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# Mineral elements in follicular fluid of buffalo ovary

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**ABSTRACT**

Investigations were conducted on 250 buffalo ovaries bearing vesicular follicles procured from slaughter house to study mineral elements in the follicular fluid. The concentration of sodium ($Na^+$) increased in large follicles (75±4.2 ug ml). In small and medium follicles it was significantly less (25±2.4., 25±2.9 ug ml) whereas the concentration of $Mg^{++}$ and $Zn^{++}$ decreased in large follicles as compared to small and medium follicles. A corresponding increase in cacium ($Ca^{++}$) was observed in large follicles than small and medium sized follicles. No significant change has been found in value of $Cu^{++}$ all the three categories.

——x——x——x——

Mineral elements influence the physiology of reproduction through their actions as metalloproteins. Deficiency of these elements leads to impaired reproductive performance in mammals (Hidiroglou, 1979, Sikka 1992). Several ;eports are available on the profile of mineral elements in serum (Pathak and Janakiraman, 1987, Singh *et al.,* 1991, Takkar *et al.,* 1992), but no report is available on their concentration in the follicular fluid as well as their effect on reproduction. In the present investigation an attempt has been made to index the profile of mineral elements in the follicular fluid of buffalo ovary.

## MATERIALS AND METHODS

For the present study ovaries were procured from slaughter house, New Delhi. 250 ovaries bearing vesicles of different sizes were taken for the extraction of the follicular fluid. These were washed with deionized water. The follicular fluid was extracted with the help of sterilized disposable needle and the syringes. The follicles were classified into three categories on the basis of the amount of follicular fluid extracted from each follicle. These categories were small follicles (0.1-0,5), medium follicles (> 0.5 to 1 ml) and large follicles (f5h 1 to 1.5 ml).

**Digestion Technique:** The samples were digested in long necked round bottom flask with triple acid (nitric acid 70% perchloric acid, and sulphuric acid 10:3:1) in the ratio of 1:10 (V v). This process was executed by heating the content over the hot plate till the volume reduced to 1/2 ml. The final volume of the contents was made 5 ml by adding distilled water. These samples were stored at 4°C in plastic vials.

The concentration of mineral elements was determined by atomic absorption spectophotometer (Ludmilla, 1976) installed at Veterinary College, Ludhiana (Punjab), Students "t" test was used to test the validity of results (Zar, 1984).

## RESULTS AND DISCUSSION

The concentration of different mineral elements in the follicular fluid of buffalo ovary has been presented in Table 1.

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In the small and medium sized follicles the concentration of copper did not show any variation but declined significantly (Table 1) in the large follicles. Similar profile has been observed for $Mg^{++}$ and $Zn^{++}$. There is no significant difference in the concentration of small and medium follicles but the value decreased significantly in the large follicles. Further it was observed that concentration of sodium however increased significantly in the large follicles, while it remained same in small and large follicles. No difference was observed in the concentration of $Ca^{++}$ in the first two categories of follicles but there was significant increase in large follicles.

The various elements found in the follicular fluid have nearly the same levels as those found in the serum. Sodium in the cow follicular fluid is more in large follicles than in serum (Lutwakmann, 1954). Similar findings have been reported by Sharma *et al.*, (1995) in their study on the antral follicles of goat. The higher level is indication of active metabolic status of the granulosa cells of developing follicles and of the high osmotic pressure in the follicle as compared to plasma. It is because of the advancement in follicle size is a direct reflection of the number of granulosa cells present.

The deficiency of $Zn^{++}$ and $Cu^{++}$ have been reported to delay postpartum conception (Sexena and Gupta, 1995) in cattle. In the present study also the concentration of zinc declined significantly in the large follicles. The serum concentration of $Ca^{++}$ and $Mg^{++}$ are positively correlated to the blood levels of sex steroids (Prasad *et al.*, 1989; Singh *et al.*, (1991). In our study also the concentyration of $Cu^{++}$ is significantly high in small and medium sized follicles than in the large follicles which is in accordance with its correlation to estrogen secreting stage of the follicle.

The iron content in the follicular fluid varied significantly with the size of the follicle. It decreased significantly with the size of the follicle. The decrease can be attributed to varied levels of steroid hormones (estrogen and progesterone) possibly because of the increased haemodynamic pulses in the vascular shunt of reproductive tract of the animal (Hidiroglou, 1979).

No significant variation was observed in the levels of $Ca^{++}$ in small and medium sized follicles which is in accordance with the studies on $Ca^{++}$ and P levels in cyclic and anoestrus buffaloes (Venkateswarlu *et al.*, 1994). Kaushik and Bugalio, (1995) also did not report any significant variation in the $Ca^{++}$ levels during the periparturient period in goats.

The study has a limitation as nothing was known about the age and reproductive status of the animals as the ovaries were collected from slaughter house. However, the profile of elements is in accordance with similar studies carried out on other animals. Since the low concentration of trace elements may be a warning of subsequent infertility in the animal (Khattab *et al.*, 1991) further detailed studies are to be carried out to elucidate the precise role of these elements in ovaries physiology.

Table 1. Concentration of microelements in the follicular fluid of buffalo ovary.

| | N | Na | Ca | Cu | Fe | Zn | Mg (µg/ ml) |
|---|---|---|---|---|---|---|---|
| Small follicles | 25 | 25 ±2.4 | 6.9 ±1.1 | 1.25 ±.5 | 1.14 ±1.6 | 514.7 ±49.2 | 25 ±5.8 |
| Medium follicles | 18 | 25 ±2.9 | 5* ±1.6 | 1.25 ±8 | 13.5* ±3.9 | 604.1* ±52.1 | 28.9* ±4.9 |
| Large follicles | 15 | 75* ±4.2 | 8* ±1.2 | 0.83* ±05 | 8.3* ±2.1 | 264.1* ±30.1 | 10.4** ±2.5 |


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