

15

Adding value to milk

This chapter briefly discusses the range of dairy products that can be made from raw milk.

The main points in this chapter

- Heat-treated liquid drinking milk is a common form of adding value to raw milk.
- Separating the milk fat from other milk solids produces butter and ghee, and also skim milk.
- Fermenting milk produces yoghurt and cheese.
- The by-products skim milk and whey can produce ice cream, cheese and whey-based drinks.
- A case study is presented of cheese making from a dairy cooperative in East Java.

Dairy farmers have the opportunity to add value to raw milk by producing a wide variety of processed products, to increase the return above the base price of raw milk. These include:

- heat-treated liquid drinking milk, such as pasteurising, or ultra high treatment, then adding flavours or incorporating it into other drinks
- separating the milk fat from other milk solids to produce butter and ghee, and also skim milk
- fermenting milk to produce yoghurt, which is also called curds in some countries
- fermenting milk to produce cheese with its major by-product, whey
- using the by-products, skim milk and whey, to produce ice cream, cheese and whey-based drinks
- adding ingredients to heated milk to produce a variety of sweets such as caramel. Further processing, such as adding acids to coagulate the milk, produces different kinds of sweets
- using cheese in cooking to produce high-value products such as cheesecakes.

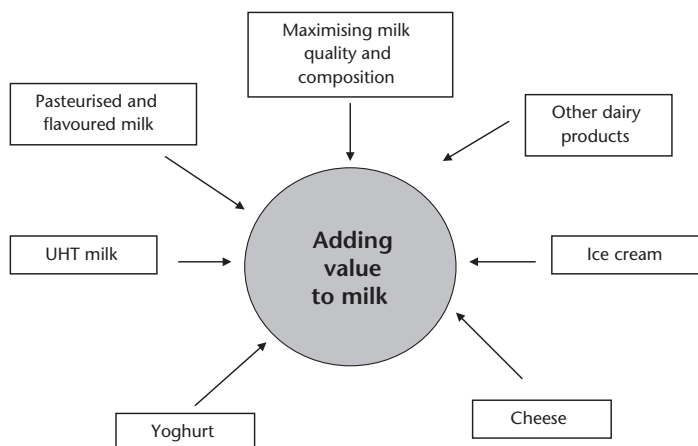


Figure 15.1. The diversity of dairy products that can add value to raw milk

Adding value to raw milk can be undertaken on an individual farm or a group of farms, using a larger, and often more reliable, supply of the raw product. Developing such cottage industries have several requirements that need to be considered. These include:

- a regular supply of quality milk that can be further economically processed
- infrastructure to support the processing at the farmer, village and regional levels
- organisational support for farmers and farming communities to develop the processing skills
- infrastructure for marketing the final products.



Pasteurising and flavouring milk in an Indonesian dairy cooperative.

The two major constraints are then the supply and quality of milk. Another factor is the existing farmer returns for the raw milk and the equivalent returns for the processed product. If milk returns vary throughout the year, depending on the supply and demand, monthly profit margins can vary. It is also likely that the products from cottage industries may not sell for the same amount as their imported equivalent.

15.1 A case study of adding value to raw milk in Indonesia

This chapter discusses value adding using an example from a project in East Java where cheese making was introduced to a dairy cooperative for sale in nearby capital cities (Moran *et al.* 2006).

It was essential to find a dairy cooperative and group of farmers who would commit to cheese making as a cottage industry, because of the considerable investment of time, training, resources and possibly short-term reduced profits.

Successful cheese making depends on using good-quality equipment and ingredients. Good milk quality is of paramount importance because the raw milk is heated, firstly, to incorporate the cheese starter and, secondly, to initiate the cheese-making process. If the raw milk already has high levels of bacterial contamination, heating will dramatically stimulate further bacterial growth leading to failure of the coagulation and cutting into curds and whey. The TPC (see Chapter 14) of raw milk destined for cheese making should not exceed 300 000 cfu/mL.

The value added to raw milk is maximised if all components of the milk can be used. That is, for cheese making, the whey has a market value either for sale fresh or as a component of another cheese such as Ricotta. Making butter or ghee could be combined with adding value to the skim milk, such as through making ice cream. Therefore, when promoting the concept of adding value to raw milk, the entire 'package' should be discussed, such as mozzarella and ricotta cheeses/whey or butter/ice cream.

Mozzarella and ricotta cheeses are ideal to introduce into cottage industries because they are heat treated during the processing, thus incorporating a sterilisation phase to ensure food safety. Mozzarella cheese is a unique Italian cheese that is mostly used as a pizza topping, hence is becoming part and parcel of affluent Asian lifestyles. It obtains its stretchy, stringy texture during a step where the curds are immersed into a bath of hot water, and worked until smooth. It is a cheese with a milk flavour and should be eaten fresh.

Ricotta, another Italian cheese, is unique in that it is made from the whey that separates from the curd during cheese making. Only fresh whey can be used when making ricotta; that is, the whey obtained from a cheese that uses rennet to set the curd. It should not be held for more than an hour before making ricotta, or it will continue to acidify and no longer be suitable. It is important that the pot used to make ricotta is deeper than it is wide: preferably twice as high as wide, to ensure a good yield.

Ricotta cheese is made from whey plus raw milk plus vinegar without additional starter or rennet. The ricotta cheese-making process is complete within 1 hr, compared with 14 days for mozzarella.

Mozzarella cheese making can be a profitable venture, in this case adding more than 50% value to the raw milk. This could increase in the future as the 'hand-made' cheese



The middleman is an integral part of informal milk marketing in Pakistan.

becomes more consistent in supply and value, thus improving its competitiveness with imported products in large cities in Asia.

Whey has long been considered a waste product and it is often discarded or used as a cattle feed. However, whey must be seen as a by-product with valuable nutrients, whose manufacture or proper utilisation has very high economic importance. It can be fed directly to cows or replace some of the milk fed to calves. Its efficient utilisation for humans requires sophisticated machinery, but fresh non-processed whey makes an ideal health drink. However, its bland taste and short shelf life have limited its acceptance and distribution.

Whey can be blended with fresh fruit or with other local products. When sweetened to taste and still warm, whey makes a delicious health drink that could be offered to women and men, as a nutritional supplement for their children, as they deliver milk to the milk collection centres associated with cheese plants. Such a procedure may require a promotion campaign, but drinking whey can form an important component of return from cheese making.

15.1.1 Constraints for cottage industries to add value to raw milk

This ongoing project created considerable interest in East Java and highlighted a variety of constraints to a successful cottage cheese industry. These include:

- the technical skills needed in cheese making to produce a consistent, high-quality product
- the supply of quality raw product
- equipping the cheese factory for operations (including buildings)
- a basic concept of hygiene on farm
- a stringent hygiene plan for the cheese factory, to include standards in clothing (including head covering), personal habits and health status
- skills to precisely monitor the processes involved in making cheese
- the need to develop taste discrimination as part of quality control
- skills in recording factory management, inputs and outputs, to allow calculations of production efficiency and to use these in troubleshooting problems
- initiating a quality control program to ensure product consistency and food safety
- developing diagnoses and action plans to tackle potential problems in quality control
- organisational support, such as sourcing government grants and loans
- provincial support in fostering the development of new cottage industries
- business management skills to source day-to-day requisites for cheese making
- preparedness to invest in an infant industry, with both resources and reduced short-term profit margins
- sufficient profit margins to justify the investment of time and resources
- a commitment by dairy cooperative management that improved milk returns will be returned to the farmers
- the scale of the cheese making operations to reduce unit transport and handling costs, and to better use the major cheese by-product, namely whey
- skills in market intelligence and promotion of a 'new' product, namely hand-made cheese
- the development of networks for marketing the finished products
- skills in preparing dishes to extend the diversification of the new products
- possibly incorporating other value-added dairy (and non-dairy) products in the product range, such as yoghurt, butter, ghee, ice cream, whey and caramel
- possible utilisation of biogas to reduce heating costs.

This page intentionally left blank