



## Functional Benefits of Goat Milk

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### Abstract

Goats play a significant role in the rural economy and health. Goat milk is an essential component of human nutrition. Goat milk is rich in nutrients that are easily absorbed by the body, such as vitamins, minerals, and trace elements. It has lower amount of lactose suitable for people suffering from lactose intolerance. Additionally, goat milk can help people who are allergic to cow milk. Goat milk contains higher concentration of medium chain triglycerides (MCT), which is classified as a unique lipid with unique health advantages. Several products made from goat milk are available in the market, including yoghurt, ice cream, fermented milk, and cheese. The marketing potential of goat milk and its products is immense. Creating awareness among people regarding the functional benefits of goat milk and its products and improvement in goat breeds for increased production is needed to get maximum benefit.

**Keywords:** goat milk, health benefits, goat milk products, nutritional value

### Introduction

The global demand for milk and milk products is increasing day by day as a result of the world's rapidly growing population. To meet this demand a large number of livestock population is needed. Small ruminants make a valuable contribution in meeting this demand. Goats are often termed as the "Poor man's cow" due to higher prolificacy and less initial investment (MacHugh and Bradley, 2001). Goat milk and products are increasingly preferred for their health and nutritional benefits. Total global goat milk production was estimated at 20.63 million tonnes in 2020 (FAOSTAT, 2022). Asia alone contributes 59.23% to the total goat milk production followed by Africa (21.75%), Europe (15.13%) and Americas (3.9%). The top Asian countries contributing to the global goat milk production in 2020 were India, Bangladesh, Pakistan, Turkey and Indonesia (FAOSTAT, 2022).

### General properties of goat milk

Fresh goat milk has a mild sweet flavour and is white and opaque (Park, 2010). When compared with cow milk, goat milk has more protein while the lactose is slightly lower. All essential amino acids are present in goat milk, making it a good source of complete protein (Alferez *et al.*, 2001). Higher percentage of smaller fat globules and medium chain fatty acids in goat milk make it less allergic, naturally more homogenised, and easily digestible than cow milk (Skapetas and Bampidis, 2016). When compared to cow and human milk, goat milk has similar vitamin levels. The level of vitamin A is more than cow milk (Kalyankar *et al.*, 2016) while vitamin B12, vitamin D and ascorbic acid are absent in goat milk. Compared to cow

and human milk, goat milk is richer in calcium, phosphorus, potassium, magnesium, and chlorine, but lower in sodium and sulphur (Park *et al.*, 2007).

### Health benefits of goat milk

Goat milk is one of the best alternatives for cow milk. Goat milk possesses high digestibility, high alkalinity, high buffering capacity, as well as some therapeutic benefits in medicine and human nutrition, when compared to cow or human milk (Park, 2007). Various health advantages of goat milk include:

1. Since goat milk has less lactose than cow milk, people who suffer from mild to moderate lactose intolerance can switch to goat milk.
2. Milk allergies are frequently caused by alpha S1-casein protein. Goat milk has low alpha S1-casein content and can help people who are allergic to cow milk.
3. Good amount of A2 beta-casein is present in goat milk which is comparable to human breast milk and it helps in the prevention of inflammatory diseases, such as colitis, irritable bowel syndrome, etc. After breastfeeding, goat milk is typically given to infants as their first source of protein which is less likely to cause milk allergies than cow milk.
4. Presence of small fat globules in goat milk makes softer curd which makes it easier to digest as compared to the cow milk.
5. In comparison to cow's milk, goat milk has a higher bioavailability of minerals like iron, calcium, phosphorous and magnesium which makes the treatment of nutritional deficiencies such as anemia and bone demineralization by goat milk appears promising.
6. Gut-friendly: Goat milk contains natural antacids and alkaline minerals. It does not cause issues like constipation or acidity and is good for people with poor digestion.
7. Prebiotic carbohydrates called oligosaccharides present in higher amount in goat milk as compared to cow milk and similar in amount and structure to human milk (Kiskini and Difilippo, 2013) encourage the growth of beneficial bacteria living in the gut ecosystem.
8. Managing cholesterol levels: Total cholesterol levels in the body is reduced and triglyceride levels are maintained because of the high concentration of essential fatty acids such as linoleic and arachidonic in goat milk.
9. In particular, young children and the elderly find goat milk more acceptable as it is similar to human milk. Infants with gastrointestinal or respiratory problems can tolerate pasteurised goat milk.
10. High levels of vitamin A found in goat's milk can help to reduce the appearance of wrinkles, clear up acne, and generally improve the condition of your skin.
11. Goat milk contains lactic acid, which promotes thicker and smoother skin by helping get rid of dead skin cells.
12. Goat milk can be used for getting a healthy weight gain since it has more calories per serving. To help malnourished children gain weight goat milk acts as good alternative to cow milk (Razafindrakoto *et al.*, 1994).
13. The use of goat milk is believed to improve hair care and prevent hair damage.
14. Capric and caprylic acids found in goat milk fat make it suitable for usage as a carrier of other chemical components in lotions and creams because they increase skin permeability (Wongpayapkul *et al.*, 2006).
15. Conjugated linoleic acid (CLA), which is abundant in goat milk (Jirillo *et al.*, 2010), reported to have anti-carcinogen effects in animal models of colon and mammary cancer as well as against human melanoma, colorectal and breast cancer in vitro models (Palombo *et al.*, 2002).

### Goat milk products

A huge variety of products made from goat milk is available such as buttermilk, cheese, ghee, butter, ice cream, yogurt, sweets, candies and condensed/dried products. Other specialty

items like hair, skin and cosmetic products derived from goat milk have also recently drawn more interest. Like goat milk, goat cheese has fewer calories, less fat, and less cholesterol than cow's milk, making it easier on the human digestive system. White Slice goat cheese, East Croatian traditional product, contained higher concentrations of phosphorus, iron and magnesium when compared to White Slice cow cheese (Slaèanac *et al.*, 2011). Yogurt, a fermented milk product made from goat milk is a great source of fatty acids, minerals, and protein, but because of its goaty flavour, it has not been widely accepted by consumers (Otes and Cagindi, 2003). Kefir is another fermented dairy product popular in many Eastern European countries where it is considered beneficial for overall health and frequently given to infants as their first weaning food. It can be prepared from goat milk thus providing all the benefits that goat milk contains. Some countries consider goat milk powder to be a nutritious supplement with canned powder and infant formula sold through drug stores or pharmacies. The anti-allergenic and creamy organoleptic qualities of ice cream made from goat milk make it a desirable option for kids and other consumers. Among various traditional Indian dairy products such as Chhana, Khoa, Ghee, Shrikhand, Dahi, etc, Paneer carries significant market potential and is a rich source of protein for vegetarians. A higher yield of good quality paneer is obtained when buffalo milk is combined with 25% of goat milk (Viji *et al.*, 2017). To improve the sensory, textural, and general quality of goat milk and its products, many technologies have been developed which has led to increased consumer acceptance and chances of contamination and spoilage has reduced.

## Conclusion

Goats generally require low maintenance, management, and feeding costs. In comparison to other milk derived from various animal species, goat milk might be considered to be a significant alternative for consumption in almost all age groups. More bioavailable proteins, lipids, vitamins, and minerals are found in goat milk than cow milk. As functional foods, goat milk and its products are incredibly beneficial in providing nourishment to all. Goat milk and its products are predicted to gain popularity on a worldwide scale as people grow more health conscious.

## References

1. MacHugh, D.E. and Bradley, D.G. (2001). Livestock genetic origins: Goats buck the trend. *Proceedings of the National Academy of Sciences*, **98**(10):5382-5384.
2. Food and Agriculture Organization of the United Nations (FAO). Food and Agriculture Organization of the United Nations statistical databases. <http://faostat.fao.org>. 31 December, 2022.
3. Park, Y.W. (2010). Goat Milk: Composition, Characteristics. In: Pond, W.G. and Bell, N. (eds.), *Encyclopedia of Animal Science*, Edn 2, CRC Press, Taylor and Francis, Florida, 2010.
4. Alferéz, M.J.M., Barrionuevo, M., Aliaga, M., Sanz-Sampelayo, I., Lisbona, M.R. and Robles, F. (2001). Digestive utilization of goat and cow milk fat in malabsorption syndrome. *Journal of Dairy Research*, **68**: 451-461.
5. Skapetas, B. and Bampidis, V. (2016). Goat production in the world: Present situation and trends. *Livestock Research for Rural Development*, **28**: 200.
6. Kalyankar, S.D., Khedkar, C.D. and Patil, A.M. (2016). Goat milk. In: Caballero, B., Finglas, P.M. and Toldrá, F. (eds.), *Encyclopedia of Food and Health*, Vol. 3. Elsevier Ltd., Oxford, 2016, 256-260.
7. Park, Y.W., Juárez, M., Ramos, M. and Haenlein, G.F.W. (2007). Physico-chemical characteristics of goat and sheep milk. *Small Ruminant Research*, **68**: 88-113.
8. Park, Y.W. (2007). Hypoallergenic and therapeutic significance of goat milk. *Small Ruminant Research*, **14**: 151-159.



9. Kiskini, A. and Difilippo, E. (2013). Oligosaccharides in goat milk: structure, health effects and isolation. *Cellular and Molecular Biology*, **59**: 25-30.
10. Razafindrakoto, O., Ravelomanana, N., Rasolofo, A., Rakotoarimanana, R.D., Gourgue, P., Coquin, P., Briend, A. and Desjeux, J.F. (1994). Goat's milk as a substitute for cow's milk in undernourished children: a randomized double-blind clinical trial. *Pediatrics*, **94**(1): 65-69.
11. Wongpayapkul, L., Leesawat, P., Rittirod, T., Klangtrakul, K. and Pongpaibul, Y. (2006). Effect of single and combined permeation enhancers on the skin permeation of ketoprofen transdermal Drug Delivery Systems. *CMU Journal of Science*, **5**: 41-52.
12. Jirillo, F., Martemucci, G., D'Alessandro, A.G., Panaro, M.A., Cianciulli, A., Superbo, M., Jirillo, E. and Magrone, T. (2010). Ability of goat milk to modulate healthy human peripheral blood lymphomonocyte and polymorphonuclear cell function: In-vitro effects and clinical implications. *Current Pharmaceutical Design*, **16**: 870-876.
13. Palombo, J.D., Ganguly, A., Bistriani, B.R. and Menard, M.P. (2002). The anti-proliferative effects of biologically active isomers of conjugated linoleic acid on human colorectal and prostatic cancer cells. *Cancer Letters*, **177**: 163-172.
14. Slaèanac, V., Hardi, J., Luèan, M., Komleniæ, D.K., Krstanoviæ, V. and Jukiæ, M. (2011). Concentration of nutritional important minerals in Croatian goat and cow milk and some dairy products made of these. *Croatian Journal of Food Science and Technology*, **3**: 21-25.
15. Otes, S. and Cagindi, O. (2003). Kefir: A Probiotic Dairy-Composition, Nutritional and Therapeutic Aspects. *Pakistan Journal of Nutrition*, **2**(2): 54-59.
16. Viji, K.S., Radha, K. and Raja Kumar, S.N. (2017). Utilization of goat milk for the preparation of paneer. *Indian Journal of Dairy Science*, **70**(1): 17-22.