Name: Date:

Food commodities: Dairy

Dairy farming

- There are thousands of dairy farms in the UK. The farming techniques and the size of dairy farms differ around the UK. Although different feed, housing and milking parlours may be used, the health and welfare of the dairy cows remains the highest priority for farmers.
- Dairy farms are mainly based in the western half of Britain where the warm, wet climate is ideal for grass growth.
- In the UK most cows eat grass during the summer and silage (dried grass or maize) in the winter. This is usually supplemented with dry feeds such as cereals and protein feeds to ensure they have a nutritionally balanced diet. Animal nutritionists help plan special diets for them.
- Dairy cows eat 25-50kg of food a day and drink around 60 litres of water.
- A dairy cow needs to give birth to a calf to produce milk. A cow is milked 2-3 times a day and can produce around 22 litres of milk a day.
- Holstein-Friesen cows, which are black and white, are the most common type of dairy cow in the UK.
- Cows wear ear tags so they can be identified and are a unique passport. Traceability from the farm is important when producing food.
- After milking, the milk is chilled and stored, ready to be taken away to be processed by the dairy.
- Farmers use modern technology to help manage their farm which includes systems to monitor individual cow's movements and milk yield, robotic milking systems, and satellite-controlled tractors.

The farm environment

- Throughout the year, the farmer will maintain the fields, gateways, fences, and hedgerows to help protect and enhance the environment.
- Cow manure known as slurry is spread on the land as an excellent source of nutrients and reduces the need for chemical fertilisers.
- The carbon footprint of milk produced in the UK is nearly a third lower than the global average.

Farm assurance and standards

- The Red Tractor symbol on packaging helps consumers know that the milk and dairy foods have been produced according to the high standards of the Assured Dairy Farms scheme.

Processing milk

1. After the milk is delivered to the dairy it is pasteurised. Pasteurisation is a process used to kill harmful microorganisms, such as certain pathogenic bacteria, yeasts and moulds, which may be present in the milk.
2. Pasteurisation involves heating the milk to a temperature of no less than 71.7ºC for 25 seconds. This process extends the shelf life of milk and is known as High Temperature Short Time (HTST).
3. The milk is then cooled for packing, labelling, storage, transportation and then distributed to retailers.
4. Homogenisation of milk involves it being pumped at very high pressures through narrow tubes, breaking up the fat globules in order for these to disperse through the liquid. Most milk available to purchase is homogenised.
5. Sterilisation is a process that destroys all micro-organisms present in a food. It uses a temperature more than 100ºC. Sterilising enables milk to be kept for months unopened and unrefrigerated, but may result in a burnt, caramelised flavour and browning.
6. Ultra-heat treatment (UHT) destroys all micro-organisms in the food without causing as much damage to the product as sterilisation. Typical temperatures is 130ºC-150ºC for 1-3 seconds.

Types and nutrition of milk

There are several different types of milk available for consumers to buy. The fat content of cow's milk will vary according to the type:

- Whole milk contains 3.5%
- Semi-skimmed milk 1.7%
- Skimmed milk is 0.1-0.3%

Dairy foods provide protein, calcium, B vitamins and iodine.

Dairy alternative milks include oat, soy, coconut, almond. Choose those that are fortified with calcium and ideally other vitamins and minerals.

Other types of milk:

- Evaporated milk – is heated to reduce the liquid content
- Condensed milk – is evaporated milk that has had sugar added
- Dried milk powder – is heated to dry the milk and remove the water

Types of cheeses

There are over 750 different cheeses produced in Britain today. Here are some examples:

- Hard e.g. West Country Cheddar
- Semi-hard e.g. Wensleydale
- Soft e.g. Cornish Brie
- Blue e.g. Blue Stilton

For more information, go to: bit.ly/3ucDlFr

Processing yogurt

1. The milk is pasteurised and homonogised. A starter culture (harmless bacteria) is then added, and the bacteria will ferment the lactose (sugar) in the milk to produce lactic acid.
2. The lactic acid fermentation process allows the milk proteins to coagulate and set producing sharp, tangy flavoured 'natural' yogurt.
3. Sugar, sweetener, pieces of fruit and/or fruit flavouring are added to the yogurt either before or after the fermentation stage. It is then packaged and chilled.

Key terms

Cheddaring: A secondary process in making cheese.
Curds: A solid product formed during cheesemaking, through coagulation.
Lactose: A sugar present in milk. Lactose is a disaccharide (galactose in chemical combination with glucose).
Milking parlour: A building where cows are milked on a dairy farm.
Milking: The primary process in making dairy products.
Pasteurisation: The process of heating food to kill most food spoilage organisms and pathogenic organisms, e.g., milk.
Rennet: A mixture of enzymes in cheese production. Makes the milk 'curdle'.
Sterilisation: The severe heating of food to kill all micro-organisms, e.g., sterilised milk.
Traceability: A system to track food through the stages of production, processing and distribution.
Ultra-heat treatment (UHT): The heating of food to kill or inactivate all micro-organisms without causing damage to the product, e.g., UHT milk.
Whey: The liquid remaining after the curds have been separated from the milk.

Processing cheese

1. Pasteurisation - the first stage in the process is the pasteurisation of the milk.
2. Curdling - a starter culture, similar to freeze dried natural yogurt, is then added to the pasteurised milk. This begins to acidify the milk and allows the bacteria to grow and begin fermentation. Rennet is added so the milk curdles and separates into curds and whey. It is then drained on cooling tables.
3. Cheddaring - as the liquid is drained off a solid mass is created, called curd mats, which are cut into sections, piled on top of each other and turned regularly. Salt is added to preserve it and to prevent the cheese from going rancid during the maturing process. It is then stored in a cool room to ripen.
4. Whey - the liquid from curdling, known as whey, is further processed where cream is removed called 'whey cream' and made into butter. Protein is also extracted from the whey for different ingredients and commonly used as a protein supplement. In addition, lactose (a sugar in the milk) is removed from the water and used in the food industry and for animal feed.

Tasks

1. Explain in detail pasteurisation and the importance of this to ensure food is safe to consume.
2. Research 5 different types of cheeses and explain how and where they are made.