



Cheese

By:

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History

- The word 'cheese' is derived from the Old English 'cese' which in turn was derived from the Latin '*caseus*' which means correct or perfect thing.
- It is commonly believed that cheese evolved in the Fertile Crescent between the rivers Tigris and Euphrates in Iraq some 8000 years ago.
- Cheddar cheese originated in the town of Cheddar, Somerset (SW England). Best known cheese in the world.

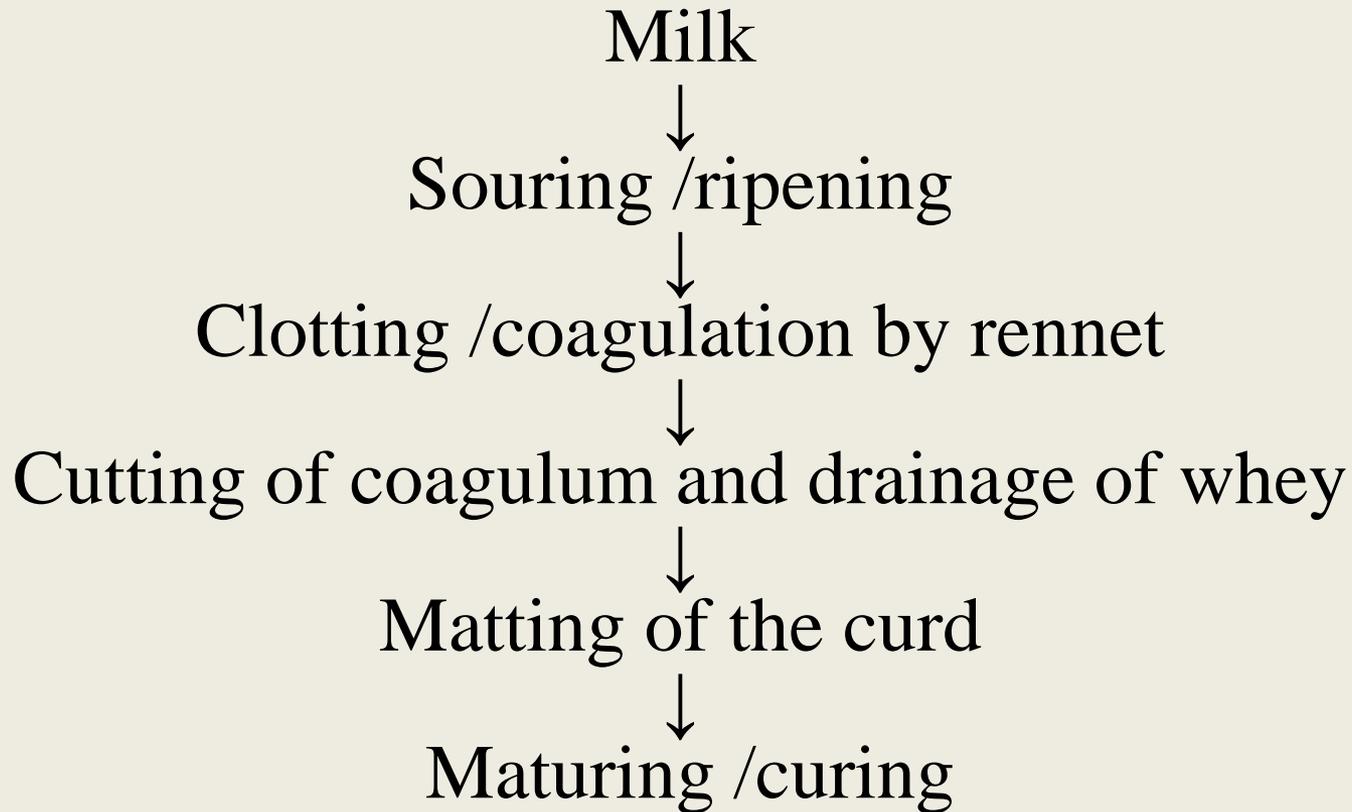
Cheese

- According to **PFA rules** (hard) cheese means the product obtained by draining after the coagulation of milk with a harmless milk-coagulating agent, under the influence of harmless bacterial cultures.
- Hard cheese shall contain not more than **43% moisture and not less than 42% milk fat on dry matter**. Hard cheese may contain 0.1 % sorbic acid or its sodium, potassium or calcium salts; 0.1% nisin.
- According to the **FSSR (2011)**, cheese means the ripened or unripened soft or semihard, hard and extra hard product, which may be coated with food grade waxes or polyfilm, and in which the whey protein/casein ratio does not exceed that of milk.

FSSR (2011) has also defined and categorize cheese on the basis of ripening as follows:

- **Ripened cheese** is cheese which is not ready for consumption shortly after manufacture.
- It is held for some time at such temperature and under such other conditions as will result in necessary biochemical and physical changes characterizing the cheese in question.
- **Mould ripened cheese** is a ripened cheese in which the ripening has been accomplished primarily by the development of characteristic mould growth through the interior and/or on the surface of the cheese.
- **Unripened cheese** including fresh cheese is cheese which is ready for consumption shortly after manufacture.

Scientific basis of cheese making



Classification of cheese

- There are about 2000 names of cheeses. It is very difficult to classify the different cheeses satisfactorily, in groups.
- **Geographical considerations:** country, valley, institution, town or region where first produced / marketed.
- **Type of milk:** cow, sheep, goat, buffalo.
- **Method of manufacture:** Temperature of cooking, degree of acidity, fineness of cutting etc. these affect moisture retention which in turn affect the firmness and also the rate of ripening.
- **General appearance:** flavour, size, colour, keeping quality.

Physical appearance and rheological properties

- **Very hard-** less than **25%** per cent moisture

e.g. Parmesan, Romano

- **Hard – 25 to 36%** moisture

a) Ripened by bacteria, without eyes:
Cheddar

b) Ripened by bacteria, with eyes:
Swiss (*Propionibacterium shermanii*)

- **Soft cheese -40 %** moisture

a) Unripened – Cottage

b) Ripened – Neufchatel

- **Semi-hard- 36 to 40 %** moisture

a) Ripened principally by bacteria:
Brick

b) Ripened by bacteria and surface microorganisms: Limburger

c) Ripened principally by blue mould:

i) External – Camembert (*Penicillium camemberti*)

ii) Internal – Gorgonzola, Blue, Roquefort (*Penicillium Roqueforti* and *Penicillium Glaucum*)

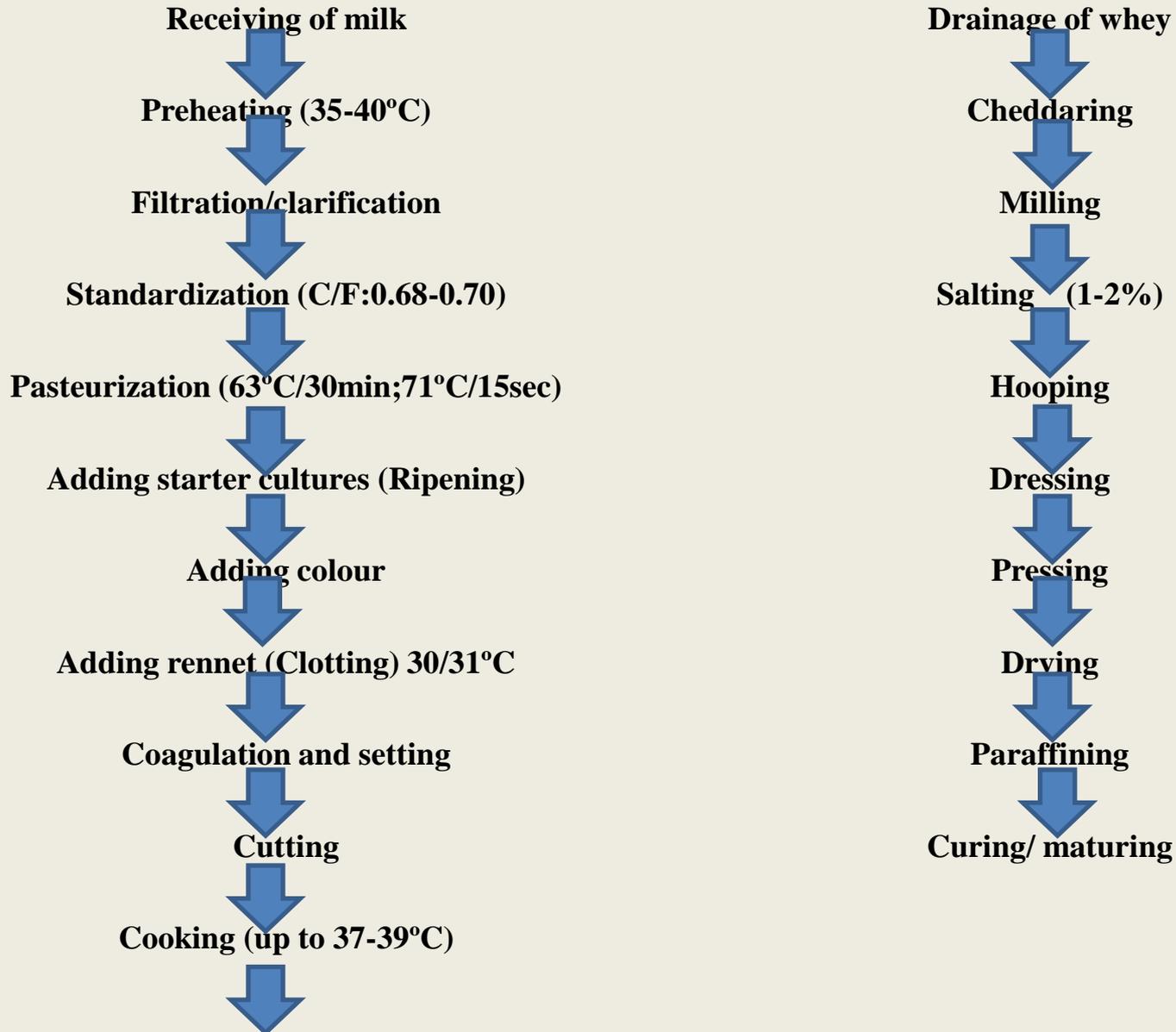
Average composition of cheese

Name	Moisture	Fat	Protein	Ash and salt
Brick	42.5	30.7	21.1	3.0
Camembert	47.9	26.3	22.2	4.1
CHEDDAR	36.8	33.8	23.7	5.6
Cottage	69.8	1.0	23.3	1.9
Cream	42.7	39.9	14.5	1.9
Edam	38.1	22.7	30.9	6.2
Limburger	54.8	19.6	21.3	5.2
Parmesan	17.0	22.7	49.4	7.6
Roquefort	38.7	32.2.	21.4	6.1.

Nutritive value of cheese

- It is an excellent source of milk proteins.
- Rich source of calcium and phosphorus
- Excellent source of several fat soluble vitamins, such as A,D,E & K.
- A concentrated source of energy. Cheddar cheese has about 400 calories /100 g.
- Palatable and digestible; there is practically no waste.

Manufacture of cheddar cheese



Cheddaring

- This refers to the combined operations of packing, turning, piling and repiling the curd cubes.
- **Packing:** After the bulk drainage of whey, the curd cubes are kept closely together in two heaps with a channel in between. This is known as packing and takes 5 to 15 minutes after dipping. It results in the formation of two long slabs of curd. These are cut with a cheese knife into blocks or strips 15 to 20 cms wide
- **Turning:** As soon as the blocks (strips) of curd can be handled without breaking, they are rolled bottom-side in the vat. This is called turning and is carried out every 15 minutes till the curd is ready for milling and salting.
- **Piling and repiling:** Within 30 to 45 minutes of packing, blocks of curd are turned and laid one over another in twos or threes. This is called piling. Then the position of the curd block is altered and this is known as repiling.

Cottage cheese

- This is a **soft, unripened** cheese usually made from **skim milk**.
- It has mildly acid flavour and consists of small particles or flakes or curd, which have a meaty consistency.
- Creamed cottage cheese has cream mixed to it upto 4 % level. Both varieties are salted always.
- Cottage cheese can be prepared by both, direct acidification and by starter culture methods.
- In direct acidification method, any food grade acid, phosphoric, lactic acid etc., are used.

Method of manufacture of Cottage cheese

Receiving (pasteurized) milk

Adding calcium chloride

Adding starter culture (lactic cultures)

Adding rennet (0.01 %)

Setting (30°C)

Cutting

Cooking (upto 46°C,over 2 hrs)

Drainage of whey

Washing and draining the curd

Salting

Creaming

Packaging and storage

Mozzarella cheese

- It is unripened cheese obtained by coagulating milk with cultures of harmless lactic acid-producing bacteria, suitable enzymes of non-animal origin or by direct acidification.
- It has a smooth elastic structure without curd granules and has a near-white colour.
- Mozzarella, with low moisture content, is a firm/semi-hard homogeneous cheese without holes and is suitable for shredding.
- Most commonly used in pizza toppings.
- Moisture: 54%; Milk fat: 35%

General defects in cheese

Name of the Defect	Causes	Prevention
Colour		
Acid cut/bleached/faded	Excessive acid development in cheese curd	Optimum acid development in cheese curd
High/Unnatural	Excessive addition of colour to cheese milk	Optimal addition of colour to cheese milk
Mottled	i) combining cheese from two lots ii) uneven acid development in cheese curd	Avoiding it and even development of acid
Finish and appearance		
Cracked Paraffin	Excessive thickness of paraffin coating on cheese	Correct thickness of paraffin coating
Lopsided / hill sided / misshapen	Incorrect filling and pressing of curd cubes	Correct filling and pressing of curd cubes
Rind rot	Excessive acidity and/or moisture in cheese before curing	Optimum acidity and/or moisture in cheese before curing

General defects in cheese

Name of the Defect	Causes	Prevention
Body		
Curdy/rubbery	i)Low moisture content in cheese before curing ii)Low acid development in curd iii)over-salting cheese iv)insufficient cheddaring of cheese curd	Optimal moisture before curing Optimal acid development Optimal salt level Proper cheddaring
Texture defects		
Fish eyes/yeast holes	Contamination with yeasts	Avoiding contamination with yeasts
Flavour		
Bitter	Low quality milk Low quality starter Excessive acid and/or moisture in cheese	By using good quality milk, starter and maintaining optimal acid and moisture in cheese

Uses of cheese

- Direct consumption as such or in sandwiches
- In the preparation of special dishes (added in cut or grated form)
- In the preparation of sauce/pizza.

Packaging

- Vegetable parchment
- Tin plate containers lacquered from inside
- First packed in aluminium foil and then in duplex board carton
- Injection moulded PP / HDPE container
- Laminates