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NUTRIENT COMPOSITION IN THE MILK OF TWO ENDEMIC COWS OF KERALA: A COMPARATIVE ANALYSIS WITH A CROSS BREED

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ABSTRACT

This investigation deals with the comparative analysis of the nutrient composition of milk samples of Vechur cow, Chembanaruvi cow with a cross breed jersey. Various physico-chemical parameters were noted. The pH varied between 6.0 to 6.1 in Vechur and Chembanaruvi cows but hybrid Jersey shows nearly neutral in nature i.e., 6.4. The minimum fat concentration in endemic verities reported was 3.2 g/100g the maximum fat concentration was 5.8 g/100g. But in hybrid cow's milk the fat concentration was 4.4 g/100g. The average calcium concentration in Vechur cow's milk was 129 mg/100g and in Chembanaruvi cow milk was 71.2 mg/100g. In cross breed jersey the calcium concentration was only 57.0 mg/100g. The protein concentration in Vechur cow's milk was 3.7%, in Chembanaruvi cow's milk was 2.7 % and in cross breed jersey the protein concentration was 2.5%. The carbohydrate concentration in Vechur r cow's milk was 3.8 g/100g, in Chembanaruvi cow's milk it was 8.0 g/100g and in cross breed Jersey it was 12.5 g/100g. The concentration of phosphorus in Vechur cow milk was 116 Mg/100g, Chembanaruvi cow's milk, there is a marginal increase was observed. It was 150 Mg/100g and in cross breed jersey the concentration was 140 Mg/100g.

Keywords: Vechur cow, Chembanaruvi cow, Milk, Nutrient composition, Endemic

INTRODUCTION

Milk is a significant provider to improving nutrition food security mostly in developing countries and it is a colloidal secretion contains plentiful nutrients such as calcium, magnesium, vitamin B12 selenium, riboflavin, and pantothenic acid. Milk is used as a medium for taking ayurvedic medicine in many preparations **[1]**. Compositions of nutrients in milk of mammalian species are affected by a variety of factors such as animal breeds, lactation period, age of animal, weather condition cow morbidity ecological and dietary composition **[2]** Cow is one of the chief suppliers of milk and meat products. Because of the high nutritious and therapeutic value, cow's milk has long been considered as a human food **[3]**. The Vechur cow is the first endemic cattle of Kerala registered with ICAR and additionally, The Guinness Book of Records recognized that Vechur cow is the smallest cattle breed in the world.

It is a breed of *Bos indicus* cattle and known by its place Vechur in Vaikom Taluk, Kottayam district of the state of Kerala in India **(Figure 1, 2)**.

Chembanaruvi cow is another endemicbreed from Kerala and also the milk of Chembanaruvi cow has great nutritive and therapeutic value. The notable feature of this cattle population is that, they are exclusively confined with the Western Ghats forest area. This cattle population is considered as the one of the oldest cattle's of Kerala. In earlier days tribal people were the custodian of Chembanaruvi cattle.

This research was carried out to highlighting milk quality of Vechur and Chembanaruvi cows by comparing it with a cross breed jersey.

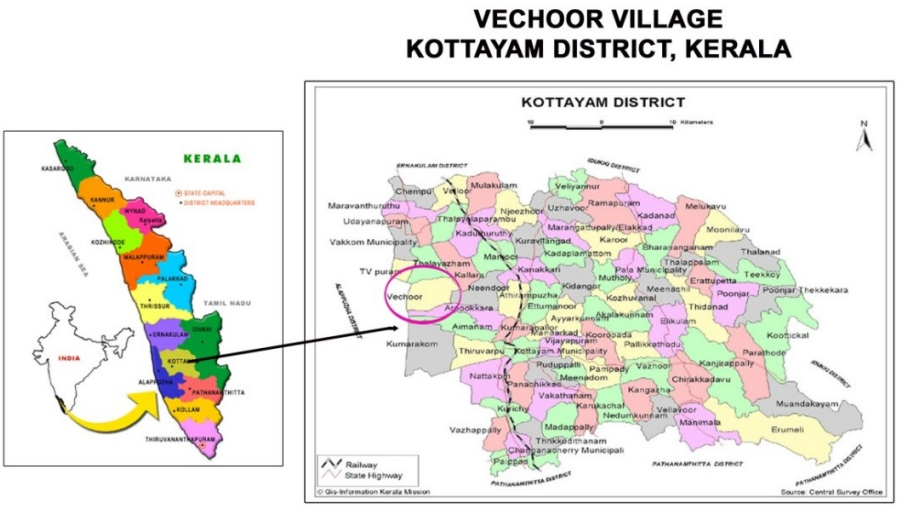

Figure 1: Vechur in Vaikom Taluk, Kottayam district of the state of Kerala in India

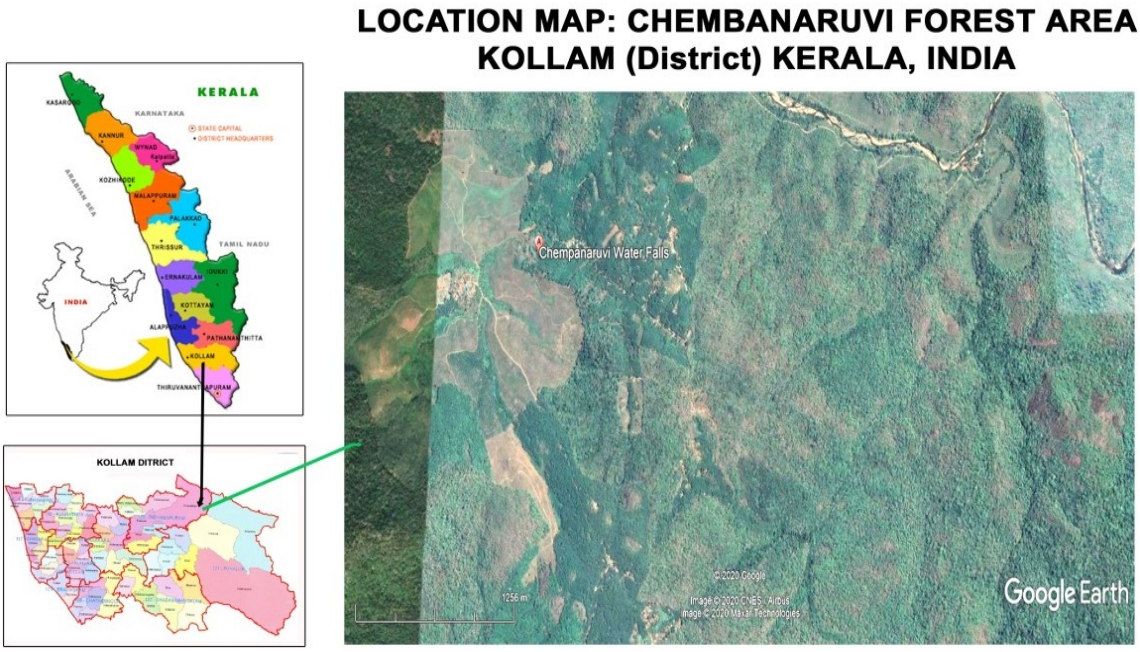

Figure 2: Location Map Chembanaruvi Forest Area Kollam, Kerala, India

MATERIALS AND METHODS

Collection of milk sample

The lactating cows of Vechur, Chembanaruvi and cross breed jersey were hand-milked before morning grazing. Representative samples of milk obtained from cows of each breeds were collected into clean, white plastic containers. The samples were taken in a cold box to the laboratory for comparative nutrient analysis.

Physico - chemical parameters of the sample

Assessment of pH

The pH was measured by using a digital pH meter.

Determination of Fat Content

The fat content was determined by using the standard method of **Mojonnier (1925) [4]**.

Determination of Calcium

The calcium content was determined by using the method of **Fernandez *et al*., (2002) [5]**.

Determination of Protein

The protein content was estimated by using the method of **Kjeldahl (1983) [6]**.

Determination of carbohydrate

The carbohydrate was estimated according to **AOAC (1990) [7]**.

Determination of phosphorus

The phosphorus was estimated according to **AOAC (1981) [8]**.

RESULT AND DISCUSSION

The pH of the milk sample analyzed reveals that the cow milk always slightly in acidic range. It is varied between 6.0 to 6.1 in Vechur and Chembanaruvi cows but hybrid Jersey shows nearly neutral in nature is 6.4. pH values found in cow milk were in agreement with the findings of **[9, 10] (Figure 3)**. The minimum fat concentration in indigenous verities reported was 3.2 g/100g the maximum fat concentration was 5.8 g/100g but in hybrid cow milk the fat concentration was 4.4 g/100g **(Figure 4)**. The present study reveals that there is a significant difference in concentration of fat content in hybrid indigenous cattle milk. The average calcium concentration in Vechur was 129 mg/100g. The calcium concentration in Chembanaruvi cow milk was 71.2 mg/100g. In cross breed jersey the calcium concentration was only 57.0 mg/100g **(Figure 5)**. There is a marginal deference in calcium concentration was observed in Vechur cows in comparison with cross breed jersey. This difference in concentration of calcium content in milk is also relevant factor about the quality of milk produced by our natural cow varieties. The total protein content analysis shows that in indigenous cow verities shows high protein content in comparison with hybrid verities ie. In Vechur cow milk the protein concentration is 3.7% in Chembanaruvi cow milk is 2.7 % in cross breed jersey the protein concentration was 2.5% **(Figure 6)**. The present study shows that there is marginal difference in protein concentration in different milk sample analyzed.

The carbohydrate concentration in Vechur cow's milk was 3.8 g/100g, in Chembanaruvi cow's milk it was 8.0 g/100g in cross breed Jersey it was 12.5 g/100g respectively. This data reveals that there is less amount of carbohydrate content was seen Vechur cow milk, slightly more concentration was observed in Chembanaruvi cow milk **(Figure 7)**.

The phosphorus concentration in Vechur cow milk was 116 Mg/100g, in Chembanaruvi cow milk there is a marginal increase was observed. It was 150 Mg/100g. In cross bred jersey the concentration was 140 Mg/100g **(Figure 8)**.

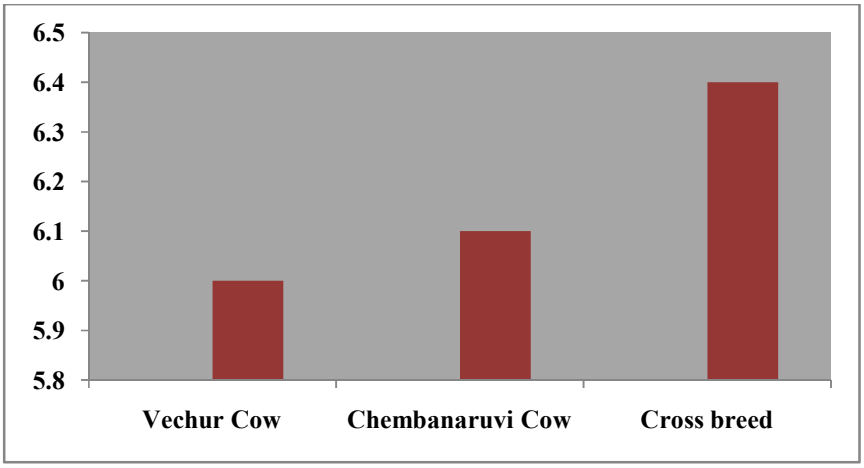

Figure 3: Comparative analysis of pH in milk samples

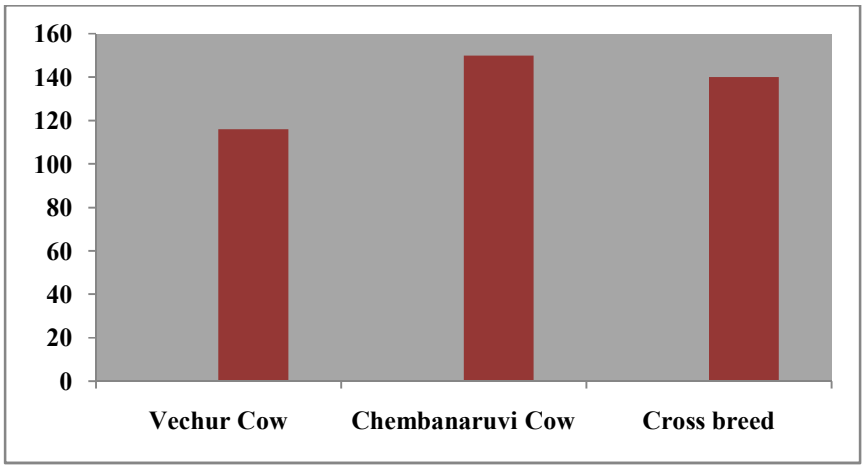

Figure 4: Comparative analysis of Fat

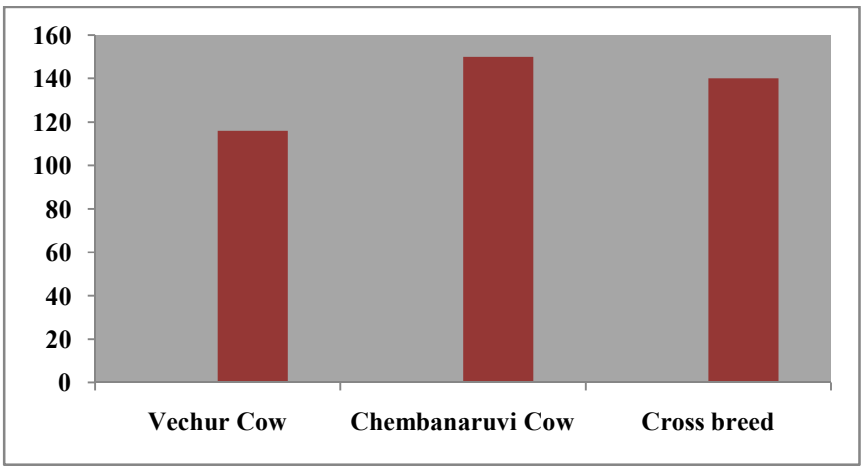

Figure 5: Comparative analysis of calcium

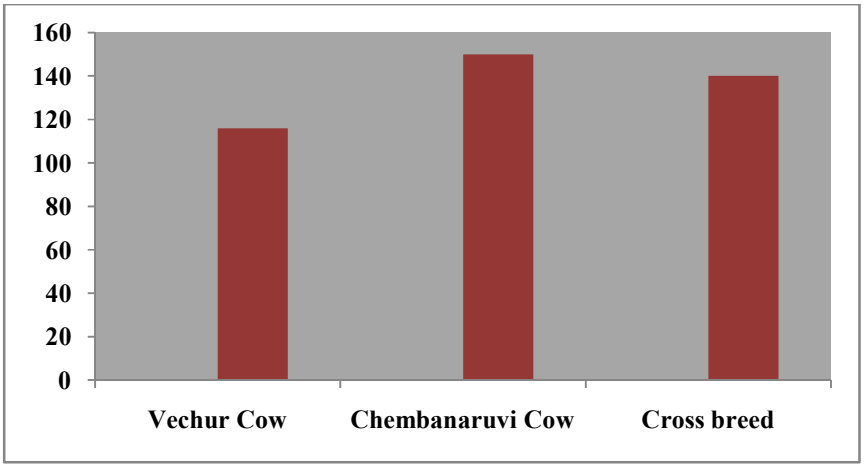

Figure 6: Comparative analysis of Protein

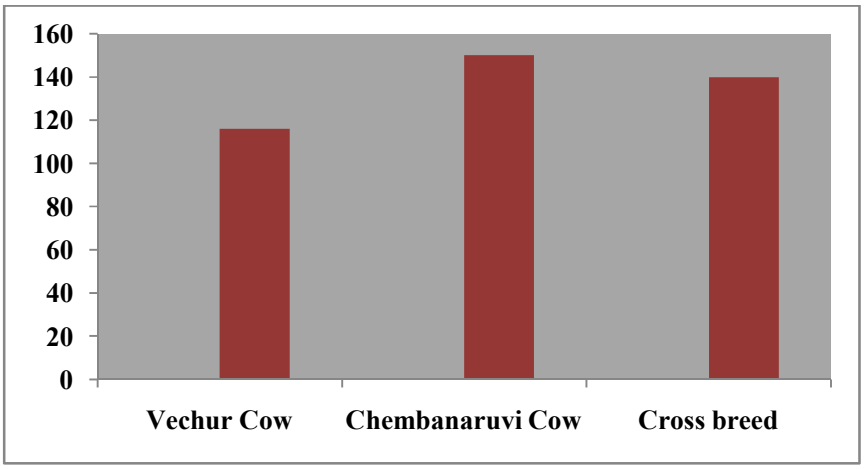

Figure 7: Comparative analysis of Carbohydrate

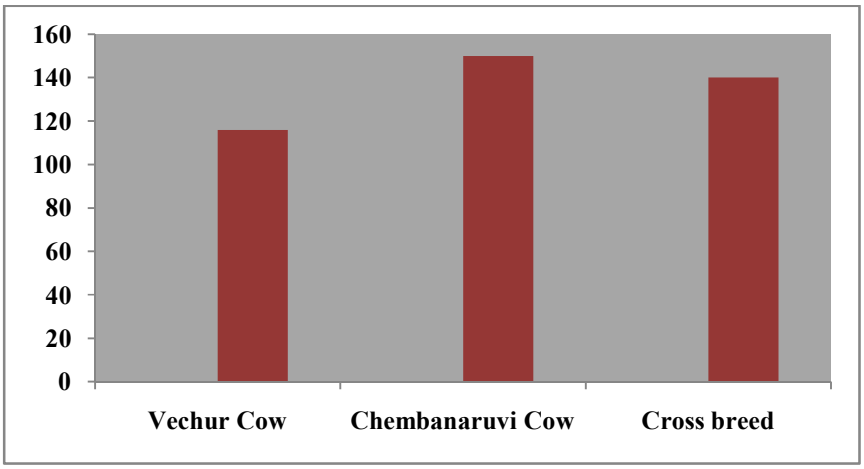

Figure 8: Comparative analysis of Phosphorous

CONCLUSION

This evidence reveals that there is a significant concentration difference in almost all parameters analyzed in indigenous cow milk of Vechur in comparison with cross breed jersey cow milk and also certain similarities in physico - chemical parameters were observed in between Vechur Chembanaruvi cows. In comparison with the hybrid varieties, the indigenous cow milk contents like calcium, proteins, fat content, minerals and phosphorous concentration are significantly varied. The Chembanaruvi indigenous cows are unknown for their characteristics in past, even though the current investigation revealed the similarities in milk characteristics between Vechur and Chembanaruvi cows. The present study also discloses the genetical relationship between Vechur Chembanaruvi cows

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