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# Study on minerals Calcium and Phosphorus in different productive stages of *Holstein friesian* Cow breed in Anthiyur of Erode District, Tamil Nadu

Yaswanthkumar. S [1], Venkitachalam. R [2], Sreejit. K[3], Karthikeyan. M.[4] Ganapathi. P [5].

[1,2,3,4] PG and Research Department of Zoology

Kongunadu Arts and Science College (Autonomous)

G.N. Mills, Post, Coimbatore - 641 029.

[5] Bargur Cattle Research Station, Bargur, Erode-638501.

***Abstract:*** **Minerals play an important role for maintenance of various metabolic processes in animals. The minerals calcium (Ca) and phosphorus (P) plays an important role in milk production and puberty in different varieties of cows. The present study was carried out in Anthiyur taluk of Erode district to determine the serum Ca and P in three different productive stages of breed such as pregnant, non-pregnant and after calving *Holstein friesian* (HF) cow breeds. The study result shows that the mean blood serum calcium level was maximum in non-pregnant cows followed by pregnant cows and calves HF cows. Similarly, the mean serum P level was maximum in pregnant cows followed by non-pregnant and calved cows. The study results show that the calcium-phosphorus ratio of the study animal HF breed cows was 2:1.**

***Key words: Minerals, calcium, phosphorus, HF cow breeds, different productive stages.***

## Introduction

Minerals play an important role in the maintenance of various metabolic processes in animals. The macro elements such as calcium, phosphorus, magnesium, sodium, potassium, Sulphur and iron, zinc, manganese, copper, cobalt, selenium, iodine and chromium are considered as micro elements or trace elements. These minerals in the nutrients play a vital role in physiological processes in the animals. Among these two important minerals such as calcium and phosphorus play an important role for milk production, functioning of the nervous system and muscular system to function properly in cows (Krsmanovic et al. 2015). A total body calcium (99%) and total body phosphorous (80%) are stored in the cow bones (Golf et al. 2000). The deficiencies of these calcium and phosphorous components either can cause bones to become weaker or breakage. Even though the calcium is very essential for onset of lactation (Tsiamadie et al. 2016). The phosphorus deficiencies can lead to delay puberty in heifers (Horst et al. 1974). The present study was carried out to determine blood serum calcium and phosphorus levels in *Holstein friesian* cow breeds in Anthiyur taluk of Erode district because the farmers mostly preferred cows for their livelihood were HF breeds.

## Materials and Methods

The study was conducted in a dairy HF breed consisting of HF cows. In total, 15 clinically healthy cows of three different productive stages were selected VIZ., pregnant, non-pregnant and after calving. The blood samples were collected from different age groups of HF cows by trained veterinary doctors. The blood was collected from the external jugular vein of the animal aseptically into a 20 ml syringe. All the blood samples were drawn between 10.00 am to 12.00 pm. Thereafter the sera were placed BCA 9Ml vacuum tube and stored at -20ºC until analyzed. The blood serum samples were analyzed by using an auto analyzer machine in the

centralized clinical laboratory at Veterinary College and Research Institute in Namakkal to estimate calcium and phosphorus level in the blood sera of different cattle.

**Result**

A total of 12 different categories HF breed cows viz., pregnant, non-pregnant and calved cows were selected to determine calcium and phosphorus level. The mean calcium values were significantly higher in non-pregnant cows (Ca 16.02 ± 1.02) followed by pregnant cows (Ca 14.28 ± 4.01) and calved cows (Ca 12.95 ± 1.34). Similarly, the mean phosphorus value was highest in pregnant cows (P 8.68 ± 0.82) followed by non-pregnant cows (P 7.44 ± 0.56) and calved cows (P 5.75 ± 2.61) respectively. Among the two macro- nutrients namely Ca and P were analyzed, the mean blood serum calcium level was maximum in non-pregnant cows (16.02 ± 1.02) followed by pregnant cows (14.28 ± 4.01) and calved cows (12.95 ± 1.34). Similarly, the mean serum P level was maximum in pregnant cows (8.68 ± 0.82) followed by non-pregnant (7.44 ± 0.56) and calved cows (5.75 ± 2.61). The study results show that the calcium-phosphorus ratio of selected HF breed cows was 2:1.

**Discussion**

The calcium values are always high in lactating dairy cows (Reinhardt et al. 1988) and Ca plays an important role for milk production (Horst et al. 1986). The amount of Ca and P deposited into the bones was higher in younger animals than aged cows. The result of the present study indicates that the highest calcium levels were found in non-pregnant cows and lowest calcium were found in calved cows. Similarly, the highest phosphorus was recorded in pregnant cows and lowest in calved cows. The present study findings are similar to the findings of other researchers, who suggest that the significant calcium and phosphorus interaction may help to increase milk production in calving cows (Kincaid et al. 1981). The HF cattle breed regularly being fed with green fodder, dry fodder, supplements and concentrate feed. In addition to that the artificial mineral mixtures powders were provided along with concentrate feed during watering. More number of green fodders were provided to calving cows because P level is always high in green fodder because P is a key element for energy transfer as well as an important component for bones and teeth development (Jaswinder Singh et al. 2018). In an effort to avoid phosphorus deficiency, dairy cows are often given more phosphorus. The ratio of calcium and phosphorus of the HF breed is 2:1 according to the National Research Council (NRC) standard

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