Cottage Cheese:

Agricultural processing brochure

South African farmers facing current economic realities are searching for new options to maintain or expand their businesses. One of the many opportunities to grow markets, turnover and profits is by adding value to farm produce. Options need to be selected carefully based on sound information and knowledge of the opportunities presenting themselves, taking into account the strengths and weaknesses of individual farms.

Introduction:

Product group: Dairy products

Dairy milk is one of the most versatile products available to the processor. Processing options include fermenting, concentrating, drying, freezing and many more methods of preservation. Processed dairy products are divided into five groups:

- Concentrated dairy products
- Cultured dairy products
- Frozen dairy products
- Liquid dairy products
- Powdered dairy products

Cottage cheese is categorised as a *cultured dairy product*.

Product description: Cottage Cheese

Cottage cheese is categorised as a *cultured dairy product*. Cottage cheese is the product obtained from coagulated milk, cream, partly or wholly skimmed milk, reconstituted (prepared) milk, or a combination of these products. Cottage cheese is a *soft, unripened cheese* containing about 80% moisture.

Cottage cheese can also be made with various additions such as herbs, pickles and spices.

Cottage cheese is classified as follows:

- Full fat cottage cheese may also be named cottage cheese, full cream cottage cheese, and creamed cottage cheese has a fat in dry matter content of at least 45% but not more than 60%.
- Medium fat cottage cheese has a fat in dry matter content of at least 25 % but not more than 45 %.
- Low fat cottage cheese has a fat in dry matter content of at least 10 % but not more than 25 %.
- Fat-free cottage cheese may also be named skim milk cottage cheese, has a fat in dry matter content of at least 10 %.

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Storage of raw milk for processing

Milk is a highly perishable product that may turn sour if left at room temperature. Milk is cooled to improve its quality and stability. Milk leaves the cow at ± 37°C and must be cooled within 3 hours to 4°C. During cold storage, the milk must be stirred gently to prevent a cream layer from forming on top (cream separation by gravity). Raw milk is thus kept in large vertical tanks at the factory or processing plant, which is fitted with one or more propeller agitator(s) until further processing proceeds.

Milk preparation for the manufacturing of cheese

Clarification of milk

Clarification is the removal of solid impurities (dirt particles, white blood cells and cells of udder tissue) from the milk, prior to further processing. Clarification is achieved through filtration.

Pre-heating of milk for separation

Prior to separation the milk is heated to 45 - 60 °C to ensure effective separation of the skim milk and cream phase. Heating also inactivates the enzyme lipase that is responsible for the development of rancidity in fats. Pre-heating guarantees the highest possible cream quality, i.e. the lowest amount of free fat in skim milk.

Fast facts:

Fresh milk should be cooled to: **4 °C**

Prior to separation the milk is heated to: **45 - 60 °C**

Separation and standardisation of milk for cheese

Separation: The cream fraction of raw milk is separated from the skim milk by passing pre-heated raw milk (45 – 60°C) through a conventional or hermetic centrifugal separator.

Standardisation follows directly after separation and involves the adjustment of the fat content of milk to obtain a product with a defined, guaranteed fat content. Cottage cheese products are classified according to their fat content. The fat content of milk must therefore be adjusted and standardised accordingly since the fat content of raw milk varies. Standardisation is preceded by separation of the milk and cream and then re-mixing the two fractions in the desired proportions.

Take note: Fat-free cottage cheese is made from skim milk and does not require re- mixing only separation.

Homogenisation of milk for cheese (optional)

Homogenisation is the process where the fat globules in the milk products are finely distributed to reduce "creaming", i.e. the separation of the cream and skim milk.

Homogenisation is accomplished by forcing the milk through a small opening at high velocity to cause disruption of the large fat globules to form small, stable fractions. Homogenisation is most effective when the milk is slightly heated (60 - 70°C) and can be done partially or completely.

Homogenisation is an optional process which has advantages for cheese processors but also disadvantages. The processor must decide which is more important.

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Advantages of homogenisation for cottage cheese:

- the uniform distribution of the fat globules,
- producing a smooth and creamy cottage cheese,
- a whiter coloured product

Disadvantages include the following:

- the milk cannot be separated (cream and skimmed milk),
- increased sensitivity to sunlight - leads to the development of a metallic taste,
- increased sensitivity to lipase (enzyme), and
- low stability of the protein to temperature variations.

Cottage Cheese Process

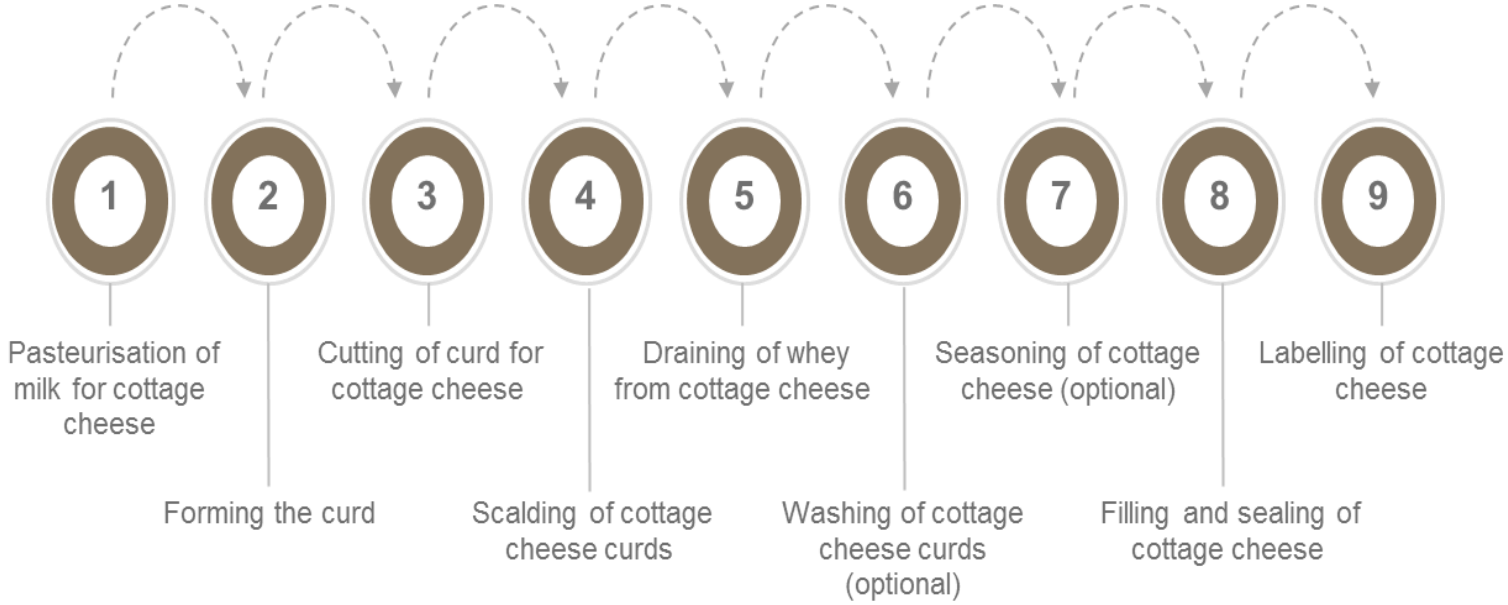
1. Pasteurisation of milk for cottage cheese

Pasteurisation is a mild heat treatment that destroys all vegetative pathogens and heat sensitive enzymes so that the phosphatase test gives a negative result. The milk is heated to 72°C, followed by rapid cooling. Although cheese made from unpasteurised milk is considered to have a better flavour and aroma, cheese milk is pasteurised to eliminate microbial competition for the starter culture and to prevent some common defects during ripening. Various pasteurisation methods are available, depending on the size of the processing plant.

2. Forming the curd:

- Bacterial culture is added to the milk in the vat at 29 °C to acidify the milk. The bacterial culture introduces 'good' bacteria, which plays an important role throughout the manufacturing process.

Process overview



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- The *temperature* creates ideal conditions to coagulate and for the bacteria to grow, and the acidic environment helps prevent foreign bacterial contamination.
- Rennet is added to the milk when it reaches a certain pH. This causes casein protein in the milk

3. Cutting of curd for cottage cheese:

The coagulum is cut with vertical and horizontal knives into small cubes of between 0,5 - 1,2 cm. This eases the whey separation (syneresis) by increasing the exposed surface areas. The cubes of curds and whey are gently stirred to prevent lump formation. Some may be removed at this stage. The curd is then left to rest for about 15 minutes.

4. Scalding of cottage cheese curds:

Scalding is a heat treatment given to cheese curds to regulate the texture and acidification of the curd. The curds are slowly heated to 55 °C to accelerate the whey separation. Slow heating is necessary to prevent case hardening. The curd-whey mixture is stirred as soon as the required temperature is reached to ease separation.

5. Draining of whey from cottage cheese:

Draining removes excess free moisture from a product by gravitation force to obtain partial drying of the product surface. The whey and the curd have separated due to cutting, stirring and scalding. The whey is drained off either through a tap or by gravity separation.

Fast facts: Washing of cottage cheese curd :

Number of washes	Temperature range
2 - 3	32 - 4 °C

6. Washing of cottage cheese curds (optional)

The curds can be washed 2 - 3 times with potable water at 30 - 32 °C, 14 °C and 4 °C respectively. This cools the curds, removes excess acid and lactose and thus inhibits further acid formation through fermentation. All the water is drained from the curd.

7. Seasoning of cottage cheese (optional)

Salt and other optional seasonings such as peppercorns and herbs may be added at this stage.

8. Filling and sealing of cottage cheese

The containers are filled by automatic injection nozzles in large processing plants. Small processors can hand fill and seal the containers. Suitable containers include plastic tubs with foil and/or plastic lids. The containers should be hermetically sealed and stored at 4°C.

9. Labelling of cottage cheese

All the cottage cheese containers are pre-labelled or labelled after they are filled and sealed.

Labelling of cheese

Labelling in South Africa is controlled by legislation. Anyone who wants to use the information provided in this document must familiarise him/herself with all the applicable laws that apply to the producing, processing, manufacturing and storage of the products referred to in this document.

Please also refer to the disclaimer on the last page.

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Other processing options – Cultured dairy products

Listed below are other processing options not covered in this report, but available from Eskom.

- **Cultured buttermilk** is the product obtained from milk that has been inoculated with a starter culture to produce a viscous liquid with a mild lactic flavour. It is consumed as a refreshing drink or used as an ingredient in various baked products.
- **Gouda** is a close textured, mild cheese. It is classified as semi-hard.
- **Kefir** is a smooth, viscous, fermented dairy drink with a fresh acidic taste and contains lactic acid, alcohol (± 1%) and gas (carbon dioxide).
- **Long life, set dessert** is a cultured dairy product similar to yoghurt that has undergone a heat process to extend the keeping quality. Set long life dessert is fermented in the final retail container and has a gel-like a consistency. It may or may not be flavoured.
- **Long life, stirred dessert** is a cultured dairy product similar to yoghurt that has undergone a heat treatment to extend the keeping quality. Stirred long life dessert is produced in large batches prior to packaging in the final retail container.
- **Maas (cultured milk) is** manufactured by inoculating pasteurised milk with a specific bacterial culture. The end product has a firm texture, no gas bubbles and no separation of whey from the coagulum. It has pleasant sour taste with a slight bite/prickliness on the tongue.
- **Processed cheese** is made from a variety of natural cheeses that are ground and blended together with emulsifying agents. Various other additives may also be added. The mixture is heated and packaging in laminated films.
- **Ricotta** is a cheese prepared from whey. Ricotta is a low fat, soft cheese with a maximum fat in dry matter content of 10% and a minimum dry matter of 20%.
- **Set yoghurt** is prepared from high or full fat pasteurised milk inoculated with a specific starter culture. Fermentation takes place in the final retail container under controlled conditions. The yoghurt has a firm, gel-like consistency and a clean surface is apparent when the yoghurt is cut.
- **Stirred yoghurt** is a fermented milk product with a thick, smooth consistency and may or may not be flavoured. It is incubated in tanks, stirred, flavoured and cooled before packaging.
- **Cultured (sour) cream** is the product obtained from cream that has been inoculated with a starter culture to allow for the development of lactic acid and flavour compounds under controlled conditions.
- **Cheese spread** is a blend of hard cheese with added emulsifying salts. The mixture undergoes a heat treatment that increases the shelf life. Cheese spread has a relatively high moisture content (± 55 %) and a pH of 5,7 - 6,3.
- **Cheddar cheese** is defined as the product obtained from coagulated milk from which the whey has been removed. The coagulum or curd has undergone ripening to a greater or lesser extent. Cheddar is classified as a high fat, hard cheese.
- **Drinking yoghurt** is essentially stirred yoghurt with a lower solids content and broken coagulum. It may be pasteurised and/or aseptically packaged to extend the keeping quality.
- **Feta** is a pickled cheese with a clean, acidic salty taste. It is packaged in a brine solution to prevent drying out and to preserve the cheese.

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- Understanding their electrical systems and processes
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Five alternative funding product offerings are available to help reduce your investment costs for new agro-processing or agro-beneficiation business or expand/improve an existing agro-processing or agro-beneficiation business.

For more info visit: http://www.eskom.co.za/sites/idm/Business/Pages/Alternativefunding.aspx

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