

Effect of certain drugs on blood biochemical profiles in cross bred cattle

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ABSTRACT

The study was conducted on 60 cross bred cows which calved before three months but did not come into heat. Various drugs viz., Receptal (gr I), Urimin (gr II), Minerex Bolus (gr III), Urimin plus Receptal (gr IV), Minerex bolus plus Receptal (gr V) were used to induce estrus and one gr was kept as control (gr VI). Levels of calcium, phosphorus, zinc and copper were estimated in blood serum samples collected before treatment (0-day) and after treatment (on the day of first estrus) and those were found in increasing trend in all the groups on day of first estrus. Highest levels of zinc (286.70 ± 14.980 mg/100 ml) and copper (184.69 ± 6.690 mg/100 ml) in blood serum on day of first estrus were recorded in blood serum of Minerex treated animals (gr III). Highest level of serum calcium (10.25 ± 0.298 mg/100 ml) on day of first estrus was noted in Minerex bolus plus Receptal treated animals (gr V). Average serum phosphorus level on day of first estrus was highest (8.30 ± 0.169 mg/100 ml) in Urimin treated animals (gr II). Differences in serum minerals levels between day of first estrus and 0-day in all the groups were highly significant ($P < 0.01$). Differences in Ca : P ratio between day of first estrus and 0-day were highly significant ($P < 0.01$) in all the groups.

Key words : Receptal, minerex bolus, urimin, calcium, phosphorus, zinc, copper, Ca:P ratio

Nutrition plays an important role in the initiation of post partum ovarian activity. Nutritional deficiencies or excess are frequently referred to as the cause of infertility (Parker and Blowey, 1976 and Francos *et al.*, 1977). All the vitamins and essential minerals are required for reproduction because of their cellular role in metabolism, maintenance and growth. The influence of these minerals on certain enzyme systems may affect reproductive efficiency. Deficiencies or excess of mineral elements like Sodium, Phosphorus, Copper and Zinc have been found to be associated with sub-normal fertility and anestrus condition (Ahlsweide, 1972). The deficiency of trace elements leads to inactive ovaries and repeat breeding in dairy animals (Hidiroglou, 1979). The blood mineral profile during post partum period has a great relevance to future fertility in dairy animals. The presence of low or very low mineral status in blood and the response to specific mineral elements may be helpful

in the diagnosis of mineral response disorder. Keeping in view the above facts, the study was carried out to assess the effects of certain drugs on biochemical profiles in anestrus cows.

The present work was carried out at Military Dairy Farm, Namkom. Sixty crossbred cows which calved before 3 months but did not come into heat were included in this study. The animals were allocated to 6 groups. Each group comprised of 10 animals. All the animals were maintained under identical feeding and managemental conditions. Following treatment schedule was followed.

- Gr I - Receptal* 5 ml, im single dose
- Gr II - Urimin** 10 ml, im, alternate day for 3 days
- Gr III - Minerex bolus*** 2 boli daily for 6 days orally
- Gr IV - Urimin 10 ml im, alternate day for 3 days
Receptal - 5 ml im, single dose on day 7
- Gr V - Minerex bolus - 2 boli daily orally for 6 days

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Receptal - 5 im, single dose on day 7

Gr VI - Control (No treatment)

Calcium was estimated by calcium kit (OCPC method), phosphorus by phosphorus kit (Molybdate U.V. method), zinc by zinc kit (Colorimetric method) and copper by copper kit (Colorimetric method) in blood samples before (0-day) and after treatment (on the day of first estrus).

Calcium:

It is evident from table that in all the groups the level of calcium showed an increasing trend from 0-day to day of first estrus. Highest level of calcium was found in gr V (10.25 ± 0.248 mg/100 ml) and lowest in gr III (9.34 ± 0.343 mg/100 ml) on the day of first estrus. However, the serum calcium level did not differ significantly among the groups on the day of first estrus. Effect of treatment on serum calcium level on both the periods was non-significant. Paired t-test revealed higher level of serum calcium on day of first estrus as compared to 0-day and the differences were highly significant ($P < 0.01$) in all the groups. Low level of serum calcium in anestrus cows has been reported by several workers (Samad *et al.*, 1980; Ali *et al.*, 1991 and Dutta *et al.*, 2001). Ali *et al.* (1991) reported significant increase in calcium level on feeding with balanced concentrate mixture with trace elements. Newar *et al.* (1999) reported significant increase in calcium level in post-partum anestrus buffaloes fed with mineral mixture. The higher level of serum calcium in cows on day of estrus might be due to fluctuating levels of estrogen in estrus cows and the lower level of serum calcium in post partum anestrus cows might be due to the failure of endocrine system to mobilize the body calcium, which leads to reproductive failure (Dutta *et al.*, 2001).

Phosphorus:

The highest level of serum phosphorus (8.34 ± 0.169 mg/100 ml) was noted in gr II whereas the value was lowest (6.68 ± 0.403 mg/100 ml) in gr I on day of first estrus (Table 1). The level of phosphorus was significantly higher in grs II and IV in which Urimin was fed to animals. Analysis of variance showed significant

($P < 0.05$) effect of treatments on serum phosphorus level. Paired t-test indicated higher serum phosphorus level on day of first estrus in all the grs than the level on 0-day and the differences were highly significant ($P < 0.01$). Findings obtained in this study are in close conformity with the findings of Samad *et al.* (1980), Prasad and Rao (1997) and Dutta *et al.* (2001). The values on the day of first estrus were more in gr II and IV in which Urimin was administered. Ali *et al.* (1991) observed significant increase in phosphorus level on feeding with balanced concentrate mixture with trace elements.

Ca : P ratio:

Values for Ca:P ratio on 0-day varied from 1.58:1 ± 0.095 in gr V to 1.97:1 ± 0.225 in gr IV (Table 1). The ratio varied on day of first estrus from 1.26:1 ± 0.093 (gr IV) to 1.54:1 ± 0.089 (gr I). Analysis of variance showed significant ($P < 0.05$) effect of treatments on average serum Ca:P ratio on day of first estrus. Paired t-test revealed lower Ca:P ratio on day of first estrus than on 0-day and the differences were highly significant ($P < 0.01$). The difference in the levels of calcium and phosphorus ratio between the day of first estrus and 0-day were found to be highly significant ($P < 0.01$) in all the grs in this study. The findings are in agreement with the findings of Venkateswarlu *et al.* (1994). Tandle *et al.* (1997) reported higher Ca:P ratio in anestrus cows than estrus cows.

Zinc:

Table indicated increasing trend in average serum zinc level from 0-day to day of first estrus. Highest value (286.70 ± 14.980 μ g/100 ml) was noted in gr III while the value was lowest (224.47 ± 20.315 μ g/100 ml) in gr II on the day of first estrus. Significant effect ($P < 0.05$) of treatments on serum zinc level on day of first estrus was noted. Paired t-test revealed that the difference in serum zinc levels between 0-day and day of first estrus was highly significant ($P < 0.01$) in all the groups. Higher levels of zinc and copper in cows returning to estrus indicate that plasma levels of zinc and copper may be of importance in relation to the time of occurrence of post partum estrus (Saxena and Gupta, 1993). The present

Table 1: Effect of different treatment on average serum calcium, phosphorus, Ca : P ratio, zinc and copper on 0-day and day of first estrus.

Treatment groups	No. of animals treated	No. of animal exhibited	Calcium level (mg/100ml)		Phosphorous level (mg/100ml)		Ca:P ratio		Zinc level µg/100ml		Copper level µg/100ml	
			0-day	day of estrus	0-day	day of estrus	0-day	day of estrus	0-day	day of estrus	0-day	day of estrus
I (Receptal)	10	9	9.36 ±0.44	10.19 ±0.40	5.03 ±0.26 ^{ab}	6.68 ±0.40 ^a	1.89:1 ±0.11	1.54:1 ±0.08 ^b	171.94 ±18.43	226.12 ±14.40 ^a	116.07 ±5.73	136.79 ±6.50 ^a
II (Urinin)	10	6	8.63 ±0.31	9.57 ±0.29	4.84 ±0.24 ^a	8.34 ±0.16 ^d	1.87:1 ±0.14	1.29:1 ±0.11 ^{ab}	172.80 ±25.08	224.47 ±20.31 ^a	128.76 ±5.63	135.61 ±7.98 ^a
III (Minerex bolus)	10	8	8.48 ±0.30	9.34 ±0.34	4.55 ±0.20 ^{bc}	7.19 ±0.20 ^{bc}	1.86:1 ±0.12	1.50:1 ±0.09 ^{an}	212.99 ±16.08	286.70 ±14.98 ^a	119.06 ±5.67	184.69 ±6.69 ^b
IV (Urinin + Receptal)	10	10	9.38 ±0.39	10.10 ±0.27	5.17 ±0.43 ^{ab}	7.80 ±0.53 ^{cd}	1.97:1 ±0.22	1.26:1 ±0.09 ^a	190.08 ±18.90	236.97 ±17.44 ^a	120.19 ±5.57	136.61 ±4.54 ^a
V (Minerex bolus + Receptal)	10	8	9.39 ±0.29	10.25 ±0.29	6.07 ±0.29 ^a	7.61 ±0.27 ^{bcd}	1.58:1 ±0.09	1.47:1 ±0.06 ^{ab}	195.21 ±12.16	269.38 ±11.36 ^{ab}	119.91 ±7.38	181.10 ±6.49 ^b
VI (Control)	10	6	8.77 ±0.32	9.62 ±0.27	5.34 ±0.31 ^{ab}	6.87 ±0.32 ^{ab}	1.68:1 ±0.12	1.47:1 ±0.10 ^{ab}	178.79 ±27.82	229.42 ±25.20 ^a	131.51 ±4.66	139.42 ±2.92 ^a

~ 0.05, ~ 0.01

findings are in agreement with the findings of Dzenite (1965), Manickam and Kathaperumal (1978) and Bioter *et al.* (1988). Newer *et al.* (1999) observed significant increase in zinc level in post partum anestrus buffaloes fed with mineral mixture.

Copper:

Highest value (184.69±6.690 µg/100 ml) of copper was noted in gr III on day of first estrus table. Analysis of variance revealed highly significant effect (P < 0.01) of treatments on serum copper level on day of first estrus. Paired t-test showed higher level of serum copper on day of first estrus as compared to 0-day and the differences were highly significant (P < 0.01) in all the grs except gr II (P < 0.05). Above findings are in close agreement with the reports of Larson *et al.* (1980), Saxena and Gupta (1993) and Prasad and Rao (1997). Significant effect of treatment was also reported by Black and French (2000).

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