Bio Vet Innovator Magazine
(Fueling The Future of Science...)
Volume 3 (Issue 6) JUNE 2026
OPEN ACCESS World Environment Day – 05th June 2026 Review Article

Recent Advances and New Trends in Goat Milk Products for Human Health and Nutrition

Sandeep Kumar[1], Gagan Chawla[2] and Vinay Kumar[3]
1Ph.D. Scholar, Department of Livestock Products Technology, College of Veterinary and Animal Science, Rajasthan University of Veterinary and Animal Sciences, Bikaner-334 001, Rajasthan, India
2PhD Scholar Animal Physiology Division, ICAR- National Dairy Research Institute, Karnal 132001, Haryana, India
3Ph.D. Scholar, Department of Veterinary and Animal Husbandry Extension Education, College of Veterinary and Animal Science, Rajasthan University of Veterinary and Animal Sciences, Bikaner-334 001, Rajasthan, India
***Corresponding Author:** dr.saharans123@gmail.com
DOI: https://doi.org/10.5281/zenodo.20710294

Received: June 07, 2026
Published: June 14, 2026

Abstract:

Goat milk occupies a distinctive position in global dairy nutrition, combining a favourable macro- and micronutrient profile with functional properties that confer health and therapeutic advantages over bovine milk. With a global goat population exceeding one billion and India holding the foremost position in goat milk production, contributing approximately 26% of world output, the significance of this resource for both smallholder livelihoods and consumer health is considerable. Goat milk is characterised by smaller fat globules, a higher proportion of medium-chain fatty acids (MCFA), comparatively low αs1-casein, and greater buffering capacity, which collectively render it superior in digestibility and tolerability to cow milk, particularly for individuals with lactose intolerance or bovine milk allergies. Its richness in calcium, phosphorus, magnesium, riboflavin, and vitamins A and D positions goat milk as a functional food applicable to infants, the elderly, and immunocompromised individuals. The growing interest in value-added goat milk products encompassing an extensive range of cheeses, yoghurt, ice cream, butter, paneer, powdered milk, and cosmetic formulations has expanded the commercial and nutritional relevance of goat dairy far beyond primary milk consumption. Contemporary dairy-processing science has further demonstrated that goat milk's bioactive components, including bioactive peptides, nucleotides, and polyamines, warrant its classification as a functional food in the modern sense. Despite its promise, challenges related to the characteristic caprine flavour, seasonal production variability, microbial safety, and limited processing infrastructure continue to constrain broader market development. This review consolidates current evidence on the composition, health benefits, processing potential, and value-added product development of goat milk, highlighting priority areas for further research and commercial advancement.
Keywords: Goat milk, dairy products, nutritional value, functional food, value-added products.

Introduction:

Globally, livestock production has expanded in parallel with rising human populations, with the world's goat population presently exceeding one billion animals distributed across more than 210 recognised breeds. India, which holds one of the largest goat populations in the world, recorded approximately 148.88 million goats in the 20th Livestock Census (2019), reflecting a growth of about 10.1% over the figure of 135.17 million recorded in 2012. India also ranks **first** in goat milk production globally, contributing about **26%** of the world's total goat milk output; domestic production, estimated at 5,180 thousand metric tonnes in 2014-15, has risen steadily to approximately 7 million metric tonnes in 2023-24 (DAHD, 2024; FAO, 2023). Notable Indian breeds include Jamunapari, Barbari, Beetal, Surti, and Jakhrana, each adapted to the diverse agro-climatic conditions of the subcontinent.

Among all farm animals, goats possess the widest ecological adaptability, thriving on varied vegetation across arid, semi-arid, and humid zones, and have consequently served as a vital livelihood resource for rural and marginalised communities since their domestication approximately 10,000 years ago during the Neolithic period (Yadav *et al.,* 2016). Often described as the 'poor man's cow', the goat uniquely combines the attributes of a small body size amenable to household management, a resilient digestive system capable of exploiting low-quality forage, and multi-purpose production of milk, meat, fibre, and skin. Goats contribute approximately **2%** of the world's total milk supply; yet, more people worldwide depend on goat milk than on the milk of any other single species, making it a cornerstone of nutrition in many developing regions (Risko and Csapo, 2019).

Goat milk contains approximately **3.1%** protein, **3.5%** fat, **4.4%** lactose, and **0.8%** ash, providing around 60 kcal per 100 ml. Its chemical composition is influenced by breed, feeding regime, stage of lactation, health status, season, and management practices (Nayik *et al.,* 2022). The value of goat milk extends beyond basic nutrition, it is widely recognised as a functional food that positively influences biological functions, reduces disease risk, and supports overall well-being. It serves additionally as a medicinal food for individuals with cow milk allergies, and in India is traditionally recommended for managing conditions such as asthma, eczema, indigestion, liver disorders, and for supportive nutrition in dengue fever convalescence, although rigorous clinical evidence for some of these uses remains limited (Lad *et al.,* 2017). A comprehensive overview of goat milk's potential as a functional food has been provided in earlier reviews (Yangilar, 2013). The present review aims to consolidate advances in the composition, nutritional properties, health benefits, and value-added product development from goat milk, with a focus on its expanding role in human health and the dairy industry.

World Milk Production and Goat Population Statistics:

Cow's milk dominates global milk supply at over 83% of total output, followed by buffalo milk at nearly 13%, with goat milk contributing approximately 2.3%. Despite its comparatively modest volume, goat milk commands a strategic position in the economies of developing nations, where it constitutes the primary dairy source for rural households. As shown in Table 1, India's contribution to world buffalo milk production is disproportionately large at 67.45%, while its share of goat milk production stands at 25.83%, underlining the country's central role in the global goat dairy sector (FAO, 2023).

Table 1: World milk production by species and India's share (%)

Species	Share in World Production (%)	India's Share of World Total (%)
Cattle	83.20	8.40
Buffalo	12.80	67.45
Goat	2.30	25.83
Sheep	1.40	-
Others	0.30	-

Source: FAO (2023); DAHD (2024)

Among the small ruminant species, goats occupy a more prominent position than sheep in terms of India's global standing. India ranks **first** globally in goat numbers, holding nearly **20%** of the world's goat population, compared to 4.5% of the world's sheep (Table 2). This demographic dominance reflects the deep integration of goat rearing into India's smallholder farming systems (DAHD, 2024).

Table 2: Comparative small ruminant population in India and the world (million head)

Species	India (million)	World (million)	India's Share (%)	India's Global Rank
Goat	148.88	~1,000	~20	1st
Sheep	74.26	~1,200	~4.5	5th

Source: 20th Livestock Census (2019); FAO (2023)

Within the Indian milk production basket, buffalo milk holds the largest share (52.8%), followed by cow milk (43.7%), with goat milk contributing **3.5%.** Despite this modest proportional share, the absolute volume and its nutritional significance in rural populations underscore the economic and food security value of goat dairy (Nayik *et al.,* 2021).

Composition And Nutritional Value of Goat Milk:

Goat milk is a complete food, supplying water, protein, fat, carbohydrates, minerals, and vitamins in proportions suitable for human nutritional requirements. A comparison of milk composition across species (Table 3) reveals that goat milk is broadly similar to cow milk in major constituent percentages, yet differs meaningfully in the character and arrangement of its constituents. The fat globules in goat milk are smaller than those in cow milk, the curd formed on acidification is softer and more friable, and the milk is naturally homogenised due to the absence of agglutinin characteristics that collectively enhance the rate and ease of digestion (Moatsou and Park, 2017). Goat milk contains a higher proportion of short- and medium-chain fatty acids (MCFA), particularly caproic (C6), caprylic (C8), and capric (C10) acids, which are rapidly absorbed and metabolised for energy, making goat milk especially suited to growing children and patients with lipid malabsorption (Panta *et al.,* 2021).

Citation: Sandeep Kumar, Gagan Chawla and Vinay Kumar. (2026). Recent Advances and New Trends in Goat Milk Products for Human Health and Nutrition. In Bio Vet Innovator Magazine (Vol. 3, Issue 6, pp. 34–42). Bio Vet Innovator Magazine. https://doi.org/10.5281/zenodo.20710294

Table 3: Comparative milk composition per 100 g across major dairy species

Constituent	Unit	Cow	Goat	Buffalo	Sheep
Water	g	87.8	88.9	81.1	83.0
Protein	g	3.2	3.1	4.5	5.4
Fat	g	3.9	3.5	8.0	7.0
Lactose	g	4.8	4.4	5.1	4.9
Energy	kcal	66	60	110	95
Saturated fatty acids	g	2.4	2.3	4.2	3.8
Monounsaturated FA	g	1.1	0.8	1.7	1.5
Polyunsaturated FA	g	0.1	0.1	0.2	0.3
Cholesterol	mg	14	10	8	11
Calcium	mg	120	100	195	170

Source: Nayik *et al.* (2022); Yadav *et al.* (2016)

One 244 ml glass of goat milk provides approximately 168 kcal, 10.9 g protein, 11 g carbohydrates, and 10 g fat. Its mineral profile is notably strong, delivering 327 mg calcium (33% DV), 271 mg phosphorus (27% DV), 498 mg potassium (14% DV), and 34 mg magnesium (9% DV) per serving. Vitamin contributions include 483 IU of Vitamin A (10% DV), 0.3 mg riboflavin (20% DV), 3.2 mg Vitamin C (5% DV), and 29.3 IU Vitamin D (7% DV). Notably, goat milk is richer in calcium, magnesium, and phosphorus compared to cow and human milk, reinforcing its value in supporting bone mineralisation, immune function, and haematopoiesis (Lad *et al.*, 2017). The chemical quality of goat milk is defined by its capacity to withstand technological processing while meeting consumer expectations across dimensions of safety, nutritional value, and sensory appeal (Premjibhai, 2017; Ribeiro and Ribeiro, 2010).

Health And Therapeutic Benefits of Goat Milk:

Several attributes distinguish goat milk as nutritionally and therapeutically superior to bovine milk in specific populations. Its higher buffering capacity is of direct clinical relevance in the management of gastric hyperacidity and peptic ulcers (Rai *et al.*, 2022). The lower αs1-casein and higher αs2-casein content of goat milk produce a weaker, more digestible curd upon acidification, accounting for greater tolerability in individuals with bovine milk protein sensitivity (Nayik *et al.*, 2022). In an extensive French clinical study involving children with confirmed cow milk allergy, 93% demonstrated positive responses upon introduction of goat milk, which was accordingly recommended as a valuable alternative in child nutrition (Lad *et al.*, 2017).

Goat milk exhibits a hypocholesterolaemic effect attributable to its higher MCT content, which suppresses endogenous cholesterol synthesis by approximately 36%, compared to 21% in cow milk (Panta *et al.,* 2021). Studies in iron-deficient rats have further shown that animals maintained on goat milk demonstrated significantly higher liver weights, superior haemoglobin regeneration efficiency, and markedly greater iron absorption rates compared to those fed cow milk, suggesting enhanced iron bioavailability from goat milk (Abd Majid *et al.,* 2020). From a developmental nutrition standpoint, goat milk contains nucleotides, free amino acids, and polyamines at concentrations comparable to human milk, making it a suitable base for infant formula preparations (Pal and Jadhav, 2013). Its immunological significance is further underlined by studies indicating that goat milk components can modulate innate immunity and attenuate inflammatory responses, supporting its potential role as a functional food in the prevention and management of chronic inflammatory and metabolic conditions (Nayik *et al.,* 2021).

Value-Added Products of Goat Milk:

The diverse compositional properties of goat milk underpin its suitability as a raw material for an extensive range of dairy products. Cheese, cultured products, ice cream, butter, paneer, powdered milk, and cosmetic preparations collectively constitute the principal categories of value-added goat milk products with established commercial and nutritional significance (Moatsou and Park, 2017; Tafes, 2020).

Cheese:

Cheese holds the greatest economic value among all manufactured goat milk products, with over 400 varieties documented globally. Goat milk cheese broadly encompasses hard varieties such as Cheddar, Gouda, and Mozzarella; soft varieties such as Brie, Feta, and Farmer's Cheese and flavoured specialities including herb and vegetable, fruit-infused, and spiced formats. Goat milk cheese generally provides superior nutritional characteristics compared to bovine cheese, offering lower calories, higher protein, lower fat, and reduced cholesterol per unit weight (Table 4). Traditional Greek Feta, prepared with a minimum of 70% sheep's milk and up to 30% goat's milk, is characterised by a salty, tangy flavour, dry crumbly texture, maximum moisture of 56%, minimum fat content of 43% DM, and a pH of 4.5. Goat milk Cheddar, produced from pasteurised milk, possesses a smooth, mild flavour notably free of the pungency typically associated with rind-ripened varieties. Italian Caprino, traditionally made from whole or skim goat's milk, and the delicate Brie with its pale interior and white-mould rind represent the breadth of European artisanal goat cheese traditions (Kochubei-Lytvynenko *et al.,* 2019).

Table 4: Nutritional comparison of goat soft cheese and bovine cream cheese per 28 g (1 oz)

Nutrient	Bovine Cream Cheese	Goat Soft Cheese
Energy (kcal)	99.5	69.4
Protein (g)	2.1	4.0
Total Fat (g)	10.0	5.5
Cholesterol (mg)	30.5	17.6
Sodium (mg)	84.5	83.4

Source: Nayik *et al.* (2022)

Citation: Sandeep Kumar, Gagan Chawla and Vinay Kumar. (2026). Recent Advances and New Trends in Goat Milk Products for Human Health and Nutrition. In Bio Vet Innovator Magazine (Vol. 3, Issue 6, pp. 34–42). Bio Vet Innovator Magazine. https://doi.org/10.5281/zenodo.20710294

Ice Cream and Frozen Desserts:

Goat milk ice cream contains lactose at markedly lower concentrations than its bovine counterpart, making it an accessible option for individuals with mild lactose sensitivity. The unique fat composition of goat milk imparts a less fatty mouthfeel compared to cow's milk ice cream and enhances the expression of flavour notes such as salted caramel, honeycomb, and fruit variants. Its natural homogenisation contributes to a smoother texture in the final product, reducing the need for added stabilisers (Moatsou and Park, 2017).

Butter:

Goat butter is distinctly white in colour, in contrast to the yellow appearance of bovine butter, because goats convert beta-carotene entirely into colourless Vitamin A, leaving no residual pigment in the milk fat. Food-grade colourants are sometimes employed by manufacturers to impart a more conventionally recognised butter appearance. Its composition makes it suitable for individuals who are sensitive to certain bovine milk proteins (Yadav *et al.,* 2016).

Paneer and Indigenous Products:

Paneer, the acid and heat coagulated fresh cheese widely consumed across South Asia, can be successfully manufactured from goat milk. Freshly prepared goat milk paneer is characterised by an absence of characteristic goaty odour, a semi-hard body with smooth texture, and freedom from air pockets. Consumer trials have documented wide acceptability and consistent demand for goat milk paneer, indicating its commercial viability in the Indian market (Pal and Jadhav, 2013).

Cajeta and Condensed Products:

Cajeta, a popular Latin American confection, is produced by prolonged simmering of goat milk with sugar until significant water evaporation and caramelisation yield a thick, viscous product of characteristic amber colour and rich flavour. Goat milk's strong buffering capacity enables a gentler, more controlled Maillard reaction during processing, producing a distinctive flavour profile that distinguishes goat cajeta from bovine condensed milk-based analogues.

Powdered and Dried Milk:

Goat milk powder retains the mild, sweet flavour of fresh goat milk and serves as a concentrated source of calcium, magnesium, and potassium, supplemented with Vitamins D3 and folic acid in commercial formulations. Powdered goat milk facilitates extended shelf life, ease of transport, and year-round availability in markets where fresh goat milk supply is seasonal or geographically limited. It is increasingly employed in infant formula development and as a dietary supplement in clinical nutrition (Song, 2022).

Cosmetic And Skin Care Applications:

Beyond alimentary uses, goat milk has found a growing niche in the cosmetic and personal care

ISSN: 3048-8397
industry. The lactic acid content of goat milk acts as a natural alpha-hydroxy acid, facilitating gentle exfoliation and skin renewal. Its protein and fat components contribute emollient properties, supporting skin barrier function and moisture retention. Commercial products derived from goat milk include soaps, shampoos, bath salts, body lotions, baby lotions, hand creams, shaving creams, and washing detergents. The mildly acidic pH of goat milk aligns closely with that of human skin, making formulations based on it well-tolerated across skin types, including sensitive skin (Mwenze and Kiplagat, 2011).

Future Prospects and Challenges:

Despite its considerable nutritional and commercial promise, broader exploitation of goat milk faces several constraints. The characteristic caprine flavour, arising from elevated concentrations of caproic, caprylic, and capric acids, remains the primary barrier to wider acceptance in populations unfamiliar with goat dairy products. Advances in feed management, milking hygiene, and cold-chain logistics are demonstrably effective in reducing off-flavour intensity (Ribeiro and Ribeiro, 2010). Microbial safety represents a persistent concern since pathogens including *Listeria monocytogenes, Brucella melitensis, and Staphylococcus aureus* can contaminate raw goat milk, the exclusive use of pasteurised milk in product manufacture is strongly recommended (Yangilar, 2013). The seasonality of goat milk production and the fragmented nature of small-holder supply chains further limit processing consistency and economies of scale. Strengthening cooperative models, investing in rural chilling infrastructure, and developing breed-specific quality standards represent priority policy interventions needed to unlock the full potential of the goat dairy sector. The processing potential of goat milk for novel functional food formats, bioactive peptide isolates, and nutraceutical applications merits systematic investigation in future research programmes (Nayik *et al.,* 2021).

Conclusion:

Goat milk represents a nutritionally rich, functionally versatile, and therapeutically relevant dairy resource whose potential remains substantially underexploited relative to bovine milk. Its distinctive compositional attributes like smaller fat globules, higher MCFA content, lower allergenicity, superior digestibility, and a favourable mineral profile position it as a superior alternative for specific consumer groups including infants, the elderly, and those with cow milk intolerance or allergy. The diversity of value-added products achievable from goat milk, spanning artisanal and industrially produced cheeses, fermented products, frozen desserts, indigenous dairy products, powdered formulations, and cosmetic preparations, offers substantial scope for market expansion and economic empowerment in goat-rearing communities. Addressing the challenges of flavour management, microbial safety, processing infrastructure, and supply-chain integration will be central to realising this potential. Collaborative efforts between researchers, veterinarians, dairy technologists, and policymakers are essential to elevate goat milk from a subsistence commodity to a mainstream functional dairy product contributing to global

ISSN: 3048-8397
nutritional security.

Conflict of Interest:

Authors declare no conflict of interest.

References:

Abd Majid N, Zainol Z, Shamaan NA, Abd Hamid N, Roslan N and Zulkifli NF (2020) Date palm and goat milk improve haematological parameters and availability of functional iron in iron deficient rats. Malays. J. Med. Health Sci. 16(3): 141-148.

DAHD (2024) Annual Report 2023-24. Department of Animal Husbandry and Dairying, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India, New Delhi.

FAO (2023) FAOSTAT: Livestock Primary Statistics. Food and Agriculture Organisation of the United Nations, Rome. Accessed from https://www.fao.org/faostat/

Kochubei-Lytvynenko O, Korolchuk I, Frolova N, Pasichnyi V and Mykoliv I (2019) Perspective on the use of goat milk in the production of soft milk cheeses. Ukrainian Food J. 8(4): 721-733.

Lad SS, Aparnathi KD, Mehta B and Velpula S (2017) Goat milk in human nutrition and health: a review. Int. J. Curr. Microbiol. Appl. Sci. 6(6): 1781-1792.

Moatsou G and Park YW (2017) Goat milk products: types of products, manufacturing technology, chemical composition, and marketing. In: Handbook of Milk of Non-Bovine Mammals. Park YW and Haenlein GFW (eds.). II ed., Wiley-Blackwell, Oxford, UK, pp. 84-150.

Mwenze PM and Kiplagat IC (2011) Functional properties of goat milk: a review. Anim. Prod. Soc. Kenya. 12(1): 88-96.

Nayik GA, Jagdale YD, Gaikwad SA, Devkatte AN, Dar AH, Dezmirean DS and Alotaibi SS (2021) Recent insights into processing approaches and potential health benefits of goat milk and its products: a review. Front. Nutr. 8: 789117.

Nayik GA, Jagdale YD, Gaikwad SA, Devkatte AN, Dar AH and Ansari MJ (2022) Nutritional profile, processing and potential products: a comparative review of goat milk. Dairy. 3(3): 622-647.

Pal M (2014) Significance of goat milk and its products in human nutrition and health. Beverage Food World. 41(3): 27-31.

Pal M and Jadhav VJ (2013) Goat milk: composition and its potential as a functional food. J. Livest. Dairy Sci. 1(1): 1-8.

Panta R, Paswan VK, Gupta PK and Kohar DN (2021) Goat's milk (GM), a booster to human immune system against diseases. In: Goat Science-Environment, Health and Economy. Martinez B and Delgado JV (eds.). IntechOpen, London, pp. 1-18.

Premjibhai PH (2017) Isolation and purification of ACE-inhibitory peptides derived from fermented Surti goat milk. Ph.D. Thesis, submitted to Anand Agricultural University, Anand.

Rai DC, Rathaur A and Yadav AK (2022) Nutritional and nutraceutical properties of goat milk for human health: a review. Indian J. Dairy Sci. 75(1): 1-12.

Ribeiro AC and Ribeiro SDA (2010) Specialty products made from goat milk. Small Rumin. Res. 89(2-3): 225-233.

Risko TC and Csapo Z (2019) Goat keeping and goat milk products in human nutrition: review. APSTRACT Appl. Stud. Agribusiness Commer. 13: 24-36.

Song X (2022) Comparison of simulated gastric digestion behaviour of commercial infant formulae made with cow, goat and sheep milk. M.Sc. Thesis, Massey University, Palmerston North, New Zealand.

Tafes AG (2020) Compositional and technological properties of goat milk and milk products: a review. Concepts Dairy Vet. Sci. 3(3): 295-300.

Yadav AK, Singh J and Yadav SK (2016) Composition, nutritional and therapeutic values of goat milk: a review. Asian J. Dairy Food Res. 35(2): 96-102.

Yangilar F (2013) As a potentially functional food: goat's milk and products. J. Food Nutr. Res. 1(4): 68-81.

Citation: Sandeep Kumar, Gagan Chawla and Vinay Kumar. (2026). Recent Advances and New Trends in Goat Milk Products for Human Health and Nutrition. In Bio Vet Innovator Magazine (Vol. 3, Issue 6, pp. 34–42). Bio Vet Innovator Magazine. https://doi.org/10.5281/zenodo.20710294