FOOD COMMODITIES (CHEESE) - 1.3.2

- Cheese is a concentrated source of milk.
- It takes 5 litres of milk to make 500g of cheese.
- There is twice as much protein in cheese as in the same amount of meat.

A: CLASSIFICATION OF CHEESE

- Cheese may be classified according to:
  - 1) Culture of bacteria used.
  - 2) Source of milk supply (eg): cow, goat.
  - 3) Type of milk (eg): whole milk, skimmed.
  - 4) Amount of moisture present.

- **NOTE**: The most common classification is according to amount of moisture present (eg) :
  - **Hard Cheese** – Cheddar.
  - **Semi – Soft Cheese** – Edam.
  - **Soft Cheese** – Cottage Cheese.

- Other examples include :

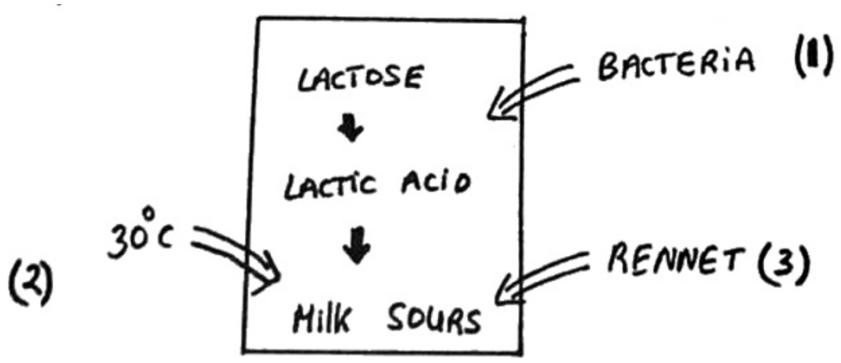
HARD	Parmesan, Stilton
SEMI-SOFT	Port Salut, Mozzarella
SOFT	Brie, Camembert

B: CULINARY USES OF CHEESE

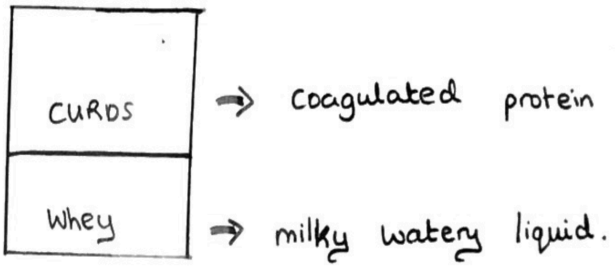
- Au gratin (eg) : cauliflower au gratin.
- Savouries (eg) : quiche, lasagne.
- Snacks (eg) : cheese straws, sandwiches.
- Deserts (eg) : cheesecake.
- Garnishes (eg) : french onion soup.
- Cheese board.
- Sauces (eg) : cheese sauce.

C: MANUFACTURE OF CHEESE (NB)

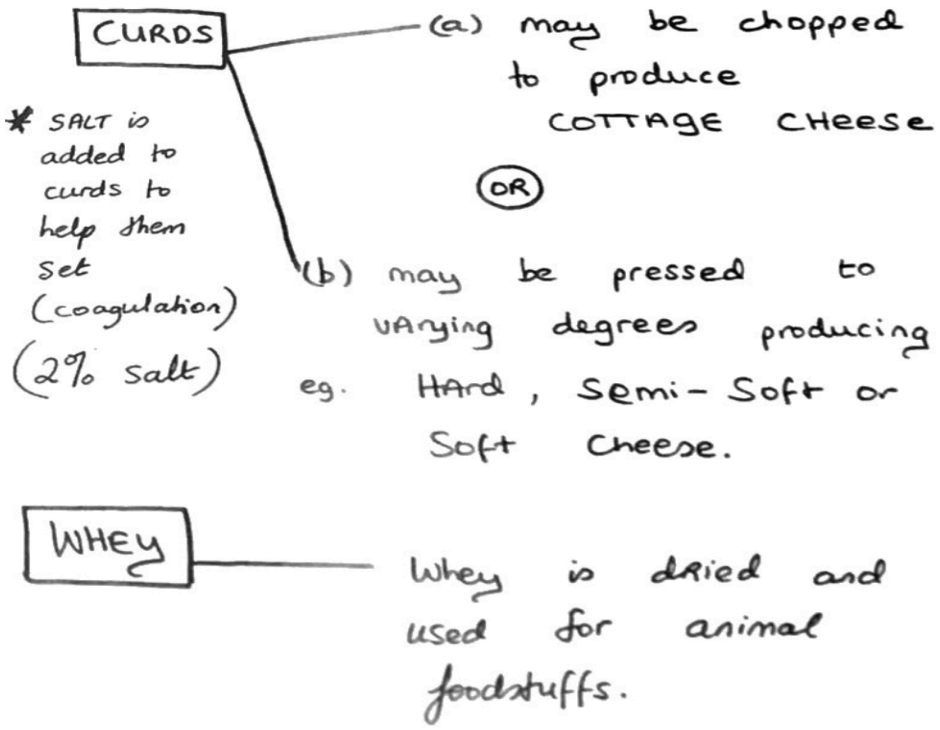
- Whole milk is homogenized (milk is passed through tiny valves to break up large fat globules into minute fat globules) and pasteurized (heated to 72 degrees Celsius for 25 seconds ad the dropped to 10 degrees Celsius
- A culture of Lactobacillus bacteria is added to the milk eg. Lactobacillus Helveticus when making cheddar cheese (the strain of lactic acid bacteria will determine the taste and texture of the cheese). The bacteria feed off lactose (milk sugar) in milk and convert it to lactic acid.
- Milk is heated to 30 degrees Celsius, and RENNET (chymosin) is added.



- Rennet contains the enzyme RENNIN which coagulates milk protein CASEINOGEN TO CASEIN. As a result curds are formed(coagulated protein) and whey (milky, watery liquid).



- The curds are chopped to release more whey (called CHEDDARING)
- The whey is drained off and dried to whey powder. Curds are heated to 30-40 degrees Celsius to squeeze out more whey.
- The curds are cut into blocks and piled on to each other to drain the last of the whey (CHEDDARING)
- 2% salt is added to set the curds further and add flavour.



- The pressed curds are wrapped in muslin and placed in moulds. They are then sprayed with hot water to help form a skin or dripped in brine. Some are later dipped in wax (Edam, Gouda)/
- The whole cheeses are removed and left to ripen or mature (temperature @ 12-15 degrees Celsius) from two months to two years. Some cheeses for longer (eg) : aged Parmesan.
    - Penicillium mould may be injected into cheese → blue veined cheese (eg) : Stilton.
    - Camembert and Brie have mould on the outside (powdery finish)
    - Cream cheese = similar to Cottage cheese but a mixture of cream and milk.
- **NOTE** : Cheese is graded according to colour, flavour and texture before being packed for sale.

PACKAGING OF CHEESE

- Some cheese types (eg) : Cheddar, Parmesan are vacuum packed in heavy duty plastic, all air is removed before packaging.
- Usually there is a zip lock in the vacuum pack so that once opened, it can be resealed.
- Cheese like Buffalo Mozzarella may be packed in a plastic bag filled with brine (salted water) to keep the cheese moist.

- Cottage cheese is packed in plastic tubs (usually circular) and Cream Cheese in rectangular plastic tubs. There is also a foil covering placed over the cheese before the plastic lid is placed on top.
- Waxed paper is also used to wrap cheese (eg) : Cheddar, Emmenthal, Gruyère Cheese.

LABELLING OF CHEESE

- Labelling of foodstuffs (prepackaged) in Ireland are in accordance with EU legislation on labelling.
  - Type of Cheese (eg) : Cheddar, Parmesan.
  - Brand (eg) : Macroom, Cahills.
  - Date Stamp (eg) : "Use by 10/Oct/2021".
  - Nutritional Information per 100g (eg) : protein, lipid, salt content etc.

5 IRISH CHEESES

NAME	COUNTY	TYPE	MILK	RENNET
St. Tola	Clare	Goat	Varies	Traditional
Cahills Farm	Limerick	Cow	Pasteurized	Vegetarian
Gubeen	West Cork	Cow	Pasteurized	Traditional
Cashel Blue	Tipperary	Cow	Pasteurized	Vegetarian
Emerald Irish Brie	Tipperary	Cow	Pasteurized	Vegetarian

RENNET

- Rennet is a substance which contains the enzyme Rennin (stomach enzyme).
- In the past, Rennet was obtained by scraping the lining of a calf's stomach. Avonmore still use this method.
- Nowadays, Rennet is mainly obtained by biotechnology. A strain of bacteria is inoculated with the gene for producing Rennin. Moore Park in Cork produced Rennet in this manner.
- Rennet is added to milk in cheese making to coagulate the milk protein to form curds.
- **NOTE** : Vegetarian Cheese – a non animal enzyme is used to coagulate milk to curds.

NUTRITIVE VALUE OF CHEESE

PROTEIN

- 27% Protein.
- High Biological Value (HBV) protein.
- Complete protein food (ie) : cheese contains all 10 essential amino acids.
- Caseinogen is the protein in cheese.

LIPIDS

- Cheddar cheese 33% lipid (Cottage cheese 4% lipid).
- Contains saturated fatty acids (mainly)
- Cholesterol is also present in cheese due to it's animal lipid origin.

CARBOHYDRATE

- 0% present in cheese as Lactose (milk sugar) is converted to Lactic Acid in the early stages of cheese production.

MINERALS

- 6% of cheese approximately.
- Macrominerals (Calcium and Phosphorous are present due to milk being the key ingredient).
- Very little Iron (trace).

VITAMINS

- Excellent source of Retinol and Beta Carotene (Vitamin A).
- No Vitamin C present.
- High in Vitamin B2 (Riboflavin) and Vitamin B3 (Niacin) – water soluble vitamins.

WATER

- 34% (Cheddar cheese)
- 77% (Cottage cheese)

DIETETIC VALUE OF CHEESE

HEALTHY BONES AND TEETH

- Cheese is an excellent source of Calcium, Phosphorous and Vitamin D. All of these nutrients together aid the calcification process in children, teenagers and adults up to mid 20's – 30 years old.

LOW CHOLESTEROL DIETS

- Many hard cheeses are high in saturated fat (eg) : Cheddar cheese. Avoid too much of this cheese as saturated fats can raise "LDL" (Low Density Lipoprotein) cholesterol in the blood.
- Choose low fat cheese or Cottage cheese (4% fat) instead.

LACKS CARBOHYDRATE AND VITAMIN C

- Therefore cheese should be served with foods rich in these nutrients (eg) : wholewheat bread and cheese, salad sandwich.

LACTO VEGETARIANS

- Do not eat meat in their diet, however cheese has high biological value protein also. In fact, 50g of cheese has twice the amount of protein as 50g of meat.

PREGNANT WOMEN

- Should avoid cheese made from raw (unpasteurized milk) (eg) : farmhouse cheeses. If consumed, there is a risk of Listeriosis food poisoning which could result in a miscarriage or a still birth.

PROCESSED CHEESE

- Wide variety available (eg) : smoked cheese, herb cheeses etc.
- Usually milder in flavour compared to other cheeses (ie) : natural cheese.
- Less nourishment than natural cheese.
- Little flavour.
- They burn/go black quite easily when subjected to heat.
- Processed cheeses are a mixture of grated (unripened) and mature cheeses. Dried milk, emulsifiers, flavourings, preservatives, salt.

DIGESTIBILITY

- Cheddar cheese is difficult to digest because of it's high lipid content (33%).
- Raw cheese is more digestible than cooked cheese.
- Grated cheese or cheese cut into cubes is easier to digest.
- Cottage cheese is easy to digest.

EFFECTS OF COOKING ON CHEESE

- Fat melts and separates after a short time.
- Protein coagulates (prolonged cooking denatures cheese).
- Little loss of food value. °
- Cheese browns/changes colour.
- Remove sauce from the heat before adding cheese to avoid overcooking it.

BUYING AND STORING CHEESE:

PRODUCTION OF PROCESSED CHEESE

- Grated mature and grated immature cheese are mixed with salt, whey powder and water.
- The mixture is heated to 85°C until it is pliable.
- Flavourings and colourings are added.
- The mixture is shaped and dried.
- The processed cheese is then wrapped and packed in blocks or individuals portions (eg) : "Dairylea", "Cultiva", "Galtea".

CLASSIFICATION OF CHEESE

- See page 1 – Hard, Soft, Semi – soft.
- Other types of cheese available :
  - Cheese with external mould (eg) : Brie, Camembert.
  - Cheese with internal mould (eg) : Blue Stilton.
  - Farmhouse cheeses.
  - Processed cheese.
  - Low fat.
  - Vegetarian

VEGETARIAN RENNET

- This is a non – animal product used to coagulate milk during cheese production instead of animal Rennet which is traditionally derived from a calf's stomach.
- The primary enzyme in animal Rennet (Rennin/Chymosin) is collected from the fourth stomach of a newborn calf (produced here to help baby cows digest milk).
- Vegetarian Rennet is vegetable or microbial in origin.
- True vegetarian Rennet is produced by collecting enzymes from vegetable sources, including plants like:
  - Fig leaves.
  - Safflower.
  - Melons.
  - Wild thistles.
- Microbial Rennet is enzymes collected from fungi or bacteria and these are fermented (may leave a bitter aftertaste so only used in cheeses not aged for too long).
- Genetically engineered Rennet is called Fermentation produced Chymosin. This is produced in Moore Park (Cork) where the gene for making Chymosin is taken out of a calves DNA and put into the DNA of yeast, mould or bacteria.