



Animal product residue testing

National Residue Survey 2008–2009

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RANDOM RESIDUE MONITORING

The animal product random residue monitoring program fulfils the requirements of:

- the Australian Quarantine and Inspection Service (AQIS) for export certification and therefore market access
- trading partners
- state and territory government regulatory authorities in the licensing of domestic meat processing facilities¹
- participating industries in supporting quality assurance initiatives.

Residue testing in animal products

NRS animal product residue monitoring projects are designed to support the market access of participating industries to their principal export markets, and also to provide information to domestic consumers of the residue levels in these commodities.

The broad-based testing approach of the residue monitoring projects further provides evidence of good practice in the usage of pesticides and veterinary medicines by the participating animal production industries. To address the specific residue monitoring requirements of importing countries, some chemicals are monitored that are not registered for use—nor are likely to be used—in Australian animal production systems.

Projects are designed to estimate the occurrence of a residue (or residues) in animal products by using randomised sampling processes. The likelihood of residues from pesticides and veterinary medicines or contaminants (for example, metals and persistent halogenated organic chemicals) guides the choice of chemicals that are measured in the samples. The chemicals and contaminants include those used commonly in agricultural and veterinary practice, as well as those necessary to fulfil export and domestic marketing requirements.

Sample collection and analysis

Sample collection rates are based on production levels of the commodity in Australia, or are directed by overseas market access requirements if the commodity is to be exported. NRS generates all requests for samples for residue monitoring.

The collection of product samples is done by relevant government officers who either send the samples directly to the laboratories for analysis, or forward the samples to appropriate sample collection points.

Meat products are sampled by authorised government officers at export abattoirs and by quality control staff at domestic abattoirs. The samples are sent from collection points to a central receipt and dispatch facility within NRS, where they are sorted into batches and forwarded to appropriate contract laboratories for analysis. In the sampling plan for random monitoring of meat, the allocation of samples to be taken at abattoirs is affected by the numbers and species of animals being slaughtered at each abattoir. The distribution of samples is designed so that the probability of an abattoir being selected for sampling is

¹ Australian domestic meat processing facilities are required to comply with the appropriate Australian Standards: AS 4696-2002 Australian Standard for Hygienic Production and Transport of Meat Products for Human Consumption; AS 4465-2001/ Amdt 1-2003 Australian Standard for the Construction of Premises and Hygienic Production of Poultry Meat for Human Consumption; AS 5010-2001 Australian Standard for the Hygienic Production of Ratite (Emu/Ostrich) Meat for Human Consumption; AS 4464-1998 Australian Standard for the Hygienic Production of Game Meat.

proportional to the commodity throughput of that abattoir. NRS sends sample requests to abattoirs each month, specifying the kind of product required and the production period during which samples are to be taken. Animals for sampling are then selected at random along the slaughter chain.

Honey is sampled by authorised officers of state and territory government authorities at appropriate stages of the production chain. The samples are sent directly to appropriate contract laboratories for analysis.

Poultry and egg products are sampled by quality assurance officers at the relevant establishments and samples are forwarded either to the NRS central receive and dispatch facility or are sent directly to the appropriate contract laboratories for analysis.

Aquaculture products are sampled by AQIS officers, while the wild-caught fish products are sampled at fish establishments by officers from AQIS, NRS staff, or state or territory government authorities. The samples are forwarded to the central receive and dispatch facility or are sent directly to the appropriate contract laboratories for analysis.

Cattle, sheep and pigs provided the largest number of samples in the commodities monitored for residues. Other commodities tested were derived from camel, deer, goat, horse, kangaroo, poultry, ratite (emu and ostrich), wild boar, honey, egg and aquatic species (both aquaculture and wild-caught seafood).

Outputs

Outputs of the animal product random monitoring program are:

- provision to stakeholders of independent, authoritative and technically-sound residue data reports, and residue advice on Australian livestock, game, fishery and animal products
- provision of residue monitoring data to meet specific market access support requirements of participating industries and relevant industry client groups.

Performance

Highlights

All animal product residue monitoring plans were reviewed and accepted by the relevant industries and AQIS. All the plans were successfully delivered.

On behalf of the cattle industry, NRS engaged a contractor, AUSMEAT Limited, to undertake residue management audits of selected cattle properties. These audits are based on the elements of the LPA quality assurance (QA) scheme, which is the largest Australian QA scheme for livestock producers. The program of audits covered both randomly selected properties, and properties where NRS monitoring had detected residues in cattle samples.

The contractor is also auditing property management plans, where these are in place, to manage the risk of organochlorine residues from previous use of such chemicals. These audits complement existing residue monitoring programs and provide additional assurance that pesticides and veterinary medicines are used appropriately in the cattle industry.

PERFORMANCE INDICATOR ONE

Acceptance by participating industries, AQIS and trading partners that each project is structured to meet its market access and assurance objectives within the specified budget.

Achievements

Acceptance of residue testing plans	NRS, in consultation with peak industry bodies, developed a residue monitoring project for each animal product within an agreed budget. All projects met the domestic market assurance or export market access requirements (as applicable) of each participating industry, and/or AQIS certification requirements for product residue status. Trading partners, through receipt and acceptance of residue monitoring plans, accepted NRS residue monitoring projects.
AQIS certification for export fish	The fish product project focused on supporting AQIS certification of the residue status of products bound for export. Representative fish species are sampled on a rotational basis (i.e. different species are selected for sampling each year) to fulfil market or trade requirements. This project met all marketing requirements.

PERFORMANCE INDICATOR TWO

Delivery of projects in accordance with agreements between NRS and participating industries, including annually reviewed agreements, with respect to:

- random monitoring sampling rates
- turnaround time from sampling to presentation of test results
- reporting of contraventions to regulatory authorities.

Achievements

Delivery of residue monitoring projects to industry	NRS delivered animal product residue monitoring projects according to mutual agreements between NRS and participating industries. The industries were satisfied with the delivery of the projects in terms of sampling rates, turnaround times for results, and reporting of contraventions to state or territory government regulatory authorities.
Turnaround times for results	The turnaround times from initial sampling to final presentation of test results were within NRS-mandated timeframes.
Reporting of contraventions	NRS notified state or territory government regulatory authorities (as applicable) in a timely and effective manner of those samples originating from within their jurisdiction that had residues greater than the relevant Australian Standards.
Poultry residue monitoring project	The poultry industry agreed to continue the random residue testing project for selected antimicrobials and hormonal growth promotants during 2008–2009.
Egg residue monitoring project	The egg residue monitoring project continued during 2008–2009 to support egg industry quality assurance programs. The egg industry has developed quality and food safety programs to address business risks, and participates in residue monitoring due to an increased interest in export markets.
Fish (wild-caught)	A new wild-caught fish program was implemented in 2008–2009 that included changes to the species tested and increased sampling rates. Samples were collected from molluscs (green and black lip abalone), crustaceans (rock lobster, prawn and spanner crab) and finfish (orange roughy and yellowfin tuna).
Aquaculture	Samples were collected for abalone and freshwater crayfish.
Honey	The program was expanded to include testing for organochlorines, organophosphates and synthetic pyrethroids during 2008–2009.

PERFORMANCE INDICATOR THREE

Presentation of high-quality and timely plans and reports on results to trading partners, industry and the Australian Government.

Achievements

Meat Residue Monitoring Plan 2009–2010 and Results Report 2007–2008	NRS prepared the <i>Meat Residue Monitoring Plan 2009–2010</i> and <i>Results Report 2007–2008</i> (including a comparison with the residue plan for 2007–2008). AQIS submitted copies of the plan and the results report to the European Union (EU), United States (US), and other markets through the relevant overseas posts as required.
Acceptance of residue monitoring plans by AQIS and participating industries	NRS officers collaborated with AQIS and peak industry bodies in the design, conduct and review of the animal residue monitoring projects.
Equivalence between Australian and United States residue testing programs	The Food Safety and Inspection Service of the United States Department of Agriculture continues to recognise Australia's residue testing program as equivalent to the US domestic residue testing program for market access purposes.
Equivalence between Australian and European Union residue testing programs	The EU continues to recognise the equivalency of the Australian residue monitoring program for access of Australian meat to the EU market.
Industry receipt of plans and results reports	NRS provided the commodity-specific residue monitoring results for 2007–2008 and the residue monitoring plan for 2009–2010 to participating industries peak bodies as agreed.

PERFORMANCE INDICATOR FOUR

Interaction and communication with participating industries is effective.

Achievements

Presentations	NRS animal product project officers attended and presented papers at conferences and peak industry and producer meetings throughout the year. These activities enabled face-to-face interaction with industry personnel, and facilitated discussions on NRS residue monitoring projects with industry and producers. Key examples are presentations of the results of residue monitoring, consultation regarding the design of residue monitoring projects, and attendance at industry annual general meetings, SAFEMEAT and Beef Industry Advisory Committee meetings. NRS officers also contributed to Codex meetings (see p. XX)
Reports to fish industry representatives	NRS attended the AQIS Seafood Export Consultative Committee and provided industry-specific reports for the fish (wild-caught) random monitoring program..
Publications	NRS delivered the <i>National Residue Survey Annual Report 2007–2008</i> to industry by mail, following formal tabling in Parliament, and during presentations by animal products staff. The report contains results from 1 July 2007 to 30 June 2008. A web-friendly version is also published on the NRS website. Summary brochures were prepared for cattle, sheep and pig. NRS published the residue monitoring results for cattle, pig, sheep and minor species at quarterly intervals in the <i>Animal Health Surveillance Quarterly</i> , published on the Animal Health Australia website.
Reports to beef, sheepmeat and pork industries	NRS continued regular reporting of results to the beef, sheepmeat and pork industries during 2008–2009 via
Residue standards for industry	International residue standards for some countries (for cattle, sheep and pig) are displayed on the NRS website. This information is for the guidance of NRS stakeholders only.

Random residue testing results

Summary of animal product results

During 2008–2009, 15 982 samples were collected from 22 animal products in the broad categories of meat, honey, egg and seafood (both aquaculture and wild-caught). In all, 200 248 analyses were carried out on these samples.

Where appropriate, results of these analyses are compared with the Australian Standards (MRL, ERL or ML) applicable to the levels of residues or contaminants that are legally permissible in food. These standards are included in the Australia New Zealand Food Standards Code. For some chemical–commodity combinations (for example, chemicals in inedible tissue) there are no applicable Australian Standards.

The table on the following page summarises the results from all animal product random monitoring projects. Detailed discussion of contraventions and results tables for each commodity follow.

Commodity	Number of samples tested ^a	Number of analyses ^b	Number of residues > Aust. Std (MRL/ ERL) ^c	Number of residues in inedible tissue ^d	Number of environmental contaminants > Aust. Std (ML) ^e	Samples compliant with relevant standards (%) ^f
MEAT						
Camel	4	105	0	n/a	0	100.00
Cattle	5 732	85 848	2	87	1	99.95
Deer	67	1 051	0	n/a	0	100.00
Goat	250	4 250	2	0	n/a	99.20
Horse	145	2 320	0	0	0	100.00
Kangaroo	55	1 095	0	n/a	0	100.00
Pig	3 302	32 713	3	n/a	0	99.91
Poultry	330	9 270	0	0	n/a	100.00
Ratite (emu)	7	113	0	n/a	0	100.00
Ratite (ostrich)	4	47	0	n/a	0	100.00
Sheep	5 475	58 023	2	56	9	99.80
Wild boar	55	1 095	1	n/a	1	96.36
Total (meat)	15 426	195 930	10	143	11	99.86
Egg	115	1 120	2	n/a	0	98.26
Honey	213	2 095	0	n/a	0	100.00
Aquaculture	15	112	0	n/a	0	100.00
Fish (wild-caught)	213	991	0	n/a	0	100.00
Total seafood	228	1 103	0	0	0	100.00
Total all samples	15 982	200 248	12	143	11	

Aust. Std – Australian Standard. ERL – extraneous residue limit. ML – maximum level. MRL – maximum residue limit.
n/a – Australian Standard does not apply. No limit set or defined.

^a Total number of samples collected from each species or commodity.

^b Most samples are analysed for more than one chemical. This is the total number of chemical–commodity combinations that were tested in each product type.

^c Number of samples observed above the Australian Standard (MRL, ML or ERL). Individual samples may contain more than one residue.

^d Australian Standards are not set for non-edible samples such as urine and faeces. Residue detections are therefore not deemed contraventions.

^e Samples were tested for chlorinated biphenyls and metals.

^f Percentage of samples conforming to relevant Australian Standards.

Summary

Twelve samples had residues of pesticides and veterinary medicines above Australian Standards (MRL, ML and ERL). These detections are deemed contraventions. There were no detections where no Australian Standard is set. Of the inedible samples, 143 contained residues. As there is no standard set for inedible tissues, these were not deemed contraventions. Environmental contaminants (metals) above Australian Standards (ML) were found in 11 samples. These detections are deemed contraventions.

Discussion: meat results

During 2008–2009, animal product residue monitoring projects covered 12 meat commodities, 15 426 samples and 195 930 analyses. The projects for cattle, sheep and pigs provided the largest numbers of samples (5 732, 5 475 and 3 302 samples respectively).

Non-compliance was shown in 21 samples (10 pesticide and veterinary medicine residues) and 11 environmental contaminants (metals) that were above applicable Australian Standards.

When analysed for environmental contaminants, one cattle and four sheep liver samples had cadmium levels that exceeded the Australian Standard maximum level (ML) of 1.25 mg/kg. Five sheep and one wild boar liver samples (six in total) contained lead residues higher than the ML of 0.5 mg/kg.

Australian Standards (maximum residue limits [MRLs] and maximum levels [MLs]) apply only to residues found in edible tissues. Some residue testing is undertaken in non-edible matrices for monitoring purposes because residues of particular chemicals in these matrices can be an indication of illegal or inappropriate use of those chemicals. Sometimes standards have not been set for some environmental contaminants (such as metals) in a particular matrix (e.g. metals in offal from a particular species).

In non-edible matrices (where no Australian Standards are established), chemical residues were detected in 143 samples. These detections were:

- hormones in cattle and sheep urine (6 and 56 samples respectively) likely to be endogenous in origin
- zearalenone metabolites in cattle faeces likely to be from feed (81 samples) containing zearalenone.

No traceback activity was initiated for any of these samples because the levels detected suggested normal agricultural practice, as indicated above.

Traceback investigations are initiated only when there are reasonable grounds to believe the residue findings may have been the result of incorrect usage of a pesticide or veterinary medicines, as is discussed in detail below.

Anthelmintics

Three classes of anthelmintics were monitored: macrocyclic lactones, benzimidazoles (triclabendazole in cattle and sheep), and salicylanilides (closantel in sheep). Samples were tested from cattle, sheep, pig, goat, horse, deer and ratite. One sample of pig fat contained a residue of ivermectin at 0.039 mg/kg, exceeding the Australian MRL of 0.02 mg/kg. A traceback investigation found that a weekend worker had moved the sow from a farrowing paddock to a sale pen where there was access to ivermectin in feed. The animal was subsequently sold. A further pig fat sample was found to contain 0.12 mg/kg of doramectin, which is above the Australian MRL of 0.1 mg/kg. The traceback investigation found that a number of sows were inadvertently sold a week earlier than planned, and were slaughtered prior to the withholding period. A warning letter was issued to the producer.

Two goat fat samples contained moxidectin residues at 0.08 mg/kg and 0.01 mg/kg. There is no Australian Standard for moxidectin in goat fat, so these residues were regarded as contraventions. An investigation into the first incident found that the residue was most likely

to have come from the use of a drench for sheep. The producer was aware that this drench was not registered for use on goats, but had been advised that drenching goats was critical in controlling black scour worm. A letter was sent to the producer indicating that any future use would breach legislation and might result in prosecution. The second investigation found that although the results were consistent with the animals having been drenched, the exact circumstances relating to the contravention could not be confirmed. The relevant state/territory authorities were advised so they could take action to prevent further contraventions.

Antibiotics

Antibiotic chemicals are used in livestock to treat infections by micro-organisms such as bacteria, protozoa and fungi that cause a range of diseases.

Monitoring of antibiotic residues involves several analytical and sampling regimes.

A general antibiotic screen is performed on kidney and identifies the class of compound present (for example β -lactam, aminoglycoside, tetracycline or macrolide). Where this chemical screen test identifies the presence of a class of compounds, confirmation and quantification is carried out by a specific high-performance liquid chromatography or gas chromatography method appropriate for the class of antibiotic.

Specific testing was done for antibiotics, including sulphonamides in kidney, and for chloramphenicol in muscle. Samples were tested from cattle, sheep, pig, poultry, horse, deer and ratites using the general screen for antibiotics. In addition, pig muscle was tested for nitroimidazoles (dimetridazole, metronidazole and ronidazole). Two bobby calf kidney samples were found to contain antibiotic residues above the relevant MRL.

One kidney sample was found to contain 0.73 mg/kg of dihydrostreptomycin, which is above the Australian MRL of 0.3 mg/kg. The traceback investigation could find no obvious source for the residue as the animal came from a property with excellent farm records and no evidence of failure to observe withholding periods. The other kidney sample contained 0.13 mg/kg of sulfadiazine and sulfadimidine at 0.32 mg/kg (Australian MRL for both is 0.1 mg/kg). The traceback investigation could not confirm a source for the residue as there was no product found on farm or dispensed from vets in the last 13 months that contained either drug.

One pig kidney sample was found to contain oxytetracycline at 1.3 mg/kg, exceeding the Australian MRL of 0.6 mg/kg. A traceback investigation was unable to determine the exact cause of the residue, however it may have been the result of either the incorrect use of a medicated pre-mix feed ration or on-farm cross-contamination.

Hormones

Samples from edible (liver) and non-edible (faeces and/or urine) matrices of cattle, sheep and horse were tested for a range of hormonal growth promotants (HGP). Several HGPs are registered for use in cattle in Australia. Where AQIS is required to certify a product as free of HGPs (for the European Union and some other markets), special production separation arrangements have been made. Hormone residues may occur legitimately in appropriately treated animals outside any HGP-free supply scheme, or may reflect endogenous production of these hormones (especially in young or pregnant animals), or can occur as a result of ingestion of naturally occurring chemicals with hormone-like characteristics.

Resorcylic acid lactones (zearanol)

The HGP zearanol is closely related to the naturally occurring substance zearalenone. Zearalenone is a plant growth regulator produced by some plants and is also produced as a mycotoxin by *Fusarium spp.*, which can infect feed sources (grain and pasture). Livestock can metabolise zearalenone to zearanol (α -zearalanol), taleranol (β -zearalanol), α -zearalenol, β -zearalenol and zearalanone. Hence zearanol residues can occur in livestock either as a result of treatment with a HGP or by ingestion of feed containing zearalenone.

Zearanol derived from the metabolism of zearalenone in ruminants is indistinguishable from zearanol residues resulting from treatment with a growth promotant such as zearanol. For compliance reasons, it is important to differentiate the presence of zearanol residues resulting from HGP administration, from those residues due to natural exposure to zearalenone. Differentiation is based on the profile of zearanol/zearalenone-related residues. When zearanol occurs with other zearalenone metabolites, it is more than likely due to the ingestion of feed containing zearalenone. When zearanol occurs in the absence of other zearalenone metabolites, it is suggestive of the administration of a HGP-containing zearanol.

No detections of α -zearalanol were found in cattle liver. Other zearalenone metabolites were detected at levels consistent with dietary exposure to feeds containing zearalenone.

Steroids

Many steroidal compounds included in the testing programs may originate from either normal endocrine function (i.e. they are endogenous) or from the administration of veterinary drugs. There were six hormone detections in cattle and 56 in sheep from animals that showed 17β 19-nortestosterone residues in their urine. At the levels detected, the residues were most likely from endogenous sex hormone production. There were no detections of boldenone in any samples and the two detections of trenbolone in cattle were consistent with use of an approved product.

Stilbenes

No residues of stilbenes were detected in any of the cattle, horse, pig, poultry or sheep samples tested.

β -agonists

Some β -agonists are registered in different countries for use as growth promotants. There is currently one β -agonist, ractopamine, registered in Australia for use only in pigs for enhancement of feed utilisation. Low-level detections of ractopamine were found in 63 samples of pig liver, but, at the levels found, there was no indication of misuse.

Non-steroidal anti-inflammatory drugs

No residues of flunixin, ketoprofen, oxyphenbutazone, phenylbutazone or tolfenamic acid were observed in any of the samples tested.

Pesticides

Organochlorines (OCs), organophosphates (OPs) and synthetic pyrethroid (SP) residues were monitored in 2400 samples from all meat commodities except poultry, where no pesticide testing was undertaken.

Organochlorines

Persistent OCs such as DDT, dieldrin, heptachlor, hexachlorocyclohexane (HCH) and hexachlorobenzene (HCB) have not been available for use on livestock since the 1970s. However, they are still present in soils where they were used for spot and broadacre pest control. Grazing livestock can ingest soil previously contaminated with these persistent OC compounds.

Endosulfan, a relatively non-persistent OC, is registered for use on certain crops, but is not for use on livestock.

No organochlorine residues above the appropriate Australian MRL were detected in any of the samples tested.

Organophosphates

Organophosphate insecticides are used to control external parasites such as buffalo fly, blowfly, ticks and lice, and are also used as protectants for grain used in feeds. One wild boar sample was found to contain chlorpyrifos-methyl at 0.18 mg/kg, exceeding the Australian MRL of 0.05 mg/kg. An investigation revealed that the most likely cause of the residue was that pigs had access to treated grain from an old silo.

Synthetic pyrethroids

Synthetic pyrethroid insecticides are used as external parasiticides in livestock, on crops, and also as protectants for grain used in feeds. No residues of synthetic pyrethroids above the Australian MRL were detected in any of the samples tested.

Benzoyl ureas and other pesticides

Monitoring was also undertaken for benzoyl-urea insect growth-regulators (chlorfluazuron, diflubenzuron, fluazuron and triflumuron) in cattle and sheep, as well as dicyclanil and cyromazine (including its metabolite, melamine) in sheep.

Two samples of sheep fat were found to contain chlorfluazuron residues, recording residues of 0.014 and 0.022 mg/kg. There is no Australian Standard for chlorfluazuron in sheep fat, so these residues were regarded as contraventions. Traceback on one sample revealed that the sheep had been grazing in a paddock adjacent to a newly developed suburb. It was believed that run-off from the building sites had contaminated the pasture with a low level of chlorfluazuron from termite treatment. The other traceback could not confirm a source for the residue.

Environmental contaminants (metals)

The metal residue screen checks samples for cadmium, lead and mercury in liver. There were five cadmium detections in liver (four sheep and one cattle) above the Australian Standard (ML) of 1.25 mg/kg. The residue levels ranged from 1.27 mg/kg to 2.12 mg/kg. Cadmium residues are commonly found in sheep and cattle offal, particularly in older animals across the southern states of Australia. A residue action level of 2.5 mg/kg has been agreed between NRS and state and territory government regulatory authorities for traceback purposes. All five residue detections were below the action level, and therefore traceback investigations were not undertaken.

There were six lead detections in liver (five sheep and one wild boar) above the Australian Standard (ML) of 0.5 mg/kg. The five sheep residues ranged from 0.55 mg/kg to 1.45 mg/kg. One traceback found that the sheep had access to dump sites containing old batteries and sump oil. The owner received a warning letter and was instructed to dispose of all material containing lead. In the remaining four cases, no obvious source of the residue could be located. The wild boar sample was found to contain lead at 4.27 mg/kg. The source of the residue could not be confirmed although a previous gunshot wound was suspected as the liver showed no evidence of a recent wound when sampled.

Outlook

NRS has been working with the cattle, sheep and pig industries to improve the flow of information for residue monitoring results. The major industry quality assurance programs for these industries are the Livestock Production Assurance scheme for sheep and cattle and Australian Pork Industry Quality program for pigs. Details of all residue detections from properties certified with these programs will be provided to the managers of the scheme.

NRS anticipates that a project monitoring plan similar to that of 2008–2009 for poultry will operate in 2009–2010.

Meat results tables

Results of analyses of the meat products are presented in the following tables, sorted in alphabetical order by commodity. Throughout the tables, the naming of chemicals follows the residue definitions within the FSANZ Food Standards Code. Abbreviations and acronyms in the tables are defined in the *Definitions, abbreviations and acronyms* section that begins on page 273.

Throughout the results tables, the heading LOR refers to the limit of reporting: this is the minimum concentration (mg/kg) of a residue used for reporting purposes. Results of analyses lower than the LOR are not included in this report. Typically, the LOR set by NRS is 10–20% of the respective MRL/ERL or ML. The total number of detections above the LOR is shown in the tables, and, where applicable, the number of detections greater than the relevant Australian Standard.

For some chemical–commodity combinations (for example, chemicals in inedible tissue) there are no applicable Australian Standards. In these cases, detections above the LOR are categorised as ‘not set,’ ‘not defined’ or ‘no limit’ as follows:

- **‘not set’**: any detection above the LOR in an edible matrix is classed as a contravention
- **‘not defined’**: for urine and faeces, results are used as indicators of environmental contamination, or failure to follow good agricultural practice
- **‘no limit’**: no standard is applicable for the contaminant, and the ‘as low as reasonably achievable’ principle applies. Detections at low levels are allowable.

CAMEL	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
PESTICIDES						
<i>Organochlorines</i>						
Aldrin and dieldrin	FAT	0.02	0.2	3	0	0
Chlordane	FAT	0.02	0.2	3	0	0
DDT	FAT	0.1	5.0	3	0	0
Endosulfan	FAT	0.02	0.2	3	0	0
Endrin	FAT	0.01	Not set	3	0	0
HCB	FAT	0.02	1.0	3	0	0
HCH	FAT	0.02	0.3	3	0	0
Heptachlor	FAT	0.02	0.2	3	0	0
Lindane (γ-HCH)	FAT	0.1	2.0	3	0	0
Methoxychlor	FAT	0.1	Not set	3	0	0
Mirex	FAT	0.05	Not set	3	0	0
<i>Organophosphates</i>						
Chlorfenvinphos	FAT	0.05	Not set	3	0	0
Chlorpyrifos	FAT	0.1	0.5	3	0	0
Chlorpyrifos-methyl	FAT	0.02	0.05	3	0	0
Coumaphos	FAT	0.2	Not set	3	0	0
Diazinon	FAT	0.1	0.7	3	0	0
Ethion	FAT	0.1	Not set	3	0	0
Famphur	FAT	0.02	Not set	3	0	0
Fenitrothion	FAT	0.02	Not set	3	0	0
Fenthion	FAT	0.05	Not set	3	0	0
Malathion	FAT	0.2	1.0	3	0	0
Phosmet	FAT	0.1	Not set	3	0	0
Temephos	FAT	0.1	Not set	3	0	0
<i>Synthetic pyrethroids</i>						
Bifenthrin	FAT	0.02	2.0	3	0	0
Bioresmethrin	FAT	0.02	Not set	3	0	0
Cyfluthrin	FAT	0.02	0.5	3	0	0
Cyhalothrin	FAT	0.02	0.5	3	0	0
Cypermethrin	FAT	0.02	0.01	3	0	0
Deltamethrin	FAT	0.02	Not set	3	0	0
Fenvalerate	FAT	0.02	1.0	3	0	0
Flumethrin	FAT	0.02	Not set	3	0	0
Permethrin	FAT	0.02	1.0	3	0	0

CAMEL (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
ENVIRONMENTAL CONTAMINANTS						
<i>Chlorinated biphenyls</i>						
Aroclor 1254	FAT	0.03	0.2	3	0	0
Aroclor 1260	FAT	0.03	0.2	3	0	0
<i>Metals</i>						
Cadmium	LIVER	0.02	No limit	1	1	n/a
Lead	LIVER	0.02	No limit	1	1	n/a
Mercury	LIVER	0.01	No limit	1	0	n/a
LOR	Limit of reporting (mg/kg).					
Not set	No standard has been set for the chemical in an edible matrix and any detection is a contravention of the Australia New Zealand Food Standards Code.					
No limit	No standard applicable for the contaminant. The 'as low as reasonably achievable' principle applies. Detections at low levels are allowable.					
n/a	Australian Standard does not apply. No limit set or defined.					

CATTLE	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
ANTHELMINTICS						
<i>Benzimidazoles</i>						
Triclabendazole	LIVER	0.1	2.0	320	1	0
<i>Imidazothiazoles</i>						
Levamisole	LIVER	0.01	1.0	320	1	0
Morantel	LIVER	0.01	2.0	320	0	0
<i>Macrocyclic lactones</i>						
Abamectin	FAT	0.005	0.1	322	0	0
Doramectin	FAT	0.005	0.1	322	2	0
Emamectin	FAT	0.005	Not set	322	0	0
Eprinomectin	FAT	0.005	0.5	322	0	0
Ivermectin	FAT	0.005	0.04	322	2	0
Moxidectin	FAT	0.005	1.0	322	21	0
ANTIBIOTICS						
<i>Aminoglycosides</i>						
Apramycin	KIDNEY	0.5	2.0	970	0	0
Dihydrostreptomycin	KIDNEY	0.1	0.3	970	2	1 ^a
Gentamycin	KIDNEY	0.1	Not set	970	0	0
Neomycin	KIDNEY	0.1	10.0	970	4	0
Streptomycin	KIDNEY	0.1	0.3	970	1	0
<i>Antimicrobials</i>						
Chloramphenicol	MUSCLE	0.0003	Not set	326	0	0
Florfenicol	MUSCLE	0.02	0.3	326	0	0
Thiamphenicol	MUSCLE	0.02	Not set	326	0	0
<i>β-lactams</i>						
Amoxicillin	KIDNEY	0.01	0.01	970	0	0
Ampicillin	KIDNEY	0.01	Not set	970	0	0
Cloxacillin	KIDNEY	0.1	Not set	970	0	0
Penicillin G (benzylpenicillin)	KIDNEY	0.01	0.06	970	0	0
<i>Cephalosporins</i>						
Ceftiofur	KIDNEY	0.2	2.0	970	0	0
Cefuroxime	KIDNEY	0.1	0.1	970	0	0
Cephalonium	KIDNEY	0.05	0.1	970	0	0
<i>Lincosamides</i>						
Lincomycin	KIDNEY	0.05	0.2	970	0	0

CATTLE (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
<i>Macrolides</i>						
Erythromycin	KIDNEY	0.1	0.3	970	0	0
Tilmicosin	KIDNEY	0.1	1.0	970	2	0
Tylosin	KIDNEY	0.1	0.1	970	0	0
<i>Sulfonamides</i>						
Sulfadiazine	KIDNEY	0.05	0.1	970	1	1 ^b
Sulfadimidine (sulfamethazine)	KIDNEY	0.05	0.1	970	2	1 ^b
Sulfadoxine	KIDNEY	0.05	0.1	970	0	0
Sulfafurazole	KIDNEY	0.05	Not set	970	0	0
Sulfamerazine	KIDNEY	0.05	Not set	970	0	0
Sulfamethoxydiazine	KIDNEY	0.05	Not set	970	0	0
Sulfapyridine	KIDNEY	0.05	Not set	970	0	0
Sulfaquinoxaline	KIDNEY	0.05	Not set	970	0	0
Sulfathiazole	KIDNEY	0.05	Not set	970	0	0
Sulfatroxazole	KIDNEY	0.05	0.1	970	0	0
<i>Tetracyclines</i>						
Chlortetracycline	KIDNEY	0.05	0.6	970	0	0
Doxycycline	KIDNEY	0.05	Not set	970	0	0
Oxytetracycline	KIDNEY	0.1	0.6	970	1	0
Tetracycline	KIDNEY	0.1	Not set	970	0	0
ANTICOCCIDIALS						
Amprolium	LIVER	0.01	Not set	301	0	0
Lasalocid	LIVER	0.01	0.7	301	2	0
Maduramicin	LIVER	0.01	Not set	301	0	0
Monensin	LIVER	0.01	0.05	301	2	0
Narasin	LIVER	0.01	0.05	301	0	0
Nicarbazin	LIVER	0.01	Not set	301	0	0
Salinomycin	LIVER	0.01	0.5	301	0	0
HORMONES						
<i>Resorcylic acid lactones</i>						
Zearalanol (α) (zeranol)	FAECES	0.002	Not defined	115	1	n/a
Zearalanol (α) (zeranol)	LIVER	0.002	0.02	335	0	0

CATTLE (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
<i>Steroids</i>						
19-Nortestosterone (17- α)	URINE	0.001	Not defined	320	6	n/a
19-Nortestosterone (17- β)	URINE	0.001	Not defined	320	0	n/a
Boldenone (17- α)	URINE	0.001	Not defined	320	0	n/a
Boldenone (17- β)	URINE	0.001	Not defined	320	0	n/a
Methandriol	URINE	0.005	Not defined	320	0	n/a
Stanozolol	URINE	0.001	Not defined	320	0	n/a
Stanozolol (16-hydroxy)	URINE	0.001	Not defined	320	0	n/a
Trenbolone	FAECES	0.002	Not defined	115	0	n/a
Trenbolone	LIVER	0.002	0.01	335	2	0
<i>Stilbenes</i>						
Dienoestrol	FAECES	0.0002	Not defined	115	0	n/a
Dienoestrol	LIVER	0.0002	Not set	335	0	0
Diethylstilboestrol	FAECES	0.0002	Not defined	115	0	n/a
Diethylstilboestrol	LIVER	0.0002	Not set	335	0	0
Hexoestrol	FAECES	0.0002	Not defined	115	0	n/a
Hexoestrol	LIVER	0.0002	Not set	335	0	0
OTHER VETERINARY DRUGS						
<i>β-agonists</i>						
Cimaterol	LIVER	0.003	Not set	325	0	0
Clenbuterol	LIVER	0.001	Not set	325	0	0
Mabuterol	LIVER	0.001	Not set	325	0	0
Ractopamine	LIVER	0.003	Not set	325	0	0
Salbutamol	LIVER	0.003	Not set	325	0	0
Zilpaterol	LIVER	0.003	Not set	325	0	0
<i>Non-steroidal anti-inflammatory drugs</i>						
Flunixin	LIVER	0.01	0.02	320	0	0
Ketoprofen	LIVER	0.02	0.05	320	0	0
Oxyphenbutazone	LIVER	0.05	Not set	320	0	0
Phenylbutazone	LIVER	0.05	Not set	320	0	0
Tolfenamic acid	LIVER	0.005	0.01	320	0	0

CATTLE (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
PESTICIDES						
<i>Benzoyl ureas</i>						
Chlorfluazuron	FAT	0.01	1.0	320	3	0
Diflubenzuron	FAT	0.01	Not set	320	0	0
Fluazuron	FAT	0.01	7.0	320	13	0
Triflumuron	FAT	0.01	0.05	320	2	0
<i>Organochlorines</i>						
Aldrin and dieldrin	FAT	0.02	0.2	1 115	6	0
Chlordane	FAT	0.02	0.2	1 115	0	0
DDT	FAT	0.1	5.0	1 115	6	0
Endosulfan	FAT	0.02	0.2	1 115	0	0
Endrin	FAT	0.05	Not set	1 115	0	0
HCB	FAT	0.02	1.0	1 115	1	0
HCH	FAT	0.02	0.3	1 115	2	0
Heptachlor	FAT	0.02	0.2	1 115	3	0
Lindane (γ-HCH)	FAT	0.1	2.0	1 115	0	0
Methoxychlor	FAT	0.1	Not set	1 115	0	0
Mirex	FAT	0.02	Not set	1 115	0	0
<i>Organophosphates</i>						
Chlorfenvinphos	FAT	0.05	0.2	1 115	0	0
Chlorpyrifos	FAT	0.1	0.5	1 115	0	0
Chlorpyrifos-methyl	FAT	0.02	0.05	1 115	1	0
Coumaphos	FAT	0.2	0.2	1 115	0	0
Diazinon	FAT	0.1	0.7	1 115	0	0
Ethion	FAT	0.1	2.5	1 115	0	0
Famphur	FAT	0.02	Not set	1 115	0	0
Fenitrothion	FAT	0.02	Not set	1 115	0	0
Fenthion	FAT	0.05	1.0	1 115	1	0
Malathion	FAT	0.2	1.0	1 115	0	0
Phosmet	FAT	0.1	1.0	1 115	0	0
Temephos	FAT	0.1	5.0	1 115	0	0

CATTLE (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
<i>Synthetic pyrethroids</i>						
Bifenthrin	FAT	0.02	2.0	1 115	1	0
Bioresmethrin	FAT	0.02	Not set	1 115	0	0
Cyfluthrin	FAT	0.02	0.5	1 115	0	0
Cyhalothrin	FAT	0.02	0.5	1 115	0	0
Cypermethrin	FAT	0.02	0.5	1 115	4	0
Deltamethrin	FAT	0.02	0.5	1 115	4	0
Fenvalerate	FAT	0.02	1.0	1 115	2	0
Flumethrin	FAT	0.02	0.2	1 115	0	0
Permethrin	FAT	0.02	1.0	1 115	7	0
<i>Other</i>						
Spinosad	FAT	0.01	1.0	322	0	0
ENVIRONMENTAL CONTAMINANTS						
<i>Chlorinated biphenyls</i>						
Aroclor 1254	FAT	0.03	0.2	1 115	0	0
Aroclor 1260	FAT	0.03	0.2	1 115	0	0
<i>Metals</i>						
Cadmium	LIVER	0.02	1.25	323	191	1 ^c
Lead	LIVER	0.02	0.5	323	51	0
Mercury	LIVER	0.01	No limit	323	4	n/a
<i>Mycotoxins</i>						
Zearalanol (β) (taleralanol)	FAECES	0.002	No limit	115	2	n/a
Zearalanol (β) (taleralanol)	LIVER	0.002	No limit	335	0	n/a
Zearalanone	FAECES	0.002	No limit	115	5	n/a
Zearalanone	LIVER	0.002	No limit	335	8	n/a
Zearalenol (α)	FAECES	0.002	No limit	115	68	n/a
Zearalenol (α)	LIVER	0.002	No limit	335	14	n/a
Zearalenol (β)	FAECES	0.002	No limit	115	81	n/a
Zearalenol (β)	LIVER	0.002	No limit	335	30	n/a
Zearalenone	FAECES	0.002	No limit	115	24	n/a
Zearalenone	LIVER	0.002	No limit	335	4	n/a
LOR	Limit of reporting (mg/kg).					
Not set	No standard has been set for the chemical in an edible matrix and any detection is a contravention of the Australia New Zealand Food Standards Code.					
No limit	No standard applicable for the contaminant. The 'as low as reasonably achievable' principle applies. Detections at low levels are allowable.					
Not defined	Standards not defined in urine and faeces.					
n/a	Australian Standard does not apply. No limit set or defined.					
^a	No evidence of chemical use on farm. Excellent on-farm records, and treatments outside withholding periods.					
^b	No evidence of chemical use on farm.					
^c	Residue was below the action level for traceback.					

DEER	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
ANTHELMINTICS						
<i>Imidazothiazoles</i>						
Levamisole	LIVER	0.02	1.0	7	0	0
Morantel	LIVER	0.02	Not set	7	0	0
<i>Macrocyclic lactones</i>						
Abamectin	FAT	0.005	Not set	8	0	0
Doramectin	FAT	0.005	Not set	8	0	0
Emamectin	FAT	0.005	Not set	8	0	0
Eprinomectin	FAT	0.005	Not set	8	0	0
Ivermectin	FAT	0.005	0.01	8	0	0
Moxidectin	FAT	0.005	1.0	8	0	0
ANTIBIOTICS						
<i>Aminoglycosides</i>						
Apramycin	KIDNEY	0.50	2.0	12	0	0
Dihydrostreptomycin	KIDNEY	0.1	0.3	12	0	0
Gentamycin	KIDNEY	0.1	Not set	12	0	0
Neomycin	KIDNEY	0.1	Not set	12	0	0
Streptomycin	KIDNEY	0.1	0.3	12	0	0
<i>Antimicrobials</i>						
Chloramphenicol	MUSCLE	0.0003	Not set	9	0	0
Florfenicol	MUSCLE	0.02	Not set	9	0	0
Thiamphenicol	MUSCLE	0.02	Not set	9	0	0
<i>β-lactams</i>						
Amoxicillin	KIDNEY	0.01	0.01	12	0	0
Ampicillin	KIDNEY	0.01	Not set	12	0	0
Cloxacillin	KIDNEY	0.1	Not set	12	0	0
Penicillin G (benzylpenicillin)	KIDNEY	0.01	0.06	12	0	0
<i>Cephalosporins</i>						
Ceftiofur	KIDNEY	0.2	Not set	12	0	0
Cefuroxime	KIDNEY	0.1	Not set	12	0	0
Cephalonium	KIDNEY	0.1	Not set	12	0	0
<i>Lincosamides</i>						
Lincomycin	KIDNEY	0.05	0.2	12	0	0

DEER (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
<i>Macrolides</i>						
Erythromycin	KIDNEY	0.1	0.3	12	0	0
Tilmicosin	KIDNEY	0.2	Not set	12	0	0
Tylosin	KIDNEY	0.1	Not set	12	0	0
<i>Sulfonamides</i>						
Sulfadiazine	KIDNEY	0.05	0.1	12	0	0
Sulfadimidine (sulfamethazine)	KIDNEY	0.05	0.1	12	0	0
Sulfadoxine	KIDNEY	0.05	0.1	12	0	0
Sulfafurazole	KIDNEY	0.05	Not set	12	0	0
Sulfamerazine	KIDNEY	0.05	Not set	12	0	0
Sulfamethoxydiazine	KIDNEY	0.05	Not set	12	0	0
Sulfapyridine	KIDNEY	0.05	Not set	12	0	0
Sulfaquinoxaline	KIDNEY	0.05	Not set	12	0	0
Sulfathiazole	KIDNEY	0.05	Not set	12	0	0
Sulfatroxazole	KIDNEY	0.05	0.1	12	0	0
<i>Tetracyclines</i>						
Chlortetracycline	KIDNEY	0.05	Not set	12	0	0
Doxycycline	KIDNEY	0.05	Not set	12	0	0
Oxytetracycline	KIDNEY	0.1	Not set	12	0	0
Tetracycline	KIDNEY	0.1	Not set	12	0	0
HORMONES						
<i>Resorcylic acid lactone</i>						
Zearalanol (α) (zeranol)	LIVER	0.002	Not set	2	0	0
<i>Steroids</i>						
19-Nortestosterone (17- α)	URINE	0.001	Not defined	2	0	n/a
19-Nortestosterone (17- β)	URINE	0.001	Not defined	2	0	n/a
Boldenone (17- α)	URINE	0.001	Not defined	2	0	n/a
Boldenone (17- β)	URINE	0.001	Not defined	2	0	n/a
Methandriol	URINE	0.005	Not defined	2	0	n/a
Stanozolol	URINE	0.001	Not defined	2	0	n/a
Stanozolol (16-hydroxy)	URINE	0.001	Not defined	2	0	n/a
<i>Stilbenes</i>						
Dienoestrol	LIVER	0.0002	Not set	2	0	0
Diethylstilboestrol	LIVER	0.0002	Not set	2	0	0
Hexoestrol	LIVER	0.0002	Not set	2	0	0

DEER (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
OTHER VETERINARY DRUGS						
<i>β-agonists</i>						
Cimaterol	LIVER	0.003	Not set	2	0	0
Clenbuterol	LIVER	0.001	Not set	2	0	0
Mabuterol	LIVER	0.001	Not set	2	0	0
Ractopamine	LIVER	0.003	Not set	2	0	0
Salbutamol	LIVER	0.003	Not set	2	0	0
Zilpaterol	LIVER	0.003	Not set	2	0	0
<i>Non-steroidal anti-inflammatory drugs</i>						
Flunixin	LIVER	0.01	Not set	5	0	0
Ketoprofen	LIVER	0.02	Not set	5	0	0
Oxyphenbutazone	LIVER	0.05	Not set	5	0	0
Phenylbutazone	LIVER	0.05	Not set	5	0	0
Tolfenamic acid	LIVER	0.005	Not set	5	0	0
PESTICIDES						
<i>Organochlorines</i>						
Aldrin and dieldrin	FAT	0.02	0.2	15	0	0
Chlordane	FAT	0.02	0.2	15	0	0
DDT	FAT	0.1	5.0	15	0	0
Endosulfan	FAT	0.02	0.2	15	0	0
Endrin	FAT	0.05	Not set	15	0	0
HCB	FAT	0.02	1.0	15	0	0
HCH	FAT	0.02	0.3	15	0	0
Heptachlor	FAT	0.02	0.2	15	0	0
Lindane (γ-HCH)	FAT	0.1	2.0	15	0	0
Methoxychlor	FAT	0.1	Not set	15	0	0
Mirex	FAT	0.02	Not set	15	0	0
<i>Organophosphates</i>						
Chlorfenvinphos	FAT	0.05	0.2	15	0	0
Chlorpyrifos	FAT	0.1	0.5	15	0	0
Chlorpyrifos-methyl	FAT	0.02	0.05	15	0	0
Coumaphos	FAT	0.2	Not set	15	0	0
Diazinon	FAT	0.1	0.7	15	0	0
Ethion	FAT	0.1	Not set	15	0	0
Famphur	FAT	0.02	Not set	15	0	0
Fenitrothion	FAT	0.02	Not set	15	0	0

DEER (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
<i>Organophosphates (cont'd)</i>						
Fenthion	FAT	0.05	Not set	15	0	0
Malathion	FAT	0.2	1.0	15	0	0
Phosmet	FAT	0.1	Not set	15	0	0
Temephos	FAT	0.1	Not set	15	0	0
<i>Synthetic pyrethroids</i>						
Bifenthrin	FAT	0.02	2.0	15	0	0
Bioresmethrin	FAT	0.02	Not set	15	0	0
Cyfluthrin	FAT	0.02	0.5	15	0	0
Cyhalothrin	FAT	0.02	0.5	15	0	0
Cypermethrin	FAT	0.02	0.5	15	0	0
Deltamethrin	FAT	0.02	Not set	15	0	0
Fenvalerate	FAT	0.02	1.0	15	0	0
Flumethrin	FAT	0.02	Not set	15	0	0
Permethrin	FAT	0.02	1.0	15	0	0
<i>Other</i>						
Spinosad	FAT	0.01	1.0	8	0	0
ENVIRONMENTAL CONTAMINANTS						
<i>Chlorinated biphenyls</i>						
Aroclor 1254	FAT	0.03	0.2	15	0	0
Aroclor 1260	FAT	0.03	0.2	15	0	0
<i>Metals</i>						
Cadmium	LIVER	0.02	No limit	5	4	n/a
Lead	LIVER	0.02	No limit	5	0	n/a
Mercury	LIVER	0.01	No limit	5	0	n/a
<i>Mycotoxins</i>						
Zearalanol (β) (taleralanol)	LIVER	0.002	No limit	2	0	n/a
Zearalanone	LIVER	0.002	No limit	2	0	n/a
Zearalenol (α)	LIVER	0.002	No limit	2	0	n/a
Zearalenol (β)	LIVER	0.002	No limit	2	0	n/a
Zearalenone	LIVER	0.002	No limit	2	0	n/a
LOR	Limit of reporting (mg/kg).					
Not set	No standard has been set for the chemical in an edible matrix and any detection is a contravention of the Australia New Zealand Food Standards Code.					
No limit	No standard applicable for the contaminant. The 'as low as reasonably achievable' principle applies. Detections at low levels are allowable.					
Not defined	Standards not defined in urine and faeces.					
n/a	Australian Standard does not apply. No limit set or defined.					

GOAT	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
ANTHELMINTICS						
<i>Macrocyclic lactones</i>						
Abamectin	FAT	0.005	0.1	100	0	0
Doramectin	FAT	0.005	Not set	100	0	0
Enamectin	FAT	0.005	Not set	100	0	0
Eprinomectin	FAT	0.005	Not set	100	0	0
Ivermectin	FAT	0.005	Not set	100	0	0
Moxidectin	FAT	0.005	Not set	100	2	2 ^a
PESTICIDES						
<i>Organochlorines</i>						
Aldrin and dieldrin	FAT	0.02	0.2	100	0	0
Chlordane	FAT	0.02	0.2	100	0	0
DDT	FAT	0.1	5.0	100	0	0
Endosulfan	FAT	0.02	0.2	100	0	0
Endrin	FAT	0.05	Not set	100	0	0
HCB	FAT	0.02	1.0	100	0	0
HCH	FAT	0.02	0.3	100	0	0
Heptachlor	FAT	0.02	0.2	100	0	0
Lindane (γ-HCH)	FAT	0.1	2.0	100	0	0
Methoxychlor	FAT	0.1	Not set	100	0	0
Mirex	FAT	0.02	Not set	100	0	0
<i>Organophosphates</i>						
Chlorfenvinphos	FAT	0.05	0.2	100	0	0
Chlorpyrifos	FAT	0.1	0.5	100	0	0
Chlorpyrifos-methyl	FAT	0.02	0.05	100	0	0
Coumaphos	FAT	0.2	Not set	100	0	0
Diazinon	FAT	0.1	0.7	100	0	0
Ethion	FAT	0.1	Not set	100	0	0
Famphur	FAT	0.02	Not set	100	0	0
Fenitrothion	FAT	0.02	Not set	100	0	0
Fenthion	FAT	0.05	Not set	100	0	0
Malathion	FAT	0.2	1.0	100	0	0
Phosmet	FAT	0.1	Not set	100	0	0
Temephos	FAT	0.1	Not set	100	0	0

GOAT (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
<i>Synthetic pyrethroids</i>						
Bifenthrin	FAT	0.02	2.0	100	0	0
Bioresmethrin	FAT	0.02	Not set	100	0	0
Cyfluthrin	FAT	0.02	0.5	100	0	0
Cyhalothrin	FAT	0.02	0.5	100	0	0
Cypermethrin	FAT	0.02	0.5	100	0	0
Deltamethrin	FAT	0.02	0.2	100	0	0
Fenvalerate	FAT	0.02	1.0	100	0	0
Flumethrin	FAT	0.02	Not set	100	0	0
Permethrin	FAT	0.02	1.0	100	0	0
<i>Other</i>						
Spinosad	FAT	0.01	1.0	100	0	0
ENVIRONMENTAL CONTAMINANTS						
<i>Chlorinated biphenyls</i>						
Aroclor 1254	FAT	0.03	0.2	100	0	0
Aroclor 1260	FAT	0.03	0.2	100	0	0
<i>Metals</i>						
Cadmium	LIVER	0.02	No limit	50	20	n/a
Lead	LIVER	0.02	No limit	50	9	n/a
Mercury	LIVER	0.01	No limit	50	1	n/a
LOR	Limit of reporting (mg/kg).					
Not set	No standard has been set for the chemical in an edible matrix and any detection is a contravention of the Australia New Zealand Food Standards Code.					
No limit	No standard applicable for the contaminant. The 'as low as reasonably achievable' principle applies. Detections at low levels are allowable.					
n/a	Australian Standard does not apply. No limit set or defined.					
^a	Incorrect use of product. Warning letters issued.					

HORSE	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
ANTHELMINTICS						
<i>Macrocyclic lactones</i>						
Abamectin	FAT	0.005	Not set	10	0	0
Doramectin	FAT	0.005	Not set	10	0	0
Eprinomectin	FAT	0.005	Not set	10	0	0
Ivermectin	FAT	0.005	Not set	10	0	0
Moxidectin	FAT	0.005	Not set	10	0	0
ANTIBIOTICS						
<i>Aminoglycosides</i>						
Apramycin	KIDNEY	0.5	2.0	40	0	0
Dihydrostreptomycin	KIDNEY	0.1	0.3	40	0	0
Gentamycin	KIDNEY	0.1	Not set	40	0	0
Neomycin	KIDNEY	0.1	Not set	40	0	0
Streptomycin	KIDNEY	0.1	0.3	40	0	0
<i>Antibiotics</i>						
Dimetridazole	MUSCLE	0.0001	Not set	10	0	0
Metronidazole	MUSCLE	0.001	Not set	10	0	0
Ronidazole	MUSCLE	0.001	Not set	10	0	0
<i>Antimicrobials</i>						
Chloramphenicol	MUSCLE	0.0003	Not set	10	0	0
Florfenicol	MUSCLE	0.02	Not set	10	0	0
Thiamphenicol	MUSCLE	0.02	Not set	10	0	0
<i>β-lactams</i>						
Amoxicillin	KIDNEY	0.01	0.01	40	0	0
Ampicillin	KIDNEY	0.01	0.01	40	0	0
Cloxacillin	KIDNEY	0.1	Not set	40	0	0
Penicillin G (benzylpenicillin)	KIDNEY	0.01	0.06	40	0	0
<i>Cephalosporins</i>						
Ceftiofur	KIDNEY	0.2	Not set	40	0	0
Cefuroxime	KIDNEY	0.1	Not set	40	0	0
Cephalonium	KIDNEY	0.1	Not set	40	0	0
<i>Lincosamides</i>						
Lincomycin	KIDNEY	0.05	0.2	40	0	0

HORSE (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
<i>Macrolides</i>						
Erythromycin	KIDNEY	0.1	0.3	40	0	0
Tilmicosin	KIDNEY	0.2	Not set	40	0	0
Tylosin	KIDNEY	0.1	Not set	40	0	0
<i>Sulfonamides</i>						
Sulfadiazine	KIDNEY	0.05	0.1	40	0	0
Sulfadimidine (sulfamethazine)	KIDNEY	0.05	0.1	40	0	0
Sulfadoxine	KIDNEY	0.05	0.1	40	0	0
Sulfafurazole	KIDNEY	0.05	Not set	40	0	0
Sulfamerazine	KIDNEY	0.05	Not set	40	0	0
Sulfamethoxydiazine	KIDNEY	0.05	Not set	40	0	0
Sulfapyridine	KIDNEY	0.05	Not set	40	0	0
Sulfaquinoxaline	KIDNEY	0.05	Not set	40	0	0
Sulfathiazole	KIDNEY	0.05	Not set	40	0	0
Sulfatroxazole	KIDNEY	0.05	0.1	40	0	0
<i>Tetracyclines</i>						
Chlortetracycline	KIDNEY	0.05	Not set	40	0	0
Doxycycline	KIDNEY	0.05	Not set	40	0	0
Oxytetracycline	KIDNEY	0.1	Not set	40	0	0
Tetracycline	KIDNEY	0.1	Not set	40	0	0
HORMONES						
<i>Resorcylic acid lactones</i>						
Zearalanol (α) (zeranol)	LIVER	0.002	Not set	10	0	0
<i>Steroids</i>						
19-Nortestosterone (17- α)	URINE	0.001	Not defined	10	0	n/a
19-Nortestosterone (17- β)	URINE	0.001	Not defined	10	0	n/a
Boldenone (17- α)	URINE	0.001	Not defined	10	0	n/a
Boldenone (17- β)	URINE	0.001	Not defined	10	0	n/a
Methandriol	URINE	0.005	Not defined	10	0	n/a
Stanozolol	URINE	0.001	Not defined	10	0	n/a
Stanozolol (16-hydroxy)	URINE	0.001	Not defined	10	0	n/a
Trenbolone	LIVER	0.002	Not set	10	0	0

HORSE (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
<i>Stilbenes</i>						
Dienoestrol	LIVER	0.0002	Not set	10	0	0
Diethylstilboestrol	LIVER	0.0002	Not set	10	0	0
Hexoestrol	LIVER	0.0002	Not set	10	0	0
OTHER VETERINARY DRUGS						
<i>β-agonists</i>						
Cimaterol	LIVER	0.003	Not set	5	0	0
Clenbuterol	LIVER	0.001	Not set	5	0	0
Mabuterol	LIVER	0.001	Not set	5	0	0
Ractopamine	LIVER	0.003	Not set	5	0	0
Salbutamol	LIVER	0.003	Not set	5	0	0
Zilpaterol	LIVER	0.003	Not set	5	0	0
<i>Non-steroidal anti-inflammatory drugs</i>						
Flunixin	LIVER	0.01	Not set	10	0	0
Ketoprofen	LIVER	0.02	Not set	10	0	0
Oxyphenbutazone	LIVER	0.05	Not set	10	0	0
Phenylbutazone	LIVER	0.05	Not set	10	0	0
Tolfenamic acid	LIVER	0.005	Not set	10	0	0
PESTICIDES						
<i>Organochlorines</i>						
Aldrin and dieldrin	FAT	0.02	0.2	20	0	0
Chlordane	FAT	0.02	0.2	20	0	0
DDT	FAT	0.1	5.0	20	1	0
Endosulfan	FAT	0.02	0.2	20	0	0
Endrin	FAT	0.05	Not set	20	0	0
HCB	FAT	0.02	1.0	20	0	0
HCH	FAT	0.02	0.3	20	0	0
Heptachlor	FAT	0.02	0.2	20	0	0
Lindane (γ-HCH)	FAT	0.1	2.0	20	0	0
Methoxychlor	FAT	0.1	Not set	20	0	0
Mirex	FAT	0.02	Not set	20	0	0

HORSE (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
<i>Organophosphates</i>						
Chlorfenvinphos	FAT	0.05	Not set	20	0	0
Chlorpyrifos	FAT	0.1	0.5	20	0	0
Chlorpyrifos-methyl	FAT	0.02	0.05	20	0	0
Coumaphos	FAT	0.2	Not set	20	0	0
Diazinon	FAT	0.1	0.7	20	0	0
Ethion	FAT	0.1	Not set	20	0	0
Famphur	FAT	0.02	Not set	20	0	0
Fenitrothion	FAT	0.02	Not set	20	0	0
Fenthion	FAT	0.05	Not set	20	0	0
Malathion	FAT	0.2	1.0	20	0	0
Phosmet	FAT	0.1	Not set	20	0	0
Temephos	FAT	0.1	Not set	20	0	0
<i>Synthetic pyrethroids</i>						
Bifenthrin	FAT	0.02	2.0	20	0	0
Bioresmethrin	FAT	0.02	Not set	20	0	0
Cyfluthrin	FAT	0.02	0.5	20	0	0
Cyhalothrin	FAT	0.02	0.5	20	0	0
Cypermethrin	FAT	0.02	0.05	20	0	0
Deltamethrin	FAT	0.02	Not set	20	0	0
Fenvalerate	FAT	0.02	1.0	20	0	0
Flumethrin	FAT	0.02	Not set	20	0	0
Permethrin	FAT	0.02	1.0	20	0	0
<i>Other</i>						
Spinosad	FAT	0.01	1.0	10	0	0
ENVIRONMENTAL CONTAMINANTS						
<i>Chlorinated biphenyls</i>						
Aroclor 1254	FAT	0.03	0.2	20	0	0
Aroclor 1260	FAT	0.03	0.2	20	0	0
<i>Metals</i>						
Cadmium	LIVER	0.02	No limit	20	20	n/a
Lead	LIVER	0.02	No limit	20	19	n/a
Mercury	LIVER	0.01	No limit	20	2	n/a

HORSE (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
<i>Mycotoxins</i>						
Zearalanol (β) (taleralanol)	LIVER	0.002	No limit	10	0	n/a
Zearalanone	LIVER	0.002	No limit	10	1	n/a
Zearalenol (α)	LIVER	0.002	No limit	10	0	n/a
Zearalenol (β)	LIVER	0.002	No limit	10	0	n/a
Zearalenone	LIVER	0.002	No limit	10	0	n/a
LOR	Limit of reporting (mg/kg).					
Not set	No standard has been set for the chemical in an edible matrix and any detection is a contravention of the Australia New Zealand Food Standards Code.					
No limit	No standard applicable for the contaminant. The 'as low as reasonably achievable' principle applies. Detections at low levels are allowable.					
Not defined	Standards not defined in urine and faeces.					
n/a	Australian Standard does not apply. No limit set or defined.					

KANGAROO	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
PESTICIDES						
<i>Organochlorines</i>						
Aldrin and dieldrin	FAT	0.02	0.2	30	0	0
Chlordane	FAT	0.02	0.2	30	0	0
DDT	FAT	0.1	5.0	30	0	0
Endosulfan	FAT	0.02	0.2	30	0	0
Endrin	FAT	0.05	Not set	30	0	0
HCB	FAT	0.02	1.0	30	0	0
HCH	FAT	0.02	0.3	30	0	0
Heptachlor	FAT	0.02	0.2	30	0	0
Lindane (γ-HCH)	FAT	0.1	2.0	30	0	0
Methoxychlor	FAT	0.1	Not set	30	0	0
Mirex	FAT	0.02	Not set	30	0	0
<i>Organophosphates</i>						
Chlorfenvinphos	FAT	0.05	Not set	30	0	0
Chlorpyrifos	FAT	0.1	0.5	30	0	0
Chlorpyrifos-methyl	FAT	0.02	0.05	30	0	0
Coumaphos	FAT	0.2	Not set	30	0	0
Diazinon	FAT	0.1	0.7	30	0	0
Ethion	FAT	0.1	Not set	30	0	0
Famphur	FAT	0.02	Not set	30	0	0
Fenitrothion	FAT	0.02	Not set	30	0	0
Fenthion	FAT	0.05	Not set	30	0	0
Malathion	FAT	0.2	1.0	30	0	0
Phosmet	FAT	0.1	Not set	30	0	0
Temephos	FAT	0.1	Not set	30	0	0
<i>Synthetic pyrethroids</i>						
Bifenthrin	FAT	0.02	2.0	30	0	0
Bioresmethrin	FAT	0.02	Not set	30	0	0
Cyfluthrin	FAT	0.02	0.5	30	0	0
Cyhalothrin	FAT	0.02	0.5	30	0	0
Cypermethrin	FAT	0.02	0.01	30	0	0
Deltamethrin	FAT	0.02	Not set	30	0	0
Fenvalerate	FAT	0.02	1.0	30	0	0
Flumethrin	FAT	0.02	Not set	30	0	0
Permethrin	FAT	0.02	1.0	30	0	0

KANGAROO (cont'd)	Matrix	LOR (mg/kg)	Aust. Std (mg/kg)	Number of samples tested	Analytical findings (number of detections)	
					> LOR ≤ Aust. Std	> Aust. Std
ENVIRONMENTAL CONTAMINANTS						
<i>Chlorinated biphenyls</i>						
Aroclor 1254	FAT	0.03	0.2	30	0	0
Aroclor 1260	FAT	0.03	0.2	30	0	0
<i>Metals</i>						
Cadmium	LIVER	0.02	No limit	25	5	n/a
Lead	LIVER	0.02	No limit	25	12	n/a
Mercury	LIVER	0.01	No limit	25	0	n/a
LOR	Limit of reporting (mg/kg).					
Not set	No standard has been set for the chemical in an edible matrix and any detection is a contravention of the Australia New Zealand Food Standards Code.					
No limit	No standard applicable for the contaminant. The 'as low as reasonably achievable' principle applies. Detections at low levels are allowable.					
Not defined	Standards not defined in urine and faeces.					
n/a	Australian Standard does not apply. No limit set or defined.					