12 normal cyclic crossbred cows were kept as control. The animals were maintained by the farmers in rural areas under the traditional animal husbandry practices without providing any balanced ration. About 10 ml of blood was collected from the jugular vein of each of the experimental and control animals. Serum samples were separated and collected in small sterilized plastic vials and stored at -20°C temperature. The serum samples were estimated for Ca and Inorganic P by titrimetric method (Clark and Collip, 1925) and Colorimetric method (Fiske and Subba Row, 1925), respectively. Serum Cu, Zn, Fe and Mn were also estimated as per the method of Arneza *et al.* (1977) utilizing atomic Absorption Spectrophotometer (Perkin Elmer Analyst 100). Statistical analysis was done as per Snedecor and Cochran (1980) and means were compared using 'Student's t-test.

RESULTS AND DISCUSSION

The mean serum mineral values with standard errors recorded in normal cyclic and repeat breeder crossbred cows are presented in the Table (1.0). The serum calcium concentration did not differ significantly between repeat breeder and normal cyclic cows, which

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Table (1.0). Serum micro mineral levels (Mean±S.E. with C.D. test) in normal cyclic and repeat breeder crossbred cows

Elements	Normal cyclic (n = 12)	Repeat breeder (n = 22)
Calcium (mg/100 ml)	10.5±0.440[a]	10.045±0.327[a]
Inorganic Phosphorus (mg/100 ml)	5.513±0.265[a]	4.729±0.150[b]
Copper (µg/ml)	0.97±0.023[a]	0.69±0.017[b]
Zinc (µg/ml)	2.09±0.057[a]	1.80±0.033[b]
Iron (µg/ml)	3.424±0.053[b]	3.594±0.043[a]
Manganese (µg/ml)	0.49±0.028[a]	0.529±0.040[a]

Means within a parameter bearing different superscript are significantly different (P<0.05).

was also supported by Singh and Pant (1998). Significantly lower level of serum inorganic phosphorus in repeat breeders (4.729±0.150 mg/100 ml) than normal cyclic cows (5.513±0.265 mg/100 ml) as observed in the present experiment was corroborated well with the findings of Khan and Iyer (1993). The most prevalent deficiency affecting reproduction appeared to be due to lack of phosphorus (Salisbury and Vandermark, 1961). The serum copper concentration in normal cyclic cows was significantly higher (0.97±0.023 µg/ml) as compared to the repeat breeder (0.69±0.017 µg/ml). Similar finding also observed by Rupde *et al.* (1993). Cu has significant role in maintaining the optimum fertility as copper behaves in a regular way to be used as an indicator for FSH, LH and estrogen activity (Desai *et al.*, 1982).

The mean concentration of zinc in repeat breeder was significantly lower (1.80±0.033 µg/ml) than that of normal cyclic cows (2.09±0.057 µg/ml), which was in accordance with the observation of Rupde *et al.* (1993). Optimum level of zinc is essential to maintain the activity of FSH and LH (Apagar, 1985) and threreby facilitating normal reproductive performance. Moreover, prostaglandin binds Zn and facilitates its transport. A reduction in zinc level might interfere with prostaglandin receptor-mediated phase and consequently the luteolytic process which inturn causes some of the reproductive pathology (Carlson *et al.*, 1982). The present findings of significantly higher (3.594±0.043 µg/ml) serum iron concentration in repeat breeders than normal cyclic cows (3.424±0.053 µg/ml) was in agreement with Eltohamy *et al.* (1989). Present observation along with that of Maynard and Loosli (1969) might suggested that Fe was of little importance in reproduction as compared with Cu and Zn. The concentration of other trace mineral namely manganese, under study, did not differ significantly between the two groups.

It may be concluded that cows with repeat breeding problem without any apparent gynaecological abnormality or infection could be suspected for mineral deficiency, especially of inorganic P, Cu and Zn.

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