

Higher Levels Of Total Protein Concentration In Uterine Secretions Of Non-Pregnant Buffaloes Than Cows

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Citation

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Abstract

Levels of total protein were estimated in the uterine secretions of six pregnant and seven non-pregnant cows and six pregnant and seven non-pregnant buffaloes, respectively. The mean values were 1.34 ± 0.24 mg/ml and 2.07 ± 0.77 mg/ml in case of non – pregnant cows and buffaloes, respectively and 59.8 ± 10.2 mg/ml and 48.25 ± 10.3 mg/ml in case of pregnant cows and buffaloes, respectively. The mean value of total protein was found to be very significantly ($p < 0.01$) higher in non-pregnant buffaloes compared to non-pregnant cows. The exact reason and the physiological significance of this finding is not known.

INTRODUCTION

Female sex steroids act on uterine endometrium to induce secretion of proteins from the epithelium into the uterine lumen [8]. These secreted proteins are believed to have roles in implantation and maintenance of pregnancy [4]. Proteins secreted by the female reproductive tract in the estrus phase may have an important role to play in gamete interaction. They may influence fertilization and implantation and early development of the embryo [3]. Some proteins synthesized in the oviduct and uterus of mammals have been thought to have significant effects on maternal immunity against fetus to maintain an environment conducive to successful reproduction [2].

Comparative studies on levels of proteins in uterine secretions of cows and buffaloes in pregnancy or in non-pregnant state could be useful in understanding species differences between the two, if any, in the immunobiology and physiology of reproduction. The present studies were undertaken with this objective since there are few reports in the available literature on this aspect.

MATERIALS AND METHODS

The uterine secretions of non-pregnant healthy animals (7 cows and 7 buffaloes) were obtained from the PAU Dairy Farm, Ludhiana. Uterine secretions from pregnant animals (6 cows and 6 buffaloes) were obtained from the Department of Veterinary Clinics and Continuing Education, PAU, Ludhiana. Uterine secretions from pregnant cows and buffaloes were collected at the time of Caesarian section

with the help of sterile syringes and from non-pregnant cows and buffaloes at the time of estrus with the help of Foley's catheter.

The levels of total proteins in the uterine secretions were estimated by Reinhold's method [6] with minor modifications. The sample (0.1 ml) was mixed with 4.9 ml of 0.75N NaOH. One ml of Biuret reagent was added to each tube immediately mixed thoroughly and was allowed to stand at room temperature for 20 min. for development of color. The optical density of the unknown sample against the reagent blank (containing 5 ml of 0.75N NaOH) was read at 545 nm.

RESULTS

TOTAL PROTEIN LEVELS IN UTERINE SECRETIONS OF NON-PREGNANT CATTLE AND BUFFALOES

The total protein levels were estimated in samples of uterine secretions of seven non – pregnant cows and seven non – pregnant buffaloes. The mean value of total proteins in case of cattle was 0.134 ± 0.024 g/100 ml (1.34 ± 0.24 mg/ml) (Table I) and in case of buffaloes it was 0.207 ± 0.077 g/100 ml (2.07 ± 0.77 mg/ml) (Table II), respectively. The total protein concentration in uterine secretions of non – pregnant buffaloes was found to be very significantly ($p < 0.01$) higher than that of non – pregnant cattle.

Figure 1

Table I: Levels of total proteins in uterine secretions of non – pregnant cows

S. no.	Animal no.	Protein concentration	
		g/100 ml	mg/ml
1	648	0.1292	1.292
2	696	0.1454	1.454
3	768	0.1292	1.292
4	725	0.1131	0.131
5	795	0.0969	0.969
6	823	0.1777	1.777
7	820	0.1454	1.454
Mean ± S. D.		0.134 ± 0.024	1.34 ± 0.24

Figure 2

Table II: Levels of total proteins in uterine secretions of non – pregnant buffaloes

S. no.	Animal no.	Protein concentration	
		g/100 ml	mg/ml
1	1860	0.1777	1.777
2	1887	0.1939	1.939
3	1905	0.3393	3.393
4	1870	0.1292	1.292
5	1716	0.1292	1.292
6	1862	0.3070	3.070
7	1786	0.1777	1.777
Mean ± S. D.		0.207 ± 0.077	2.07 ± 0.77

TOTAL PROTEIN LEVELS IN UTERINE SECRETIONS OF PREGNANT CATTLE AND BUFFALOES

The total protein levels were estimated in samples of uterine secretions of six pregnant cows and six pregnant buffaloes. The mean value of total proteins in case of cattle was 5.98 ± 1.02 g/100 ml (59.8 ± 10.2 mg/ml) (Table III) and in case of buffaloes it was 4.825 ± 1.03 g/100 ml (48.25 ± 10.3 mg/ml) (Table IV), respectively. The difference in mean values of total protein concentration in uterine secretions of pregnant cattle and buffaloes was not significant.

Figure 3

Table III: Levels of total proteins in uterine secretions of pregnant cows

S. no.	Animal no.	Protein concentration	
		g/100 ml	mg/ml
1	592	6.205	62.05
2	599	5.122	51.22
3	585	7.595	75.95
4	581	4.492	44.92
5	607	6.771	67.71
6	617	5.704	57.04
Mean ± S. D.		5.98 ± 1.02	59.8 ± 10.2

Figure 4

Table IV: Levels of total proteins in uterine secretions of pregnant buffaloes

S. no.	Animal no.	Protein concentration	
		g/100 ml	mg/ml
1	617	5.445	54.45
2	839	3.539	35.39
3	588	6.738	67.38
4	598	4.815	48.15
5	453	5.704	57.04
6	454	6.253	62.53
Mean ± S. D.		4.825 ± 1.03	48.25 ± 10.3

DISCUSSION

Studies on proteins in uterine flushings of bovines, particularly buffaloes, are scanty. Therefore, the present investigation was aimed at determining the protein concentrations in uterine flushings of healthy non – pregnant and pregnant cows as well as non – pregnant and pregnant buffaloes. In the present study, the total protein concentration in uterine secretions of non – pregnant buffaloes was found to be very significantly ($p < 0.01$) higher than that of non – pregnant cattle.

However, the difference between values in pregnant cows and buffaloes was non-significant.

The mean value of total proteins in case of non – pregnant cattle obtained in our study was found to be comparable to the value reported earlier [5]. The mean value was reported to be 1.07 ± 0.03 mg/ml. The significantly higher level of total protein in uterine secretions of non – pregnant buffaloes compared to non-pregnant cattle found in our study was rather unexpected. We have not come across any such report in the available literature. The exact significance of this finding is not known. The physiology of reproduction in buffalo is somewhat different to cattle in many respects. This data indicates that there is a biochemical basis for this difference between buffaloes and cattle.

Studies were conducted [1] on total recoverable uterine luminal protein in cyclic cattle and reported that maximal and consistent stimulation of intrauterine protein production and accumulation within the uterine lumen appeared to occur during periods associated with progesterone exposure. The total protein recovered from the uterine horns of cows was reported to be 5 to 10 mg during first two weeks of pregnancy while it increased to 15 to 25 mg during the third week of pregnancy [7].

Although the comparison between total protein values in pregnant cows and buffaloes did not reveal any significant difference in our study, more studies need to be carried out

using samples from different stages of pregnancy in both the species to make such a comparison more informative. Since such samples are difficult to procure in case of expensive animals kept on organized farms, our studies were limited to samples from pregnant animals taken during Caesarian sections only.

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