Manufacturing fermented **dairy products**

by Gerhard Venter

Souring is a way of preserving the wholesomeness of milk. Since time immemorial, some left-over sour milk in a calabash or clay pot has served as the starter for the next day's fermentation.

When people started to make butter, the resulting buttermilk was also fermented. Today, a myriad of products are made alongside traditional products. Advances in nutrition and health research have given mankind knowledge of (long-existing) probiotic microorganisms, which is extensively used as components in starters for fermented milks.

Microorganisms that acidify milk exist everywhere in the environment. Their affinity for lactic acid enables these microorganisms to overgrow spoilage organisms, in effect killing them by lactic acid production and consequently souring the milk.

Today, different starter microorganisms selected in pure culture are used to produce liquid, fermented dairy (and other) products.

In many cases, these dairy products do not consist only of milk. Products for the traditional users' market (sour milk) are not highly formulated like the speciality products. In many products, singular types of microorganisms are used, while in others, combinations are used.

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How it's made

Ingredients:

1. Milk.
2. Added foodstuffs such as added milk solids, sugar and/or stabiliser.
3. Colorants and flavourings added after fermentation is complete. Sterilised fruit pulp, whole fruit, nuts, chocolate and even herbs and spices may be added.
4. Starter. The desired end product will determine the type of culture to be used.

The process

1. The milk or mixed base is pasteurised and transferred to a hygienically clean fermentation vessel or mixing vessel (the former for batch fermentation, the latter for in-container fermentation). Homogenisation improves the structure of the final product.
2. The temperature is adjusted to suit the culture which will be used (normally between 24 and 32°C for mesophylic cultures or as high as 35 to 43°C for cultures containing thermophylic cultures, such as yoghurt).
3. The appropriate mass of culture (whether in liquid or freeze-dried form) is added as soon as the fermentation base reaches temperature. It is then mixed thoroughly into the base. Depending on whether a long set or short set time is preferred, the amount of culture can be varied.
4. For in-container fermented products the culture-seeded mixture and other ingredients are then transferred to the container, which is sealed and conveyed to the fermentation chamber. Any undue disturbance of the product is prevented.
5. For batch-fermented products, fermentation is completed prior to the addition of flavourings, colorants and solid foodstuffs only once the product has been cooled.
6. Temperature and acid development must be controlled diligently to ensure that acidification happens at a controlled rate, while over-acidification is prevented. The same goes for the formation of other flavour or structural contributions, which are sometimes temperature dependant.
7. In order to decelerate acid forming, cooling must be applied to the product before the desired acidity is reached (e.g. if pH 4.3 is the aim, cooling should start at around pH 4.7).
8. Some products should not be disturbed in the fermentation vessel before it has substantially cooled, to prevent rupturing of the coagulum and whey separation. Yoghurt specifically needs to be cooled to about 25°C (unstabilised yoghurt down to 15°C).
9. Then only should it be stirred and pumped via a mixer (where fruit etc. is added) to the packaging machine (or manually spooned into containers). Unstabilised yoghurt has the uncanny ability of a 'second setting' if not properly treated. Modern stabilisers obviously impart this characteristic too.
10. Packaged products should be stored under refrigeration until distributed. UM