

# SMALL-SCALE BUTTER MAKING

Butter can be made from fresh or fermented milk. If fresh milk is used, it must first be separated into skim milk and cream. The cream is churned and the final product is known as sweet butter.

The milk used to make lactic butter does not require separation into skim and cream. Instead milk is fermented to form yoghurt, and lactic butter is produced directly from churning of the yoghurt.

## Sweet cream butter

Raw milk is first separated into skim and cream in a centrifugal separator (electrically or manually powered). Milk with a high fat content gives a higher butter yield.

The fat content in the cream is determined using a Gerbera cream butyrometer. The cream should then be standardized to approximately 40% fat content using the separated skim milk. Standardization of cream to the correct fat content is important, because it affects the churning efficiency and thus butter yield.

Standardized cream is then pasteurized at 72°C for 15 seconds or 63°C for 30 minutes. These are minimum pasteurization requirements, and for improved keeping quality of the butter, especially where the process is not automated and thus temperature holding times are only approximate, it is advisable to exceed the minimum heat treatment, e.g. 75°C for one minute.

The cream should be continually stirred during heating to ensure even heat distribution, and timing started when it reaches the correct temperature.

Pasteurized cream is then chilled below 4°C for several hours (or overnight). This 'ages' the cream and improves its churning efficiency and butter yield.

The next day, aged cream is churned either in a butter churn or a small mixer, (eg Kenwood Chef). It is important to keep the temperature as low as possible during churning. During churning, cream viscosity increases, and finally the cream 'breaks'. This is a clear separation of cream into butter grains and buttermilk. Churning should be continued until butter grains adhere together into one lump.

The buttermilk is drained off and clean, chilled water added to the butter. Slow churning cleans the butter from residual buttermilk, which reduces the keeping quality of the butter if allowed to remain. The water is drained off, and 1-2% salt (of butter weight) is added to the butter during continued slow churning, to achieve even salt distribution.

The butter is then packaged into grease-proof paper, and stored below 4°C.

## Lactic butter

Whole fresh milk is pasteurised (see pasteurisation process for sweet cream butter), and then cooled to 37°C before adding a starter culture (this may be a small amount of yoghurt left over from a previous batch). The milk is then incubated for several hours (or overnight) in a warm place (30-37°C) until set. The resulting yoghurt is chilled for several hours, and then churned (see churning process for sweet cream butter). The lactic butter is salted and packaged in the same way as sweet butter. Due to the fermentation process, the keeping quality of lactic butter is not as good as that of sweet butter.

## Quality control

Butter can be made without a refrigerator or the use of chilled water, but this leads to the following problems:

- If the cream is not allowed to age at a low temperature the fat globules will not develop the

- crystalline structure necessary for good separation of cream into butter and buttermilk.
- A high temperature during the churning process reduces the butter yield, as some of the butterfat liquefies, and is lost with the buttermilk.
- The keeping quality of butter will be reduced if stored without refrigeration. At refrigeration temperatures, butter will keep for several months, but at ambient temperatures off-odours develop after only a few days. However, in many countries, a slightly rancid flavour in butter is found quite acceptable.

The water used for 'washing' butter after the buttermilk has been drained off must be potable, as otherwise it will re-contaminate the pasteurised butter, and reduce its keeping quality.

An anti-oxidant such as BHA (butylated hydroxy anisole) or BHT (butylated hydroxy toluene) may be added to butter to extend its keeping quality at concentration not exceeding 0.02%, but this may not be readily available, and may be expensive.

Lactic butter can be made more easily than sweet cream butter on a small scale, as it does not require the use of a separator or butyrometer, and the chilling stage is less important

### Equipment required

Cream butyrometer  
Centrifugal separator (manual)  
Thermometer  
Heater  
Stirrer  
Churn or high speed blender (eg Kenwood chef)  
Grease-proof paper  
Chiller or refrigerator

### Equipment suppliers

*Note: This is a selective list of suppliers and does not imply ITDG endorsement.*

Cream butyrometer  
Gallenkamp Limited  
Bishops Meadow Road  
Loughborough  
Leicestershire  
LE11 0RG United Kingdom

Centrifugal separator (manual), butter churns and other dairy equipment  
Smallholding Supplies  
Pikes Farmhouse  
East Pennard  
Shepton Mallet  
Somerset  
BA4 6RR United Kingdom

Kenwood chef  
Kenwood Limited  
New Lane  
Havant  
Hants PO9 2NH United Kingdom