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Questions sur Produits laitiers & Cheese, Nutrition & Health

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1. What is cheese?

In France the term "cheese" is governed by a decree (from November 2007 updated in November 2013). It is a product made exclusively from specific dairy ingredients (milk; cream, fat, buttermilk) used alone or in a mixture and coagulated (in whole or in part). The coagulation of milk gives a solid phase (curds) and a liquid phase (whey). Coagulum – which will turn into cheese – may be strained, molded, salted, fermented and/or ripened for more or less time. Minimum dry matter content of a cheese of 23 g/100 g**.

In France alone, there are 1000 different cheeses classified by types.

It is worth noting that speciality cheeses, in the strict sense of the term do not fall under the "cheeses" category. They can contain raw materials from milk, other than those used to make cheeses (such as serum proteins in high concentrations for example). Their minimum dry matter content is 20 g/100 g of end product for ripened specialty cheeses and 10 g/100 g for unripened cheeses.

* Full cream milk, semi-skimmed or totally-skimmed milk. Mostly cow's, goat's or sheep's milk but also buffalo's milk in some countries (for example Italy).
** By way of derogation, for "cottage" cheeses or "cream" cheeses this content may be decreased to 15 g or even 10 g for 100 g.

2. What are its main types?

Cheeses are usually grouped into major types depending on the technologies used for manufacturing them.

- **Fresh (or cottage):** just curds;
- **Surface-ripened cheeses** (camembert, brie…): the coagulum is drained, molded, inoculated with mold (penicillium candidum) and ripened; or washed rind cheeses (pont- l'évêque, munster, livarot…): after unmolding, the rind is washed and brushed regularly;
- **Blue-veined cheeses** (fourme d'Ambert, bleu de Bresse…): inoculated with penicillium glaucum prior to being molded;
- **Pressed** uncooked **cheeses** (cantal, tomme, reblochon, St nectaire…): the coagulum is pressed and drained well; or cooked (emmental, comté…): the curd/whey mixture is heated before the curd is pressed;

- **Goat's cheese** (chabichous, crottins…);
- **Fondus** (crème de gruyère…): made from cheeses and other dairy products and melted under heat.

Nutrient composition

3. What are its main nutritional benefits?

The nutrient composition of cheeses depends essentially on that of the milk used and its manufacturing method.

- The nutrient composition of the milk itself is largely linked to the breed of the animal and its genetics but also to the herding (livestock feeding, milking period…).

- To sum up the impact of technologies: draining leads to a loss of proteins (with the whey) and lactose; skimming leads to a loss of lipids hence of fat soluble vitamins (A and D) and fermentation and ripening lead to an enrichment in group B vitamins (folic acid…).

The table in ***Annexe A*** draws together technologies and nutrient compositions and highlights these differences based on the types of cheese.

One should not generalise! However, most cheeses are distinguishable by their interesting protein, mineral and trace element (calcium, zinc, potassium…) and vitamin content (vit A, B2, B9, B12, D…).

The energy value of a cheese essentially depends on its water and fat content*. It may vary from 50 kcal per 100 g of 0% fat cottage cheese to 300 kcal for 100 g pressed cheese. One should bear in mind that "hard" cheeses are to be eaten in small quantities (30 g on average for more than 100 g for cream cheeses…).

*Lipids (fat) provide 9 kcal/g. In 0% fat cheeses, the proteins and carbohydrates provide energy (4 kcal/g).

4. What about its proteins?

The essential amino acid content in the proteins found in cheese gives them an extremely high* biological value and their digestibility nears 95%. In other words, proteins are nearly fully absorbed by the intestine and provide the amino acids needed for the development of the organism. Apart from this "nutritive" role, proteins – under their native form or in their biopeptide state - could have physiological functions of their own. These would relate to the cardiovascular system (anti-thrombotic and anti-hypertensive activity), the nervous system (activity opioids, anti-stress…), the body's natural defenses (antimicrobial activity, immunostimulant…), the transport of minerals (iron, calcium) and the digestive system. More than 360 peptides were identified from cheeses, 50 of which were already described as bio-peptides**.

*Where some soft cheeses are slightly lacking in sulphur-containing amino acids (methionine and cysteine) this is compensated by the habit of eating them with bread (wheat is rich in sulphur-containing amino acids)…
**These biopeptides, fragments of hydrolysed proteins are obtained under the action of enzymes or microorganisms during the transformation of milk or during its digestion. The activity of many of these has been described in cells and/or animal models and need to be confirmed in humans.

5. What about its vitamins?

Cheese fat soluble vitamin content (A and D and incidentally E) depends on its fat content. As to its water-soluble vitamin content (Group-B vitamins), it varies significantly from one cheese to another. In fact, it results from two opposite factors: the loss which occurs during straining and the synthesis which occurs during the ripening. Most cheeses provide appreciable quantities of folates (vitamin B9) and retinol (vitamin A). However, they are deficient in vitamin C.

*Thus, the group-B vitamins seem to be largely eliminated with the whey during straining (about 25% retained in the coagulum). In order to compensate this, the bacterial and fungal microflora synthesise it during the ripening (riboflavin, pantothenic acid, pyridoxine, folic acid… and sometimes also thiamine and vitamin B12).

6. What about its calcium?

Cheeses are an excellent source of calcium. However, the rate of calcium varies according to their water content and their manufacturing method: less than 100 mg/100 g for cream cheeses to more than 1000 mg for some cooked cheeses*. Cheese calcium is particularly well absorbed and bioavailable**. In addition, some research studies have found that the interaction of high-in-calcium milk product with the other constituents (proteins, vitamins, fats, etc.) gives it specific health effects.

* The calcium content for 100 g of cheese: pressed cooked cheeses from 900 to 1000 mg; processed and blue-veined cheese from 500 to 700 mg; soft cheese with washed rind from 400 to 800 mg; surface-ripened cheese from 100 to 300 mg; cream cheese from 60 to 100 mg.
**Cheese's absorption coefficient of calcium can be compared to that of milk (~33%).
Its bioavailability is promoted by the simultaneous intake of phosphorous in good proportions and by the presence of peptides. Phosphopeptides from enzymatic hydrolysis of caseins seem to facilitate the placing and keeping of the calcium in solution (a large number of these peptides (+ than 45) have been identified as transporters of calcium).

7. What about other minerals and trace elements?

Cheeses are also an interesting source of zinc (from 2 to 10 mg/100 g), iodine and selenium. Some provide significant quantities of potassium (between 100 and 200 mg/100 g). Phosphorous content usually follows that of calcium in a Ca/P ratio (near 1.3) particularly internal use.

Most cheeses are low in magnesium (10 to 50 mg/100 g). As for sodium* its content varies from 30 mg/100 g to 1600 mg.

Worth noting: the salting methods (method, duration, temperature, substance for salting) are defined in tendering specifications for cheeses covered by a PDO (Roquefort, bleu d'Auvergne for example).

* (Unsalted) cream cheeses have very little sodium (from 30 mg à 60 mg/100 g). Ripened cheeses have more (from 400 à 1600 mg/100 g). In fact, salting is essential for making all types of ripened cheese due to its triple action: formation of a rind, maintaining the moisture and action on the microbial growth. Furthermore, salt is a flavour enhancer and contributes to cheese's organoleptic qualities.

8. What about its lipids?

Lipids are responsible for the creaminess of cheese and several free fatty acids, which are produced during ripening, contribute to the cheese's flavor. Cheese lipids are found in the form of an emulsion, thereby making them easy to digest. These lipids are made of a mixture of fatty acids, mainly saturated but also mono and poly unsaturated, which have agonistic and antagonistic effects and which can interact with the other constituents of milk (in particular calcium). It is worth noting the presence of two trans fatty acids, vaccenic acid and rumenic acid (CLA), which have beneficial effects on health*.

* The trans fatty acid content of cheeses is substantially linked to that of the milk used and thus to the livestock's diet, its breed and the region of collection. Ewe's and mountain ewes' milk cheeses are rich in vaccenic and rumenic acids.

9. What about its other constituents?

The many other constituents of cheese having nutritional benefits and/or healthy effects, one may cite: lactose (milk sugar), probiotic bacteria and biogenic amines.

- **Lactose***, which is hydrolysed to glucose and galactose in the intestine is a source of energy (4 kcal/g). Furthermore, it can promote the assimilation of calcium and is known to have interesting properties for the balance of the digestive flora. It limits the proliferation of pathogenic bacteria and promotes the development of bacteria with beneficial effects on the intestine (prebiotic effect).
- **Biogenic amines**** (histamine, tyramine, putrescine, cadaverine) which, for the most part, result from the transformation of free amino acids by some bacterial strains, fulfill essential organism functions. Nevertheless, with excess intake, these could cause certain disorders (QS n°42).
- **Microorganisms** used in the manufacture of cheese (acidification, ripening…) may act as probiotics.

For example some propionic bacteria used in particular in the manufacture of pressed cooked cheeses, seem to have effects on the microbiota (intestinal microbial ecosystem) and the associated metabolic activities, but also on the modulation of carcinogenesis and intestinal inflammation.

*Ripened cheeses do not usually contain lactose; the small quantity remaining in the coagulum at the end of straining is transformed into lactic acid during the ripening. Hardly strained and hardly fermented cream cheeses and processed cheeses contain from 3 to 6 g/100 g.
** The formation of biogenic amines may be more important in cheeses which have a long ripening period or preservation (blue-veined cheeses as well as soft cheeses, cooked cheeses, etc.)
*** According to the WHO, bacteria are: "live micro-organisms which when administered in adequate amounts, confer a health benefit on the host."

Cheese & Health

What is the relationship between cheese and:

10. Bone health & oral health?

- Cheeses are an essential source of calcium in our diet and its beneficial role on the bones in addition to preventing osteoporosis no longer needs to be proven. Experimental studies suggest that the excess of phosphorous, sodium or even sulphates and proteins* in our diet could promotecould induce urinary excretion of calcium as well as calcium bone loss. This is highly controversial information but especially difficult, or even impossible to extrapolate to a specific food and thus to cheeses. Although, epidemiological studies are few and far between, they show that cheeses have a protective role on bone health.
- Studies in humans have shown that cheese has a protective role in the prevention of caries, the action of cheese being independent from sugar intake. Its richness in calcium and phosphorous contribute to healthy teeth: it protects against the acidity in the mouth, facilitates the fixing of fluorine and its proteins reinforce the protective effect of the saliva of which it stimulates the production (from chewing).

*The SO4/Ca ratio in cheeses is of 0.6 and can go up to 2.6 in some sulphated high-calcium mineral waters. As for the role of proteins on urinary calcium, it seems minor, short term and largely counterbalanced by the calcium and potassium content *(Annexe B)*.

11. Cardiovascular diseases?

Although the role of lipids and saturated fatty acids on cholesterolemia and on cardiovascular diseases is still an area of active scientific research, sick people who are on a hypolipidemic diet will be justly advised to eat low-fat cheeses and low-fat dairy products. However, for the others, all type of cheese can be eaten as part of a healthy balanced diet.

In fact, the study (at non nutritional nor physiological doses) of isolated constituents of cheese (fatty acids, calcium, proteins…) on cardiovascular parameters has sometimes led to hasty conclusions*. Nevertheless, most studies examining the role of cheeses on cardiovascular health of people in good health show rather neutral effects and even sometimes beneficial ones, serving to explain for some the popular "French paradox" (Annex A). One of the explanations may be its beneficial action on some cardiovascular risk factors such as hypertension, hypercholesterolemia or inflammation.

*The "cheeses contain saturated fatty acids and are thereby bad for cholesterol and the heart" shortcut needs to be put into perspective. Short and medium chain fatty acids (C4 to C10) do not have a negative impact on the lipid profile, stearin is neutral (even beneficial), the results concerning lauric and palmitic acid are contradictory and those on myristic acid (considered as hypercholesterolemic when consumed in excess) are to be interpreted according to the total energy and lipid intake.

12. Intolerances and allergies?

Lactose intolerance, the allergy itself (allergy to dairy products) and "false food allergies" are to be distinguished. Their symptoms (skin reactions, digestive disorders…) are sometimes very similar but the mechanisms involved are entirely different.

Severe lactose intolerance (due to an innate deficit in lactase) is very rare. As for the people who are lactose intolerant (adults who are more or less lactase deficient), usually have a good tolerance to cheese (in particular mixed into dishes) and especially to ripened cheese that no longer contains lactose.

In the case of allergies to milk protein* In the case of allergies to milk protein* (illness caused by the immune system), cheese (whether it is goat, cow or sheep's cheese) is not allowed. These allergies may be very severe but fortunately they are rare after the age of 3 years.

"False food allergies" are caused by a too high consumption of biogenic amines (histamine and especially tyramine); their consequences (headaches and especially gastrointestinal disorders) are usually only temporary**.

*Some people who have an allergy to eggs may react to the lysozyme used for the manufacture of some cheeses.
**Cheese is not the sole cause of these types of reactions. They can be caused by other fermented foods such as wine, sauerkraut, sausages or even some canned fish (anchovy fillet, tuna…).

13. Other pathologies ?

Type 2 diabetes: Recent epidemiological studies have suggested that the consumption of cheese has a beneficial effect on the risk of diabetes. Thus, a study conducted in 8 European countries on 340 234 people shows that the consumption of 55 g of cheese a day (a bit less than 2 portions) decreases the risk of diabetes by 12% in comparison to low daily intakes (11 g or less per day).

Following a recent meta-analysis concerning 17 studies with 426 000 participants and about 27 000 cases of diabetes, it is to be noted that the consumption of dairy products had an overall protective effect. The analysis of 8 of these studies focused on cheese and also showed a potentially beneficial effect.

The potentially protective effect of cheese on type 2 diabetes is based on a certain number of hypotheses in particular its beneficial role on weight control and as a marker of a healthier diet and/or way of life. Furthermore, furthermore, some of the constituents of cheese may be involved: proteins, minerals (calcium, magnesium, phosphorous), fat soluble vitamins (A, D and K2), water soluble vitamins (B12 and riboflavin), fatty acids (medium chain, trans-palmitoleic acid, CLA)…Ripening may also play a role.

Cancer: Experimental studies (in vitro or in animal models) show an effect (either beneficial or adverse) of isolated cheese constituents (calcium, phosphorous, vitamin D, fatty acids, proteins…) whereas epidemiological studies do not clearly show a leading role (positive or negative) of cheese consumption on most cancers. Nevertheless, a beneficial role on colon cancer has been suggested.

Weight: When eaten in moderation, cheese is not fattening and as part of an hypoenergetic diet, it does not limit weight loss.

A foresight was led over a 9 year follow-up period with 19 352 older women aged between 40 to 55 years, analysing the impact of cheese consumption. Those who maintained their consumption throughout the study were shown to be less prone to weight gain (30% decrease risk to put on 1 kg/year). Those who limited their consumption increased their probability of putting on weight. Data confirmed by the *grande étude prospective française* (French prospective study) D.E.S.I.R (Data from the Epidemiological Study on the Insulin Resistance Syndrome): more than 5000 men and women aged between 30 and 64 years monitored for 9 years. It showed that those with a higher cheese and calcium intake were the ones which witnessed the least increase in waist size and BMI over a 9 year period.

Amongst potential explanations of the effect of cheese on weight: milk calcium (increases the fecal excretion of lipids and can control the appetite and adipocyte metabolism favourably). Milk proteins (have a satiety effect and their richness in leucine helps to maintain the lean body mass. In addition, some bioactive peptides decrease adipocyte lipogenesis, some dairy fatty acids (such as rumenic acid can exert a favourable effect on adiponectin and on body fat).

14. What do we conclude?

Although epidemiological studies do not show causal relationships*, they highlight a number of either neutral or beneficial associations between cheese consumption and health: bone health, normal blood pressure, decrease risk of cardio-vascular disease, type 2 diabetes, and colorectal cancer, as well as better weight control better weight control…Other studies will however be necessary in order to validate these results and explain their mechanisms.

* Ideally, these relationships should be tested in intervention trials. Long and expensive studies which are vey often difficult to conduct.

Place of cheese in the diet of the French

15. Where does cheese stand in the diet of the French?

With approximately 26.7 kg of cheese consumed a year and by inhabitant, the French are amongst the largest European consumers ahead of the Finnish and Danish (25.6 and 24.6 kg).

Cheese is eaten by all: 98 % of the French aged between 3 to 75 years.

Cheese is mostly eaten "as is" in the two main meals (lunch and dinner) or in certain dishes. Its consumption increases with age. According to the CCAF study 2013 *, French adults eat about 33 g/day (namely the equivalent of a portion). Men eat more of it than women (38 g/d vs. 28 g/day), seniors slightly more (around 40 g/d), and children twice as less (16 g/day).

The two major types preferred by the French are soft cheeses (of camembert type) and pressed cooked cheeses (emmental, Comté…).

Then come the pressed uncooked cheeses (tome, cantal…), goat cheeses and salted cream cheeses. While men are drawn to traditional cheeses with a pronounced flavour (camembert or blue-veined cheeses…), women like softer cheeses (salted or 0% fat cream cheeses). Children and young adults prefer processed cheeses and salted cream cheeses.

* Data from CCAF consumer survey (French food consumption and behaviours) conducted by the CREDOC between October 2012 and July 2013 with 948 children (aged between 3 to 17 years) and 1091 adults (aged between 18 and 75 years), namely, 2039 participants from 1262 households representing French homes ***(QS n°56)***.

16. For fulfilling nutritional requirements?

According to the INCA2 study – conducted in France about ten years ago (2005-2007) – cheeses contribute by 20% to calcium intake in adults, 13% in teenagers (11-17 years) and 12% in children (3-10 years as well as being the 1st contributor)*. They provide 10% lipids (of total lipid intake) to adults and 6% and 7% respectively to teenagers and children. In addition, cheeses are significant for the population's protein intake: 9 % intake for adults and 6% for younger people. Furthermore, they contribute to 7% sodium intake in adults, 6% in children and 5% in teenagers.

* The 2013 CCAF study offers fully comparable numbers. Calcium is essential in all stages of life, the DRI in children aged between 4 and 6 years is of 700 mg/day, in children aged between 7 and 9 years of 900 mg and in teenagers up to 19 years of 1200 mg. In adults, they are of 900 mg and go up to 1200 mg/day in women of over 55 years (namely after the menopause) and in elderly people. There is 300 mg calcium in 250 ml of milk, in 30 g of emmental cheese or comté or in 40 g of blue-veined cheeses; in 2 yogurts or 300 g cottage cheese.

17. To who and why recommend it?

Cheese forms an integral part of the French heritage and the "French food model" characterised by a balanced distribution around 3 main structured meals (breakfast, lunch and dinner) and some light snacking. In France, cheese eaters have a more varied diet and more regular meal times than the rest. Their nutrient intake is also higher. Cheese is interesting for all ages.:

Children and teenagers: Calcium plays a key role on growth and bone solidity…The "bone stock" is formed before the age of 18. Along with milk and other dairy products, cheese is a determining food for a strong skeleton on which we will have to depend our entire life. 41% of children who do not eat cheese have a lower calcium intake by two thirds of the dietary reference intake and are hence at a risk of deficiency.

Seniors: With its calcium, proteins, phosphorous, vitamins and all its other constituents, cheese is the senior's ally. With a small amount, it provides its nutritional richness to those with a small appetite and contributes to preventing malnutrition, muscle loss and bone loss.

Those who are watching their weight, their cholesterol levels and/or their blood pressure: in reasonable quantities, cheese is not fattening and when part of a hypoenergetic diet, does not prevent one from losing weight. A diet without cheese decreases calcium intake without helping to lose more weight. Furthermore, a reasonable consumption of cheese is perfectly compatible in the diet of those who are keeping an eye on their cholesterol or blood pressure.

Cheese comes in a wide variety, thereby satisfying every person's needs and cravings: One serving of cheese a day helps keep malnutrition at bay!

Cheese at the heart of the French paradox?

The French eat more full-fat foods than the Americans and their diet is higher in saturated fatty acids. However, their cardiovascular mortality rate is nearly 3 times lower. According to scientists, cheese may be the missing piece in explaining this "French paradox"…

Cardiovascular diseases (CVD) include coronary diseases (such as cardiac arrest) and strokes (cerebrovascular accident CVA). The diet is part of the axes of prevention and its role on certain risk factors – such as hypercholesterolaemia – is often highlighted.

The neutral or even beneficial effect on the various cardiovascular risk factors and more generally on the onset of a CVD has been highlighted by recent epidemiological studies as well as by intervention trials on humans.

- **In 2013:** the results of a study on 33.636 Swedish women between 48 and 83, followed for nearly 12 years, demonstrate that women who eat more cheese have a 26% lower coronary risk [(1)].
- **In 2014:** a meta-analysis of 15 studies including 764.635 participants shows a significant association between cheese consumption and a reduced stroke risk regardless of gender [(2)].
- **In 2015:** a review of the literature on cheese's effect on cardiovascular risk. 4 prospective studies show no correlation; 1 shows an increased risk; 2 show a decreased risk; and another shows no correlation in men but a decreased risk in women [(3)].
- **In 2016:** a meta-analysis of 18 studies with 8 to 26 years of follow-up that included 762.414 subjects and 29.943 stroke events. The authors observed a negative correlation (small but significant) between cheese consumption and stroke risk. Risk reduction was maximal for subjects who consumed approximately one serving of cheese per day (25 g) [(4)].

One explanation for the neutral or possibly beneficial role of cheese may be its effect on certain cardiovascular risk factors such as high blood pressure or high cholesterol.

Cheese and high blood pressure

Certain nutrients found in milk may play a role in may play a role in the regulation of blood pressure: calcium, potassium, phosphorus, magnesium, vitamins (D, B6), and peptides. Many milk-protein derived peptides have demonstrated hypotensive effects. Both casein and whey proteins-derived peptides (casokinins, lactokinins) may inhibit the ACE enzyme, known to raise blood pressure. Others seem to work in other ways (opioid activity, calcium absorption, etc.).

In a recent study on 168 Norwegians with an average age of 51 (56% women), the authors demonstrated that cheese eaters had lower systolic blood pressure [(5)].

Cheese and high cholesterol:

High cholesterol is a CVD risk factor, but the relationship between cholesterol levels and CVD risk is quite complex. It is overly simplistic to refer to total cholesterol or LDL cholesterol as a single marker for risk. Other markers - such as HDL cholesterol, which is considered to have a protective effect must also be taken into consideration.

- **In 2014:** a study conducted in Iran on 1.752 participants (782 men and 970 women) demonstrated that cheese eaters had higher levels of C-reactive protein (CRP), apolipoprotein A, HDL cholesterol, while fasting blood pressure, total cholesterol, LDI cholesterol, Apo B and triglyceride where not any higher [(6)].
- **In 2014:** An intervention trial conducted in France on 115 subjects with moderately high cholesterol levels compared the effect of daily cheese consumption (2 servings of 30 g of camembert) to that of yogurt (2 yogurts of 125g servings). After 5 weeks, the authors did not observe the cheese having any effect on cholesterol levels or blood pressure [(7)].
- **In 2015:** a metabolomics study analysed the metabolic profiles of the urine and faeces of 15 volunteers on isocaloric diets (milk with 1.5% fat, cow's milk cheese containing the same amount of calcium and a control diet). It shows that cheese could have a direct effect on the lipid metabolism and/or on the microbiota [(8)].
- **In 2015:** 153 people (with an average age of 43, 52.3% of women) were randomly randomly allocated to 1 of 3 intervention groups. The first group consumed 50 g of low-fat and low-salt cheese; the second, 80 g/day of Gouda cheese (27% fat), and the control group had reduced cheese intake. After 8 weeks of intervention, no metabolic changes were observed in the cheese groups. Neither total cholesterol nor LDL cholesterol levels increase were witnessed. The authors even observed a decrease in total cholesterol and triglyceride levels in the "Gouda" group [(9)].

COAGULATION	Lactic acid, with or without rennet	Action of rennet with lactic acidification							
STRAINING	By centrifugation or filtration	Slow straining with simple cutting				Straining facilitated by cutting, stirring			
				Pressing		GrindingPressing	Heating and pressing		
TYPES OF TEXTURES	Fresh cheeses	Soft cheeses		Pressed uncooked cheeses			Pressed cooked cheeses		Processed
RIPENING	Without ripening	Surface mould	Washed rind	Surface-ripened cheese	Washed rind		Holes Dry rind	Without holes Smear-ripened	
TYPES OF CHEESES	Blue-veined cheese	Camembert with raw milk	Munster	Tomme de montagne	Reblochon	Cantal	Emmental	Comté	at 22 % fat
Content for 100 g									
Water (g)	81,8	55,4	48,5	42,1	48	40,5	37,5	31,5	54,7
Dry matter (g)	18,2	44,6	51,5	57,9	52	59,5	62,5	68,5	45,3
Energy (kcal)	94,2	267	339	361	330	371	367	417	276
Fat-soluble compounds									
Lipids (g)	6,85	20,2	27	30,1	28	30,3	28,3	34	22,5
Vit. A (Retinol) (µg)	64	246	297	160	0	160	266	223	250
Water-soluble compounds									
Lactose (g)	3,6	0,1	1,12	ND	0	0	0	0	6,5
Proteins (g)	3,69	20,4	23,4	22,6	21	24,7	28,2	28,1	10
Calcium (mg)	125	245	350	626	493	759	971	909	576
Sodium (mg)	21,3	670	682	807	477	837	277	567	737
B2 (Riboflavine) (mg)	0,16	0,64	0,32	ND	0	ND	0,34	ND	0,35
B9 (Folates) (µg)	33	ND	12	26,9	25	19,4	20	5	6,8

Table inspired from Sibra C. - CNAOL 2014 and completed by data from Ciqual 2013.

Briefly

Cheese forms an integral part of the French heritage and the "French food model" characterised by a balanced distribution around 3 main structured meals (breakfast, lunch and dinner) and some light snacking.

In France, cheese eaters have a more varied diet and more regular meal times than the rest. Their nutrient intake is also higher.

The nutrient composition of cheese is what makes it interesting for all ages. It provides proteins of great nutritional value, lipids which give it its creaminess and flavour, vitamins (A, D and B group), trace elements and last but not least, calcium…The health benefits linked to its consumption are numerous: healthy bones, blood pressure control, decrease of cardiovascular risks and type 2 diabetes,…One serving of cheese a day, keeps malnutrition at bay!

In order to make the most of all its benefits, varying cheeses is recommended!

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Pour en savoir plus

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- Cheese industry studies – Oqali Report - Data 2015-Edition 2016 – Inra & Anses
- Zoom on consumer behaviours – Cheese – Cniel 2015

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Questions du Grand Public

• Should one cut out cheese when dieting?

In moderation, cheese does not contribute to weight gain and as part of a diet does not prevent from losing weight. A diet without cheese decreases calcium intake without helping to lose any more weight.

When dieting, we tend to attach a lot of importance to the caloric value of food and forget its energy content (protein, lipid, carbohydrate, vitamin and mineral content).

Thus, cheese should be chosen based on its richness in calcium. For example, a 30 g serving of cantal covers 1/3 of the daily calcium requirements for an adult and represents a good calcium/calorie ratio. Thus, there is no reason to deprive yourself of cheese because you are on a diet: one serving a day, in addition to two skimmed or semi-skimmed dairy products covers yours calcium requirements without excess while preserving the pleasure of eating.

• Why isn't there anymore 45% fat camembert?

Nowadays, regulation imposes to display the fat content for 100 g of end product. Before, the fat content of cheeses was calculated from the dry matter (what remained from the cheese once all water was removed). A camembert which was labelled "45% fat" is nowadays labelled 21% fat (as there is 50 g water for 100 g camembert) but the product remains exactly the same!

• Does cheese protect from dental cavities?

Dental cavities are caused when bacteria from plaque are nourished by sugars contained in food and produce acids, which, in time, make a hollow in the tooth. Some proteins contained in cheese, such as casein, reinforce the protective action of saliva which helps neutralise the acids that attack the teeth. Cheese's richness in calcium and phosphorous also contributes to protecting the teeth.

• Which cheeses have the most calcium?

Those which are made with the most quantity of milk. They are dry and have a compact aspect. Thus, pressed cheeses have the most calcium. One 30 g serving of emmental or comté can cover 1/3 of an adult's requirements in calcium. Then come blue-veined cheeses (blue cheese, Roquefort), soft cheeses (camembert, munster, maroilles) and fresh & cream cheeses (petit-suisse, slightly-salted cream cheese, broccio…). Thereby, it is essential to vary cheeses in order to benefit from their nutritional qualities and flavours.

• When can babies start having cheese?

From the age of 8 months, babies can start tasting cheese such as, a pinch of grated cheese to be added to his/her puree or soup, or a bit of gruyere cream or even one or two slivers of soft cheese without the rind.

• What are the recommended cheeses in the case of lactose intolerance?

Lactose intolerant individuals cannot digest the sugar which is naturally present in milk, since they do not have the enzyme essential for its digestion (lactase) in sufficient quantity. This translates as digestive disorders (stomach aches, diarrhea…). Ripened cheeses contain low or less lactose (eliminated during straining and/or degraded during ripening) and can be eaten without side-effects.

• What are PDO and PGI cheeses?

Protected designation of origin (PDO): Official sign of quality, the PDO guarantees the consumer that all production steps have indeed taken place in the geographical area defined based on renowned traditional know-how. Each PDO is defined by a designation decree which focuses on: the production area, milk production conditions, ripening transformation and conditions (if possible), and the product's control and accreditation modalities. There are 50 dairy PDO's including 3 butters, 2 sour creams and 45 chesses of which: beaufort, bleu d'Auvergne, brie de Meaux, camembert de Normandie, cantal, comté, époisses, fourme d'Ambert, laguiole, maroilles, munster, reblochon…

Protected geographical indication (PGI): Created in 1992 within Europe, the PGI designates a product which has characteristics that are linked to the geographic location in which its production and/or transformation has taken place according to well specified conditions. 7 PGI for French cheeses: tomme from Savoie, emmental from Savoie, the French central East emmental, tomme from the Pyrénées, gruyere, saint-marcellin, soumaintrain.

• Is cheese a healthy snack?

Yes. A study conducted on 201, 8-year old children shows that those who snacked on cheese and vegetables, swallowed less calories. Food guide "La santé vient en mangeant" (Health comes by eating), devised as part of the National Program for Nutrition and health also states: "When you are feeling peckish, you can avoid giving in to foods which are high in sugar and fat (chocolates, pastries, cakes, sweets…) or even high in fat and salt (crackers, crisps, cooked meats…). All you need to have on hand is a bit of bread, a fruit, a slice of cheese or even a yogurt…"

• Do cheese proteins promote calcium loss and decalcification?

Bones are made from a protein structure to which calcium phosphate crystals fix themselves. To keep them healthy, they need proteins, phosphorous and calcium, 3 nutrients which are found in cheese. The quantity of calcium retained by the bones depends on the quantity of calcium absorbed by the intestine and that eliminated in the urine. If a high consumption of proteins (be it animal or vegetable) can sometimes increase the urine calcium loss in the short term, this effect is however compensated by an increase in the absorption of calcium, hence of the quantity of calcium which enters the body. Furthermore, many studies show that big protein eaters have a higher bone mass than small protein eaters.

• Do fatty acids in cheese prevent calcium absorption?

No, calcium is essentially absorbed in the first third of the intestine, however, interaction with fatty acids can only take place "further down"… thus consisting of interaction with excess non absorbed calcium, which does not hinder the absorbability of cheese calcium. The calcium which has escaped from absorption then forms "soaps" with the fatty acids (free fatty acids and long-chain saturated fatty acids in particular) and contributes in decreasing their absorption…An advanced explanation in the famous "French paradox".

• Does cheese increase constipation?

Some people suffering from constipation - in particular elderly people – often deny themselves cheese. Result: their constipation is not cured and depriving themselves of cheese, a substantial source of calcium, only increases their risk of calcium deficiency. In the event of constipation, it is highly advisable to have a regular physical activity (walking for instance), to drink lots of water and eat more fibers (raw or dried fruit- prunes or wholemeal bread).

• Why is there salt in cheese?

Salt has been used for thousands of years in order to give food flavour and preserve it by preventing unwanted microorganisms from developing, or even for its technological properties texture. The use of salt in cheese-making corresponds to a key step of the manufacturing technology and ensures that the product is safe and tastes good. Indeed, salting contributes to: the straining, formation of the rind, selecting positive microflora, preventing the development of unwanted microorganisms (listeria for example). It also has an effect on various biochemical factors (activity of the water, mineral balance, buffering power) and increases the product's organoleptic qualities.

YES to cheese!

- Reasonable consumption of cheese is perfectly compatible with every individual's diet, including those who are keeping an eye on their heart.
- In reasonable quantities, cheese does not contribute to weight gain and associated with a diet, does not prevent weight loss.
- It is extremely difficult, and even impossible to attain the recommended calcium intake with a low consumption of dairy products, in particular of cheeses.
- In elderly people, cheese contributes in fighting undernourishment. In small amounts, it is an excellent source of calcium and many other nutrients (proteins, phosphorous, zinc, selenium, vitamins K, D, A, B2 and B12, etc.)
- Cheese forms an integral part of the French heritage and the "French food model" characterised by a balanced distribution around 3 main structured meals (breakfast, lunch and dinner) and some light snacking. In France, cheese lovers have a more varied diet and more regular meal times than the rest.