

The main traditional goat chesse types obtained in different European Countries

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Abstract

The concept of typicality, in this production chain, varies according to the culture and the tradition of each country. In Western and Northern Europe, consumers gave priority to the safety of the chesse, while in Eastern and Southern Europe to different factors (tradition, technology, etc.) which give a specific flavour to cheese. The notion of ‘‘typical product’’ combines the characteristics of the product with its localisation and, above all, with its origin (geographic and historical). These criteria are absolutely necessary for the identification and protection of these products. At present, most of traditional goat cheeses are produced on farms according to traditional cheesemaking techniques, and some of them are produced on dairy firms because the industrial processors are interested in their promotion in concordance with the consumers’ increasing demand. Most of these traditional goat cheeses types are made only from raw goat milk but, in conformity with the tradition of each country, some of them are made from a mixture of cow and goat milk, or sheep and goat milk. Generally, the production of traditional goat cheese is expected to increase, and the demand for these cheese types is also expected to rise in the future

Keywords: goat milk, traditional product, cheese types, goat cheese.

1. Introduction

In the Europe and particularly in countries with a developing dairy industry the milk of several mammals is processed by traditional methods into a variety of products for immediate consumption or for later use during times of reduced milk production. In many countries there exist several traditional milk products whose processing techniques and technologies are handed down from generation to generation through demonstration and experience.

Goat cheese is mainly produced in the Balkan countries and in the southern EU countries (France, Italy, Spain, Portugal, Greece) according with the goats stocks. Certainly, there are many other countries in Europe where goat cheese is produced, such as Poland, Hungary, Norway, etc.

In general, through traditional goat cheeses, we understand those products which are produced only on farms according to traditional cheesemaking techniques (artisanal cheesemaking, or handicraft). Some of them can also be produced in small dairies units if they make cheese by hand. Unfortunately, in some cases, this production of artisanal type permits to have cheeses that are less standardised, but of good quality and with a characteristic flavour.

2. Results and Discussions

The notion traditional goat cheese. The notion of ‘‘traditional’’ goat cheese combines the characteristics of the product with its localisation and, above all, its origin (geographic and historical).

In Western and Northern Europe, consumers gave priority to the safety of the cheese while in Eastern and Southern Europe to different factors (tradition, technology, etc.) which give a specific flavour to cheese. There are some differences in the understanding of this notion from one country to another. For example, in Greece, most of the goat cheese varieties are considered traditional despite the fact that these products are mainly obtained from dairies with the help of modern techniques. On the other hand, in Italy, only cheeses which are produced on farms are considered traditional, and they are registered in the list of Traditional Agro-food products.

In France, the notion of "farming" cheese is very well defined. Almost 45% from the total goat cheese production which is obtained in France is made after traditional cheesemaking techniques (Bodin, 2002). The use of this mark ("farming") requires four conditions:

1. The quality of the producer – it is compulsory to be an agricultural producer;
2. The production place – it must be the farm;
3. The milk origin – only the milk obtained from the farm can be used;
4. The production type – a "farmer" cheese has the following succession phases: milk filtration, milk aging, coagulation, curd cutting, moulding, draining (eventually the cheese returns), salting, drying and aging.

The operations which are normally used in the dairies are called intensive techniques, and are not admitted in the "farming" cheese production chain (artisanal cheesemaking), like: milk ultrafiltration, milk delactosage, the use of concentrated milk or powder milk, the usage of milk proteins or serum proteins, the use of other coagulant enzymes than rennet or the

addition of chlorhydrate, lysozyme or sorbat (for fresh cheese), the continuous coagulation through the rennet injection, the usage of film in aging or under controlled atmosphere, which permit the acceleration of aging operations.

There are also many goat cheese types (even those traditional) which have obtained an A.O.C. (Appellation d'Origine Contrôlée) or an A.O.P. (Appellation d'Origine Protégée) like in France, or a P.D.O. designation (Protected Designation of Origin) in the other countries, which means a high-quality product, because the consumers are guaranteed that each product is made according to its production regulations. In 1992, by the Rules No. 2081 and 2082, the EU has enlarged to all countries the cultural approach of the south, defining the criteria for the identification and protection of these products. In France, a cheese type which has an A.O.C. corresponds to three criteria that are very well defined:

- a designation, defined and protégé for this product which cannot be imitated or denatured;
- a known origin, limited to certain communes or to an entire province;
- a controlled product whose quality is based on the precise criteria guaranteed by a cheesemakers' Union or Syndicate.

There are some techniques which are tolerable in the A.O.C. or P.D.O. cheeses such as: the addition of calcium chloride in milk, milk pasteurisation, the use of commercial starters, curd freezing, the usage of multiple moulds, the conservation of cheese in cool rooms, and the use of commercial spores suspension for cheese ripening. Also, it is permitted for these goat cheese types to practise the cheese mixing with edible oils or addition of seasoning.

If we compare the manufacture techniques which were applied 50 years ago with those existing now, we observe that many conditions and parameters of manufacture have changed, for instance:

- the diminished duration of curdling and drainage;
- milk acidification after each trait trend to be completely replaced;
- the development of materials for curdling and drainage with time passing (wood disappeared and plastic has taken its place, the appearance of multimoulds for lactic soft-cheese technologies which prevents the waste of time, but also affect the fineness of cheese, etc.);
- the disappearance of wooden moulds, and the appearance of new types;
- the progressive disappearance of natural caves, and their replacement with those that have a soft surface, easy to clean;
- the diminution of ripening time.

Perhaps we regret these changes, but they are necessary, and the progressive disappearance of the traditional manufacture methods, according with the new hygiene requirements, can lead to an imbalance between the microbial species and their ecological niche. Also the mechanic trait, milk cooling, new breeding and cleaning methods have changed the bacteriological balance of the milk (because, at present, the natural lactic ferments are not dominant in raw milk) and nowadays raw goat milk has not the same lactic activity as in the past, and its acidification capacity has reduced. Thus, there is the risk to obtain common cheese products if we unify the manufacture techniques.

Formerly, most of the traditional cheese production was either for self-consumption or sale to neighbouring farmers, local markets and fairs. Today, most cheesemaker farmers sell their products directly to the farm or market, but they also try to penetrate into the big or medium markets. Thus, the farmer products must adapt to the consumers' nutrition behaviour and exigences. A study made in France in 1989 showed that the main defaults of the farmer's cheese were attached to hygiene deficiency (23%), their irregular quality (19%), and their presentation (19%) (Millet, 1998).

At present, the critiques which are formulated to these products are their unattractive packaging and their small protection.

The determinant factors for the typicality of goat cheese. In the past years, especially in the EU countries, the criteria were established for the identification and protection of these products, that is, there are some factors that are considered determinant for the typicality of goat cheese, especially for those traditional cheese varieties which have an origin designation (Rubino, 2004).

Feeding system. Production systems range from pasture-fed to fully-housed operations and may be year-round, or seasonal for cheese production. Generally, a lot of cheese derives its specificity from the feeding system, and more and more producers try to link cheese to a particular feeding system. The relationship between the feeding system and cheese flavour is so evident and accepted by consumers that researchers are trying to delimit the homogeneous areas that can mark a cheese for its pedoclimatic and floristic conditions. At present, a lot of Cheesemakers' Associations, to comply with the image through a reinforcement of the specificity factors, are trying to introduce the feeding system into the cheese production rules.

Breed. In the recent years, there has been demonstrated the existence of polymorphism in the casein fractions. In goat milk, the casein level changes according to the α_{S1} - casein. The casein polymorphism varies either among animals or among populations and, for that reason, the technological properties of milk changes according to the casein variants.

As a consequence, because of its polymorphism, a breed permits to mark a cheese having specific organoleptic characteristics. Thus, for certain cheese varieties, it is necessary to use milk provided by a specific breed. For example, some goat cheese varieties take their name after the goat breed's name (Agrino delle Orobie-Italy, Serranias de Cadiz-Spain,

Queso Majorero-Spain, Queso Murcia al vino-Spain, Queso Palmero-Spain); for other cheese varieties, milk production is in compliance with the specifications of P.D.O. designation (Poulligny Saint Pierre – France is produced only with milk from Alpine, Saanen and Poitevine).

Milk composition also differs among breeds, and this is very important in goat cheese manufacture. Thus, the cheese yields depend on the fat and protein contents. In addition, depending on the type of cheese made, the ratio of fat to protein (casein) in milk affects the quality of the cheese (Taftă, 2002).

Rennet. Coagulation by rennet is an important phase in cheese production. Since ancient times, this was done by utilising extracts from the stomach of animals (kid, lamb or calf) or from some vegetables. As it is known, the rennet is a complex mixture of enzymes whose composition varies according to the species (animal or vegetable), and to the age or the animal feeding system. For that reason, their proteolytic and lipolytic activity varies, which is determinant for the formation of the distinctive cheese characteristics and flavours. Thus, vegetable rennet determines greater proteolytic activity, and rennet contains lipase in plus (only paste rennet), an enzyme responsible of triglycerid lypolysis with the formation of free fatty acids determining the characteristic and flavour. Also, in the manufacture of some cheese varieties, it has been shown that a higher yield of cheese is obtained using animal rennet rather than vegetable ones.

Natural aging. Aging is an important phase in the cheese life. In this phase, an intense enzymatic process occurs towards fat, protein and sugar whose degradation contributes to the aromatic compound formation. These enzymes come from the environment, thus the ripening structure assumes a great importance. Many famous cheeses owe their typicality to the fact that they aged in natural cheese-cellars, because of the optimal environmental condition

(Formaggio a pasta molle della Valle d'Aosta-Italy, Queso Palmera-Spain, Calenzana-France, etc.).

Other typicality factors (the use of raw milk, cheese making in farms, cheese moulded by spoons). Most of the goat chesse varieties are produced with *raw goat milk* because the temperature treatment destroys the microbic flora which is responsible for the cheese flavour. The cheeses made from non-raw milk have a more flattened flavour, and a lot of consumers do not like this type of cheese. Regulations for several POD cheeses provide raw milk utilisation.

Many goat cheese varieties are produced on *farms* after traditional cheesemaking techniques. This production of artisanal type permits to have cheeses that are less standardised, but of good quality and with a characteristic flavour, which makes this cheese type attractive for consumers. Finally, cheese quality is influenced by the curd moulding type, that is, the cheese which is *moulded by spoon* has a better quality. So, in many cases, cheesemakers prefer to utilise this artisanal technique, even if it is slower and more expensive.

The main traditional (artisanal cheesemaking) goat cheese types. Goat cheese is made in almost every country of the Europe. Despite the large number of cheese varieties, goat cheeses may be classified into different groups, i.e. ripened and unripened cheese, cheese with low or high fat contents, and cheese with soft or hard consistency.

Usually, we can distinguish the following six types: fresh cheese, soft paste cheese (with in bloom or washed crust), semi-hard cheese ripened in brine, whey cheese, pressed uncooked paste cheese, and blue cheese. In general, the production of traditional goat cheese has the following succession phases: milk filtration, milk maturing, milk heating, milk coagulation, curd cutting, moulding, draining, salting, drying, and aging (Răducuță, 2004).

Most of the traditional goat cheeses types are made only from raw goat milk, but according to the tradition of each country, some of them are made from a mixture of cow and goat milk, or sheep and goat milk.

There are also some goat cheese varieties which are made only from goat whey (Mizithra, Manouri - Greece) obtained through protein flocculation by direct contact with a heat source or others which are made from a mixture of whey with fresh milk (Ricotta, Scuete - Italy) or whey, fresh milk and water (Brocciu - France).

All the goat cheeses which received an A.O.C., A.O.P. or P.D.O. are made compulsory only with goat milk. In France, those cheeses which are made from a mixture of goat and cow milk are denominated half-goat cheeses if the extract of dry matter has minimum 50% goat origin. Therefore, this notion is compulsory written on the cheese label, in order to provide the consumers with correct information on these products.

Fresh cheese. Several varieties of fresh goat cheeses are made after a simple technology (milk maturing, lactic coagulation, moulding, draining, and cold conservation) which requires small investment. It can be a traditional product (homogeneous or heterogeneous), manufactured on farm and sold to market in summer.

It is consumed as such or seasoned with aromatic herbs, garlic, pepper, etc. The dry matter of this cheese type varies between 20 and 40%, depending on the fat content.

The soft paste cheese. Milk coagulation may be of two types:

- Using acid coagulation (curdling lasts about 1-2 days), as in case of Molthais sur Feuille, Cabecou d'Autan, Crottin de Chavignol, Picodon, Queso de Cabra, etc., which are cheeses obtained after lactic coagulation.

The curd is easily cut into pieces (5-10 cm) and then it is put in cloth or directly in moulds of different shapes (using a spoon) for drainage without pressure, respectively through curd acidification and mould turnings. After its removal from the moulds and salting, aging can start. Aging is made in a moist cellar where the cheese develops mold (*Penicillium camemberti* or *Geothricum candidum*), and is turned several times. The external aspect, the texture of the paste, and the intensity of aromas depend on the ripening time. The ripening is made in three directions: either we obtain an in blossom crust owing to mold spores, either a washed crust owing to the washing of the cheese with salty water, or a mixed crust which results from both methods. The dry matter of this cheese type is around 45%, and it can be conserved 4 to 12 weeks from its manufacture day;

- Using enzymatic coagulation with rennet, as in case of Calenzana, Formaggio a pasta molle della Valle d'Aosta, Formaggella del Luinese, etc., where the curd is cut and mixed to obtain grains of different sizes (1-3 cm). The curd is stirred to increase the cheese dry matter and then moulded, salted, and ripened in natural caves or cellars.

The blue cheese (like Blu Grater). There are a few goat cheese varieties of this cheese type. Usually, only raw goat milk is used. After coagulation, the curd is cut into nut-sized pieces, left to rest for a short time and then transferred to moulds.

The cheese is dry-salted or in brine and, after a week, it is perforated to allow molds to grow (*Penicillium roqueforti* or *glaucum*).

Ripening lasts for several weeks to several months in traditional caves. During this phase, the cheeses are turned several times. In general, this cheese type has a cylindrical shape and a creamy, soft texture. The taste is lightly spicy and comes in different weights. The dry matter of this cheese type varies between 45 and 50%.

The cheese in brine (like Feta, Telemea, Sfela, Telemea, etc.). The best quality is made from ewe milk, although a mixture of ewe and goat milk can also be used. Milk coagulation is made by using traditional rennet, and ranges between 40 and 60 minutes. After milk coagulation, the curd is cut into 1-3 cm cubes and left undisturbed for a few minutes. The curd is then transferred either to perforated moulds or into a frame and after that is pressed. The cheese cloth is removed, and the pressed curd is cut into pieces which are introduced in brine or dry salted. Then, the cheese is placed into tins, casks or plastic boxes, salted with granular salt, and transferred into the ripening rooms (14-16°C), where it remains until the pH reduces to less than 4.8. After that, the cheese is covered with brine or whey brine (7-12% NaCl), and transferred to cold stores to complete at least 1-2 months of ripening.

The cheese has a white colour and the paste is compact with few and small eyes. The consistence is buttery and tears into pieces easily. It has a pleasant scent and it is acidulous, salty, easily distinguished from other cheeses. The dry matter of this cheese type is superior to 45%.

The uncooked pressed cheese (Tomme de Pyrenees, Vecjo di cjavre, Crotonese, Fatuli, Queso Garrotxa, Queso Aracena, etc.).

The most important factors of milk coagulation are: temperature, which ranges from 25 to 40°C after the recipe type, and the rennet strength. In most cases, coagulation time ranges from 40 to 60 minutes.

The curd is usually broken with a wooden stick and scooped manually into traditional moulds.

After this phase, the curd is pressed by hand, dry salted or salted in brine, and the cheese is transferred in aging caves or natural cellars from 6 days to several months, according with cheese type. Some cheese varieties can be smoked before aging. Also, in the aging phase, some varieties are turned frequently and kneaded by hand, and can be rubbed with olive oil (Queso Gomeru). During the ripening time, other varieties are bathed in wine or in wine must, giving the rind its characteristic colour and strong floral bouquet aroma (Murcia al vino, Manoura). The dry matter of this cheese type is equal or superior to 45% and the crust can be with molds, morge or soft.

3. Conclusions

1. In the traditional goat cheese production field, it is absolutely necessary to find a way for a better understanding of this notion (traditional) and, on the basis of this approach, to find the appropriate regulations in this production chain which will be applied to all European countries.
2. Usually, we can distinguish the following six traditional goat cheese types: fresh cheese, soft paste cheese (with in bloom or washed crust), semi-hard cheese ripened in brine, whey cheese, pressed uncooked paste cheese, and blue cheese.
3. The demand for cheese goat products in Europe continues to increase, even for those made according to the traditional techniques (artisanal cheesemaking, or handicraft), and the increasing demand results from the rapidly growing populations, urbanisation, and some increase in the income per capita. In general, the consumers recognise this cheese type that is made almost manually, following old recipes, and are willing to pay more for it.

4. Although cheesemaking survived as an art for more than thousands of years, the advance of scientific knowledge has led to a better understanding of the raw material, milk, and the cheesemaking and ripening processes. A series of developments have taken place, which aid the cheesemaker to produce a better and more consistent quality cheese. However, the progressive disappearance of the traditional manufacture methods, according to the new hygiene requirements, can result in common cheese products if we unify the manufacture techniques.

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