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Goat milk: A review

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Abstract

Goats are earliest domesticated animals. Humans especially who have problem of lactase deficiency and hence, the goat milk is preferred for them. Fat, protein, lactose, vitamins, enzymes and mineral salts are some of the important nutrients which are rich in goat milk. Beside this, cow and human milk which less amount of calcium, magnesium and phosphorus as compared to goat milk. Goat is additionally called as poor man's cow. It is concluded that the goat milk are very much useful in various disorders like GIT disturbances, colic, dysentery and problems related with respiratory tracts.

Keywords: Goat milk, fat, protein, benefits

Introduction

Goat is one of the most crucial species of livestock industry which can adapt to harsh climate. Goat milk contains many essential nutrients such as vitamins, minerals, trace elements, electrolytes, enzymes, proteins, and fatty acids that are easily assimilated by the body. Goat milk having many medicinal values like prebiotics, anti-allergy and anticancer. It is quiet better than cow milk because of its easy digestibility.

Composition of goat milk

Physical properties such as surface tension, viscosity and specific gravity is less in cow milk as compared to goat milk (Park *et al.*, 2007) [6]. Composition of milk changes according to species, breed, Individual, feeding management, season, diet, and environmental condition, stage of the lactation, position and status of the udder.

Table 1: Chemical composition of ruminants and human milk

Composition	Goat	Cow	Human
Total solid	13.2	12.3	12.4
Fat	4.0	3.4	3.8
Total Protein	3.6	3.2	1.2
Casein	2.9	2.5	0.4
Whey Protein	0.61	0.65	0.70
Lactose	4.5	4.6	7.0
Minerals	0.8	0.7	0.2
Energy (kcal/100g)	70	66	63

Nutritional value of goat milk

Milk Lipid- a crucial component in goat milk is its fat or lipid content. In goat milk, size of fat globules is 1.5 – 2.0 which is less than size of fat globules in cow milk is 2.5-3.5 μm and the higher proportion of globules is 28% in goat's milk as compared to cow milk it contribute only 10% of fat globules. The composition of fat in goat milk is huge different from cow milk. Cow milk which is rich in caprylic, Capric, Lauric, Myristic and palmitic by 2 times as compared goat milk. Beside this, stearic and monounsaturated fatty acid lower in cow milk as compared to goat milk.

Table 2: Average fatty acid composition (g/100 g milk) in lipids of goat and cow milk

	Goat milk	Cow milk	Difference (%) for goat milk
C4:0 butyric	0.13	0.11	
C6:0 caproic	0.09	0.06	
C8:0 caprylic	0.10	0.04	
C10:0 capric	0.26	0.08	
C12:0 lauric	0.12	0.09	
C14:0 myristic	0.10	0.34	
C16:0 palmitic	0.91	0.88	
C18:0 stearic	0.44	0.40	
C6-14 total MCT	0.89	0.61	+46
C4-18 total SAFA	2.67	2.08	+28
C16:1 palmitoleic	0.08	0.08	
C18:1 oleic	0.98	0.84	
C16:1-22:1 total MUFA	1.11	0.96	+16
C18:2 linoleic	0.11	0.08	
C18:3 linolenic	0.04	0.05	
C18:2-18:3 total PUFA	0.15	0.12	+25

Source: Posati and Orr, 1976 [7] MCT-Medium chain triglycerides, MUFA-Monounsaturated fatty acid, PUFA-Polyunsaturated fatty acid

MUFA, PUFA, CLA and MCT are rich in goat milk as compared to cow milk. Medium chain triglycerides are used to provide energy and play role in clinical disorder including mal-absorption syndromes, steatorrhea, hyperlipoproteinemia, intestinal resection, preterm baby feeding, non-thriftiness of kids, infant malnutrition, epilepsy, CF, coronary by-pass, and gallstones.

CLA is an important bioactive component in goat milk. CLA reduces allergy in humans, and work as anti-inflammatory by reduces the production of pro-inflammatory cytokines associated with irritable bowel disease, atherosclerosis, cancer and other immunopathologies in the body.

Milk protein

Unstable micelle phase composed of casein with soluble composed of whey proteins are two distinct phases of milk proteins are present. The caseins constitute about 80% of the proteins and are classified as α 1, α 2, β and κ casein, while the main whey proteins are – lactoglobulin and, α -lactalbumin. Greater β -casein solubilisation, more calcium and phosphorus and lower heat stability are in goat milk than cow milk. (Horackoval *et al.*, 2014) [2]. The aminoalkanoic acid which is present in goat milk is Taurine and its concentration is just too much above cow milk. Taurine helps in development of brain, growth and formation of bile salts and its deficiency results in cardiomyopathy, epilepsy, lack of growth among others. The whey and casein milk proteins also as their bioactive peptides and include immunoglobulin, lactoferrin, lactoperoxidase, folate binding protein and more recently, α -lactalbumin and β -lactoglobulin.

Carrier of retinol, fatty acids and triglycerides; transfer of passive immunity; Immunomodulatory activity; Anti-carcinogenic activity are a number of the biological function of β -lactoglobulin. albumin Synthesis of lipids, Antioxidant activity; Anti-carcinogenic activity, Lactoferrin Antimicrobial activity; Antifungal activity; Immunomodulatory activity; Anti-thrombotic activity, Immunoglobulins Immunomodulatory activity; Growth and development are

function of, α -lactalbumin.

Milk carbohydrate

Major Carbohydrate in goat milk is Lactose. The lactose concentration is typically found to be less than that found in cow's milk. Lactose play sort of role like intestinal absorption of calcium, magnesium and phosphorous and therefore the utilization of vitamin D.

Milk oligosaccharides are thought to be beneficial to human nutrition due to their prebiotics and anti-infective properties (LaraVilloslada *et al.*, 2006) [5]. Oligosaccharide structures identified in goat milk are most almost like that of human milk so it's beneficial for infant thanks to their prebiotics and anti-infective properties. In induced colitis oligosaccharides have anti-inflammatory effect and helps in management of bowel diseases.

Milk vitamin

Goats convert all β -carotene from foods into vitamin A within the milk; therefore the concentration of vitamin A is higher in goat milk. (Conesa *et al.*, 2008) [1]. Vitamin A is vital for both innate and adaptive immune responses, including cell-mediated immunity and antibody responses. Low concentrations of vitamin B6 and vitamin D, which are both important during infancy present in both goat also as cow milk. Vitamin D plays a crucial role the system and should help prevent infections, autoimmune diseases, cancer and diabetes additionally to its role in bone health maintenance. Vitamin C helps in regulation of immunity via antiviral and anti-oxidant properties. Deficiencies in vitamin B₆ and vitamin B₁₂ which cause "goat milk anemia" which is deficient in goat milk. (Jenness, 1980) [3]. High temperature short time pasteurization (HTST) best processing method to preserve vitamins also on extend shelf life of the milk.

Table 3: Vitamin content of cow and goat milk

Vitamin	Goat	Cow
Vitamin A (IU)	185	126
Vitamin D (IU)	2.3	2.0
Thiamine (mg)	0.068	0.045
Riboflavin (mg)	0.21	0.16
Niacin (mg)	0.27	0.08
Pantothenic acid (mg)	0.31	0.32
Vitamin B6 (mg)	0.046	0.042
Folic acid (μ g)	1.0	5.0
Biotin (μ g)	1.5	2.0
Vitamin B12 (μ g)	0.065	0.357
Vitamin C (mg)	1.29	0.94

Source: Park *et al.*, 2007 [6]

Milk mineral

Minerals like Potassium, Calcium, Chloride, Phosphorus, Selenium, Zinc and Copper are higher in goat milk. K is plays a vital role of maintaining acid base balance and also for function of muscle, nerves and kidney. Chloride important for fluid balance, blood pH and pressure chloride is vital. Calcium is necessary for bone growth and development. Se involved in the cell protection against free radicals. In several enzyme Zn is that the key component that are involved in transport of CO₂, protein production. For maintenance of healthy skin, wound healing Zn play vital role.

Table 4: Mineral content of cow and goat milk

Minerals (mg/100g)	Cow milk	Goat milk
Ca	122	134
P	119	121
Mg	12	16

K	152	181
Na	58	41
Cl	100	150
S	32	28
Fe	0.08	0.07
Cu	0.06	0.05
Mn	0.02	0.032
Zn	0.53	0.56

Source: Park *et al.*, 2007 [6]

Medical significance of goat milk

The symptoms like GIT disturbances, colic, dysentery and problems related with respiratory tract are often eliminated when goat milk is fed to the infants. Goat milk played most biological reactions and exerts antioxidant and anti-inflammatory effects within the body. Regular consumption of goat milk it improves mineralization of bone, enhances the vitamin, mineral with haemoglobin levels. Goats' milk could even be an honest source of potassium, an important mineral help in maintaining normal sign and heart function.

Low-density lipoprotein (LDL) is such atherogenic lipoprotein which transports cholesterol from the liver to the blood vessels and is usually called "The bad cholesterol". The "good" cholesterol is that the HDL (HDL) which transports cholesterol from the vessels to the oxidative modification of LDL (ox-LDL) plays a pivotal role in atherosclerosis progression. MUFA, PUFA and MCT are beneficial in cardiovascular diseases. Proteins of the goat milk are important source of the angiotensin converting enzyme (ACE), antihypertensive peptide and inhibitory peptides which able to control microbial infection and promotes defense mechanism against diseases. Goat milk features a high content of conjugated linoleic acid (CLA) (Jirillo *et al.*, 2010) [4]. Goat milk acts as prebiotics in gut and improves the health of the alimentary tract (Raynal-Ljutovac *et al.*, 2008) [8]. They're responsible for the beneficial bacteria i.e. Bifidobacteria within the intestine. Bifidobacteria exert an honest range of health benefits including immune-stimulation, prevention of pathogenic infections, anticarcinogenic activity and cholesterol lowering activity additionally to improving lactose mal digestion.

Conclusion

In terms of nutritional value goat milk is superior to cow milk. Goat has the power to supply milk of excellent composition and quality for human consumption. Compositions of Caprine milk include fat, protein, ash, vitamins, lactose and enzymes. The superior digestibility of goat milk, the right composition of fatty acids, protein and its content of bioactive compounds seem to offer properties suitable for treating or preventing certain medical conditions. Goat milk may reduce the danger of disorder by antioxidative, anti-atherogenic and anti-thrombotic effects.

References

1. Conesa C, Sanchez L, Rota C, Perez M, Calvo M, Farnoud S. Isolation of lactoferrin from milk of different species; calorimetric and antimicrobial studies. *Comp Biochem Physiol* 2008;150:131-139.
2. Horackoval S, Sedlackova1 P, Slukovaand M, Milada P. Influence of Whey, Whey Component and Malt on the Growth and Acids Production of Lactobacilli in Milk. *Czech J Food Sci* 2014;32:526-531.
3. Jenness R. Composition and characteristics of goat milk: Review 1968-1979. *J Dairy Sci* 1980;63:1605-1630.
4. Jirillo F, Martemucci GD, Alessandro AG, Panaro MA, Cianciulli A, Superbo M, Magrone T. Ability of goat milk to modulate healthy human peripheral blood lymphomonocyte and polymorpho nuclear cell function: *In vitro* effects and clinical implications. *Curr Pharmaceutical Design* 2010;16:870-876.
5. Lara Villoslada F, Debras E, Nieto A, Concha A, Galvez J, Lopez Huertas E, Boz J, Obled C, Xaus J. Oligosaccharides isolated from goat milk reduce intestinal inflammation in a rat model of dextran sodium sulfate induced colitis. *Clinical Nutrition* 2006;25:477-488.
6. Park YW, Juárez M, Ramos M, Haenlein GFW. Physico-chemical characteristics of goat and sheep milk. *Small Ruminant Res* 2007;68:88-113.
7. Posati LP, Orr ML. *Composition of Foods, Dairy and Egg Products, Agriculture Handbook No. 8- 1.* USDA-ARS, Consumer and Food Economics Institute Publishers, Washington DC 1976, P77-109.
8. Raynal-Ljutovac K, Lagriffoul G, Paccard P, Guillet I, Chilliard Y. Composition of goat and sheep milk products: An update. *Small Ruminant Res* 2008;9:57-72.