

# Goat cheese

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“Chèvre” or goat cheese is a food term used to designate cheese made out of goat milk.

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## Chemical composition

Goat milk differs from cow milk in a way of being lower in fat. Fat contents represents 4% of the total composition of cow milk when only 3.44% for goat milk.

<b>Chemical components of Goat Milk</b>	
Water	900 g/ L
Proteins	30,8 g/ L
Fat contents	34,4 g/ L
Lactose	48 g/ L
Calcium	1,25 g/ L
Phosphore	0,95 g/ L

## Proteins

### Casein

Goat milk contains 30,8g/ kg of proteins. It is important to quantify it because it represents the casein concentration. Casein is a conjugated protein, it will form micelles by binding with phosphate groups. Those groups will then bind calcium, which is important for micelles structures. The micelles will later form aggregates that is essential to cheese production. Proteins have a preponderant role and are essential to cheese making process. Casein can

represent up to 70% of the total amount of proteins in goat milk. But all caseins in milk cannot form micelles as a part of it is lost in the aqueous phase.

Casein can be found in milk under four different types:

- $\alpha(s1)$  – Casein: low concentration in goat milk making it more digestible than cow milk.
- $\alpha(s2)$  – Casein: major casein proteins with  $(s1)$  – Casein.
- $\beta$ - Casein: more hydrophobic than caseins and very sensitive to calcium concentration.
- $\kappa$ - Casein: it is found on the surface of the casein micelles (hairy layer) and is a huge factor concerning the cheese making process.

Casein micelles structures will lead to aggregation due to several type of interactions:

- Van der Waals interactions will cause aggregation under all circumstances.
- Electrostatic interactions will create a repulsive force that will vary with pH.
- Steric interactions will also create a repulsion force due to  $\kappa$ - Casein on the surface of the micelle. Casein is important to the functional behavior of dairy products.

### **Whey protein or serum protein**

Whey proteins are the one that will remain after the coagulation of casein micelles. Those proteins will not coagulate but form a liquid during the process of cheese making. They are non-desirables products in cheese. However, they represent 20% of protein in goat milk. Whey contains the most part of lactose.

[1]

## **Fat contents**

Goat milk contains less fat than cow milk. In the process of cheese making, it is necessary to obtain not the largest amount of fat possible as it is for proteins. Instead, the amount of fat needs to be controlled because fat can impact the cheese making process: a concentration that is too low in fat content can be a reason the cheese won't meet regulations expectations and a too high concentration can limit the process and create a non-usable unit. Fat content in milk is represented by fat globules. Phospholipids forming a tri-layer and associated substances such as cholesterol will create the membrane that retain the triglycerides present in the middle of the fat globule. Triglycerides are fatty acids (saturated and unsaturated) that represent 98% of the total of fat contents.

## **Lactose**

Lactose is a specific sugar present in the milk. It is synthesized in the mammal and found in equal quantities in cow and goat milk. Its main role is to be a substrate for the lactic bacteria during the cheese making process. Those bacteria dispose of an enzyme,  $\beta$ -galactosidase, which is responsible for the cleavage of lactose molecules in two different and distinct molecules: glucose and galactose. Those sugars will then be used during the formation of lactic acid, responsible for the drop of pH during the cheese making process.

Goat milk is composed of several minerals such as sodium, potassium, magnesium and calcium. Those are ions that are positively charged. But goat milk is also composed of negatively charged ions such as chloride, sulfates, phosphates. Phosphate and calcium will directly influence the cheese fabrication. They can be found under two different phases, aqueous and micellar (bounded to casein micelles) at equilibrium. The equilibrium can be perturbed by a change in physical and chemical properties. Their concentration will define milk capacity to resist to acidification.

## **Microbial agents in cheese fabrication**

Goat milk and milk in general contains three different types of micro-organisms.

- Bacteria: some are useful or even necessary for the cheese making process (thermophile and lactic thermophiles) when others are detrimental or even dangerous for the making of a good and regulated cheese.
- Moulds: those that develop in acid environments will act during the aging process (penicilium candidum).
- Yeasts: transform sugars in alcohol and will also be a factor of aging (candida).

[2][3]

**Goat cheese, goats' cheese, or chèvre** (/ˈʃɛvrə/ or /ˈʃɛv/; from the French word for *goat*), is cheese made from goat's milk.

## **Properties**

Cow's milk and goat's milk have similar overall fat contents.<sup>[4]</sup> However, the higher proportion of medium-chain fatty acids such as caproic, caprylic and capric acid in goat's milk contributes to the characteristic tart flavor of goat's milk cheese. (These fatty acids take their name from the Latin for goat, *capra*.)<sup>[5]</sup>

Goat milk is often consumed by young children, the elderly, those who are ill, or have a low tolerance to cow's milk. Goat milk is more similar to human milk than that of the cow, although there is large variation among breeds in both animals. Although the West has popularized the cow, goat milk and goat



Fresh chevre and crackers

cheese are preferred dairy products in much of the rest of the world. Because goat cheese is often made in areas where refrigeration is limited, aged goat cheeses are often heavily treated with salt to prevent decay. As a result, salt has become associated with the flavor of goat cheese.

Goat cheese has been made for thousands of years, and was probably one of the earliest made dairy products. In the most simple form, goat cheese is made by allowing raw milk to naturally curdle, and then draining and pressing the curds. Other techniques use an acid (such as vinegar or lemon juice) or rennet to coagulate the milk. Soft goat cheeses are made in kitchens all over the world, with cooks hanging bundles of cheesecloth filled with curds in the warm kitchen for several days to drain and cure. If the cheese is to be aged, it is often brined so it will form a rind, and then stored in a cool cheese cave for several months to cure.

Goat cheese softens when exposed to heat, although it does not melt in the same way many cow cheeses do. Firmer goat cheeses with rinds are sometimes baked in an oven to form a warm viscous form of the cheese.

## List of goat's milk cheeses by region

### Australia

- Buche Noir is a fresh pressed goats curd covered in fine vine ash from the Sydney region.
- Meredith Dairy from the western districts of Victoria.

### China

- Rubing is a fresh goat cheese from Yunnan Province, resembling the Indian paneer.



Chevre with lavender and wild fennel

## Eastern Mediterranean

- Labneh is a goat, cow or sheep yogurt cheese consumed in many parts of the world including the Eastern Mediterranean. It is often eaten with olive oil, olives, zaatar and fresh vegetables on flatbread for breakfast.

## France

France produces a great number of goat's milk cheeses, especially in the Loire Valley and Poitou, where goats are said to have been brought by the Moors in the 8th century.<sup>[6]</sup> Examples of French chèvres include Bucheron, Chabis, Chavroux, Clochette, Couronne Lochoise, Crottin de Chavignol (largest produced goat cheese AOC), Faisselle, Montrachet (Burgundy), Pélardon, Picodon, Pouligny Saint-Pierre, Rocamadour, Sainte-Maure de Touraine, Chabichou du Poitou, Valençay, and Pyramide.

It is sometimes served hot as chèvre chaud.

## Greece

- Feta, mizithra and anthotyros are traditionally made from goat's milk.

## Ireland

- Tullyboy goat cheese is a hard mature cheese made from pasteurized milk.

## Italy

- Caprino is an Italian goat's milk cheese.

## Japan

- Yagi Cheese is a goat cheese made in Japan.

## Malta

- Ġbejna is a goat (or sheep) soft cheese. Various types are found which include; fresh (friski or tal-ilma), sundried (moxxa, bajda or t'Għawdex), salt cured (maħsula), peppered (tal-bżar) seasoned (imħawra).

## Netherlands

- In the Netherlands there are several smaller goat cheese farms. In the 'Westerkwartier', the region west of the city of Groningen has a relatively large concentration of biological goat cheese farms and the most famous goat cheese from this region is called Machedoux, which is a brie-like cheese made from goat milk that is sold and served in restaurants all over the Netherlands and in Belgium and northern Germany. In other parts of the Netherlands, goat cheese is usually made in the Gouda style.

## Norway

- Geitost, which means *goat cheese*. It is brown and made from goat milk and whey. You can also buy other brown cheeses, for example Brunost ("Brown cheese") which are made from cow milk whey, goat milk whey or a combination of both.
- A fresh goat milk cheese is also available, known as Snøfrisk. It comes in different varieties including natural, chanterelles, herbs, and various other additions.
- Recently a firm white goat cheese was also made available in supermarkets.

## Portugal

- Castelo Branco is a Portuguese goat's milk cheese.

## Spain

- Mató is a Catalan fresh cheese made from cow's or goat's milk.



- Garrotxa is a firm goat's cheese originally from Garrotxa in northern Catalonia.

## Turkey

- Tulum Cheese is a goat cheese made in Turkey.
- Sepet Cheese and Kaşar Cheese] are also produced from goat milk and marketing as Goat Sepet Cheese and Goat Kaşar Cheese.
- Beyaz Peynir ("White Cheese" in Turkish) is a brine cheese produced from sheep, cow, or goat milk and when it is made off 100% goat milk, then it is also categorized as Goat Cheese in Turkey and named as Coat White Cheese.



Goat cheese from Yeghegnadzor, Armenia

## United Kingdom

- Pantysgawn is a Welsh goat's milk cheese.
- Capricorn is a Somerset, UK goat's milk cheese.
- Gevrik is a Cornish goat's milk cheese. The word gevrik meaning 'little goat' in the Cornish language.<sup>[7]</sup>
- Tesyn is a Cornish smoked goat's milk cheese.<sup>[8]</sup> Tesyn means 'cake' in the Cornish language.<sup>[9]</sup>

## United States

- Kunik is a goat and Jersey cow blend, mold-ripened with similar properties to Brie.
- Humboldt Fog is a mold-ripened goat cheese with a central line of edible white ash made by Cypress Grove Chevre

## Venezuela

- In Venezuela, specifically in the states of Falcón, Lara and the population of San Jose de Turgua in Miranda state, many types of goat cheese are produced using traditional methods. The most common type is Pasta Firme. A variety of artisanal cheeses are manufactured by smaller producers.<sup>[10]</sup>

## See also

- List of cheeses
- List of goat dishes

## References

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## External links

- Goat Dairy Foods (http://drinc.ucdavis.edu/goatdairy.htm) from the University of California, Davis Dairy Research and Information Center

- National Public Radios covering of a local news case from Norway: Burning Cheese Closes Norwegian Road For Days (<http://www.npr.org/blogs/thetwo-way/2013/01/23/170057690/burning-cheese-closes-norwegian-road-for-days>)

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