

Antibiotic screening

The dairy industry has an obligation to ensure that antibiotics (as well as other chemicals) which may be present in the milk of treated animals are effectively managed to ensure that they are not present in dairy products above levels permitted in the Australia New Zealand Food Standards Code (the Code).¹

Farm and manufacturer food safety programs ensure that systems are in place to verify that antibiotic residues are not present in milk above maximum residue limits (MRL). One such method is the routine screening of farm and tanker milk using commercially available rapid test kits. Such methods provide real-time guidance on the suitability of milk for processing.

A wide range of commercially available test kits can be used to qualitatively screen for antimicrobial (or antibiotic) residues in milk. Specialist analytical laboratories can then undertake quantitative tests to validate these results and provide information regarding the level and specific residue present.

Screening methods

Screening methods are generally qualitative tests, and give a positive or negative result to indicate the presence or absence of particular antibiotic residues in the milk or dairy products. Compared to confirmatory methods they are more rapid, easy to use and relatively inexpensive.

Screening tests are divided into either broad or narrow spectrum test methods. A broad spectrum test detects a range of classes of antibiotic (such as beta-lactams, cephalosporins, aminoglycosides, macrolides, tetracyclines and sulphonamides), whereas a narrow spectrum test detects a limited number of classes. For example, a narrow spectrum test may only cover beta-lactams.

Importantly, screening test methods do not identify the specific antibiotic residue present, nor are they designed to indicate whether or not a particular antibiotic residue is present at a level above the MRL in the Code.

Screening kits

A wide range of commercial screening test kits are available and manufacturers need to consult suppliers of screening tests to identify the most appropriate test kits for their business.

While the principal issue when selecting screening kits is to consider regulatory requirements, other issues include performance of the screening kit, cost per test, range of inhibitory substances detected, and ease of use. The suitability of a screening kit will vary between manufacturers. It is important to establish a relationship with the kit suppliers as they are best placed to assist with troubleshooting.

Factors to consider when choosing a screening kit

Screening kit approvals

Many commercial antibiotic residue screening kits have been formally approved or certified by regulatory bodies or internationally recognised organisations that undertake evaluations, validations and/or performance testing. DFSV does not evaluate, approve or certify screening kits.

When choosing a commercial antibiotic residue screening test kit, manufacturers are advised to check the test kit's approval or certification status and to consider having the kits efficacy validated for use under their conditions in a commercial laboratory.

Classes of antibiotics

Dairy manufacturers need to assess which classes of antibiotics need to be screened. Ideally, this will include as many classes as possible and will be detailed in the manufacturer's food safety program. In certain circumstances, specific customers may also require screening for additional antibiotic classes.

Test matrix

Most commercial antibiotic screening kits are designed for use with cow's milk. Other matrices, such as goat, sheep, and buffalo milk or processed dairy products, may not be suitable for some kits or may require variations to the standard kit instructions to achieve a valid result.

Prior to using a test kit on a matrix other than cow's milk, check with the test kit manufacturer to ensure it is suitable for that matrix, or whether variations are necessary.

Detection limits of antibiotic residue screening test kits

The limits of detection for antibiotic residues may vary considerably between commercial test kits. This should be considered when deciding which test kit to use.

Shelf life

Antibiotic screening tests may have a limited shelf life as the chemicals and reagents will deteriorate over time. Consideration should be given to the number of tests required before buying multiple units. Some systems are designed for high throughput while others might be more appropriate for smaller facilities.

Resources

Some test kits require refrigeration or specialised laboratory facilities. Manufacturers must ensure they have the capability to store and operate the tests according to the manufacturer's instructions.

Ease of use and timeliness

Other important factors to consider when selecting a suitable test kit are the time taken to yield a result, ease of use, and the set-up costs of equipment and consumables.

Validation

The manufacturer must demonstrate that they can use the test kit effectively and obtain accurate results, this may include testing control samples to ensure that they can detect and differentiate between positive and negative results and that they are confident that they can work the test properly.

Key points to consider

- Antibiotic residues can be detected in milk and milk products using a range of test methods.
- Screening test methods are generally qualitative tests, giving positive or negative results for the presence of antibiotic residues.
- Screening test kits do not identify the specific antibiotic residue present, or indicate whether the level exceeds the MRL.
- Always consider the sensitivities (detection limits) of test kits when deciding which to use.
- Most commercial antibiotic residue screening test kits are designed for use in cow's milk. Suitability for use in milk of other species should be determined prior to purchase.
- Consult with Australian test kit distributors to gather the information you require and to identify suitable screening kits.

References

1. Food Standards Australia New Zealand 2016, [Australia New Zealand Food Standards Code: Standard 1.4.2- Maximum Residue Limits](#), Commonwealth of Australia, Canberra.

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

©Dairy Food Safety Victoria 2016

This document is intended to be used as a general guide only and is not a comprehensive statement of all the relevant considerations with respect to your particular circumstances, nor does it comprise, or substitute for, legal or professional advice. DFSV does not guarantee the accuracy, reliability, currency or completeness of the information. Links to other websites are provided as a service to users and do not constitute endorsement, nor are we able to give assurances of the accuracy of their content. DFSV accepts no legal liability arising from, or connected to, or loss due to any reliance on this document.

Reference to any specific test kit product is for information only and does not constitute endorsement or recommendation by DFSV. This information is a guide only and does not include all kits currently available in Australia. The availability of kits listed may also change.