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 standardised to approximately 40% fat content using the separated skim milk. Standardisation of cream to the correct fat content is important, because it affects the churning efficiency and thus butter yield.

Standardised cream is then pasteurised at 72°C for 15 seconds or 63°C for 30 minutes. These are minimum pasteurisation 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.

Pasteurised 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 endorsement by Practical Action.

Cream butyrometer
Hindusthan Thermostatics
5- Industrial Estate, Ambala Cantt-133 006 Haryana
India
Tel + 0171 2699116/2663783
Fax: +91 171 2699391
E-mail: ht@htindia.com
Website: ht@htindia.com

Centrifugal separator (manual), butter churns and other dairy equipment
Smallholding Supplies
Pikes Farmhouse
East Pennard
Shepton Mallet
Somerset
BA4 6RR,
United Kingdom
Tel/Fax: +44 (0)1749 860688
Making butter

Kenwood Limited
New Lane
Havant
Hampshire
PO9 2NH
United Kingdom
Tel: +44 (0) 23 9247 6000
Fax: +44 (0) 23 9239 2400
Website: http://www.kenwood.co.uk/
Manufacture: Kenwood Chef, etc. Worldwide distribution.

Dairy Udyog C-230
Ghatkopar Industrial Estate
L.B.S. Marg
Ghatkopar (West)
Mumbai - 400 086
India
Tel: +91 22 517 1636 / 517 1960
Fax: +91 22 517 0878
E-mail: jipun@vsnl.com
Butter Making Equipment including butter churns, moulds, vats and balancing equipment.

Goma Engineering PVT Ltd Majiwada
Behind Universal Petrol Pump
Thane - 400 601
Mumbai
India
Tel: +91 22 534 6436/534 0875
Fax: +91 22 533 3634/3632
E-mail: goma@bom3.vsnl.net.in
 Manufacture butter churns

References and further reading

Dairy processing Practical Action Technical Brief
Chiuri (The butter tree of Nepal) Practical Action Technical Brief