Cheese Making Steps

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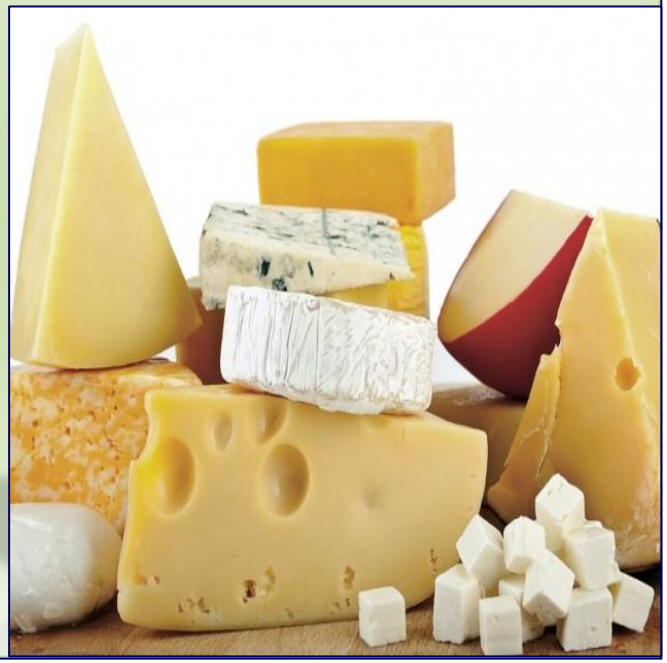
Cheese Making Steps Collected and Simplified Presentation for Teaching

Cheese Making

INTRODUCTION

- **Cheese** is a generic term for a diverse group of milk-based *food* products. Cheese is produced throughout the world in wide-ranging flavours, textures, and forms.
- Cheese consists of proteins and fat from milk, usually the milk of *cows*, *buffalo*, *goats*, or *sheep*. It is produced by coagulation of the milk protein *casein*.



1000 cheese types in France and 1200 in Italy

Cheese has a deep-rooted history, is a food product that reflects the cultural memory and history of communities, besides being a method of preserving milk. Cheese varieties differ according to the cultural structure of the countries, climatic conditions, animal diversity, and production techniques.

Introducing Cheese

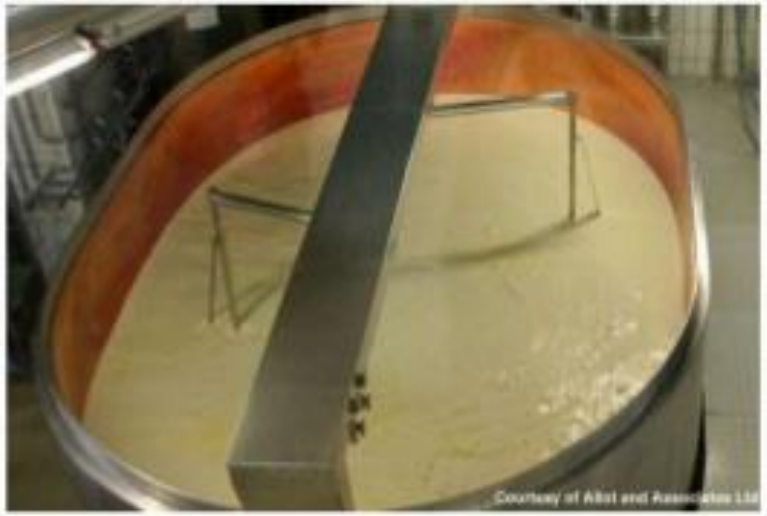
- What distinguishes different types of cheese?
  - Composition - moisture, fat content
  - Structure - texture and body
  - Flavour - salty, propionic, nutty..
  - Appearance - colour, wax rind or size of the block
- Cheese can be thought as a means of preserving milk by removing water.
- Characteristics can be manipulated by altering the cultures, ingredients and techniques used.

(Small Change, Big Difference)

CHEESE PRODUCTION

Virtually all cheese is made by coagulating milk protein (casein) in a manner that traps milk solids and milk fat into a curd matrix. This curd matrix is then consolidated to express the liquid fraction, cheese whey. Cheese whey contains those milk solids which are not held in the curd mass, in particular most of the milk sugar (lactose) and a number of soluble proteins.

- Milk receipt, pre-treatment and standardisation
- Pasteurisation
- Addition of starter culture
- Coagulation
- Extraction of whey
- Cutting and cooking of curd
- Salting
- Ripening
- Packaging
- Distribution



Cheese Types

- Dry salt cheese e.g. Cheddar, Colby
- Brine salt cheese e.g. Gouda, Edam
- Stretched Curd e.g. Mozzarella
- Specialty cheeses e.g. Blue Vein
- Processed cheese

Processing of cheese milk

Raw Milk

Standardise of protein across the whole season e.g. consistency

Standardisation

Fat level for different cheeses

Pasteurisation

Curd manufacture

Processing of cheese milk

Raw Milk

↓

Standardisation

↓

Pasteurisation

↓

Curd manufacture

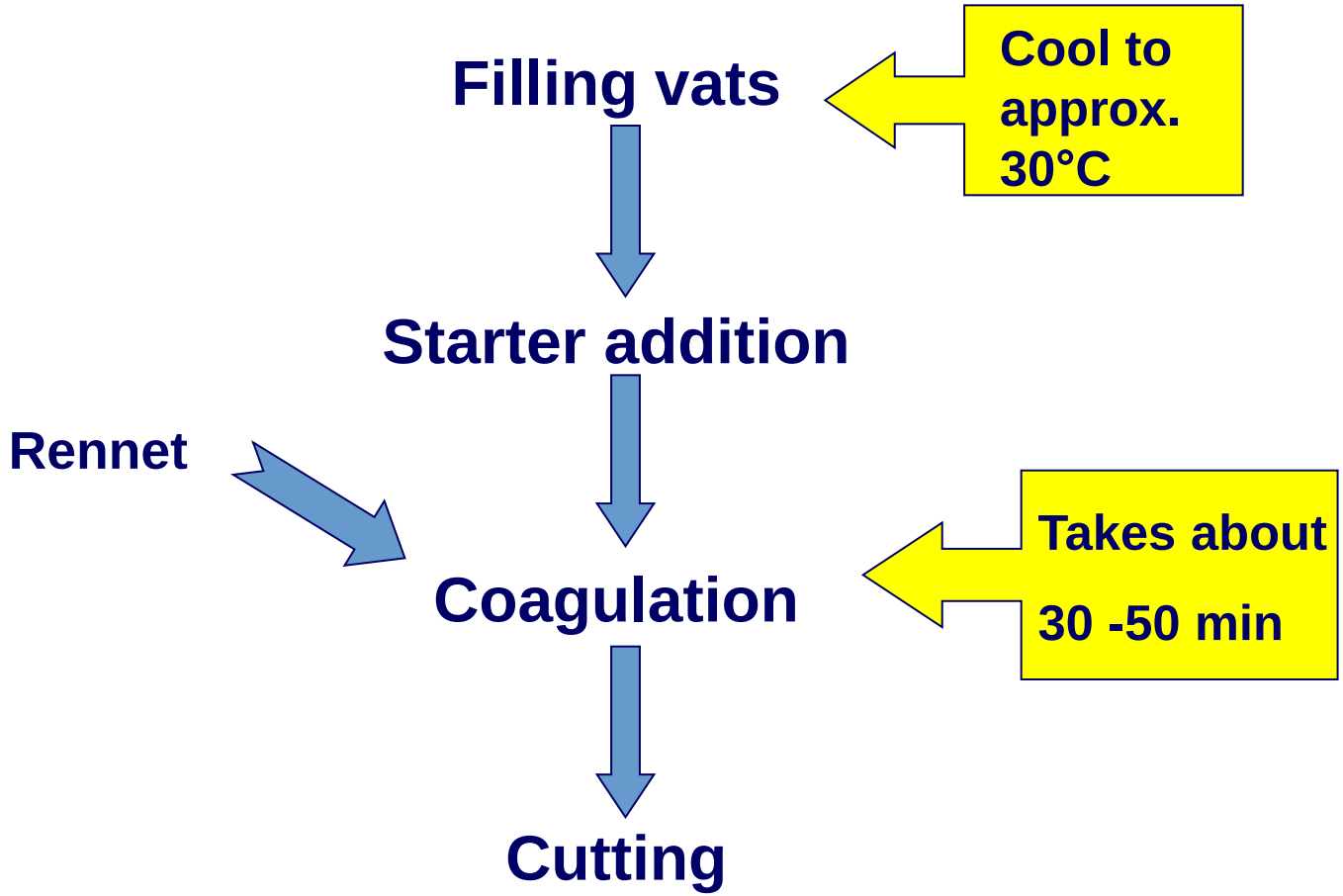
Heat treatment 72°C for 15 sec.

Kills majority of microbes in milk e.g. Pathogens

RENNET

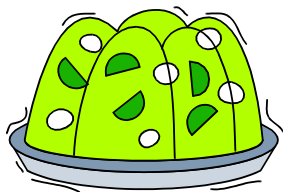
- .Rennet An enzyme used to coagulate milk during the cheese making process. Rennet is derived from one of four sources: the stomach lining of a young calf (the enzyme rennin is found in the stomach lining of animals because it aids in the digestion of their mother's milk)
- plants (typically thistle)
- microbes in fungus and yeast
- Genetically engineered rennet that imitates animal rennet.

Curd manufacture



Curd manufacture

- Starter
  - "Beneficial" bacteria which ferment the sugar (lactose) in milk
  - Different species of the bacteria impact cheese flavour.
- Rennet
  - Enzyme from calves' stomach
  - destabilises casein in milk
  - milk turns into soft gel - like junket.



Curd manufacture

Filling vats

↓

Starter addition

↓

Rennet → Coagulation

↓

Cutting ← Rotating Knives cut curds into ~5mm cubes

Curd conditioning process

De-whey/wash

Whey taken off and remove lactose by washing with potable water

Helps expel moisture out of curd cooks at 38°C

Cook

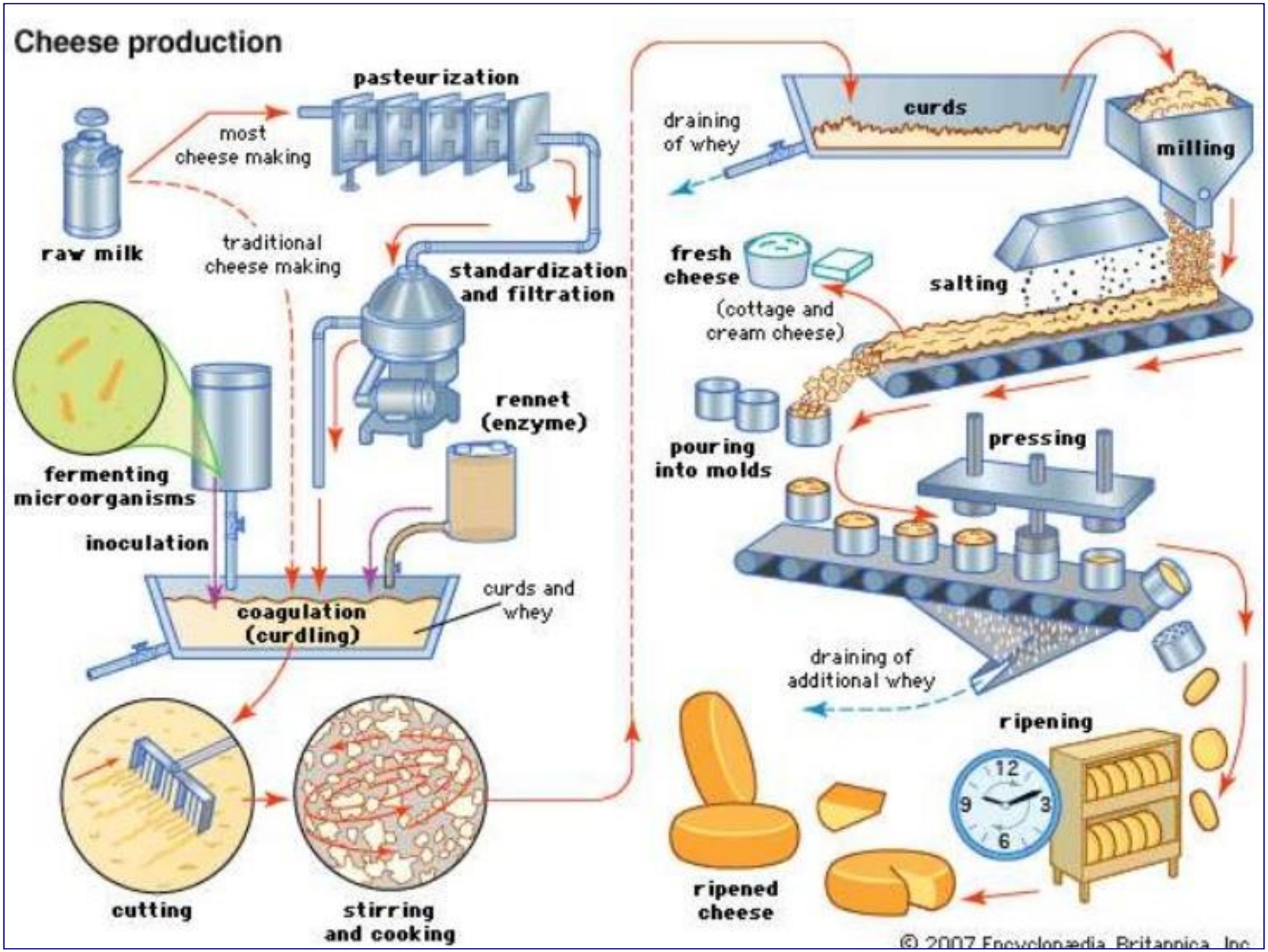
Controls starter activity

Drain

Dry salt process

Whey taken off

Brine salt process


Cheese production
pasteurization
most cheese making
raw milk
traditional cheese making
standardization and filtration
rennet (enzyme)
fermenting microorganisms
inoculation
coagulation (curdling)
curds and whey
cutting
stirring and cooking
draining of whey
curds
milling
fresh cheese
(cottage and cream cheese)
salting
pouring into molds
pressing
draining of additional whey
ripening
ripened cheese
© 2007 Encyclopædia Britannica, Inc.

Block forming process

Dry salt cheese

Curd/whey separation via screen

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Cheddaring on "Alfomatic" belt system

↓

Milling

↓

Brine Salt cheese

Whey removal & Block formers in "Casomatic" tower

↓

Cheese mould

↓

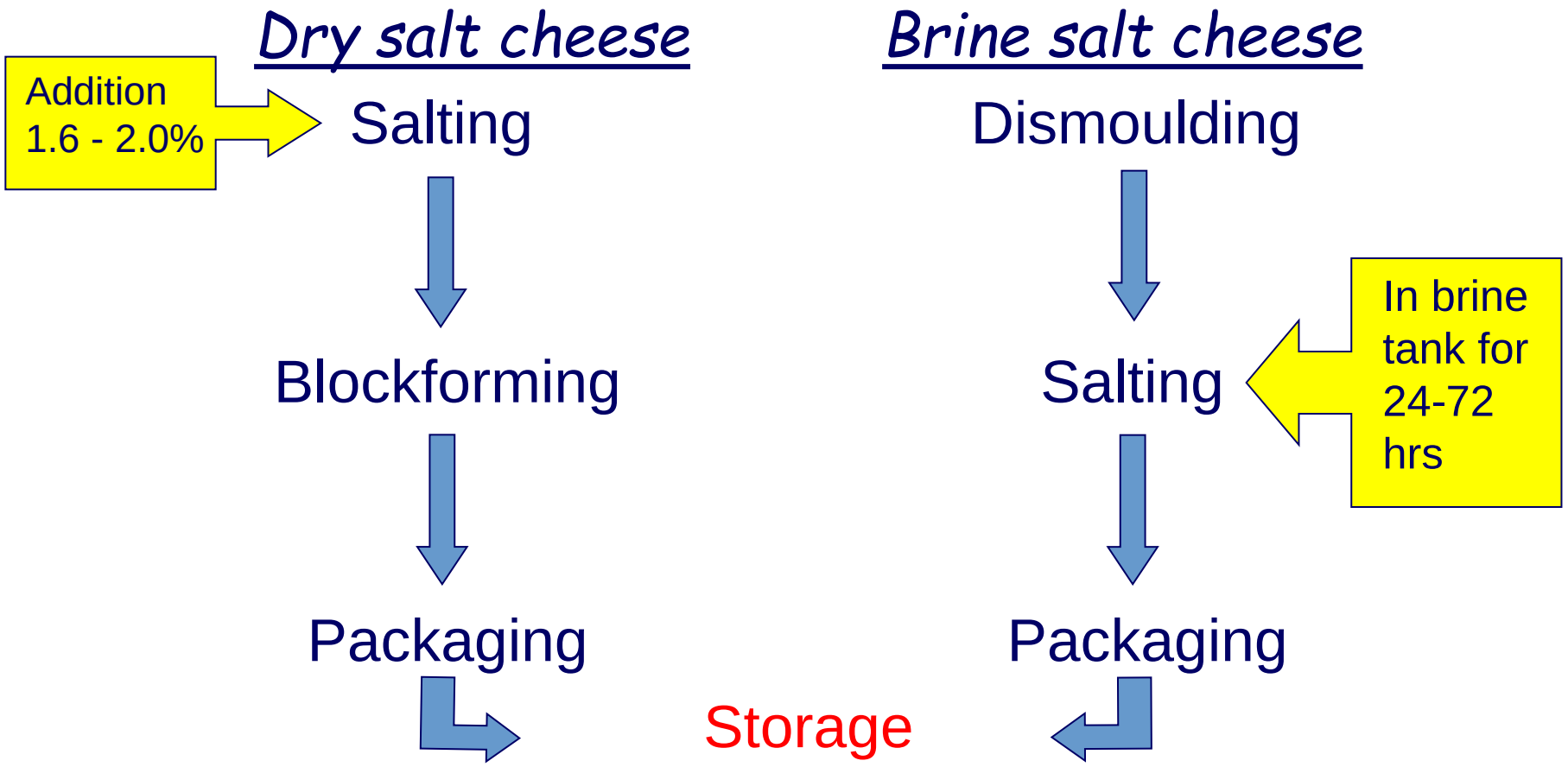
Pressing

↓

For Dry-Salt Cheese

- Cheddaring
  - curd loses more moisture
  - clumps together into continuous mat
  - in approx. 2 hours
  - Acid development to about pH 5.3
- Milling & Salting
  - mat of curd then milled into finger-sized pieces
  - salt applied and mixed

Block forming process



Maturation or ripening

- Cheese ripening is basically about the breakdown of proteins, lipids and carbohydrates (acids and sugars) which releases flavour compounds and modifies cheese texture.
- Ripening varies from nil for fresh cheese to 5 years for some hard ripened cheese.
- Like a good wine, a good aged cheese should get better and better with age.
- Ripening processes are broadly classified as interior and surface ripened.

RIPENING CHEESES

- **Packaging**
  - **blocks put into plastic bags, vacuum sealed and put into boxes**
  - **Dry-salt cheese passes through a rapid cool room (~ 24 hours)**
  - **Metal detector, coding, then palletised**
- **Storage**

  temperature and time will depend on the type of cheese (e.g. cheddar 10°C until mature)
  - **www.youtube.com/watch?v=xEnifYNnDCA**
  - **www.youtube.com/watch?v=wxm8jTzU_8o&t=18s**

Composition:
moisture, %fat
Structure:
texture & body
Flavour:
salty, propionic, nutty
Appearance:
colour, wax rind, size of block

Applications of cheese

CHEESE

- **Consumer**
  - **Table Cheese**
    - Bread/crackers
    - Sandwiches
- **Ingredients**
  - **Cheese dishes**
    - Uncooked
      - Desserts
      - Salads
      - Cheesecake
    - Cooked
      - Sauces
      - Soups
      - Quiche
      - Pasta
  - **Shredding**
    - Pizza
    - Fillings
    - Sprinkling
  - **Processed cheese products**
    - Salami
    - Burgers
    - Dips
  - **Cheese powders**
    - Sauce
    - Gratings
    - Snack coatings
  - **Enzyme modified cheese**
    - Dressings
    - Seasonings
    - Ready meals
    - Imitation cheese

From Fox *et al.* (2000) Pg 453

Functional requirements

- **Shreddability - ability to shred into thin strips of uniform dimensions, and resist clumping e.g. Cheddar, Gouda**
- **Sliceability - ability to be cut cleanly into thin slices without crumbling e.g. Swiss-type cheese**
- **Meltability - ability to melt, and flow e.g.Cheddar, Cream cheese**
- **Spreadability - ability to spread easily when subjected to a shear stress e.g. Cream cheese**
- **Crumbliness - ability to break down into small irregular shaped pieces when rubbed e.g. Cheshire, Feta**
- **Stretchability - ability to stretch when baked e.g. Mozzarella**