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SERUM BIOCHEMICAL CHANGES DURING ESTRUS IN BUFFLO-COWS AND THEIR RELATION TO CONCEPTION

(with One Table)

By

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التغيرات البيوكيميائية لمصل الدم أثناء الشبق وعلاقته بالحمل

نشأت صالح ، سيمى عطا الله ، أسامة غبص الله

سيمى شعراوى

أجريت هذه الدراسة على عدد ١٤ جاموسة غير عشار حلابه ومننقلمه فى دورة الشبق وفى
صحبه جيده .

يتراوح عمر هذه الحيوانات بين ٤ - ٧ سنوات وأعطت من ٢ - ٥ ولادات .
عند ظهور علامات الشبق على أى من هذه الحيوانات عرضت فى الوقت المناسب للتوثيب
الطبيعى من طلوقة جاموسى سليم وخصب وتم عزلها بعد ذلك لمدة ٦٠ يوم لتشخيص الحمل
بالجس عن طريق المستقيم .

أثناء الشباع تم أخذ عينة دم من كل جاموسة وتم فصل مصل الدم لتحديد تركيز العناصر الآتية
به وهى البروتين الكلى ، الزلال ، الجلوبيولين ، نسبة الزلال / الجلوبيولين ، الكوليسترول الكلى ،
الكالسيوم ، الفسفور غير العضوى ونسبة الكالسيوم / الفوسفور .

أثبتت الجس عن طريق المستقيم عن وجود عدد ٧ جاموسة عشار و ٧ أخرى غير عشار .
بينت نتائج التحليل لمصل الجاموس العشار وغير العشار أثناء الشبق عن وجود اختلاف
معنوى بين تركيز كل من العناصر الآتية :

البروتين الكلى ، الجلوبيولين ، الكالسيوم ، الفسفور العضوى ونسبة الكالسيوم /
الفسفور والحمل .

بينما تركيز كل من : الزلال ، نسبة الزلال / الجلوبيولين والكوليسترول أثناء الشبق لم يوجد
اختلاف معنوى بين الجاموس العشار وغير العشار .

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SUMMARY

The present study was carried out on 14 non pregnant regular cycling lactating healthy buffalo-cows. They aged 4-7 years and gave from 2-5 births. Each buffalo-cow came in estrus was subjected to natural service at the suitable time by a sound good fertile buffalo bull and isolated for 60 days till rectal palpation was performed for pregnancy diagnosis. During estrus blood samples were taken and serum total protein, albumin, globulin, A/G ratio, total cholesterol, calcium and phosphorus were estimated for each animal. By rectal palpation for pregnancy diagnosis 7 buffaloes were found pregnant and another seven were confirmed non pregnant. Serum analysis proved a significant differences between concentrations of total protein, Globulin, calcium, phosphorus and C/P ratio at estrus and conception while albumin, A/G ratio, total cholesterol showed no relationship with conception.

Keywords: Serum, biochemical changes, estrus, buffalo cows, relation, conception

INTRODUCTION

Reproductive inefficiency in lactating dairy buffaloes is a major problem in many dairy herds, delayed first service, failure of buffaloes to cycle, failure to observe estrous and poor conception rates are major contributors to this problem.

Blod profile had an intimate relationship with the fertility criteria and might be a potential aid in characterizing the infertility problems (FARRAG, 1978; LARSON *et al.*, 1980 and BARAKAT, 1982). ARZUMANJAN and DOROTIJUK (1964) observed that the blood-protein coefficient and serum albumin were higher in cows which conceived to insemination than in those failing to conceive. The supplementation of phosphorus to lactating cows in areas deficient in phosphorus improved pregnancy rate and the provision of protein was of equal if not greater importance than phosphorus (HART and MITCHELL, 1965).

ROWLANDS *et al.* (1977). found a higher levels of albumin and a significant decrease in globulin level between 40 and 100 days post-calving in cows which conceive one service. ROWLANDS *et al.* (1980) observed a significant lower concentration of albumin between 0 and 2 weeks postpartum in the blood of

Friesian cows which required four or more services per conception. They further added that globulin concentration and albumin/ globulin ratio during early postpartum were significantly related to conception rate. SNOOK (1964) concluded that delayed conception common in dairy herds was due to lack of phosphorus in the diet. HART and MICHELL (1965) observed that phosphorus supplement to lactating cows improved their conception. ROWLANDS *et al.* (1977) reported that there was no relationship between blood composition of phosphorus in dairy cows and the number of services required for conception. The adding of superphosphate to the drinking water of cows in an infertile dairy herd increased the first service pregnancy rate from 36.5 to 63.2% (SCHARP, 1979).

ROWLANDS *et al.* (1980) demonstrated that there was no relationship between conception rate and the concentration of cholesterol in the blood of Friesian cows. FINALLY ROWLANDS *et al.* (1977) reported in dairy cows that there was no relationship between blood composition of calcium and the number of services required for conception. The current literature lack any information about blood biochemical profiles during estrous in buffaloes and their relation to conception. This situation arouse the interest to assess a relationship between selected blood components during estrous and conception.

MATERIAL AND METHODS

A total of 14 non pregnant regular cycling lactating healthy buffalocows were included in the present study. The buffalo-cows aged 2-7 years weighed 500-600 kg and gave from 2-5 births. They were selected from a herd kept at the farm of the Faculty of Veterinary Medicine. The selected buffaloes were kept under the same nutritional and managerial regime during the course of the experiment. Each animal was gynaecologically examined according to ZEMJANIS (1970). The principles recommended by ROBERTS (1982) to assure the absence of cervicitis and endometritis were adopted. During estrus (which was manifested by receptivity toward the male and appearance of estrous signs, also a palpable Graafian follicle and turgid uterus by rectal examination) blood samples were collected from the jugular vein and allowed to clot and centrifuged at 3000 r.p.m. for 15 minutes for separation of serum. The separated serum stored at -20°C till processed further. Each buffalo-cow manifesting estrous was subjected to natural service by a sound good fertile buffalo bull common to the farm. The animals were kept away from buffalo bulls from the time of service till 60

days when they were examined for pregnancy by rectal palpation.

Biochemical determination of serum total protein (KING and WOOTON, 1982), albumin (DRUPT, 1974), inorganic phosphorus (KUTTNER and LICHTENSTEIN, 1930), Cholesterol (RATLIFF and HALL, 1973) and calcium (RAY-SAKER and CHAUHAN, 1967) were carried out using test kits.*

The obtained data using t-test were statistically analyzed according to SNEDECOR and COCHRAN (1967).

RESULTS

As shown in table 1 of the total buffalo-cows examined 7 were pregnant and 7 were non pregnant 60 days after natural service. The obtained results revealed a significant relationship between blood composition of total protein, globulin calcium and phosphorus during estrus and conception while albumin, A/G ratio and cholesterol showed no relationship with conception.

DISCUSSION

The most significant correlations observed between blood composition during estrus and conception involved serum total protein, globulin, calcium and phosphorus (Table, 1). The mean serum total protein in buffalo-cows which conceived has been estimated to be 7.61 gm/dl in comparison with 7.01 gm/dl for those buffaloes which failed to conceive, and these results are in agreement with those of ARZUMANJAN and DOROTJUK (1964) and HART and MITCHELL (1965) who reported that total protein was important for improving pregnancy rate. The relationship with globulin showed that the mean value in buffaloes which conceived has been estimate to be 4.43 ± 0.16 gm/l in comparsion with 3.68 ± 0.17 gm/dl for those which failed to conceive. Those buffaloes which became pregnant showed a significant ($P < 0.01$) increase in serum globulin level during estrus and these results suggest that globulin concentration during estrus was significantly related to conception. Similar findings in cows were observed by Rowlands *et al.* (1980) who found an increased globulin concentration in the 3 weeks following calving which was significantly related to conception rate.

The realltionship with calcium revealed that the mean value

* Biomerieux (Bain/France).

in buffalo-cows which conceived has been estimated to be 6.71 ± 0.17 mg/dl in comparison with 7.49 ± 0.29 mg/dl for those which failed to conceive. Pregnant buffaloes manifested a significant ($P < 0.05$) decrease in serum calcium level during estrus. These findings are contrary to those of ROWLANDS *et al.*, (1977) who concluded that in dairy cows 40 and 100 days post calving there was no relationship between blood composition of calcium and the number of services required for conception. The mean inorganic phosphorus concentration in dairy buffaloes during estrus has been estimated to be 3.49 ± 0.15 mg/dl and 2.88 ± 0.07 mg/dl for those conceived and not conceived respectively. These findings suggest that serum phosphorus concentration during estrus in buffaloes was significantly ($P < 0.01$) correlated with conception. SIMILARLY SNOOK (1964); HART and MICHELL (1965) and SCHARP (1979) reported that adding of phosphorus to lactating cows improved their conception. ROWLANDS *et al.* (1977) reported a reverse trend for phosphorus in dairy cows.

The mean albumin concentration during estrus for both conceived and not conceived lactating buffaloes was 3.19 ± 0.21 gm/dl and 3.33 ± 0.13 gm/dl respectively. No correlation occurred between albumin concentration at estrus and conception in buffaloes ROWLANDS *et al.* (1980) found no correlation between albumin concentration at 7-9 weeks after calving in cows and the number of services required for conception. Contrary results were obtained by ROWLANDS *et al.* (1977) in dairy cows. The mean A/G ratio during estrus for both conceived and not conceived lactating buffalos was 0.72 ± 0.06 and 0.91 ± 0.07 respectively. There was no correlation between conception and A/G at estrus in buffaloes. ROWLANDS *et al.* (1980) found that A/G ratio in lactating cows between 0 and 2 weeks postpartum was significantly related to conception. The average serum total cholesterol concentration during estrus for conceived and not conceived buffaloes was 45.83 ± 4.85 mg/dl and 51.31 ± 2.78 mg/dl respectively. No significant relationship was observed between conception and serum cholesterol level at estrus in buffalo cows. ROWLANDS *et al.* (1980) reported that there was no relationship between conception rate and the concentration of cholesterol in the blood of Friesian cows.

The mean C/P ratio during estrus for both conceived and not conceived lactating buffaloes was 1.94 ± 0.06 and 2.6 ± 0.08 respectively. Pregnant buffaloes manifested a significant ($P < 0.01$) decrease in C/P ratio during estrus, although the ratio for pregnant and non pregnant buffaloes during estrus are in agreement with the findings of CARNAHAN (1974) who concluded that if normal reproductive efficiency is to be maintained in

dairy cows Ca/P ratio should be between 1.5: 1 and 2.5: 1.

It can be concluded that in buffalo-cows blood composition of total protein globulin, calcium, phosphorus and C/P ratio during estrus showed a significant relationship with conception while albumin, A/G ratio and cholesterol exhibited no relationship with conception.

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