

Definition, standards and classification and nutritive values of cheese

Complete Definition.....

Cheese is the curd or substance formed by the coagulation of milk of certain mammals by rennet or similar enzymes in the presence of lactic acid produced by added or adventitious microorganisms, from which part of the moisture has been removed by cutting, warming and pressing, which has been shaped in mould and then ripened (also unripened) by holding for sometime at suitable temperatures and humidity.

Cheese is the fresh or matured solid or semi-solid product obtained:

By coagulating milk, skim milk or partly skimmed milk, whey, cream or butter milk or any combination of these materials, through the action of rennet or other suitable coagulating agents and by partially draining the whey resulting from coagulation

Or

By processing techniques involving coagulation of milk and/or materials obtained from milk (whey protein casein ratio does not exceed that of milk) and which give an end product which has similar physical, chemical or organoleptic characteristics as the product defined above

According to FSSR (2011).....

- 1. Cheese means the ripened or unripened soft or semi-hard, hard and extra hard product, which may be coated with food grade waxes or polyfilm, and whey protein/casein ratio does not exceed that of milk.**
- 2. May contain starter cultures of harmless lactic acid and/or flavor producing bacteria, safe and suitable enzymes and sodium chloride.**
- 3. Form of blocks, slices, cut, shredded or grated cheese.**
- 4. Pleasant taste and flavor, free from off flavor and rancidity.**
- 5. May contain permitted food additives.**
- 6. Shall conform the microbiological requirements prescribed in the regulation.**

On the basis of ripening (FSSR, 2011)

Ripened cheese: Not ready for consumption shortly after manufacture but held for some time for biochemical and physical changes.

Mold ripened cheese: Ripening done by the mold growth through the interior and/ or on the surface of the cheese.

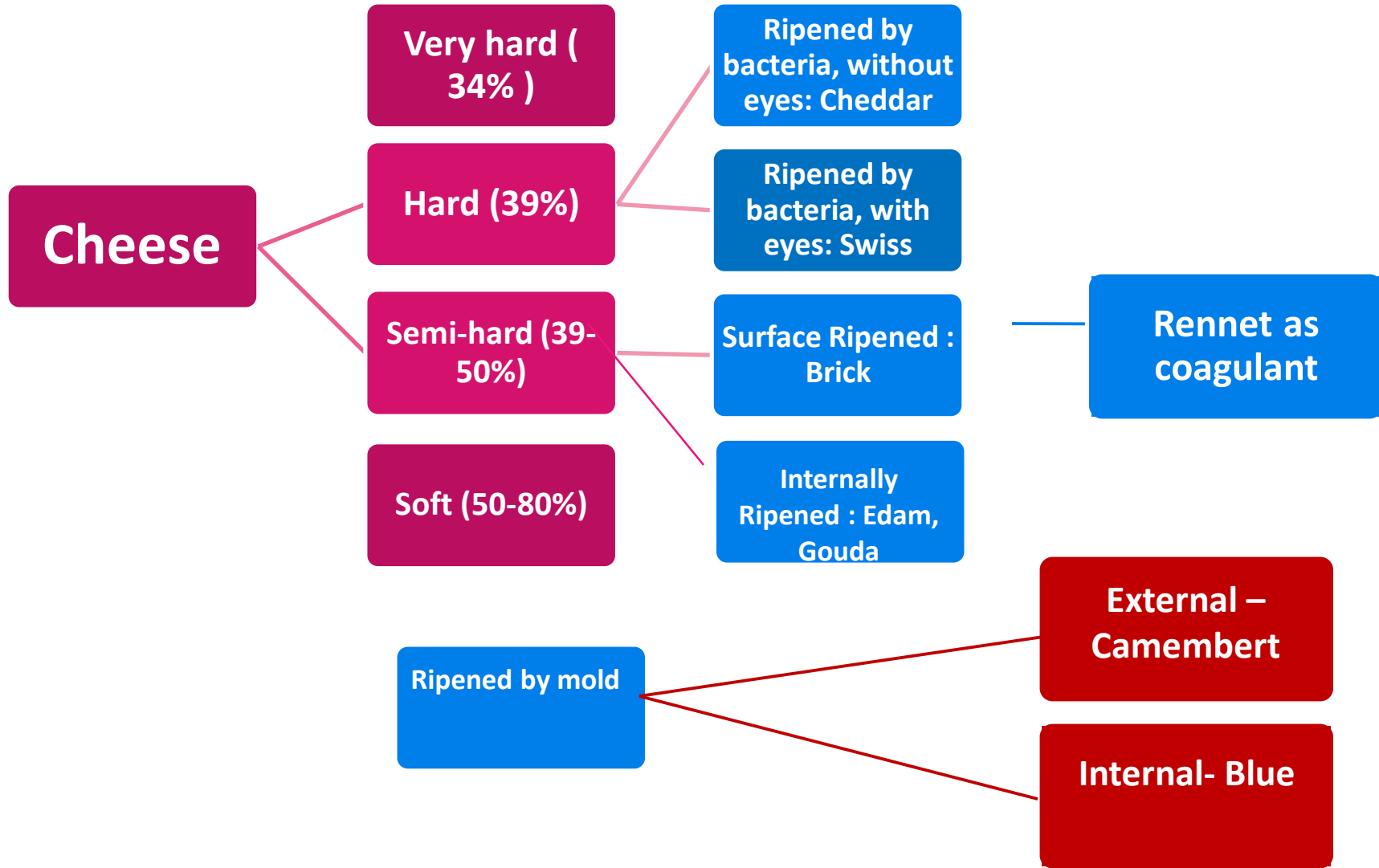
Unripened cheese: Fresh cheese which is ready for consumption shortly after manufacture.

Classification of Cheese

Basis of classification include age, type of milk, country of origin, ripening process/agents, important compositional varieties, like moisture and fat, general appearance, texture and rheological qualities.

18 types of Natural Cheeses

Parmesan	Provolone
Gouda	Romano
Edam	Roquefort
Swiss	Sapsago
Cheddar	Cottage
Brick	Neufchatel
Herve	Trappist
Camembert	Cream
Limburger	Whey



Type of cheese	Moisture, maximum	Milk Fat (on dry basis), minimum
Hard pressed cheese	39.0%	48.0%
Semi hard cheese	45.0%	40.0%
Semi soft cheese	52.0%	45.0%
Soft cheese	80.0%	20.0%
Extra hard cheese	36.0%	32.0%
Mozzarella cheese	60.0%	35.0%
Pizza cheese	54.0%	35.0%

Legal standards for cheese

Distinctive Processing	Distinctive Characteristics	Typical Varieties
Curd coagulated primarily by acid	Delicate, soft curd	Cottage, Neufchatel
Curd particles matted together	Close texture, firm body	Cheddar, Cheshire
Curd particles kept separate	Open texture	Colby, Monterey, Gouda, Edam
Presence of small amount of copper from copper cheese kettle or vat	Granular texture, brittle body	Grand-hard grating types: Parmesan, Romano
Stretched curd	Plastic curd, thread-like or flaky texture	Mozzarella, Provolone
Bacteria-ripened internally accompanied by eye formation	Gas holes or eyes throughout cheese	Emmentaler or Swiss (large curd), Gruyere
Mold ripened throughout interior	Visible mold veins, typical piquant, spicy flavor	Blue, Roquefort, Stilton, Gorgonzola
Surface ripened principally by mold	Edible crust, soft creamy interior, typical pungent flavor	Camembert, Brie
Surface ripened principally by bacteria and yeast	Surface growth; soft, smooth waxy body, typical mild to robust flavor	Brick Limburger, Muenster
Protein of whey and milk coagulated by heat	Sweetish flavor of whey	Whey cheeses: Ricotta, Mysost, Primost

Ten distinct types of natural cheeses classified according to differences in processing

Composition and Nutritional Value of Cheese.....

- 1. High concentration of essential nutrients relative to its energy level.**
- 2. Nutritional composition is determined by multifactorial parameters including type of milk (species, breed, stage of lactation and fat content), manufacturing and ripening procedures.**
- 3. Rich in fat and casein, which are retained in the curd during manufacture, small amount of water soluble constituents (whey proteins, lactose, and water soluble vitamins), which partition mainly into the whey.**

Approximate composition of some varieties of cheese (%)

Variety	Moisture	Fat	Protein	Ash (Salt-free)	Salt	Calcium	Phosphorous	Food energy (calorie/100 g)
Cheddar	37.5	32.0	25.0	2.0	1.5	0.86	0.60	398
Gouda	38.5	28.5	25.5	2.5	1.5	-	-	377
Swiss	39.0	28.0	27.0	2.0	1.5	0.90	0.75	370
Roquefort	39.5	32.0	22.0	2.0	4.0	0.65	0.45	385
Brick	41.0	31.0	22.0	1.2	1.8	-	-	370
Limburger	45.5	28.0	22.0	2.0	2.1	0.50	0.40	345
Mozzarella	54.0	18.0	22.1	2.3	0.7	-	-	290
Cottage (uncreamed)	79.5	0.3	15.0	0.8	1.0	0.10	0.15	200

Protein.....

- 1. High content of biologically valuable protein (approx. 4-40%, depending upon the variety).**
- 2. During cheese manufacture, whey proteins are lost in whey and casein remains in cheese.**
- 3. Casein is slightly deficient in sulphur-containing amino acids. So, biological value of cheese protein is slightly less than that of the total milk protein.**
- 4. Cheese protein is almost 100% digestible, as ripening involves a progressive breakdown of casein to water-soluble peptides and free amino acids.**
- 5. Bioactive peptides are released during proteolysis of cheese, exerting health benefits to human body.**

Carbohydrate.....

1. Lactose is lost in whey during cheese manufacture.
2. Trace amount of carbohydrate remains in the cheese, hydrolysed by LAB. So, a safe food for lactose-intolerant people.

Lipids....

1. Fat affects cheese firmness, adhesiveness, mouthfeel, flavour and nutrition. Contributes a significant amount of both saturated and total fat to the diet.
2. Cheese fat contains 66% saturated, 30% monounsaturated and 4% polyunsaturated fatty acids. So, a dietary source of both total fat and saturated fatty acids.
3. Cholesterol content ranges from approx. 10-100 mg/100 g and is of lesser importance than its saturated fat content.

Vitamins and Minerals.....

1. As milk fat is retained in cheese curd, the fat soluble vitamins remain in the curd and water soluble vitamins are lost in whey.
2. Good sources of vitamin A, riboflavin, vitamin B12, and lesser extent of folate and vitamin C.
3. Source of calcium, phosphorus, and magnesium.
4. Cheese has a potential role in supplying extra and highly bioavailable calcium. However, acid-coagulated cheeses (Cottage) contain considerably less calcium than rennet-coagulated varieties.
5. Adequate calcium intake during childhood and in teenage years is important in development of high bone mass which may prevent osteoporosis.