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Empirical assessment of the physico-chemical composition of colostrum in Kanni goat (*Capra hircus*)

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Abstract

The present study was undertaken to evaluate the physico-chemical composition of colostrum obtained from Kanni aadu goat (*Capra hircus*) breed predominantly reared in the southern part of Tamil Nadu. A total of 13 colostrum samples were collected within 24-48 hours after kidding and analysed using standard analytical procedures. The results revealed that the mean crude protein, fat and lactose contents were $5.39 \pm 0.35\%$, $5.62 \pm 0.28\%$ and $4.03 \pm 0.25\%$, respectively. The mean ash content was $0.91 \pm 0.05\%$, while the total solids and solid-not-fat contents were $15.78 \pm 0.60\%$ and $9.96 \pm 0.32\%$, respectively. The water content of the samples averaged $84.22 \pm 0.54\%$, whereas the density and acidity values were 29.58 ± 0.33 and 6.23 ± 0.07 , respectively. The findings indicate that Kanni goat colostrum is rich in nutrients and contains higher concentrations of protein, fat and total solids compared with normal milk.

Keywords: Kanni Aadu, colostrum, physico-chemical composition, total solids, empirical study

Introduction

Goat farming plays an important role in the agricultural economy of many developing countries, particularly in tropical and subtropical regions. Goats are well known for their adaptability to diverse climatic conditions, efficient feed conversion and ability to thrive under low-input production systems. In India, goat husbandry provides livelihood support for small and marginal farmers through the production of meat, milk and other by-products. Indigenous breeds such as the Kanni goat are well adapted to the agro-climatic conditions of southern India and contribute significantly to rural livestock production systems (Devendra and Burns, 1983) [4]. Colostrum is the first mammary secretion produced immediately after parturition and differs markedly from normal milk in its composition and biological properties. It contains high concentrations of proteins, immunoglobulins, lipids, vitamins and minerals which are essential for neonatal nutrition and immune protection (George F. W. Haenlein, 2004; Park *et al.*, 2007) [5, 10]. Colostrum also contains various bioactive compounds that support the development of the digestive and immune systems in newborn animals (Mehra *et al.*, 2020) [9]. The nutritional composition of colostrum is known to vary depending on several factors including breed, parity, stage of lactation, nutritional status and environmental conditions (Raynal-Ljutovac *et al.*, 2008) [11]. Compared with normal milk, colostrum generally contains higher levels of protein, fat and total solids while lactose concentration tends to be relatively lower. Several researchers have reported that goat colostrum is particularly rich in immunoglobulins and other bioactive components which play a vital role in passive immunity transfer to newborn kids (Kessler *et al.*, 2019) [7]. In spite of its importance, information on the composition of colostrum in indigenous goat breeds such as the Kanni goat is relatively limited. Understanding the physico-chemical characteristics of colostrum is essential for improving neonatal nutrition and management practices in goat production systems. Therefore, the present study was undertaken to evaluate the physico-chemical composition of colostrum obtained from Kanni goat using empirical laboratory data.

Materials and Methods

Sample collection

A total of thirteen colostrum samples were obtained from healthy Kanni goats (*Capra hircus*) maintained under typical field management conditions in the Tirunelveli region of Tamil Nadu. Sampling was carried out within 24-48 hours after parturition, corresponding to the early colostrum period. The samples were collected during the morning hours under hygienic conditions in sterile containers to avoid contamination. Immediately after collection, the samples were properly labeled and transported to the laboratory in chilled conditions using an insulated ice box to maintain their quality until analysis.

The collected colostrum samples were analysed for various physico-chemical parameters, including crude protein, fat, lactose, ash, total solids, solid-not-fat, water content, density and acidity using standard analytical procedures. The proximate composition of the colostrum samples was determined according to the methods described by the Association of Official Analytical Chemists (2005) [2]. The density of the samples was measured using a Milkoscan analyzer, while the acidity of the colostrum was determined by the titration method as prescribed by the Association of Official Analytical Chemists (1990) [3].

Statistical Analysis

The data obtained from the analysis were subjected to statistical evaluation using standard descriptive statistical methods.

Results and Discussion

The results of the present study are given in Table 1. It revealed that Kanni goat colostrum contains higher concentrations of nutrients compared with normal goat milk. The mean crude protein content observed in the present study was 5.39%, which reflects the high concentration of immunoglobulins and bioactive proteins typically present in colostrum. Similar findings have been reported in earlier studies where goat colostrum exhibited elevated protein (8.78%) levels during the early postpartum period. The mean fat content recorded in the present study was 5.62%, indicating that colostrum provides a significant source of energy required by newborn kids immediately after birth. Fat plays an important role in providing metabolic energy and supporting thermoregulation in neonatal animals. Comparable fat levels (7.5%) in goat colostrum have also been reported in previous studies on small ruminants.

The lactose content in the present investigation averaged 4.03%, which was relatively lower compared to lactose concentrations generally reported in normal goat milk. This decrease in lactose concentration is a characteristic feature of colostrum and is associated with the higher proportion of proteins and other solids (Mehra *et al.*, 2020) [9]. Similar trends have been observed in studies evaluating the composition of goat colostrum during the early lactation period (Kumar *et al.*, 2023) [8]. The mean total solids content of 15.78% observed in the present study indicates the dense nutrient composition of colostrum. Higher total solids content in colostrum compared to normal milk has also been reported by several researchers studying small ruminant milk composition (Park *et al.*, 2007) [10]. The solid-not-fat content averaged 9.96%, further demonstrating the presence of substantial amounts of proteins, lactose and minerals.

The water content in the samples ranged from 81.44% to 88.01%, while the acidity values recorded in the present study

were within the normal range reported for fresh goat colostrum. Variations in these parameters may be attributed to differences in physiological conditions and management practices among animals (Altintas and Kankavi, 2021) [1]. The mean density of Kanni goat colostrum recorded in the present study was 29.58 ± 0.33 , with values ranging from 27.90 to 31.56. The relatively higher density observed in colostrum compared with normal milk can be attributed to the elevated concentration of solids such as proteins, fat, minerals and other bioactive components present during the early stage of lactation. Colostrum is known to contain higher levels of immunoglobulins, casein and other nitrogenous compounds, which contribute significantly to its higher specific gravity. Similar observations have been reported in earlier studies on goat milk and colostrum composition, where the density of colostrum was found to be higher due to increased total solids content during the initial postpartum period (Park *et al.*, 2007) [10]. The density values obtained in the present investigation indicate the nutrient-rich nature of colostrum produced by Kanni goat.

Table 1: Mean $\pm$ SE of physico-chemical parameters of Kanni goat colostrum

Parameter	Mean	Minimum	Maximum	Standard Error
Crude protein (%)	5.39	3.18	7.10	0.35
Fat (%)	5.62	3.80	6.80	0.28
Lactose (%)	4.03	3.06	5.50	0.25
Ash (%)	0.91	0.60	1.20	0.05
Water (%)	84.22	81.44	88.01	0.54
Total solids (%)	15.78	12.70	18.56	0.60
Solid-not-fat (%)	9.96	8.19	11.70	0.32
Density	29.58	27.90	31.56	0.33
Acidity	0.191	0.178	0.220	0.04

The mean acidity of the colostrum samples in the present study was $0.191 \pm 0.004\%$ lactic acid, with a range of 0.178 to 0.220%. These values fall within the normal range reported for fresh goat colostrum. The slightly higher acidity of colostrum compared with normal milk may be attributed to its higher concentration of proteins, minerals and other buffering substances. Colostrum typically exhibits increased titratable acidity during the early postpartum period because of the elevated levels of casein and whey proteins present in the secretion. Similar acidity values in goat colostrum have been reported in previous studies evaluating the physico-chemical properties of small ruminant milk (Raynal-Ljutovac *et al.*, 2008; Mehra *et al.*, 2020) [11, 9]. The acidity levels recorded in the present study suggest that the colostrum samples were fresh and of good quality at the time of analysis.

Overall, the findings of the present study confirm that colostrum from Kanni goat is a nutritionally rich secretion containing high levels of essential nutrients and bioactive compounds. Such nutritional richness is crucial for supporting early growth, immune protection and survival of neonatal kids. Similar conclusions have been reported in several studies evaluating the nutritional and functional properties of goat colostrum (Mehra *et al.*, 2020; González-Navarro *et al.*, 2022) [9, 6].

Conclusion

The present study revealed that colostrum from Kanni goat is rich in protein, fat and total solids. The high nutrient concentration observed in the samples highlights the importance of colostrum intake by newborn kids immediately after birth for optimal growth and immune protection. The

information generated in this study may contribute to a better understanding of the nutritional characteristics of indigenous goat breeds.

Conflict of Interest

Not available

Financial Support

Not available

References

1. Altintas R, Kankavi O. Changes in total antioxidant contents of colostrum of Honamli and Hair goat breeds during the first five days of parturition. *Indian Journal of Animal Research*. 2021; 55:1010-1013.
2. AOAC International. Official methods of analysis of AOAC International. 18th ed. Gaithersburg (MD): Association of Official Analytical Chemists; 2005.
3. AOAC. Official methods of analysis. 15th ed. Arlington (VA): Association of Official Analytical Chemists; 1990.
4. Devendra C, Burns M. Goat production in the tropics. Farnham Royal (UK): Commonwealth Agricultural Bureaux; 1983.
5. Haenlein GFW. Goat milk in human nutrition. *Small Ruminant Research*. 2004; 51:155-163.
6. González-Navarro EJ, Beltrán MC, Molina MP, Pérez-Barbería FJ, Berruga MI. Suitability of goat colostrum to produce a fermented yogurt-type product. *Animals*. 2022; 12:3025-3025.
7. Kessler EC, Bruckmaier RM, Gross JJ. Immunoglobulin G content and colostrum composition of different goat and sheep breeds. *Journal of Dairy Science*. 2019; 102:5542-5549.
8. Kumar B, Singh DV, Palod J, Kansal G. Pattern of immunoglobulin and physico-chemical composition of goat colostrum. *Theoretical Biology Forum*. 2023; 12:282-288.
9. Mehra R, Sangwan K, Garhwal R. Composition and therapeutic applications of goat milk and colostrum. *Research and Reviews: Journal of Dairy Science and Technology*. 2020;1-1.
10. Park YW, Juárez M, Ramos M, Haenlein GFW. Physico-chemical characteristics of goat and sheep milk. *Small Ruminant Research*. 2007; 68:88-113.
11. Raynal-Ljutovac K, Lagriffoul G, Paccard P, Guillet I, Chilliard Y. Composition of goat and sheep milk products. *Small Ruminant Research*. 2008; 79:57-72.

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