

Australian Milk Residue Analysis (AMRA) Survey

Annual Report 2025–26



The Australian Milk Residue Analysis (AMRA) Survey is the independent chemical residue monitoring program for bovine milk, delivered for the Australian Government Department of Agriculture, Fisheries and Forestry and State Regulatory Authorities:



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Executive summary

The Australian Milk Residue Analysis Survey (the Survey) is the national residue monitoring program for agricultural, veterinary chemicals and environmental contaminants in bovine milk. The Survey supports the export requirements of the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF) under the *Export Control (Milk and Milk Products) Rules 2021*¹.

The Survey is funded through DAFF, which also approves the sampling plan. Dairy Food Safety Victoria (DFSV) coordinated the Survey on behalf of DAFF during the 2025–26 financial year. Following the consolidation of DFSV into Safe Food Victoria (SFV) on 1 July 2026, responsibility for coordinating the Survey transferred to SFV.

The Survey is a risk-based program designed to identify and monitor residues from chemical inputs in the Australian milk supply chain. It verifies that the control measures in place are effective in ensuring food safety and provides assurance to both local and international consumers about the safety and quality of Australian dairy products.

The Survey tests randomly selected raw milk samples for a range of residues. Samples are collected from all dairying regions, with the number of samples from each region proportionate to its milk production volume and form a representative sample of the whole industry.

For the 2025-26 Survey, 1000 milk samples were collected and 14,500 analyses were conducted. All samples met Australian residue standards, achieving 100% compliance.

Setting of Australian residue standards

The Australian Pesticides and Veterinary Medicines Authority (APVMA) responsible for the assessment, registration, and regulation of agricultural and veterinary (agvet) chemicals in Australia. The APVMA also sets maximum residue limits (MRLs) for domestically produced and imported food. Following consideration by *Food Standards Australia New Zealand* (FSANZ), these MRLs are incorporated into the *Australia New Zealand Food Standards Code* (the Code)².

The APVMA also sets extraneous residue limits (ERLs), which are the maximum permitted levels of residues in food commodities that arise from environmental sources rather than direct agricultural use.

A maximum level (ML) maximum concentration of a specified contaminant or natural toxicant permitted in a food and applies to substances such as heavy metals and mycotoxins². These are listed in the Code.

The Code specifies that where no MRL or ERL has been established for a particular agvet chemical residue in a food, no detectable residue of that chemical is permitted². In contrast, where no ML has been established for an environmental contaminant in a food, the presence of low levels may be acceptable provided they do not pose a food safety risk.

Survey design and sample collection

The Survey design is risk-based and reflects the agricultural practices of the Australian dairy industry. Samples are collected from all dairy producing states, with the number collected from each region proportionate to its milk production volume. The sampling framework is guided by the European Union (EU) residue monitoring directives. The compounds selected for testing reflect the patterns of agvet chemical use in Australian dairy production, as well as chemicals of interest to Australia's trading partners.

All samples were collected randomly across Australia over a twelve-month. Within this random selection, there are stratified components based on defined geographic regions, seasonal factors, and historical chemical usage patterns are also included. Samples selected through stratified sampling were analysed specifically for triclabendazole residues, while samples selected through random sampling were tested for antimicrobials, amphenicols, benzimidazoles, levamisole, aflatoxin M1, macrocyclic lactones, organochlorines, organophosphates, synthetic pyrethroids and non-steroidal anti-inflammatory drugs. The number of analyses conducted for the 2025–26 AMRA Survey are listed in Appendix 2.

When a residue is detected, the laboratory notifies SFV, which then informs the relevant State Regulatory Authority (SRA) and DAFF. The level of action is set at $\geq 50\%$ of the Australian or EU MRL/ERL, whichever is more stringent, or at any detectable level where no MRL or ERL has been established. Where a residue is detected at or above the level of action, the SRA, in collaboration with DAFF and the relevant dairy company, identifies the farms that contributed milk to the affected tanker load. Individual farm samples are then tested to determine the source of the residue.

Once the responsible farm or farms are identified, further investigations are undertaken to determine the cause of the detection and implement appropriate corrective actions. The dairy company also undertakes a trace forward investigation to ensure dairy products

containing residues above Australian or EU Standards do not enter the relevant market. All aspects of the Survey are subject to audit by DAFF and governments of importing countries. SRAs are responsible for verifying that corrective and preventative actions have been implemented.

Annual Review

The risk profile of agricultural, veterinary and environmental contaminants is reviewed annually by representatives from the manufacturing and farming sectors, Dairy Australia, SRAs and DAFF. This review examines emerging chemical residue risks, changes in chemical use patterns and potential trends that may affect the dairy industry. It also provides an opportunity for industry input and helps identify areas for improvement in the survey design and implementation.

Proficiency Testing

All survey samples are analysed by contracted laboratories accredited by the National Association of Testing Authorities (NATA). These laboratories are required to participate in the Milk Laboratory Performance Evaluation Program, which assesses ongoing competency and demonstrates their proficiency in conducting analyses for the Survey. The program is administered by the National Residue Survey (NRS), which is accredited by NATA as a Proficiency Testing Scheme Provider.

Compounds tested

The Survey includes a range of residue groups: antimicrobials, endoparasiticides, ectoparasiticides, feed and environmental contaminants. The test methods used and the contracted laboratories are detailed in Appendix 3.

Amphenicols

In Australia, chloramphenicol, florfenicol and thiamphenicol are not currently registered for use in dairy cattle. Amphenicols are therefore considered to present a low risk within the Australian dairy residue risk profile. To verify that off-label use is not occurring and that the risk remains low, 30 randomly selected samples were collected and analysed for these residues.

Antimicrobials

Many antimicrobial compounds, excluding amphenicols, are registered for use in dairy cattle in Australia and form part of good agricultural practice for the management of bacterial infections in livestock. A total of 300 milk samples were randomly selected for antimicrobial residue analysis across all dairy- producing states. Each sample was analysed for 24 antimicrobial compounds.

Animal parasite control chemicals

Benzimidazoles, levamisole and macrocyclic lactones are important endoparasiticides and may be used on Australian dairy farms in accordance with good agricultural practices. Macrocyclic lactones are the more commonly used group of endoparasiticides. A total of 320 random samples were collected nationally and analysed for these residues, including 230 samples for macrocyclic lactones, 70 samples for benzimidazoles and 20 samples for levamisole.

Triclabendazole is another endoparasiticide that is predominantly used in southern regions of Australia during specific times of the year. To reflect this use pattern, 30 samples were selected from these regions and analysed for triclabendazole residues.

In Australia, organophosphates and synthetic pyrethroids are used in registered veterinary products to control external parasites in cattle in accordance with good agricultural practice. A total of 230 random samples were collected nationally and analysed for organophosphate and synthetic pyrethroid residues.

Feed contaminants

Organophosphates and synthetic pyrethroids are also used to control insects in harvested and stored food crops, such as grains. As a result, residues may enter the milk supply chain through animal feed. Therefore, samples collected to monitor the use of parasite control chemicals in dairy cattle also provide surveillance for potential feed-related contaminants.

Australia's variable climate means that drought conditions are common in some regions. During drought, pasture-based feeding systems may become less sustainable, resulting in increased use of supplementary feeds. Some supplementary feeds, including peanut by-products, maize and sorghum, may present a higher risk of aflatoxin B1 contamination. Drought stressed crops and high humidity can promote the growth of *Aspergillus* moulds, which produce aflatoxins. When dairy cattle ingest feeds contaminated with aflatoxin B1, the toxin can be metabolised and excreted in milk as aflatoxin M1. To monitor for the presence of aflatoxin M1, 30 randomly selected milk samples were analysed during the 2025-26 survey year.

Environmental contaminants

Organochlorine pesticides are no longer registered for use in Australia; however, they are known to persist in the environment and degrade slowly over time. Cattle may occasionally ingest soil containing residual organochlorine pesticides. To monitor for the presence of these residues, 30 randomly selected samples were collected and analysed.

Anti-inflammatory treatments

Non-steroidal anti-inflammatory drugs (NSAIDs) are used in dairy cattle to reduce inflammation and provide pain relief in conditions such as mastitis. Four NSAID compounds are currently registered for this use in dairy cattle in Australia. Phenylbutazone and oxyphenbutazone are not registered for this use but were included in the Survey to verify that off-label use is not occurring. A total of 30 randomly selected samples were collected and analysed for residues of flunixin, meloxicam, ketoprofen, tolfenamic acid, phenylbutazone and oxyphenbutazone.

Report on results

Summary of results

Results for the 2025–26 Survey are presented in Table 1.

During 2025–26 Survey year, 1000 milk samples were collected and a total of 14,500 analyses were performed. No residues were identified at levels above the relevant Australian standard.

Table 1 AMRA Survey residue monitoring results 2025-26

Compound or Analyte Residue	Number of samples		Level of Action* (µg/kg)	Number of detections at or above Level of Action	Australian Standard* (µg/kg)	Number of results above AU Standard
	Planned	Tested				
Amphenicols						
Chloramphenicol	30	30	AD	0	Not set	0
Florfenicol	30	30	AD	0	Not set	0
Florfenicol amine	30	30	AD	0	Not set	0
Thiamphenicol	30	30	AD	0	Not set	0
Antimicrobials						
B-lactams						
Benzyl G Penicillin	300	300	1*	0	1.5	0
Cloxacillin	300	300	10*	0	10	0
Ampicillin	300	300	4*	0	10	0
Amoxicillin	300	300	4*	0	10	0
Cephalosporins						
Ceftiofur	300	300	50*	0	100	0
Cefuroxime	300	300	20*	0	100	0
Cephalonium	300	300	10*	0	20	0
Cephapirin	300	300	5	0	10	0
Cephazolin	300	300	4*	0	Not set	0
Tetracyclines						
Tetracycline	300	300	50	0	100	0
Oxytetracycline	300	300	50	0	100	0
Chlortetracycline	300	300	10*	0	Not set	0
Sulfonamides						
Sulfadiazine	300	300	50*	0	100	0
Sulfadimidine	300	300	50*	0	Not set	0
Sulfadoxine	300	300	50*	0	100	0
Sulfatroxazole	300	300	50*	0	100	0
Macrolides						
Erythromycin	300	300	40*	0	40	0
Lincomycin	300	300	50*	0	20	0
Oleandomycin	300	300	50*	0	Not set	0
Tylosin	300	300	50*	0	50	0
Tilmicosin	300	300	20*	0	Not set	0
Aminoglycosides						
Streptomycin and Dihydrostreptomycin	300	300	100*	0	200	0
Neomycin	300	300	750	0	1500	0
Gentamycin	300	300	20*	0	Not set	0
Endoparasiticides and Ectoparasiticides						
Triclabendazole	30	30	5	0	10	0
Benzimidazoles						
Albendazole	70	70	5*	0	Not set	0
Fenbendazole	70	70	5*	0	100	0
Oxfendazole	70	70	5*	0	100	0
Febantel	70	70	5*	0	Not set	0
Thiabendazole	70	70	25	0	50	0
Clorsulon	70	70	8	0	1500	0
Nitroxynil	70	70	10	0	500	0
Mebendazole	70	70	5*	0	20	0
Monepantel	70	70	5*	0	50	0
Praziquantel	70	70	5*	0	Not set	0
Levamisole	20	20	5*	0	300	0

Compound or Analyte Residue	Number of samples		Level of Action* (µg/kg)	Number of detections at or above Level of Action	Australian Standard* (µg/kg)	Number of results above AU Standard
	Planned	Tested				
Endoparasiticides and Ectoparasiticides						
Macrocyclic Lactones						
Ivermectin	230	230	5*	0	50	0
Abamectin	230	230	5*	0	20	0
Doramectin	230	230	5*	0	50	0
Moxidectin	230	230	500F	0	2000F	0
Eprinomectin	230	230	10	0	30	0
Ectoparasiticides and Feed Contaminants						
Organophosphates						
Bromophos-ethyl	230	230	4*	0	Not set	0
Chlorpyrifos	230	230	100F	0	200F	0
Chlorpyrifos-methyl	230	230	25F	0	50F	0
Chlorfenvinphos	230	230	100F	0	200F	0
Coumaphos	230	230	4*	0	10	0
Dichlorvos	230	230	4*	0	10	0
Diazinon	230	230	250F	0	500F	0
Ethion	230	230	125F	0	500F	0
Fenchlorphos	230	230	4*	0	Not set	0
Fenitrothion	230	230	100F	0	50F	0
Fenthion	230	230	4*	0	Not set	0
Malathion (Maldison)	230	230	250F	0	1000F	0
Parathion-methyl	230	230	4*	0	Not set	0
Pirimiphos-methyl	230	230	5	0	50	0
Synthetic Pyrethroids						
Deltamethrin	230	230	25	0	50	0
Flumethrin	230	230	15*	0	50	0
Permethrin	230	230	25	0	50	0
Cypermethrin	230	230	500F	0	1000F	0
Fenvalerate	230	230	20	0	200	0
Cyfluthrin	230	230	10*	0	100	0
Cyhalothrin	230	230	250F	0	500F	0
Mycotoxins						
Aflatoxin M1	30	30	0.05	0	-	0
Anti-inflammatory Treatments						
Non-steroidal Anti-inflammatory Drugs						
Flunixin	30	30	5*	0	Not set	0
Meloxicam	30	30	5*	0	5	0
Ketoprofen	30	30	25	0	50	0
Tolfenamic acid	30	30	25	0	50	0
Phenylbutazone	30	30	5*	0	Not set	0
Oxyphenbutazone	30	30	5*	0	Not set	0
Environmental Contaminants						
Organochlorines						
Aldrin & Dieldrin	30	30	100F*	0	150F	0
BHC	30	30	100F*	0	100F	0
Chlordane	30	30	100F*	0	50F	0
Lindane	30	30	100F*	0	200F	0
DDT	30	30	100F*	0	1250F	0
Heptachlor	30	30	100F*	0	150F	0
HCB	30	30	100F*	0	500F	0
Endosulfan	30	30	100F*	0	Not set	0

F	These analytes are reported in the milk fat.
Not set	No standard has been set for the chemical in milk.
#	Refers to the level at which follow up and/or investigatory action is undertaken. The level of action is set at 50% of the Australian or EU MRL whichever is more stringent or at any level where no MRL has been specified
*	Food Standards Australia New Zealand. <i>Food Standards Code. Schedules 19, 20 and 21.</i>
AD	Any detection.
-	No upper limit is applicable for the contaminant. Detections of the contaminant at low levels are allowable.
*	Level of Action set at the limit of quantitation.

Industry residue testing

In addition to the residue monitoring conducted through the Survey, Australian dairy companies predominantly undertake their own antimicrobial residue testing. This includes screening for antimicrobial residues in bulk milk silos, bulk milk tankers, individual farm vat milk and in some cases, finished products.

Screening of bulk milk tankers on arrival at dairy processing facilities is used to determine the suitability of milk for further processing. Some manufacturers also test bulk milk silos and finished as an additional precautionary measure.

Testing of individual farm samples is undertaken by many dairy companies through routine supplier monitoring programs and, in some cases, in response to proactive farmer requests for targeted testing.

Many companies that operate on-site laboratories also participate in proficiency testing programs to verify the accuracy and consistency of their test results.

Ten dairy companies provided annual summaries of residue testing performed during the 2025–26 Survey year. The provision of these summaries was voluntary. The results are collated in Tables 2 and 3 and provide additional evidence that the Australian dairy industry's approach to agricultural and veterinary chemical use is effective in supporting the production of safe food.

Industry antimicrobial residue testing results

Table 2 provides a summary of antimicrobial residue testing undertaken by the reporting dairy companies on raw milk and finished products during the period 1 July 2025 – 30 June 2026.

A total of 434,539 routine antimicrobial screening tests were performed on raw milk from farms, bulk milk tankers and bulk milk silos. Of these tests, 99.94% of samples returned no detectable residues. All dairy companies have documented food safety programs in place, which include controls for managing antimicrobial residue detections.

A total of 4,008 finished product samples were tested for antimicrobial residues, with no residue detections reported.

Table 2: Company residue testing results for antimicrobial residues (1 July 2025–30 June 2026)

Test Type	Number of Samples Analysed	Percentage of Negative Screening Detections (%)
Raw Milk – On-Farm	32,110	99.53
Raw Milk – Bulk Tanker	400,765	99.97
Raw Milk – Silo	1,664	100.00
Finished Product – (includes milk, cream, powders, butter, cheese and concentrates)	4,008	100.00

Industry testing for other residues

Most large dairy companies, and some medium-sized companies, conduct residue testing in addition to antimicrobial screening. Samples of raw milk and finished products are tested for a range of chemical residues, including aflatoxins, pesticides and environmental contaminants. An aggregate summary of these results is presented in Table 3.

Table 3: Industry residue testing results for other residues performed on raw milk and finished products (1 July 2025–30 June 2026)

Test Type	Number of Samples Analysed	Percentage of Negative Detections (%)
Heavy metals	976	100.00
Aflatoxin M1	1373	100.00
Organophosphates and synthetic pyrethroids	702	100.00
Organochlorines	148	100.00
Melamine	94	100.00

National Residue Survey

The National Residue Survey (NRS) is a monitoring program administered by DAFF that identifies and monitors chemical residues in Australian agricultural commodities. Results from the NRS cattle meat and grains programs demonstrate a high level of compliance with the Code, providing additional evidence of responsible agricultural and veterinary chemical use practices across Australia's participating animal and agricultural production industries.

The *NRS 2023-24 Industry Brochure: National Residue Survey 2023-24 Annual Summary*³ provides a summary of residue testing results for a range of agricultural commodities monitored through the NRS. It is estimated that approximately 20% of Australia's meat production is derived from dairy cattle. Many of the analytes monitored through the NRS are also included in the AMRA Survey. The NRS results therefore provide additional evidence to support the residue monitoring outcomes observed in the Australian dairy industry.

References

1. Australian Government Department of Agriculture, Fisheries and Forestry, *Export Control (Milk and Milk Products) Rules 2021*, (2021)
<<https://www.legislation.gov.au/Details/F2021L00304>>
2. Food Standards Australia New Zealand, *Australia New Zealand Food Standards Code. Schedules 19, 20 and 21*, (2025)
<<https://www.foodstandards.gov.au/code/Pages/default.aspx>>
3. Australian Government Department of Agriculture, Fisheries and Forestry, *NRS 2023-24 Industry Brochure: National Residue Survey 2023-24 Annual Summary*, (2025)
<<http://www.agriculture.gov.au/ag-farm-food/food/nrs/nrs-results-publications/industry-brochures/summary>>

Appendices

Appendix 1: Extract from the Export Control (Milk and Milk Products) Rules 2021

5-26 Product standards – general

Contaminants, chemicals, additives etc.

- (1) Prescribed milk and milk products and their ingredients must not contain any of the following that does not comply with a requirement of the Food Standards Code:
- (a) a level of metal or non-metal contaminant or a nature toxicant;
 - (b) an amount of agricultural or veterinary chemical;
 - (c) a food additive, processing aid, vitamin, mineral, added nutrient, or other matter or substance.

Note 1: For contaminants and natural toxicants, see Standard 1.4.1 and 1.4.4 of the Food Standards Code.

Note 2: For agricultural or veterinary chemicals, see Standard 1.4.2 of the Food Standards Code.

Note 3: For food additives, processing aids and vitamins, see Standards 1.3.1 to 1.3.3 of the Food Standards Code.

- (2) Paragraph (1)(a) does not apply if:
- (a) importing country requirements provide for a maximum level of the contaminant or natural toxicant for the milk or milk products or their ingredients that is different from the Food Standards Code requirement; and
 - (b) the approved arrangement for operations to prepare the milk or milk products provides for a system of controls to be implemented to ensure that the different requirement is complied with; and
 - (c) the system of controls referred to in paragraph (b) of this subsection is implemented in accordance with the approved arrangement.
- (3) Paragraph (1)(b) does not apply if:
- (a) importing country requirements provide for an amount of agricultural or veterinary chemical for the milk or milk products or their ingredients that is different from the Food Standards Code requirement; and
 - (b) the approved arrangement for operations to prepare the milk or milk products provides for a system of controls to be implemented to ensure that the different requirement is complied with; and
 - (c) the system of controls referred to in paragraph (b) of this subsection is implemented in accordance with the approved arrangement.
- (4) Paragraph (1)(c) does not apply if:
- (a) Importing country requirements provide for a food additive, processing aid, vitamin, mineral, added nutrient or other matter or substance for the milk or milk products or their ingredients that is different from the Food Standards Code requirement; and
 - (b) The approved arrangement for operations to prepare the milk or milk products provides for a system of controls to be implemented to ensure that the different requirement is complied with; and
 - (c) The system of controls referred to in paragraph (b) of this subsection is implemented in accordance with the approved arrangement.

Appendix 2: Number of samples tested in each Australian dairy state by test type for the 2025–26 AMRA Survey

Residue type	State*						
	VIC	NSW	QLD	TAS	SA	WA	Total
Amphenicols	20	0	0	6	1	3	30
Antimicrobials	178	32	9	40	30	11	300
Organophosphates & Synthetic Pyrethroids	152	27	8	26	9	8	230
Triclabendazole	20	4	0	6	0	0	30
Aflatoxin M1	20	4	1	2	0	3	30
Macrocyclic Lactones	139	24	6	30	22	9	230
Levamisole	11	2	1	3	2	1	20
Benzimidazoles	39	8	3	10	8	2	70
Non-steroidal Anti-inflammatory Drugs	21	4	0	3	2	0	30
Organochlorines	18	4	2	1	4	1	30

Key: * Australian States: VIC – Victoria; NSW – New South Wales; QLD – Queensland; TAS – Tasmania; SA – South Australia; WA – Western Australia.

Appendix 3: Contracted laboratories and residue tests performed

The 2025–26 AMRA Survey milk samples were analysed by two nationally accredited laboratories as listed below:

Laboratory	Residue Type	Test Method
National Measurement Institute 1/153 Bertie St Port Melbourne Vic 3207 Australia	Antimicrobials Screen	Microbial Inhibition Test (MIT) for beta-lactams, tetracyclines, macrolides and aminoglycosides. Thin Layer Chromatography (TLC) for sulphonamides
National Measurement Institute 1/153 Bertie St Port Melbourne Vic 3207 Australia	Antimicrobials Confirmation, Benzimidazoles, Levamisole, Macrocyclic Lactones, Triclabendazole, Aflatoxin M1 and Non-steroidal Anti-inflammatory Drugs	Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)
National Measurement Institute 1/153 Bertie St Port Melbourne Vic 3207 Australia	Organophosphates, Synthetic Pyrethroids	Gas Chromatography Tandem Mass Spectrometry (GC-MS/MS)
MNAQ 3 Lennon St West Melbourne Vic 3003	Amphenicols	Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)
MNAQ 3 Lennon St West Melbourne Vic 3003	Organochlorines	Gas Chromatography Tandem Mass Spectrometry (GC-MS/MS)

Contracted laboratories are required to be accredited by NATA to ISO/IEC Standard 17025 for the methods used in the AMRA Survey. Laboratories are also required to participate in a laboratory proficiency evaluation program coordinated by the NRS.