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Short Communication

Predicting Fertile Oestrus On The Basis Of Plasma Progesterone and Some Metabolites in Buffaloes*

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ABSTRACT

A study on 225 normal cyclic buffaloes revealed that the plasma progesterone concentration at fertile oestrus was significantly ($P < 0.01$) lower than the infertile oestrus (0.26 ± 0.02 vs 0.97 ± 0.13 ng/ml). Pregnancy occurred only in animals having basal progesterone level (< 0.3 ng/ml) at AI. The mean values of plasma glucose, total protein and total cholesterol concentration observed at oestrus in buffaloes were 57.65 ± 0.52 mg/dl, 7.92 ± 0.07 g/dl and 113.75 ± 2.82 mg/dl, respectively. The levels neither varied significantly between fertile and infertile oestruses nor between village centres, though the plasma total cholesterol was low at fertile oestrus.

Key words: Buffalo, Fertile oestrus, Plasma progesterone, Metabolites, Fertility.

INTRODUCTION

Enhancing buffalo productivity through genetic up-gradation using artificial insemination (AI) has contributed greatly to increased milk production in the country, however, the coverage of breedable cattle and buffalo population under AI is hardly 15 to 20 % (James, 2005). The major hurdle in the use of AI in buffaloes is poor manifestation of oestrus, inaccurate oestrus detection and thus inaccurate time of AI. Certain blood biochemical parameters may directly influence the reproductive performance of dairy animals (Kumaresan *et al.* 2001; Kavani *et al.* 2005). This study was, therefore, planned to investigate whether the plasma progesterone and certain metabolites at the time of AI can predict fertile or infertile oestrus in buffaloes.

About 225 buffaloes selected at random from Chikhodra, Bedva and Sarsa villages of Anand district (Gujarat) were inseminated at oestrus by the trained lay inseminators of Amul dairy between December 2006 and May 2007. Jugular blood samples were collected immediately after AI in heparinized vials. Plasma was stored at –20°C till analyzed. Pregnancy was confirmed in non-return animals per rectum by 60 days post-AI.

The plasma samples were used to estimate the P_4 profile employing standard RIA technique of Kubasic *et al.* (1984). Labelled antigen (with I^{125}), antibody coated tubes and standards were procured from Immunotech-SA, Marsielle Cedex, France. The sensitivity of the assay was 0.1 ng/ml. The intra- and inter-assay coefficient of variation was 5.4 and 9.1 %, respectively. The biochemical constituents, viz. plasma glucose (GOD/POD method), total protein (Biuret method) and total cholesterol (CHOD/PAP method) were estimated using standard procedures and kits procured from Crest Biosystems, Goa, with the help of Clinical Chemistry Analyser, Junior Selectra (Vital Scientific, the Netherlands). The data were analyzed statistically using chi-square test and student's 't'test.

Plasma progesterone was different ($P<0.01$) between fertile and infertile oestrus (Table 1) in accordance with a previous report (Panchal *et al.* 1992). Kumaresan *et al.* (2001) observed higher conception rate in cattle and buffaloes having low progesterone level (< 0.1 ng/ml) at oestrus/AI as compared to those having high progesterone. In the present study also, the overall lowest plasma P_4 at AI (0.62 ± 0.11 vs

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0.72±0.13 and 1.01±0.26 ng/ml) and the highest conception rate (37.83 vs 25.40 and 31.37 %) were recorded for Bedva centre as compared to other two centres. The village-wise results indirectly reflected the oestrus detection and insemination efficiency of three inseminators, the inseminator at Bedva being more efficient, followed by that of Chikhodra and the poorest one at Sarsa.

Table 1. Plasma progesterone and metabolic profile at oestrus / AI in buffaloes defined to be pregnant (P) and non-pregnant (NP) (Mean ± SE)

Group	No. of buffaloes	Progesterone (ng/ml)	Glucose (mg/dl)	Total protein (g/dl)	Cholesterol (mg/dl)
P	74	0.26±0.02**	56.50±0.83	9.73±0.14	108.11±5.29
NP	151	0.97±0.13	58.22±0.64	9.72±0.09	116.51±3.28

** $P < 0.01$ between groups.

Plasma glucose at fertile and infertile oestrus in buffaloes under study was not different (Table 1) suggesting no association of blood glucose with fertility status. Depression of blood glucose within normal range do not lower fertility, though a severe depression, which is not seen in this study, has been found to be associated with a reduced conception rate (Rodriguez *et al.* 2004).

Plasma total protein and plasma total cholesterol in buffaloes under study did not vary between fertile and infertile oestruses (Table 1), which is in support of the previous studies (Srivastava and Sahni, 2000, Ahlawat, 2003, Chandrakar *et al.* 2003). Moreover, there was some positive association between plasma cholesterol and P_4 profile at fertile ($r = 0.35$) and infertile ($r = 0.23$) oestrus in buffaloes under study. This was conceivable, since cholesterol is the precursor for steroid hormone synthesis in gonads.

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REFERENCES

Ahlawat, A.R. (2003). Clinical, biochemical and endocrinological diagnosis of patho-physiological conditions in Cattle. M.V.Sc. Thesis, Gujarat Agril. University, Sardarkrushinagar, India.

Chandrakar, D., Tiwari, R. P., Awasthi, M. K. and Hirpurkar, S. D. (2003). Serum biochemical profile of repeat breeder crossbred cows. Indian J. Anim. Reprod., **24**(2): 125-127.

James, J. (2005). Frozen semen production n India: scope and limitations. Lead paper in Proc. of National Seminar on Augmenting Reproductive Efficiency of Dairy Animals, organized by GLDB, December 10-12, Vety. College, Anand, pp. 8-19.

Kavani, F. S., Khasatiya, C. T., Sthanki, D. J., Thakor, D. B., Dhami, A. J. and Panchal, M. T. (2005). Studies on postpartum biochemical and hormonal profile of fertile and infertile oestrous cycles in Surti buffaloes. Indian J. Anim. Reprod., **26**(1): 1-6.

Kubasic, N. P., Hallauer, G. D. and Brodows, R .G. (1984). Evaluation of direct solid-phase RIA for progesterone, useful for monitoring luteal function. Clinical Chem., **30** (2): 284-286.

Kumaresan, A., Ansari, M. R., Rawal, C. V. S., Purbey, L. N and Sanwal, P. C. (2001). Influence of plasma progesterone level and cervical mucus fern pattern at oestrus on conception rate in bovines. Indian J. Anim. Reprod., 22(1): 83-84.

Panchal, M. T., Dhami, A. J., Mehta, V. M. and Kodagali, S. B. (1992). Plasma progesterone profile of fertility and infertile oestrous cycles in repeat breeding buffaloes. Indian Vet. J., 69: 766-767.

Rodriguez, I., Perez, C. C., Espana, F., Dorado, J., Hidalgo, M. and Sanz, J. (2004). Chemical levels in plasma from repeat breeder cows after artificial insemination. Archivos-de-Zootecnia, 53(201): 59-68.

Srivastava, S. K. and Sahni, K. L. (2000). Blood mineral level affecting pregnancy rate in cows and buffaloes. Indian J. Anim. Sci., 70 (1) : 33-34.

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