National Residue Survey 2017–18
Pome fruit

The National Residue Survey (NRS) is an operational unit within the Australian Government Department of Agriculture and Water Resources, and since 1992 has been funded by industries through levies or contracted by direct funding.

The NRS is an essential part of Australia’s pesticide and veterinary medicine residue management framework providing verification of good agricultural practice in support of chemical control-of-use legislation and guidelines.

NRS residue monitoring programs monitor the levels of, and associated risks from, pesticides and veterinary medicine residues in Australian food products. The programs help to facilitate and encourage ongoing access to domestic and export markets. NRS supports Australia’s primary producers and food processors who provide quality animal, grain and horticulture products which meet both Australian and relevant international standards.

Key points
- In 2017–18, the overall compliance rate against Australian standards was 94.3 per cent.
- Australian primary producers continue to demonstrate a high degree of good agricultural practice.
- The National Residue Survey is certified to ISO 9001 Quality Management System.

Pome fruit program overview

The pome fruit program is a cooperative arrangement between the NRS, Apple & Pear Australia Ltd. (APAL) and the Australian pome fruit industry. Since 1998, the pome fruit program has been funded by the NRS component of the statutory levy on apple and pear productions.

The program involves the collection of up to 400 pome fruit samples from pack houses and markets throughout Australia each year. These samples are tested for a range of pesticides, environmental contaminants and microorganisms. The program supports quality assurance and requirements for access to domestic and international markets.
Analytical screens

Analytical screens are developed in consultation with the industry and take into account Australian registered chemicals, chemical residue profiles and overseas market requirements.

Apple and pear samples are screened for a range of different insecticides, herbicides, fungicides, environmental contaminants and microorganisms, as outlined in Table 1.

### TABLE 1 Analytical screens for the pome fruit program

<table>
<thead>
<tr>
<th>Chemical screen</th>
<th>Chemical group</th>
<th>Analyte/Microorganisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-residue pesticide screen</td>
<td>Insecticides</td>
<td>abamectin, acephate, acetamiprid, aldicarb, amitraz, azamethiphos, azinphos-methyl,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>bifenazate, bifenthrin, bioresmethrin, buprofezin, cadusafos, carbaryl, carbofuran,</td>
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<tr>
<td></td>
<td></td>
<td>chlorantraniliprole, chlorfenapyr, chlorfenvinphos, chlorpyrifos, chlorpyrifos-methyl,</td>
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<tr>
<td></td>
<td></td>
<td>clofentezine, clothianidin, cyfluthrin, cyhalothrin, cypermethrin, deltamethrin,</td>
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<tr>
<td></td>
<td></td>
<td>diazinon, dichlorvos, diflubenzuron, dimethoate, diphenylamine, disulfoton, emamectin,</td>
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<tr>
<td></td>
<td></td>
<td>esfenvalerate, ethion, ethoprophos, etoxazole, fenamiphos, fenbutatin oxide, fenthion,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>fenpyroximate, fenpropimorph, fipronil, hexythiazox, imidacloprid, indoxacarbazepine,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>malathion (maldison), metaldehyde, methacrifos, methamidophos, methidathion, methiocarb,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>methomyl, methoprene, methoxychlor, methoxyfenozide, mevinphos, monocrotophos,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>omethoate, parathion, parathion-methyl, permethrin, phosalone, phorate, phosmet,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>piperonyl butoxide, pirimicarb, pirimiphos-methyl, profenofos, propargite,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>pyrethroids, pyridaben, pyriproxyfen, spinetoram, triacetin, chlorpyrifos,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>trifloxystrobin, trichlorfon, trifluralin, trifenoxim, thiamethoxam, thiodicarb,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>triazine, triazofenol, triazine, triazophos, trichlorfon, trifluralin</td>
</tr>
<tr>
<td></td>
<td>Fungicides</td>
<td>2-phenylphenol, azoxystrobin, benalaxyl, benomyl, bitertanol, bosalid, bupirimate,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>captan, captan, chlorantraniliprole, cypermethrin, dimethoate, fenamiphos, fenbutatin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>oxide, fenpropimorph, fenpyroximate, fipronil, hexythiazox, imidacloprid, indoxacarbazepine,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>malathion (maldison), metaldehyde, methacrifos, methamidophos, methidathion, methiocarb,</td>
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<tr>
<td></td>
<td></td>
<td>methomyl, methoprene, methoxychlor, methoxyfenozide, mevinphos, monocrotophos,</td>
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<tr>
<td></td>
<td></td>
<td>omethoate, parathion, parathion-methyl, permethrin, phosalone, phorate, phosmet,</td>
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<td></td>
<td></td>
<td>piperonyl butoxide, pirimicarb, pirimiphos-methyl, profenofos, propargite,</td>
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<tr>
<td></td>
<td></td>
<td>pyrethroids, pyridaben, pyriproxyfen, spinetoram, triacetin, chlorpyrifos,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>trifloxystrobin, trichlorfon, trifluralin, trifenoxim, thiamethoxam, thiodicarb,</td>
</tr>
<tr>
<td></td>
<td>Herbicides</td>
<td>2,2-DPA, 2,4-D, atrazine, bromacil, bromoxynil, carfentrazone-ethyl, chlorpropham,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>clorsulfuron, clorthal-dimethyl, clethodim, clodinafop-propargyl, cyprodial, cyanazine,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dicamba, dichlofenil, dichlorprop-P, diflufenican, diuron, ethofumesate, iodosulfuron-methyl,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ioxynil, isoxaben, linuron, MCPA, methabenzthiazuron, metolachlor, metosulfuron,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>metribuzin, metribuzin, metsulfuron-methyl, napropamide, norflurazon, oryzalin,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>oxyfluorfen, pendimethalin, picloram, propachlor, propyzamide, quizalofop-ethyl,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>quizalofop-P, saflufenacil, sethoxydim, simazine, tralkoxydim, triasulfuron, tricyclazole,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>trifluralin, trifluralin, trifenoxim, thiamethoxam, thiodicarb, trichlorfon, trifluralin</td>
</tr>
<tr>
<td></td>
<td>Contaminants</td>
<td>aldrin, chlordane, DDT, dieletrin, endosulfan, endrin, HCB, heptachlor, lindane and</td>
</tr>
<tr>
<td>Metals</td>
<td>Elements</td>
<td>mirex</td>
</tr>
<tr>
<td></td>
<td></td>
<td>arsenic, cadmium, copper, lead and mercury</td>
</tr>
<tr>
<td></td>
<td>Microorganisms</td>
<td>Thermotolerant coliforms, <em>Escherichia coli</em>, <em>Listeria species</em>, <em>Salmonella</em> species,</td>
</tr>
<tr>
<td></td>
<td>and food</td>
<td>coagulase-positive <em>Staphylococcus</em> species</td>
</tr>
<tr>
<td>pathogens</td>
<td>Bacteria</td>
<td>Thermotolerant coliforms, <em>Escherichia coli</em>, <em>Listeria species</em>, <em>Salmonella</em> species,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>coagulase-positive <em>Staphylococcus</em> species</td>
</tr>
</tbody>
</table>
Results

In 2017–18, a total of 331 pome fruit samples was collected for pesticide residue analysis. The results were compared with Australian standards and where appropriate, relevant international standards. Out of 331 pome fruit samples collected, 113 samples were tested for metals. The results indicated detections of arsenic at a very low level of 0.038mg/kg and copper levels ranging from 0.18-1.03mg/kg. Noting that there are no limits for arsenic and copper, these very low levels of detection help reinforce the contaminant free status of Australian pome fruits.

In 41 pome fruit samples that were tested for microorganisms and food pathogens, there were no detections above the food safety limits, resulting in 100% compliance rates with the microbiological limits in the food standards code. These results show an excellent compliance status of Australian pome fruits with food safety standards and demonstrate the strong commitment of the pome fruit industry to good agricultural practice.

A summary of compliance rates against Australian standards for pesticide residues over the past five years is provided in Table 2. The results highlight a consistent compliance status against Australian standards and help maintain the reputation and integrity of Australian pome fruit in domestic and international markets.

<table>
<thead>
<tr>
<th>Year</th>
<th>Apple program</th>
<th></th>
<th>Pear program</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Samples</td>
<td>Compliance rates (%)</td>
<td>Samples</td>
<td>Compliance rates (%)</td>
</tr>
<tr>
<td></td>
<td>collected</td>
<td>(%)</td>
<td>collected</td>
<td>(%)</td>
</tr>
<tr>
<td>2013–14</td>
<td>314</td>
<td>98.1</td>
<td>110</td>
<td>100</td>
</tr>
<tr>
<td>2014–15</td>
<td>294</td>
<td>95.9</td>
<td>92</td>
<td>97.8</td>
</tr>
<tr>
<td>2015–16</td>
<td>282</td>
<td>97.9</td>
<td>94</td>
<td>95.7</td>
</tr>
<tr>
<td>2016–17</td>
<td>248</td>
<td>98.0</td>
<td>99</td>
<td>98.0</td>
</tr>
<tr>
<td>2017–18</td>
<td>246</td>
<td>95.5</td>
<td>85</td>
<td>90.6</td>
</tr>
</tbody>
</table>
Laboratory selection and performance

The NRS contracts laboratories to analyse animal and plant product samples for pesticide/veterinary medicine residues and environmental contaminants.

Laboratories are selected through the Australian Government tendering process on the basis of their proficiency and value for money. Laboratories must be accredited to international standard ISO/IEC 17025 at commencement of testing.

Contracted laboratories are proficiency tested by the NRS to ensure the validity of their analytical results and technical competence.

The NRS has been accredited by the National Association of Testing Authorities as a proficiency test provider since July 2005.

International export markets

The NRS maintains a database of maximum residue limits (MRLs) established for Australia and major export markets for industries supported by the NRS. All analysis results are checked for compliance against Australian standards and relevant international MRLs.