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# L'Arte del Casaro

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A circular illustration with a hand-drawn, sketchy border. Inside the circle, a large wheel of cheese sits on a wooden cutting board with a prominent grain pattern. A wedge of cheese is cut from the wheel and lies on the board next to a cheese knife with a wooden handle and a metal blade. The background of the illustration is a light greenish-grey, showing a faint cityscape with a large domed building and classical columns.

# History and quality of cheese



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## 1. History of cheese

The first cheese in history can certainly be attributed to some distracted people who forgot to consume fresh milk or to keep it in a cool place. With the heat, the milk acidifies and in a short time a curd is formed. Or, more likely, a hunter, wanting to bring some supplies in anticipation of a rather long trip, put the milk in a goatskin. The poor man did not know that in the stomach of ruminants, precisely in the abomasum, there are enzymes that facilitate digestion of milk. Let's try to imagine what his surprise was when he tried to drink it: instead of the white and tasty liquid came out something yellowish and rather acidic. The hunter, unawarely, drank the whey and immediately began to taste the solid part left in the goatskin. We do not know if he said "look, it is cheese" or "it is good", but what is certain is that, starting from that day, mammals were milked primarily to produce what the Greeks called "form" and the Romans "caseus". We said that cheese is certainly the result of a distraction, but its quality is the result of an accumulated millennial experience, of men who have contributed day by day to improve the technique, adapting it to the environments and the course of history.

For over two millennia, the only known cheese was Pecorino and Homer is perhaps the first to describe the production technique in a detailed way. Polyphemus, when returning to the cave, eats the sheep, adds rennet to the milk and after waiting for a while, puts the firm curd in the moulds. This is what it is still done nowadays. But if the technique was almost the same everywhere, the cheese itself was less similar, especially because of the use of different types of coagulants. David, before using the slingshot, thought of impressing

Goliath (1 Samuel 17-18) offering ten cheeses, different from each other for the type of rennet used (fig latex, thistle flowers). But were the Romans to make rennet an element of refinement. Pliny the Elder, in its Natural History, writes that: "*the rennet of the fawn, the hare, and the kid is the most esteemed, but the best of all is that of the dasyplus: this last acts as a specific for diarrhoea, that animal being the only one with teeth in both jaws*". But in Pliny the imagination had no limits, rather refer to Columella, an expert Spanish agronomist who moved to Rome: "*it is convenient to coagulate the milk with rennet of lamb or kid, though it can also be used thistle flowers or safflower seeds and fig latex coming from the carved bark. There is no doubt that the cheese coagulated with figs has a great flavour .... Some people put green pine cones in a bucket, pour milk and remove them when the curd is ready to be placed in moulds. Other people crush green pine kernels and mix them with milk to coagulate it. There are also those who mix shredded sieved thyme to the milk*". In other words, the variations were many, but it was also the right time for new types of cheese. Still reading Columella: "*well known is the way of making "hand pressed" (manu pressum) cheese. In fact, the milk coagulated inside the bucket, until it is warm, separates from the whey and, throwing hot water over it, it is shaped by hand or in boxwood moulds. It also has a pleasant taste if it is hardened in brine and then coloured with apple tree or straw smoke*". We are talking about the ancestor of spun curd cheese because it is precisely in the addition of hot water that lies the difference between traditional cheese - shaped in moulds - and pasta filata ones, hand shaped because the curd is more rigid. Of course we are not talking yet of Mozzarella, where the paste has to be

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stretched and then rolled, but the result is very close because the pressing in boiling water compacts the curd in the same way as pasta filata cheese.

With the decline of the Roman Empire, the interest in things happening South of the Po river greatly attenuates; cheese history begins to be written almost exclusively for those produced in Northern Italy. Pantaleone da Confienza, in the middle of the 15<sup>th</sup> century, in its “*Summa Lacticiniorum*” makes a point on the vast cheese production but skips those produced in Central and Southern Italy, mentioning merely the *sardinicum* as being unworthy, in actual fact terrible.

To tell the truth, nowadays some productive systems are not very dissimilar to the ones practiced at the time of the Romans, so we can formulate a hypothesis. Let’s think of Caciocavallo Podolico. Let’s think of many models in the Alps and the Apennines. Something has changed in the production system, with quite perceptible or obvious consequences. Columella once again comes to our aid: “*the bucket, once filled with milk, must be kept to a certain degree of warmth, but it must not be exposed to the flame as someone thinks; instead, it has to be placed not far from the fire, and as soon as the milk is curdled, it is immediately poured into juniper baskets or wicker baskets, or in moulds, because it is very important to let the whey drain from the beginning and separate the coagulated material*”.

This passage is important because it tells us that milk was coagulated shortly after milking. Normally the milk is processed once a day and cooled down; in small farms, when or where there is little production, milk is even stored for several days, often without refrigeration. The milk quality suffers, the microbial content

increases and, for example, “*holes*” or swelling are the most immediate effect on quality. Another important step is cheese salting. In the past, salt, though expensive, was indispensable for product preservation: nobody could afford the luxury of wasting entire wheels of cheese; so it was used in excessive quantities. Still reading Columella: “*as soon as the cheese has acquired a certain consistency, [farmers] put weights above it to let the whey drain away; then, once removed from the moulds or the baskets, they place it in a dark and cool place, so that it does not spoil, on very clean boards, sprinkle it with fine salt and let it harden, putting weights over it. When this is done for nine days, it is washed with fresh water and placed in shadowy place on trimmings made for this purpose, arranging it so that one wheel does not touch the other and left to dry moderately. Then, in order to keep it tender, it is piled up in a closed place away from the wind, on different boards. Thus it does not develop holes, and it is neither salty nor dry; of these defects, the first one occurs if the cheese has not been sufficiently pressed, the second one if it has been salted too much, and the third one if it has been dried too long in the sun*”. Columella describes the production technique very well, but it is clear that nine days of salting for cheeses that did not have large dimensions are excessive. It is clear that conservation and transport had to be a constant concern at that time: “*this type of cheese can also be shipped*”. In fact, for fresh cheese Columella suggests: “*the one that has to be consumed fresh a few days after it has been made, is produced with less effort. Removed from the moulds, it is salted in brine and then dried in the sun*”. But excess salt was not just a prerogative of the Romans.

Quality of the raw material has also to be considered. At Columella’s time it was at the

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highest level because animals were grazing and did not produce large amounts of milk. Today, however, milk is mainly produced in intensive farming where quantity, rather than quality, is preferred.

An important step was and still is hygiene in the stages after milking. Very precarious or almost absent in the past, excessive and exaggerated at present. Once, milk was processed immediately after milking so as not to allow bacteria to proliferate to a large extent; nowadays, the excess of hygiene has drastically reduced the microbial content so that, to coagulate milk, it is necessary to add starters. In short, the cheeses of the past had a more distinct personality, were more aromatic and much saltier than those we are accustomed to today.

## 2. Raw milk cheeses

If for André Simon, a writer and expert in food and wine, “Cheese is milk grown up”, for the language of the legislator cheese is the product obtained by coagulation of whole, semi-skimmed or skimmed milk or enriched with the addition of cream, and with the removal of the whey.

The removal of the whey is therefore the stage of preparation that distinguishes cheese from other milk products, such as fermented yoghurt, kefir or similar. In cheesemaking, milk may be used raw or pasteurised.

During pasteurisation, milk is heated at 72°C for 15 seconds, greatly reducing the microbial content at the expense of the microflora useful for cheesemaking, thus making the subsequent addition of starters indispensable.

The use of raw milk, that has not undergone thermal treatment, is now a heritage of high quality cheeses rich in natural bacterial flora,

that, although it cannot guarantee the consistency of the end product, ensures flavour, aroma and unsurpassed quality.

Moreover, thanks to the presence of natural flora, the typicality and territorial nature of milk remains unchanged even more when it is processed directly without refrigeration and intermediate heating.

Clearly, hygiene conditions play a crucial role in the processing of raw milk. In order to obtain a fine cheese, it is necessary to pay close attention throughout the cheesemaking process, from the stable to the transformation and ageing areas. In addition to raw milk, several companies have added the characteristic of native breeds and natural feeding. The cheese, obtained from milk produced under these conditions, has noble and undoubted sensory and nutritional characteristics.

## 3. Cheese: health benefits

Cheese is made essentially of: fat, protein, water and salt. Generally, taking away water, fat and protein are more or less proportional. So beware of the label, because there are light branded products on the market whose fat content is double the protein! In some cheese there is also reported the energy content, the kilocalories. However, thinking about it, in either cases we always talk about quantity and never quality. In essence, looking at the label would seem that all cheeses, having removed water that has no nutritional value, are the same, since fat and protein are equally distributed. But it is not so, there is fat and fat, proteins are not all equal and the biological value of calories changes in relation to the above components.

Water has no nutritional value, hence may not

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matters, but in cheese, its content is often linked to the ageing of the product: the more water there is, the fresher the cheese. This is why sometimes people following a diet prefer cheeses with lots of water, so that they ingest less energy. However, cheese digestibility depends on the ageing, so a fresh cheese is less digestible than a mature one.

An important function of cheese is to provide high quality biological proteins because they contain essential amino acids that are scarcely present in vegetables. Therefore milk proteins, together with meat proteins, are “natural food supplements”. Moreover, these proteins have high digestibility in milk and, in particular, in cheese because, during ageing, they undergo a process of proteolysis or a “predigestion” of proteins, making our body’s task much easier. Lactose, the milk sugar, can be a problem for people suffering from “lactose intolerance”, that is, for those people who fail, for various reasons, to synthesize in sufficient quantities the lactase, the enzyme responsible for the digestion of this sugar. In the case of cheese, the lactose content decreases as the ageing progresses.

Finally, the most “controversial” component is fat; however, simply speaking of “fat” is reductive and misleading since, as far as milk is concerned, it is necessary to distinguish between saturated and unsaturated fats. Saturated fats are those to be kept under control since these are the main drivers of cardiovascular and obesity diseases.

Each fat molecule equals 9.5 calories, which is why it is the component most taken into account when selecting a cheese. Normally, the ratio between saturated and unsaturated fats is 70/30. However, this ratio is not fixed but changes mainly in relation to the type of animal feeding and breeding. In grazing animals this ratio drops to 60/40, because the

fresh fodder component is rich in unsaturated fatty acids. In addition, milk obtained from grazing animals contains significantly higher levels of vitamin A and vitamin E compared to the product obtained from animals reared in stables.

## CONJUGATED LINOLEIC ACID (CLA)

Fatty acids are a group of substances contained in both animal and vegetable foods, and are the basic constituents of fats. Depending on their chemical structure, they are distinguished in two different categories: saturated and unsaturated (presence of double bonds in the carbon atom chain forming the molecule); the latter ones are further distinguished in cis and trans. Nutraceutical properties are recognised for fatty acids belonging to the category of trans unsaturated fats, commonly referred to as trans fatty acids. Trans fatty acids are widespread in vegetable foods, such as seeds and fodder, rich in linoleic acid and linolenic acid. Animal feed is characterised by the presence of saturated fatty acids but in foods such as milk, there is the vaccenic acid which is the precursor of conjugated linoleic acid (CLA). The latter, in fact, is formed in the rumen by the presence of an enzyme acting on the vaccenic acid produced in turn by linoleic and linolenic acid. CLAs have important nutraceutical properties such as: reduction of coronary heart disease, cholesterol reduction, anti-tumour properties, anti-cancer properties, anti-diabetic properties, immunological action, bone mineralization and obesity reduction.

The concentration of CLA in ruminants is influenced by several factors, first of all the amount of polyunsaturated fatty acids intake in the diet. Their increase, as in the case of linoleic acid which is the substrate for its

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synthesis, induces an increase in the production of CLA. Studies show that CLA content in milk is higher when an animal is fed on lush fodder at the initial growth rate (and not second cut). This correlation is the result of the CLA content found in milk and its derivatives, which is higher in those products from animals whose diet is almost entirely based on natural pastures, namely ewe's milk and its derivatives.

	CLA (nmol/mg fat)	St. Dev. ±
Milk	25.32	0.38
Ewe's milk	105.85	0.80
Yoghurt	28.44	4.42
Parmesan	30.83	2.25
Pecorino	46.48	20.95
Ewe's Ricotta	86.24	9.93
Emmentaler	50.73	1.28

## 4. Cheese label

As of 19<sup>th</sup> April 2017, the Decree of 9<sup>th</sup> December 2016 (G.U. No. 15 dated 19-01-2017), issued by the Ministry of Agricultural, Food and Forestry Policies, has entered into force and obliges to indicate on the label the origin of milk for all dairy products, in accordance with Regulation (EU) No. 1169/2011.

It is not therefore only the milk that is affected by the measure, but also all its derivatives. Where the milk, or milk used as an ingredient in dairy products, has been produced, packaged and processed in the same country, the indication of origin may be limited to a single indication, such as "*Milk origin: Italy*".

If, on the other hand, packaging and processing takes place in the territory of several countries, the following terms may be used, depending on their origin:

- *milk from EU*: if milking takes place in one or more European countries;
- *milk conditioned or processed in EU*: whether these phases occur in one or more European countries.

If operations are also carried out outside the European Union, the term "*non-EU countries*" should be used.

Only the PDO and PGI products for which the origin and traceability of milk are already covered by the specification are clearly excluded from the Decree.

## 5. Cheese cutting

Cutting a cheese is not, and should not be, an opportunity to strike on guests or customers. Not even in the Renaissance, when scenography was an important part of banquets and when the cut was left to the Trincianti, real cutting professionals, knives were used only to cut the biggest wheels. If every food has to be "*good to think*", every slice of cheese must also be "*good to see*". A cheese plate with well cut slices, allowing you to grasp, even from the visual examination, some characteristics of the product that you are tasting, such as the structure of the paste, the colour and consistency of the rind, the presence of moulds, the colour, is not only an invitation to eating, but it is also a key element of tasting.

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Since there are several types of cheese, very different from each other, the issue concerns not only the cutting, but also the type of knife. Theoretically, there should be a knife for each type of cheese.

At home there are not many knives because we tend to buy cheese portions; we rarely have whole wheels. When we serve a plate of cheese, we need at least three types of knives:

- a long and thin knife for soft and fresh cheese. When you cut a white mould cheese, the blade needs to be cleaned after each cut in order to prevent the mould from dirtying the paste;
- a rather short and thick knife for a more consistent, semi-hard cheese;
- a drop-shaped knife for hard cheeses. When we face aged products, with low humidity and a compact and granular structure, it is better to serve the cheese in cubes rather than slices.

A different approach should be adopted by counter staff. They have to cut all cheese types and the goal is not to present the slice well, but just to serve the customer as swiftly and as practically as possible. In this case, there are functional knives that facilitate the cutting operation.

Cutting also responds to customer needs. Clearly, hard cheeses will not be diced, but they will try to offer slices that still have a piece of rind.

It is in wine shops and restaurants that cutting requires the utmost attention. A good cart should have at least 20 cheeses representing all categories. They then use different knives for each type, not only to cut each cheese properly and appropriately, but also because the cut rite is part of the art to present the “rare” product that is being served to the customer. So, first of all, when you change category, you need to change knife, but also

with the same cheese, if for any reason the paste may be contaminated by the dirty blade, you need to clean it after each slice. But let’s see what kind of knives it is necessary to have and for what kinds of cheese:

- for creamy cheese, such as Ricotta, a spatula must be used;
- for fresh and soft cheese, such as Crescenza, Robiola, Taleggio, you need a knife with a long, thin and small blade because the blade must not oppose resistance during cutting and the cheese must not be deformed;
- pressed and semi-hard cheese, such as Fontina and Asiago, must be cut with bigger knives, big blade and good grip to allow an effective and rapid cut;
- hard cheese. These types of cheese must not be cut with a knife because the passage of the blade flattens the surface of the paste with at least two negative consequences: the first one is aesthetic, because the granularity of the paste is not placed in evidence; the second one is qualitative, because a broken paste exposes a larger surface to air and this causes a greater aroma release. These types of cheese then, if they are too big, should be punctured with a pointed knife along the heel in order to obtain two halves. If they are quite small, it is possible to remove the rind entirely. Once the rind has been removed, it is possible to proceed with a drop-shaped knife in order to obtain medium-to-small sized cubes.

## 5. Cheese storage

The production technique and the quality of the raw material greatly affect cheese preservation. In particular, the production technique dictates the maximum shelf life, the milk quality influences the ageing period. Mozzarella must be consumed within a short

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time: in Campania, the day after production at the latest, elsewhere within a week. Caciocavallo produced with milk from intensive breeding reaches its top after six months, while the Podolico one, produced with milk from Podolica cows that are allowed to graze, should be aged for at least a year and, if kept in good conditions, it is still good after 7-8 years, even though it is a cheese of small dimensions.

Keeping a cheese well is important because, while all cheeses should be consumed at room temperature to value the aromatic complexity, this temperature however, because of its variability, does not allow a good preservation of the product. At home there is only the fridge available, but now everyone has realised that this appliance kills all the flavours; Ricotta and Mozzarella stored in the fridge lose all their fragrance and flavour.

But at home there is only the refrigerator. What to do then?

Let's start by saying that the need to preserve the cheese correctly does not only concern the consumer, but also the counter staff, restaurants and wine shops. Since the conditions are different, different solutions are available. Let's proceed gradually.

At home, the problem generally concerns a few types of cheese, already cut into pieces and stored for a few days. We rarely have whole wheels. Of course, the ideal would be to buy always fresh products, but often that it is not possible. We also assume that we have only the fridge, because cellars are no longer used. In this case, the suggestions are:

- Mozzarella should always be kept out of the fridge, immersed in brine;
- Ricotta, to be kept out of the fridge as well, simply covered with aluminium foil;
- fresh cheese, such as Crescenza and Robiola,

can be stored out or inside the fridge in its own packaging;

- soft cheese, like Taleggio, and those intended to be stored for a short while, should be kept in the fridge wrapped in cellophane. The cellophane must be pressed onto the cut part because air and the lack of moisture favour the development of moulds and the breakage of the paste. If storage is prolonged, the cellophane should be replaced;
- hard cheese, for which storage is easier because it is drier and hence less susceptible to mould development and loss of humidity, can be covered with a damp cloth and left outside the fridge in a cool dry place;
- blue cheese must be wrapped in aluminium foil and stored in the fridge.

For counter staff, forced to use only the fridge, everything depends on the rapidity at which a cheese is sold. Those who have a very short storage time, practically do not give any problems and, at least during the day, they can be left in their pack without any further operation. Otherwise, in the fridge, medium and long aged cheeses lose moisture and begin to break, while fresh ones dry up and develop moulds. The rule is always the same: hard cheeses can be covered with a damp cloth, the others must be wrapped in cellophane.

A bit different is the case of restaurants and wine shops that have a cart because, in addition or beside the fridge, they have a rest room. In fact, they should have a cellar, because the wealth of a cart is all in the manager's ability to look for rare and different types of cheese. To enhance this quality, each cheese has to be stored at the right

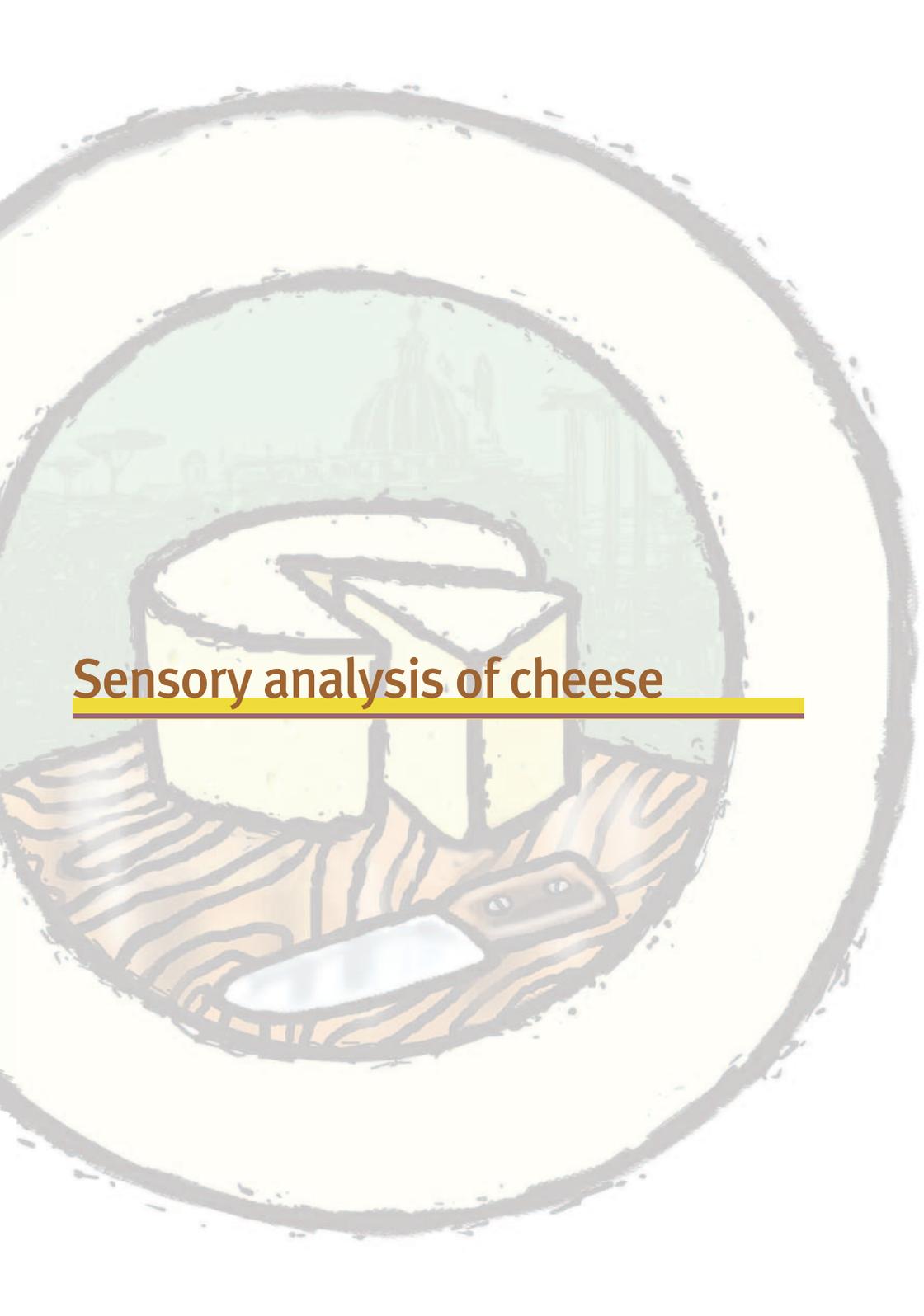
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temperature and humidity. The general principle is that fresh cheeses, by law, should be stored in a refrigerator; the important thing is to pull them out at least two hours before serving. Soft, blue and white mould cheeses should be kept at 9°C, while hard ones at 12-16°C. For these cheeses, humidity is

important, it should never fall below 70%, better if it is around 85%.

The ideal should be to have two different rooms and a fridge. Each evening, when the cart is emptied, each cheese must be wrapped in cellophane or in a cloth and stored in the fridge or cellar.

A circular illustration with a hand-drawn, sketchy border. Inside the circle, a large wheel of cheese sits on a wooden cutting board with a prominent grain pattern. A wedge of cheese is cut from the wheel and placed next to it. A knife with a wooden handle and a silver blade lies on the board in the foreground. The background is a light green wash featuring a faint, stylized illustration of a domed building, possibly a cathedral or a cheese factory, with some trees and architectural details. The overall style is artistic and illustrative.

# Sensory analysis of cheese



# Sensory analysis of cheese

## 1. Principles of sensory evaluation

Sensory analysis is a method for determining the organoleptic characteristics of food products through the use of all five human senses (Figure 1).

Analytical tests are laboratory tests that are carried out using experienced and / or trained tasters; they are used to evaluate differences or similarities between two or more samples as well as for the identification and quantification of sensorial descriptors.

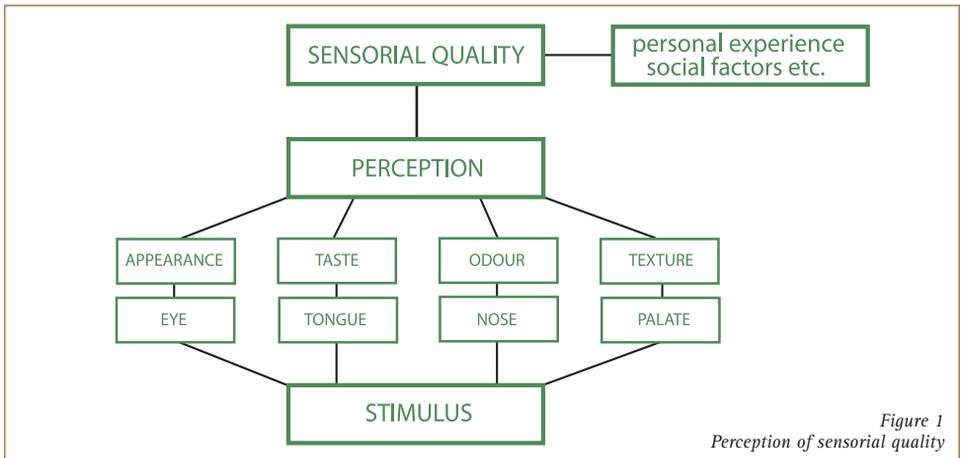


Figure 1  
Perception of sensorial quality

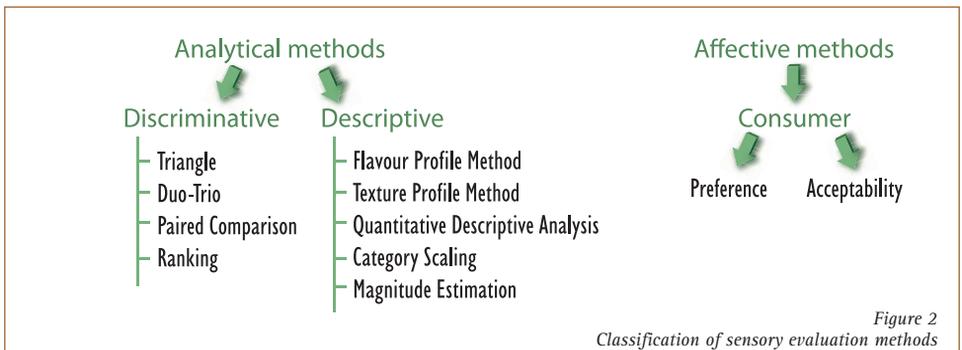


Figure 2  
Classification of sensory evaluation methods

Sensory tests are classified into two main groups: “analytical” tests that, in turn, are divided into descriptive and discriminative, and “affective” tests, i.e. preference and acceptability (Figure 2).

Discriminatory analytical methods give an answer to the question “Is there a significant difference between products?” To get relevant results, this kind of test requires 25 to 50 evaluations.

# Sensory analysis of cheese

Descriptive analytical methods give an answer to the question “What is the difference and how wide is it?” These tests are conducted on a small number of participants, 6 to 12, depending on their degree of experience.

The affective tests, finally, allow you to determine whether the differences between the products are important for the consumer and affect their acceptability and therefore their purchase.

The classification of the sensory methods, according to the above mentioned three categories, each one with specific goals, requires a different degree of qualification of the participants, distinguished in panel and consumer, to distinguish between objectivity and subjectivity of the sensory evaluation (Figure 3).

## PANEL

- selected or professional tasters
- trained
- work as analytical instruments
- answer to discriminative and descriptive tests
- group: 6-12 tasters

## CONSUMER

- consumers selected at random
- untrained
- represent a target population
- express only preference or acceptability opinions
- group: 100-500 consumers

Figure 3

Analytical tests are performed by a panel of 6 to 12 qualified tasters, while affective tests are performed by consumers, in other words by a target group representing a certain population of 100 to 500 untrained people.

Descriptive tests imply qualitative and quantitative description of the sensory characteristics of a product by a panel of qualified tasters. In addition to being able to express verbally their perceptions of taste, flavour and aroma, they have to evaluate the intensity and differences of each category of product assessed.

The evaluation stages are essentially three:

- selection of descriptors;
- panel calibration;
- estimate of the intensity of the descriptors.

In the first stage, a panel of experts selects the adjectives that best describe the products to be evaluated.

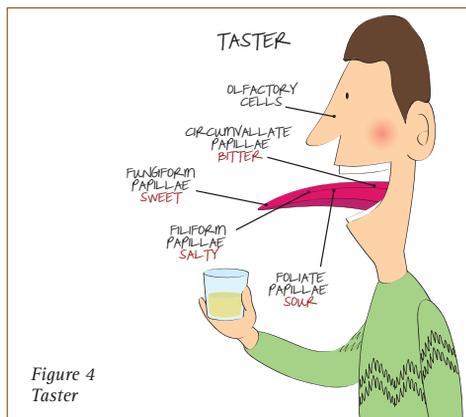
In the second stage, preliminary tests are performed on standard products allowing panel calibration.

Finally, a quantitative evaluation of each qualitative descriptor, expressed with a common numeric scale that, most often, ranges from 0 to 10.

Sample analysis involves a visual examination (appearance), followed by the olfactory evaluation (aroma) and taste.

As far as taste is concerned, it has to be noted that sensations are perceived mainly by the tongue through taste buds that allow to recognise the four basic tastes: sweet, sour, salty and bitter (Figure 4).

# Sensory analysis of cheese



## 2. Cheese evaluation

Initially, defects are defined because, if present, would lead to the exclusion of the product from the subsequent evaluation stages (Table 1). The selection of descriptors describing the product was carried out by a panel of experts, who developed the list according to the product characteristics (Table 2).

**Table n° 1**

### CHEESE DEFECTS

#### A. Visual evaluation

1. On the rind: abnormal colours of the rind (white, red, brown, green-blue);
2. On the rind: cracks/caverns;
3. On the rind: moulds (pink, black, etc.);
4. On the rind: insects (cheese fly, cheese mites);
5. On the paste: holes, flaky, chalky, rotten (white or grey), white spots.

#### B. Olfactory evaluation

1. On the paste: off odours (mouldy, rancid, animal, manure, silage, etc.).

#### C. Gustatory evaluation

1. On the paste: off flavours, excessive bitterness.

#### D. Structural evaluation

1. On the wheel: early blowing, late blowing;
2. On the wheel: softening.

**Table n° 2**

### POSITIVE CHEESE ATTRIBUTES

#### A. Visual descriptors

1. Appearance: shape, dimension, rind (white mould, washed, smooth, rough), colour;
2. Paste: underrind thickness, eyes, colour;
3. Paste: consistency.

#### B. Olfactory descriptors

1. Overall odour: general term used to indicate the complete set of sensations perceived through the nose;
2. Lactic: fresh milk, boiled milk, acidified curds;
3. Vegetal: grass, fermenting grass, boiled vegetables;
4. Floral: honey, flowers;
5. Fruity: dried fruit, citrus fruits, tropical fruits;
6. Roasted: light, medium, strong and very strong, roasted nuts;
7. Spicy: fresh, minty, peppery;
8. Intensity: low, medium-to-low, medium, medium-to-high, high;
9. Persistence: low, medium-to-low, medium, medium-to-high, high.

# Sensory analysis of cheese

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## C. Gustatory descriptors

1. Sweet: basic taste characteristic of milk sugars, perceived mainly on the tip of the tongue;
2. Sour: basic taste characteristic of the organic acids that are formed during coagulation, perceived mainly on the sides and under the tongue;
3. Bitter: basic taste characteristic of anomalous fermentations during processing/ageing or product defects, perceived at the back of the tongue, unless included in product specifications;
4. Salty: basic taste characteristic of minerals (e.g. sodium chloride), perceived on the sides of the tongue;
5. Intensity: low, medium-to-low, medium, medium-to-high, high;
6. Trigeminal sensations: astringent, spicy, pungent, refreshing, burning, metallic;
7. Overall sensations: aftertaste, persistency.

## D. Structural descriptors

1. Hardness: resistance to chewing;
2. Friability: tendency to break into fragments;
3. Adhesiveness: difficulty in removing cheese from palate and teeth;
4. Solubility: rapid cheese fusion in the saliva;
5. Grittiness: perception of compact granules;
6. Humidity: presence of a high quantity of liquids;
7. Lumpiness: perception of small lumps;
8. Crystals: perception of glassy granules;
9. Elasticity, rigidity, deformability, rubbery, greasiness.



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