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Effect of inorganic phosphorus on repeat breeding crossbred cows*

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ABSTRACT

A study was conducted on 70 repeat breeding cross bred cows. 20 cows (C1) served as healthy control. Repeat breeding cow were divided in to six groups *i.e.* 10 cow as untreated control (C2) and treatment group. Treatment groups T_1 having 20 cows and rest (T_2-T_5) 10 cow each. each group received treatment as mineral mixture (T_1), Duraprogen- Progesterone(T_2), Iliren- Prostaglandin (T_3), Amikacin(T_4) and Oxytetracyclin (T_5). On 0 day of estrus mean value of serum inorganic phosphorus ranged from 4.48 to 5.86mg% whereas the values for different groups were found to be as C_2(4.85), T_1(4.84), T_2(5.08), T_3(5.07), T_5(5.00) mg%, and were less than the normal healthy control (5.90mg%). On day 21 the serum inorganic phosphorus value decreased ($P<0.01$) in treatment control and various treated groups as compared to normal healthy control. The decreased for C_2, T_1, T_2, T_3, T_4 and T_5 was 1.1, 0.8, 0.81, 0.82, 0.86, and 0.94 mg% respectively. The mean serum inorganic phosphorus value differs ($P<0.01$) between repeat breeding control and mineral mixture treated group (T_1). However, mean inorganic phosphorus values did not differ, among repeat breeding control and other various treated groups. On day 45 the mean inorganic phosphorus values decreased significantly in repeat breeding control and various treated groups from normal healthy control group. The mean serum inorganic phosphorus values decreased by 1.11, 0.41, 0.82, 0.84, 0.82 and 0.96 mg% for each group. However, the mean inorganic phosphorus values of mineral mixture treated group T_1(5.46 mg%) & repeat breeding control C_2(4.77 mg%), and other treated groups [T_2(5.06mg%), T_3(5.04 mg%), T_4 (5.02 mg%)and T_5(4.94 mg%)] differed significantly. The result shows that the group, supplemented with mineral mixture revealed significant difference of serum inorganic phosphorus at different stages of their observation i.e. day 0, 21and 45. It also differed significantly with treated groups (T_2, T_3, T_4& T5) at day 45 but not on day 0 and day 21.

Key words: Inorganic Phosphorus, Repeat breeding, Mineral mixture.

INTRODUCTION

Normal levels of various minerals are the indispensable for normal function of various system of body including reproductive system. Reproductive failures are of various types in which repeat breeding is a very common and important syndrome as it prolongs the age at 1st calving in heifers and extends the inter-calving intervals in cows leading to lowering of calf crop.

Mineral imbalances or deficiencies may be a factor responsible for repeat breeding condition because minerals play an intermediate role in the promotion of actions of hormones and enzymes at sub-cellular levels in an integrated fashion. Even marginal deficiency of phosphorus is sufficient to cause disturbance in pituitary ovarian axis without manifestation of specific deficiency symptoms (Bhaskaran

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and Abdulla Khan, 1981). Phosphorus deficiency may lead to delayed onset of puberty in heifers and failure of estrum in cows. Proper supplementation of phosphorus markedly decreased the number of services required per conception from 3.7 to 1.3 in dairy heifers (Morrow, 1969).Therefore the present investigation was undertaken to study the effect of haemato-inorganic phosphorus level on the incidence of repeat breeding.

MATERIALS AND METHODS

The present study was conducted at outdoor clinics of Deptt of the A.R.G.O., BVC, in and around Patna and Dairy Farm, Pusa, during August, 2002 to July-2003. A total of 90 crossbred cows (H.F.X Indigenous, Jersey X Indigenous type) were included in the study, comprising of 70 repeat breeding and 20 normal (C_1) cows. Further these 70 repeat breeding cows were divided into 6 groups (C_2- 10 repeat breeding cows with no treatment and 5 treated groups viz. T_1 - 20 repeat breeding cows treated with mineral mixture, T_2 -10 repeat breeding cows treated with Duraprogen (Progesterone), T_3-10 repeat breeding cows treated with Iliren (Prostaglandin analogue), T_4-10 repeat breeding treated with Amikacin and T_5 treated with Oxytetracycline- LA). The blood samples were collected on day of estrus (0 day) without treatment and on 21st & 45th day post treatment. The serum inorganic phosphorus was estimated following the method of Fiske and Subbarow (1925).

RESULTS AND DISCUSSION

The result of the study (Table-I) revealed that there was significant effect of various groups on serum inorganic phosphorus level.

Table-I: Analysis of variance showing the effect of serum inorganic phosphorus (mg%) in various groups.

Sourcesof variation	Degree of freedom	'0' day		21st day		45th days	
		M.S.S	F. Value	M.S.S	F. Value	M.S.S	F. Value
Between treatments	6	2.24	24.61**	2.108	13.42**	2.221	17.76**
Within treatment	83	0.091		0.157		0.125	

Significant** (P<0.01)

The mean ±S.E. along their CV% of serum inorganic phosphorus (mg %) in various groups have been given in Table-II. The mean value of serum inorganic phosphorus on 0 day ranged from 4.48 to 5.86 mg% and showed significant variation among the groups. The inorganic phosphorus values of C_2, T_1, T_2, T_3, T_4 & T_5 groups decreased (P<0.01) by 0.83, 0.88 and 0.86 mg % respectively (Table II) from the normal healthy control to treated groups. However, the mean serum inorganic phosphorus values did not differ (P<0.01) among repeat breeding control and various treated groups.

On day 21, the mean serum inorganic phosphorus values decreased (P<0.01) in untreated repeat breeding control and various treated groups from normal healthy control group. The mean values of serum inorganic phosphorus in C_2, T_1, T_2, T_3, T_4 & T_5 decreased by 1.1, 0.8, 0.81, 0.82,0.86 and 0.94 mg %, respectively (see Tabli II) from the normal healthy control group. The mean serum inorganic phosphorus values also differed (P<0.01) between repeat breeding control and mineral mixture treated group (T_1). However, the mean inorganic phosphorus values did not differ (P<0.01) among repeat breeding control and other various treated groups. On day 45, the mean serum inorganic phosphorus values decreased (P<0.01) by 1.11, 0.41, 0.82, 0.84, 0.82 and 0.96 mg% respectively in repeat breeding control and various treated groups showed significant (P<0.01) variation in comparison of normal healthy control group. Further, it was observed that the mean serum inorganic phosphorus values of repeat breeding control (C_2), T_2, T_3, T_4 & T_5 groups decreased (P<0.01) from mineral mixture treated group (T_1) by 0.71, 0.40, 0.42, 0.44 and 0.52 mg % respectively. The mean serum inorganic phosphorus value did not differ significantly among others treated and repeat breeding control group except T_1 at 45th days at all three stages of observations.

Salisbury and Vandermark (1961) considered the phosphorus deficiency as most prevalent cause affecting reproduction. In the present study too, the serum inorganic phosphorus levels in regular breeder cows was recorded higher which differed (P<0.01) with that of C_2, T_1, T_2, T_3, T_4 & T_5 groups at all days (0, 21 and 45) of observations. The present findings corroborate with the observations of Enkhia *et al.* (1983), Nair *et al.* (1988), Khan and Iyer (1993), Islam *et al.* (1994), Ramakrishna (1996) and Das *et al.* (2002) Srivastava and Kharche (1986), Bhaskaran and Abdullakhan (1981), Bhaskaran and Patil (1982) and Mufarrege *et al.* (1986) were also of the opinion that marginal deficiency of phosphorus may be sufficient to cause disturbances in pituitary ovarian axis resulting to various reproductive problems. However, Rupade *et al.* (1993) reported non-significant low levels of serum inorganic phosphorus in repeat breeding cows, which might be due to variation in ecological condition and group size.

The group supplemented with mineral mixture revealed significant difference of serum inorganic phosphorus at different stages of their observation *i.e.* day 0, 21 and 45. It also differs significantly with all other treated groups (T_2, T_3, T_4 and T_5) at day 45 but not on day 0 and day 21. This is quite contrary to the reports reported by Rupade *et al.* (1993) and Kumar (2000), in which higher but non significant serum inorganic phosphorus values were found in cows treated with mineral mixture.

The animals treated with progesterone (T_2), prostaglandin (T_3), amikacin (T_4) and oxytetracycline LA (T_5) did not differ significantly among themselves and between the three observations (day 0, 21 and 45). Scanty literature is available for the level of serum inorganic phosphorus in repeat breeding animals treated with antimicrobials such as amikacin and oxytetracycline LA and thus, the present findings is incomparable. Further study is necessary in this regard.

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Table –II : Mean ± S.E. along their C.V. % of serum inorganic phosphorus (mg %) in various groups

Groups	No. of cows	'0' day	21st day	45th day
C1	20	5.86±0.06a (4.93)	5.90±0.063a (4.82)	5.88±0.061a (4.66)
C2	10	4.85±0.11^{bc}(7.48)	4.80 ± 0.1 l^{bc}(7.41)	4.77±0.13^{bc}8.73
T1	20	4.84±0.10^{bc}(4.62)	5. 10 ±0.08° (7.60)	5.46±0.05^{e}(4.20)
T2	10	5.08 ± 0.067^{bc}(4.23)	5.09 ±0.08°" (5.11)	5.06±0.13^{cd}(8.34)
T3	10	5.07 ± 0.06^{bc}(4.16)	5.08±0.15^{cd}(9.40)	5.04±0.14^{cd}(9.40)
T4	10	4.98 ± 0.07^{bc}(4.04)	5.04 ± 0.07^{cd}(4.07)	5.02±0.10^{cd}(6.47)
T5	10	5.00 ± 0.07^{bc}(4.89)	4.96±0.17^{cd}(6.87)	4.94±0.12^{cd}(8.20)

Figures in parenthesis indicate co-efficient of variation percentage. Means with different superscripts taken column wise differ significantly.

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