

Levels of trace minerals, glucose and haemoglobin in relation to occurrence of post-parturient oestrus in buffaloes*

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ABSTRACT

The study was conducted to study the role of plasma/blood levels of copper, zinc, cobalt, glucose and haemoglobin in relation to early or late occurrence of post-partum oestrus in buffaloes. The mean levels of plasma copper, zinc, cobalt, glucose and blood haemoglobin (average of levels at day 0, 30 and 60) were 1.125 ± 0.024 $\mu\text{g/ml}$, 1.484 ± 0.029 $\mu\text{g/ml}$, 0.541 ± 0.024 $\mu\text{g/ml}$, 52.49 ± 1.382 $\text{mg}\%$ and 13.29 ± 0.209 $\text{g}\%$ and 1.209 ± 0.026 $\mu\text{g/ml}$, 1.472 ± 0.031 $\mu\text{g/ml}$, 0.477 ± 0.020 $\mu\text{g/ml}$, 53.82 ± 1.744 $\text{mg}\%$ and 13.63 ± 0.256 $\text{g}\%$, respectively, in buffaloes of Group 1 (oestrus in > 90 days, n = 10) and Group - 2 (oestrus in < 90 days, n = 6). The t-test analysis revealed that the levels of copper, zinc, cobalt, glucose and haemoglobin were not related to early or late occurrence of post-partum oestrus in buffaloes.

Key words : Trace mineral, glucose, haemoglobin, post-partum anoestrus, buffalo

Anoestrus in buffalo is the most common single cause of infertility causing heavy economic losses to buffalo owners. Many factors viz., nutrition, uterine pathology, debilitating diseases, genetic factors, poor management, suckling, seasonal factors, high lactation, parasitism and poor oestrus detection may be implicated the etiology of anoestrus and further the disturbances in hormonal and biochemical milieu including trace minerals may also cause anoestrus condition and their estimations might be of potential aid in characterizing post-partum anoestrus in buffalo (Chauhan and Kessay, 1984). There are conflicting views in literature on the role of trace minerals in causing post-partum anoestrus in buffaloes. The present study was therefore carried out to estimate blood / plasma levels of copper, zinc, cobalt, glucose and haemoglobin in post-partum buffaloes returning and not returning to oestrus within 90 days post-partum.

Sixteen post-parturient buffaloes belonging to the Livestock Research Centre of G.B. Pant University of Agriculture & Technology, Pantnagar, were used in the present study. The buffaloes were maintained under standard feeding and management. All the buffaloes calved during the months of July and August and were in their 3rd to 7th lactations. The animals were examined per-rectally at one-month post-partum

and thereafter in weekly interval upto 3 months post-partum to assess uterine involution and resumption of ovarian cyclicity. All the experimental animals were closely observed for the external symptoms of oestrus regularly twice daily, both in morning and evening hours using a teaser bull for about 40 minutes each time. External behavioural expressions of oestrus symptoms together with per-rectal findings, thereafter, was the basis of true return of oestrus in experimental buffaloes. The experimental buffaloes were grouped as under.

Group 1 : Buffaloes not exhibiting oestrus within 90 days of calving (n = 10).

Group 2 : Buffaloes exhibiting oestrus within 90 days of calving (n = 6).

About 10 ml blood was collected aseptically from jugular vein at parturition, day 30 and day 60 post-partum in clean and dry heparinized tubes (A). Plasma was collected and stored at -20°C till estimation of trace minerals. Approximately 3 ml of the blood collected in heparinized tubes was transferred to another tube containing 10 mg sodium fluoride (B). The plasma collected was stored at -20°C for the estimation of glucose level. Haemoglobin was estimated by Sahli's haemoglobinometer (Acid haematin method) immediately after blood collection. Glucose in plasma was estimated by GOD-POD method using AUTOPAK reagent kit (Bayer Diagnostic India Ltd., Baroda, Gujarat) and semi-autoanalyzer (Spa)

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Autochem 2011). The copper, cobalt and zinc levels in plasma were estimated by Atomic Absorption Spectrophotometer (GBC Scientific Equipment PTY, Ltd., Dandonog, Victoria, Australia) after digesting the plasma sample in nitric acid and triple acid mixture. The t-test analysis of data was done as per Snedecor and Cochran (1994).

The comparative results of the study on post-parturient buffaloes which did not exhibit oestrus within 90 days (Group-1, n = 10) and which exhibited oestrus within 90 days (Group 2, n = 6) are presented in table 1. The mean levels of copper, glucose and haemoglobin and were lower in group-

1979 and Umesh *et al.*, 1995). However, Chandolia and Verma (1987) could not find blood glucose levels related with the occurrence of ovarian cyclicity and their findings are in agreement with the present findings. The levels of blood haemoglobin were always found to be within normal range in the present study and in no case anaemic condition was detected. The haemoglobin level was also not found to be related with ovarian cyclicity in the present study. However, Gupta (1977) reported that blood haemoglobin level was directly related with ovarian cyclicity. The results of the present study indicate that the levels of copper, zinc, cobalt,

Table 1. Mean levels of trace minerals, glucose and haemoglobin in relation to occurrence of post-parturient oestrus in buffaloes

	Post-parturient oestrus after 90 days (Gr-1)	Post-parturient oestrus within 90 days (Gr-2)
No. of buffaloes	10	6
Average duration of post-parturient oestrus (days)	> 90	78.0±3.96
Mean plasma copper level (µg/ml)	1.125±0.024	1.209±0.026
Mean plasma zinc level (µg/ml)	1.484±0.029	1.472±0.031
Mean plasma cobalt level (µg/ml)	0.541±0.024	0.477±0.020
Mean plasma glucose level (mg%)	52.49±1.382	53.82±1.744
Mean blood haemoglobin level (g%)	13.29±0.209	13.63±0.256

I compared to group-2, whereas zinc and cobalt levels in group-1 were slightly higher than group-2. t-test analysis in between the levels of copper, zinc, cobalt, glucose and haemoglobin in group-1 and group-2 did not reveal significant difference. McDowell and Conard (1977) opined that the critical levels of copper, zinc and cobalt in cattle are 0.68 µg/ml, 0.8 µg/ml and 0.25 µg/ml, respectively and the levels lower than above represent deficiency of these minerals. McDowell (1992) suggested critical levels for copper as 0.65 µg/ml and for zinc as 0.6 - 0.8 µg/ml. The levels obtained in the present study are much higher than the critical levels suggested by above workers. Similar results have been reported earlier by Chandolia and Verma (1987) and Paul *et al.* (2000) for copper; Dabas *et al.* (1987) for zinc and Tambe *et al.* (1996) for cobalt. However, the reports of Umesh *et al.* (1995) and Vohra *et al.* (1995) do not agree with the present findings in relation to trace animals. Blood glucose level has been found to have positive correlation with ovarian cyclicity in buffaloes by many of the earlier workers (Gupta, 1977; Dhoble and Gupta,

glucose and haemoglobin as observed in present study do not influence early or late occurrence of post-partum oestrus in buffaloes.

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