

قسم : الولادة - كلية الطب البيطرى - جامعة أسيوط .
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دراسات لبعض مكونات السيرم فى الأبقار والجاموس الخصيب
والذى يعانى من نقص الخصوية

أحمد عبد الرحيم

تم فى هذا البحث تعيين مستوى البروتين الكلى واليوريبا والجلوكوز فى سيرم
٣٥٩ جاموسه و ١٣٢ بقره جمعت من المجرر وكذلك من الحيوانات الحيه
بمحافظة أسيوط . وقد أوضحت النتائج أن هناك فروق معنوية فى مستوى
البروتين الكلى والجلوكوز بين الحيوانات التى تعانى من خمول فى المبيض
ومن مثيلتها ذات المبيض الطبيعية فى نشاطها الوظيفى .

وأوضحت الدراسة كذلك أن هناك زيادة معنوية فى مستوى البروتين الكلى
اثناء فترة الشبق فى حين كانت الزيادة المعنوية فى مستوى الجلوكوز واليوريبا
أثناء المرحلة الرابعة من دورة الشبق .

STUDIES ON SOME SERUM CONSTITUENTS IN FERTILE AND INFERTILE COWS AND BUFFALOES (WITH 5 TABLES)

BY

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SUMMARY

This study included determination of total protein, BUN and glucose in the sera of fertile and infertile animals. 359 buffaloes and 11 cows.

The results showed that animals with normally functioning ovaries possessed a significantly higher level of total serum protein (T.S.P.) and glucose than those with completely inactive ovaries. The level of T.S.P. showed significant increase during diestrus period while blood urea nitrogen (BUN) and glucose showed significant increase during oestrus period of the cycle.

Values of T.S.P. and glucose obtained during the dry season were much higher than the corresponding values obtained during the green season.

INTRODUCTION

Nutritional error had been repeatedly incriminated as an etiological factors of anoestrus in Cow (HIGNETT 1950, McCQUIRE, 1970; OSMAN *ET AL.*, 1970 and FARRAG, 1978).

ROBERTS (1971) and BROSTER (1973) cited that low plane of nutrition e.g. Lack of carbohydrates, proteins and fat may be one of the several causes of anoestrus and delay in the onset of puberty in cattle.

In buffaloes, RAIZADA *ET AL.* (1969) mentioned that fertility was significantly higher in animals maintained on plane of nutrition containing high percentage of proteins. Moreover, EL-NAGGAR *ET AL.* (1973) concluded that feeding high protein ration resulted in enhancing the attainment of puberty in buffalo-heifers.

Changes in the total plasma proteins indicate the status of animals body (CORNELIUS and KAENEKO, 1963). Moreover, COLES (1967) cited that alterations in the plasma proteins is most commonly associated with lack of proper diet or poor absorption of dietary constituents from the intestinal tract.

Urea is the chief end product of protein metabolism and it is excreted entirely by the kidneys. Its level in the blood is related directly to protein intake and to renal excretory capacity (GRADWOHL, 1956).

The present work was undertaken to study the changes in the total serum proteins, blood urea nitrogen (BUN) & glucose in fertile and infertile cows and buffaloes during the green and the dry season.

MATERIAL AND METHODS

The material used in this study included:

I- Clinical investigation of living animal:

A- Eleven native cattle heifers ranged in age from 1.5-2 year. From each animal, blood sample was taken weekly six times during dry season and six times during the green season. Just before blood sampling, rectal examination was performed to determine the stage of the cycle.

B- A total of 167 fertile and infertile buffalo heifers and buffalo cows were included in this part. For each animal rectal examination was performed twice with 7-10 day interval to determine the condition of the condition of the ovaries.

II- Slaughter house material:

A total of 192 non-pregnant genitalia of buffalo-cows (ranging in age from 6-12 years) were collected from Assiut Slaughterhouse.

We have adopted the classification reported by LE-SAWAF and SXGLUSR (1962) in grouping the ovaries according to Assiut slaughterhouse.

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In all cases, blood samples were withdrawn by venipuncture of the jugular vein to obtain clear sera.

Total serum proteins were estimated by means of ABLE refractometer (MACFATE, 1972) and blood urea-nitrogen (BUN) was estimated by RATTSKA (1970). Blood glucose was determined by the method of BENEDICT (1931).

Statistical analysis was done according to SNEDECOR and COCHRAN (1967).

RESULTS

Results are presented in Table 1 - 4. In all studied material, blood glucose and BUN showed significantly ($P/0.01$) higher values during diestrus while T.S.P. showed significantly ($P/0.01$) higher value during estrus.

Moreover, animals with normally functioning ovaries possessed a significantly ($P/0.05$) higher T.S.P. and blood glucose level than those with questionably active or completely inactive ovaries.

In Native cattle heifers, the obtained values for total protein and blood glucose during the dry season were much higher than the values obtained during the green season. In regard to BUN the reverse was true.

DISCUSSION

In all the studied material, T.S.P. showed significantly higher values during estrus. This can be attributed to the increased metabolic activity of the animal under estrogenic phase of the cycle. On the other hand, blood glucose and BUN levels were significantly higher during diestrus period. This probably reflect greater appetite under progesterone during the luteal phase of the cycle. Similar results were reported by BHAGWAN and DUTT (1974) in sheep.

Animals with normally functioning ovaries, in both cows and buffaloes possessed a significantly higher levels of T.S.P. and BUN, than those with questionable ovarian activity or those with completely inactive ovaries. In cattle, OLDS (1953) and ROBERTS (1971) cited that the quantity and quality of protein are important for reproductive functions. Similarly, DURREL, 1951; CHRISTIE, 1962 and BEEZE and PASZTOR 1964 cited that protein deficiency was claimed to be one of the major causes of infertility in cattle. In buffaloes, RAIZADA ET AL. (1969) reported that fertility was significantly higher in animals maintained on plane of nutrition containing high percentage of protein. EL-NAGGAR ET AL. (1973) concluded that feeding high protein ration resulted in enhancing the attainment of puberty in buffalo-heifers.

Moreover, COLES (1967) cited that alterations in the T.S.P. are most commonly associated with lack of proper diet or poor absorption of dietary constituents from the intestinal tract. The decrease of BUN is associated with decreased intake or impaired absorption of proteins.

The level of blood glucose was significantly lower in cows and buffaloes suffering from ovarian inactivity than those with normally active ovaries. These results are in agreement with the observations of OXENRELDER and WAGNER (1971), DOWNIE and GELMAN (1976), BOYD (1977) and DHOBLE and GUTPA (1978).

In Native cattle heifers, the serum values of total protein and blood glucose obtained during the dry season were much higher than the corresponding values obtained during the green season. Such result could be expected since the effect of climatic seasonal variations upon the biochemical constituents of blood have been demonstrated (TEERI ET AL., 1964); SINGH ET AL., 1966 and ROUSSEL ET AL., 1971). Moreover, AMER ET AL., (1977) stated that, in both cows and buffaloes, total serum protein and BUN reached its maximum level during summer season.

It can be suggested from this study that low level of total serum protein and glucose may be an indication of subnormal feeding and energy status of anoestrus cows and buffaloes and therefore, may be used to assess the reproductive function in these animals.

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TABLE (1): Total serum proteins blood urea nitrogen and blood glucose in relation to the ovarian function in slaughtered buffalo-Cows.

| Cand. of the ovaries | No. of animals | T.S. Proteins gm % | BUN mg% | Glucose mg% |
|----------------------|----------------|--------------------------|-------------------------|----------------------------|
| Bstrus | 39 | 8.01±0.46 (6.63-8.75) | 13.32± 2.1 (9 -16) | 46.4± 1.37 (43.9-40.2) |
| Dioestrus | 73 | 6.95±1.31 (6.0 -8.64) | 15.40± 2.6 (12 -19) | 49.6± 2.52 (45.1-55.6) |
| Total | 112 | 7.47±1.52 (5.01-7.19) | 14.36±3.1 (9 -19) | 48.0± 3.22 (43.9-55.6) |
| Q.O. | 27 | 6.78±0.92 (5.01-7.19) | 11.00± 0.8 (9 -12) | 47.9±4.12 (42.1-53.0) |
| S.O. | 53 | 5.22±1.06 (3.22-6.35) | 9.3 ± 0.9 (8 -13) | 44.8± 5.13 (40.13-56.1) |

TABLE (2): Total serum proteins, blood urea nitrogen and blood glucose in buffalo-heifers

| Stage of the cycle | No. of animals | S.T. Protein gm% | BUN mg% | Glucose mg% |
|--------------------|----------------|----------------------------|-----------------------------|------------------------------|
| Estrus | 17 | 9.15± 1.04 (7.17-12.53) | 19.55± 0.01 (18.1 -20.6) | 44.96± 1.22 (40.3 -48.5) |
| Dioestrus | 23 | 8.35± 1.25 (7.39-12.82) | 22.4 ± 1.0 (13.9 -24.2) | 46.2 ± 2.13 (41.8 -50.1) |
| Total | 45 | 8.33± 1.82 (6.10-12.82) | 20.98± 0.8 (18.1 -24.2) | 45.6 ± 3.24 (40.3 -50.1) |
| Static ovaries | 35 | 5.48± 0.66 (4.29- 7.19) | 12.6 ± 0.9 (10.2 -14.5) | 43.9 ± 1.15 (39.1 -47.5) |

TABLE (3): Total serum proteins, blood urea nitrogen and blood glucose in buffalo-Cows.

| Stage of the cycle | No. of animals | T. Protein gm% | BUN mg% | Glucose mg% |
|--------------------|----------------|--------------------------|----------------------------|----------------------------|
| Estrus | 16 | 7.90±1.89 (6.10-9.0) | 13.67± 0.3 (11.4 -15.6) | 47.4± 2.55 (41.6-54.1) |
| Dioestrus | 21 | 6.89±0.43 (6.00±7.40) | 14.9 ± 0.2 (12.6 -17.1) | 53.6± 3.40 (40.9-57.7) |
| Total | 37 | 7.33±2.12 (5.90-9.49) | 14.29± 0.3 (14.29-17.0) | 50.5± 2.11 (40.9-57.7) |
| Static ovaries | 50 | 5.61±1.05 (4.52-7.44) | 12.43± 0.4 (11.6-14.00) | 46.6± 2.26 (40.7-55.4) |

Q.O. = Questionable activity

S.O. = Static ovaries.

TABLE (4): Total serum proteins, blood urea nitrogen and blood glucose in relation to the ovarian Function in Native cattle heifers Green Season.

| Stage of the cycle | season | No. of animals | T. Proteins mg% | DUN mg% | Glucose mg% |
|--------------------|--------|----------------|-----------------|-----------------|------------------|
| Estrus | gree | 13 | 8.56 \pm 1.02 | 10.20 \pm 0.2 | 44.91 \pm 1.55 |
| | dry | | (6.98-11.03) | (8.01-12.3) | (40.5 -48.48) |
| Dioestrus | gree | 23 | 7.98 \pm 0.09 | 11.54 \pm 0.5 | 47.22 \pm 1.13 |
| | dry | | (6.69-12.04) | (8.7 -13.4) | (45.2 -52.1) |
| Total | gree | 36 | 8.20 \pm 1.22 | 10.87 \pm 0.8 | 46.07 \pm 2.26 |
| | dry | | (6.25-12.04) | (8.1 -13.4) | (40.5 -52.0) |
| Stalic ovaries | gree | 6 | 6.94 \pm 0.88 | 7.3 \pm 0.1 | 45.8 \pm 3.01 |
| | dry | | (4.17- 8.72) | (6.5 - 8.5) | (43.4 -57.3) |

TABLE (5): Serum total proteins, blood urea nitrogen and blood gucose in realltion to the ovarian function in Native cattle helper (Dry season).

| Stage of the cycle | No. of animals | T. Proteins gm% | BUN mg% | Glucose mg% |
|--------------------|----------------|---------------------|----------------|-------------------|
| Estus | 18 | 10.06 \pm 1.01 | 8.33 \pm 0.6 | 49.5 \pm 3.1 |
| | | (7.00-13.34) | (6.1 - 9.5) | (42.1-56.0) |
| Dioestrus | 20 | 9.45 \pm 0.72 | 9.66 \pm 0.3 | 56.7 \pm 1.31 |
| | | (7.13 \pm 13.00) | (8.1 -11.2) | (48.2 \pm 58.9) |
| Total | 38 | 9.63 \pm 1.19 | 9.00 \pm 0.7 | 53.1 \pm 3.42 |
| | | (7.13-13.34) | (6.1 -11.5) | (42.1658.9) |
| Static ovaries | 6 | 7.29 \pm 0.84 | 8.61 \pm 0.2 | 50.6 \pm 2.26 |
| | | (5.81- 8.21) | (7.0 - 9.1) | (46.7-55.4) |

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