Sampling dairy products for microbiological analysis

Maintaining the integrity of samples taken for microbiological analysis is vital to ensure that the results of such testing are meaningful and relevant. Contamination of samples during collection will result in inaccurate results and may result in a failure to meet specifications or trigger unnecessary investigations.

Ideally, food samples for microbiological testing should be sent to the laboratory in their retail packaging where they can be sampled by experienced laboratory technicians under controlled conditions. However, it is impractical to send large sized products or product produced in bulk to the laboratory. Hence it is necessary to take a sub sample. This must be collected in a way that ensures neither the sample nor the bulk product become contaminated with microorganisms. This is known as aseptic sampling.

Sampling equipment

The basic principle of aseptic sampling techniques is to ensure that anything which comes into contact with the sample is free from microorganisms. Sampling equipment such as knives, scalpels, triers and scoops, must be cleaned before sterilisation. The purpose of cleaning is to remove all visible soiling that may harbour bacteria. Once cleaned, the equipment can be sterilised by a number of methods.

Sterilising sampling equipment

The **Australian Standard 1166-2004 Milk and milk products – Guidance on sampling**, outlines a number of methods for sterilisation of sampling equipment. The methods recommended include **exposure to hot air at 170ºC–175ºC for not less than two hours** and **exposure to steam at 121ºC for not less than 20 minutes in an autoclave**. The methods require the sampling equipment to be appropriately packaged.

The standard also makes provision for situations where the above two methods are not feasible, and specifies a number of alternative sterilisation methods which can be utilised provided the sampling equipment is used immediately. The most relevant of these methods include **immersion in at least 70% (v/v) ethanol solution or ignition (flaming) with 96% (v/v) ethanol solution**. Ethanol becomes less effective at concentrations greater than 70% so concentrations should be kept near this level when used for the immersion method. Where ethanol is unavailable, methylated spirits may be used as an alternative for flaming. Single use disposable sterile equipment is also suitable for collection of samples. These must be opened immediately prior to sampling.

Where the sterilisation method involves heating, the equipment must be cooled before use. If sterilised by immersion in ethanol, equipment must be allowed to dry. Equipment that has been sterilised should not come in contact with any non-sterilised surface which would result in re-contamination. This can be achieved by placing implements inside autoclave bags or aluminium foil prior to autoclaving.

Sample collection

Samples should be selected in a manner that ensures they are representative of the batch. The number of samples collected will depend on the sampling plan. The DFSV Technical Information Note *Microbiological testing of finished dairy products* provides further information on microbiological sampling plans.

Collection of the sample must be performed in a manner which ensures that it is not contaminated and should be undertaken by a person trained in aseptic techniques. It should be undertaken in a clean area and the bench surface wiped with 70% ethanol prior to use.

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When sampling, gloves should be worn to reduce the chance of skin bacteria contaminating the sample. Particular care should be taken when removing packaging, to ensure that external surfaces of packaging do not come in contact with the sample. This can be avoided by wiping the surface of the package with 70% ethanol prior to opening.

Sterile equipment should be used to remove an appropriate sized portion of sample. Once removed from the bulk unit, the sample should be placed in a receptacle that is free from organisms, such as a sterile bag or container.

It is vitally important that the container is correctly labelled with batch codes and dates. If more than one sample is to be taken, the sampling equipment must be resterilised between samples to prevent cross contamination. Alternatively, separate sterilised implements may be used.

Once samples have been sealed in appropriate containers, they should be placed under refrigeration (for perishable products) and transported to the laboratory as soon as possible (within 24 hours). Failure to keep samples cold (<4°C) where appropriate and have them tested without delay may result in growth of any organisms present and result in an overestimation of their incidence in the original sample.

Key points to consider

- Always use sterilised sampling equipment and sample jars.
- Ensure your sampling environment is clean and use the correct sampling procedures.
- Promptly transport the samples to the laboratory ensuring that where appropriate the temperature is maintained at <4°C.

References

Dairy Food Safety Victoria, Technical information note: Microbiological testing of finished dairy products, DFSV, Melbourne, 2013

Standards Australia (2004). Milk and milk products – Guidance on sampling. (AS 1166-2004)

Further information

Further food safety technical information is available at www.dairysafe.vic.gov.au

Or contact Dairy Food Safety Victoria on (03) 9810 5900 or info@dairysafe.vic.gov.au

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