



# **Dairy National Chemical Contaminants Programme**

**Dairy Product Surveillance 2012 / 2013**

**Issue One**

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Publications Logistics Officer  
Ministry for Primary Industries  
PO Box 2526  
WELLINGTON 6140

Email: [NCCP@mpi.govt.nz](mailto:NCCP@mpi.govt.nz)

Telephone: 0800 00 83 33

Facsimile: 04-894 0300

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December 2014



# Dairy National Chemical Contaminants Programme – Dairy Product Surveillance 2012/2013

## 1.1 INTRODUCTION:

This Dairy National Chemical Contaminants Programme (NCCP) – Dairy Product Surveillance Report provides a summary of results for dairy product sampled over the full 2012/13 dairy season, spanning the period July 2012 to June 2013. The purpose of the NCCP is to:

- (a) provide an assurance that not less than 99% of dairy products manufactured in New Zealand conform to New Zealand and international dairy processing requirements;
- (b) verify that dairy processors have effective self-monitoring plans in place under their risk management programmes;
- (c) establish baseline levels for specific constituents naturally present in milk and dairy products;
- (d) confirm the accuracy of attestations provided to other competent authorities; and
- (e) investigate unfavourable findings to ensure that controls remain effective and that emerging hazards are identified and appropriate regulatory measures applied.

Surveillance of dairy products for chemical residues and contaminants is routinely undertaken and supports the NCCP monitoring of raw milk used for the manufacture of dairy products. These two programmes combine to provide a high level of confidence in the safety and suitability of New Zealand dairy products.

## 1.2 WE LOOKED FOR:

- 482 compounds or elements covering:
  - Antibiotics and other veterinary medicines;
  - Pesticides;
  - Herbicides;
  - Fungicides;
  - Compounds withdrawn or not permitted for use on or with food producing animals;

- Compounds not permitted for use in dairy products or food contact materials, or with restrictions on their permitted use;
- Chemical contaminants;
- Chemical elements, including heavy metals; and
- Compositional parameters naturally present in milk.

### **1.3 WE SAMPLED:**

- using MPI recognised dairy verifiers (auditors).
- without bias from the range of dairy products manufactured in New Zealand over the period of July 2012 through to June 2013, including milk, cream, cheese, butter, anhydrous milk fat, milk powders, infant formula and other formulated products, whey products and casein. Dairy products sampled included those:
  - intended as ingredients and which are typically in a concentrated form;
  - retail ready products intended for sale as foods in a concentrated form that will be reconstituted prior to consumption; and
  - that are foods in the form that they will be consumed or used.

### **1.4 WE TESTED:**

- 123 random product samples and obtained 55,129 individual chemical residue and contaminant test results.
- 56 samples were tested for various compositional attributes for survey purposes. The results of these tests will help build a profile by dairy product type which may be used as a point of reference in the future for the assessment of product integrity and determination of adulteration or fraud. Because of the nature of this testing results are not included in Table 1 but compounds and elements are listed in Table 2.



## 1.5 ACTION LIMITS:

Action Limits (ALs) are the maximum tolerable level of a particular compound detected in a product before action is taken. The action includes confirmation that regulatory limits have been met and investigation to determine the reason for the finding. The nominated ALs are based on those established for raw milk unless:

- (i) a product or food specific tolerance limit applies, or
- (ii) the compound is not permitted for use as a veterinary medicine or agricultural compound, and is not permitted for use or addition during the manufacturing process.

In assessing results against ALs, concentration factors have been taken into consideration where permitted and where appropriate for the intended market(s) and New Zealand. The general principle applied is that if the raw milk used to manufacture a product conformed to all applicable limits, then the manufactured product is also expected to conform based on concentration factors.

If MPI becomes concerned that partitioning of a compound within a specific product stream is of concern then a specific tolerance limit will be established for that compound and product. For example some lipophilic compounds are expressed on a fat basis in accordance with CODEX conventions.

For compounds that are not permitted for use on milking animals any confirmed detection is considered unacceptable.

## 1.6 WE FOUND:

Of the 55,129 individual chemical residue and contaminant test results, there were 85 detections (0.15%), with one result (DEHA) recorded as exceeding the AL threshold. Table 1 provides a summary of the chemical residue and contaminant testing undertaken and the findings. Low level detections for chemical elements routinely expected to be present in milk have been excluded from this table.

Given the breadth of products sampled and compounds tested for, the number of detections are considered to be very low. This indicates that dairy processors are operating under risk management programmes that are effective and ensure that the dairy products manufactured are safe, wholesome and free from contamination.

The detections of most interest were:

### **1.6.1 Dicyandiamide (DCD):**

DCD is a nitrification inhibitor that has the potential to greatly assist pastoral farming by reducing nitrogen loss to the environment and reducing the production of greenhouse gases when applied to pastoral land. In late 2012 the use of DCD was no longer permitted in New Zealand until international agreement is reached on a maximum residue limit (MRL), due to minor traces of this compound becoming detectable in concentrated dairy products.

A targeted survey on DCD was undertaken during the NCCP 12/13 period, with 1,994 DCD tests completed for milk and milk products collected/manufactured since 1st June 2012. This is the combined total for samples collected and tested by both the Ministry, under NCCP, and the New Zealand dairy industry. Sampling was targeted to the areas where DCD was applied to land, with the focus being product manufactured during, and shortly following, the DCD application period of 1st June 2012 through to 28th September 2012.

371 detections of DCD were recorded, as seen in Table 4. The last dairy product manufactured directly from milk to have DCD detected was made 12th November 2012. This was the only detection for product made directly from milk in November. 602 samples of products made from milk produced from 13 November 2012 onwards were analysed with no DCD found.

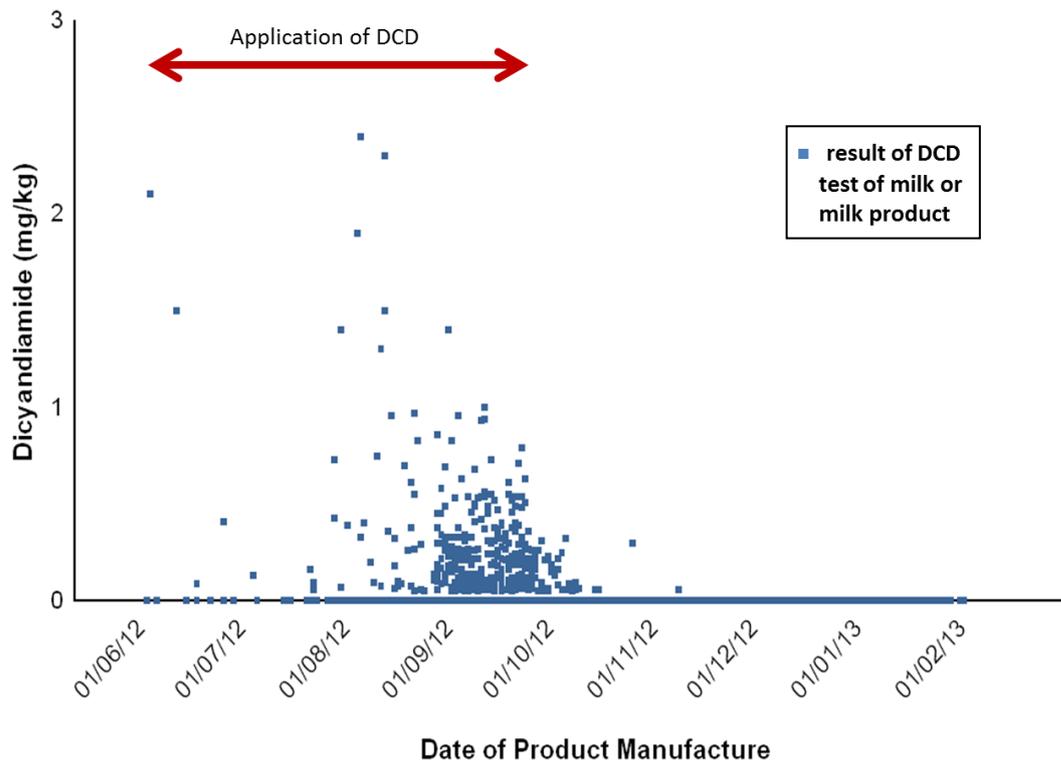
The highest detection recorded was 2.4 parts per million (2.4 mg/Kg) found in skim milk powder manufactured 9/8/12. Only 9 of the 1,994 samples analysed exceeded 1 part per million (1 mg/kg). These products were all concentrated (dried to remove the water) and are not consumed in their concentrated form.

When considered on a liquid milk basis all results are well below 1 part per million, confirming that the actions taken were effective.

The application of DCD to pastoral land was suspended in 2012 based on findings in dairy product. As a consequence, no further detections of DCD have occurred in products manufactured from milk produced 13 November 2012 onward.



Graph 1: Results of targeted DCD testing over 1994 milk and milk products, by date of product manufacture



### 1.6.2 Cyanuric Acid:

Cyanuric Acid was found in one colostrum powder sample at a level of 0.03 mg/L on a liquid colostrum basis, well below the 1 mg/kg AL. MPI has previously investigated low level findings and has confirmed that these are not linked to any form of milk or feed adulteration. Each sample was also tested for melamine, with no trace detected, confirming that the findings are not associated with melamine.

### 1.6.3 Metals:

- **Lead:** was detected at trace levels in 11 samples with the highest level detected being 0.027 mg/kg in colostrum powder, equating to approx. 0.002 mg/L on a liquid colostrum basis.
- **Cadmium:** was also detected at trace levels in 11 samples, with the highest level being 0,01 mg/kg on a dried basis (approx. 0.001 on a milk basis).
- **Tin:** was detected in four samples at very low levels, the highest being 0.11mg/kg compared with the joint Australia New Zealand Food Standards Code limit of 250mg/kg.
- **Bismuth:** is used in teat sealant products for the protection of cow teats from infection over the dry period and is part of the strategy to minimise the use of antibiotics. Bismuth was detected in 21 samples from products manufactured early in the dairy season at levels below the default MRL. Many markets exempt bismuth from MRL requirements due to its inert nature and its

common use as an antacid. MPI is reviewing the current instructions and administration practices followed by dairy farmers, as well as the appropriate limit if any.

- **Copper and Iron:** are naturally occurring in milk at low levels, with copper detected in all product samples and iron detected in 18 samples. The levels were confirmed to be below the thresholds that would have an impact on product quality.

These detections of metals in processed, concentrated dairy products are well below ALs and are not of concern. It is noted that a change in the test methodology used has meant that the test now has a much lower limit of detection, and as a consequence, a greater number of very low level detections are to be expected for a range of metals. None-the-less, lead will continue to be monitored through the NCCP to ensure that any trends are quantified.

#### **1.6.4 Semicarbazide (SEM):**

SEM is a metabolite of the veterinary medicine nitrofurazone, which is prohibited in some countries and no longer registered or available for use on milking animals in New Zealand. This compound was detected at levels in 27% of samples tested (maximum level being 0.0022 mg/kg on a dried basis), all of which were concentrated dried milk powders.

These findings do not represent a food safety concern and are not due to use of a withdrawn/prohibited medicine. The findings are consistent with previous studies that have demonstrated that SEM is an inherent component at very low levels (parts per billion) of highly concentrated dried products. This has been highlighted in the NCCP Sampling Plan over the last several years.

SEM has been shown to be present from sources other than nitrofurazone and screening for these metabolites is considered to be more reliable than analysis for the parent drugs which are less stable. Because of the status of the nitrofurans (no registered use for dairy cattle) any detection of a metabolite in the absence of the parent drug will initiate immediate traceback procedures to determine whether abuse has occurred. It is specifically noted that SEM will only be used as a trigger for further investigation, and on its own is not a conclusive indicator of non-conformance.

#### **1.6.5 Pesticides:**

- **DDE:** was found in 12 samples, taken predominately from high fat milk products, such as AMF, butter and cheese. All detections were <0.1 mg/kg which is well below the New Zealand MRL of 1.25 mg/kg on a fat basis and below the action limit of 0.50 mg/kg on a fat basis (0.02 mg/L on a 4% fat, milk basis) which is consistent with CODEX limits. Periodic findings of DDE at low levels in the fat of dairy products is to be expected due to carryover from historical use. These



findings are consistent with the raw milk programme and previous product monitoring results. There is active monitoring in place by dairy processors to ensure only milk that conforms to the DDE/DDT MRL requirements is collected for processing.

Metabolites of DDT are periodically identified very early in lactation from animals grazing land where DDT was historically applied to control “grass grub” (*Costelytra zealandica*).

In 1970, New Zealand became one of the first countries in the world to ban the use of DDT on pastoral land. Most commonly residues of DDE, rather than the parent compound DDT, are identified which confirms historic rather than recent use of this pesticide in New Zealand.

- **Diphenylamine** is used in rubberware as well as being associated with some dyes. Diphenylamine was detected at low levels in five samples tested, with the highest result of 0.025 mg/kg in a sample of AMF. While this exceeds the action limit for raw milk, the concentration factor associated with AMF means that the result is within acceptable limits and does not represent a food safety or trade concern.

MPI will continue to monitor and investigate future findings of diphenylamine in order to gain a better understanding of the source of this compound.

- **Piperonyl butoxide** is an organic compound which by itself is not a pesticide, but is added to pesticides to enhance their potency, through properties which inhibit biological defense mechanisms of insects, allowing the actual pesticide compound to be more effective, and piperonyl butoxide can be found in some fly sprays in New Zealand. Two samples tested for piperonyl butoxide had detections at 0.011 and 0.022 mg/kg (concentrated basis). Both samples were from butter and do not exceed the action limit when adjusted to allow for the concentration of milk fat which occurs during manufacturing. MPI will continue to monitor for piperonyl butoxide to confirm responsible use of products containing the compound.
- **Temephos:** Temephos is an organophosphate compound used for the treatment of lice on cattle and non-lactating dairy animals. Two samples tested had detectable concentrations of temephos at levels well below the 0.1 mg/L action limit for raw milk. The low level of these detections negates the need to apply a concentration factor and confirms that there is no food safety concern. Products containing temephos have a 14 day milk withholding period. Findings

of temephos in liquid milk above the MRL would indicate a failure to apply the correct milk withholding period and will be investigated.

#### **1.6.6 Phthalates:**

Seven samples had detectable levels of phthalates, covering five different phthalates. Three of the seven results were for phthalates that have been removed from use in the formulation of food contact materials (1 x DEHP, 1 x DIDP, 1 x DINP). It is noted that in each case the product reflects a concentration factor of at least 10 times over that of raw milk, meaning that on a milk corrected basis all results were below 1 mg/kg and do not represent a food safety concern.

Of the three, DEHP is known to have been included in the formulation of milk liners to provide the required flexing on the component during milking. These milk liners have been found to be the primary source of DEHP in milk products. Consequently DEHP has been removed from use in the formulation of rubber components for the milking plant. The single detection of DEHP is likely to reflect legacy use of old formulation milk liners.

Three samples contained DEHA, with one sample having a level that exceeded the AL. The AL for DEHA has been established based on levels of the compound reasonably expected to be found in milk or dairy products, though DEHA is not a phthalate of high concern. DEHA has replaced DEHP in some materials and so detections are to be expected, but at low levels only. No source was identified for this detection.

Contaminant migration standards for milk contact materials are applied through the Code of Practice; Design and Operation of Farm Dairies (NZCP1). All findings of phthalates of concern will be acted upon, and investigations will be undertaken where necessary to determine the root source of contamination so that remedial action can be taken.



## 1.7 CONCLUSION:

These results confirm that dairy products manufactured in New Zealand meet the limits for chemical residues and contaminants applied internationally and domestically. This indicates that the controls applied under the current regulatory framework are adequate and continue to ensure that New Zealand dairy products conform to both consumer expectations and international regulatory requirements.

All consumers can be confident that dairy products manufactured in New Zealand are safe, wholesome and free from contamination.

**TABLE 1: SUMMARY OF DAIRY PRODUCT RESIDUE AND CONTMINANT RESULTS FOR 2012/2013**

Compound Name	Samples	Not Detected	Detected below <sup>1</sup>	Detected Above <sup>2</sup>	Flag
Acephate	122	122	0	0	
Acetochlor	123	123	0	0	
Acibenzolar-S-methyl	123	123	0	0	
Acifluorfen	123	123	0	0	
AHD( Nitrofurantoin)	111	111	0	0	
Alachlor	123	123	0	0	
Alanycarb	123	123	0	0	
Aldicarb	123	123	0	0	
Aldicarb sulfone	123	123	0	0	
Aldicarb sulfoxide	123	123	0	0	
Aldrin	121	121	0	0	
Allidochlor	123	123	0	0	
Ametryn	123	123	0	0	
Amoxicillin	63	63	0	0	
AMOZ (Furaltadone)	111	111	0	0	
Ampicillin	63	63	0	0	
Anilofos	123	123	0	0	
AOZ (Furazolidone)	111	111	0	0	
Arsenic	56	56	0	0	
Atrazine	123	123	0	0	
Azaconazole	123	123	0	0	
Azamethiphos	123	123	0	0	
Azinphos-methyl	123	123	0	0	
Azoxystrobin	123	123	0	0	
Benalaxyl	123	123	0	0	
Bendiocarb	123	123	0	0	
Benfluralin	123	123	0	0	
Benfuracarb	123	123	0	0	
Benodanil	123	123	0	0	
Benoxacor	123	123	0	0	
Bensulfuron-methyl	123	123	0	0	
Bensulide	123	123	0	0	
Benzyl butyl phthalate	77	77	0	0	
BHC (alpha)	121	121	0	0	
BHC (beta)	121	121	0	0	
BHC (delta)	121	121	0	0	
Bifenox	123	123	0	0	
Bifenthrin	121	121	0	0	
Bioresmethrin	121	121	0	0	
Bis(2-ethylhexyl) phthalate	77	76	1	0	●
Bis(2-ethylhexyl) adipate	77	74	2	1	●
Bitertanol	123	123	0	0	
Boscalid	123	123	0	0	
Bromacil	123	123	0	0	
Bromobutide	123	123	0	0	
Bromophos	121	121	0	0	



Compound Name	Samples	Not Detected	Detected below <sup>1</sup>	Detected Above <sup>2</sup>	Flag
Bromophos-ethyl	121	121	0	0	
Bromopropylate	121	121	0	0	
Bupirimate	123	123	0	0	
Buprofezin	123	123	0	0	
Butachlor	123	123	0	0	
Butafenacil	123	123	0	0	
Butamifos	123	123	0	0	
Cadmium	56	45	11	0	●
Cadusafos	123	123	0	0	
Cafenstrole	123	123	0	0	
Captan	121	121	0	0	
Carbaryl	123	123	0	0	
Carbendazim	123	123	0	0	
Carbetamide	123	123	0	0	
Carbofuran	123	123	0	0	
Carboxin	121	121	0	0	
Carfentrazone-ethyl	123	123	0	0	
Carpropamid	123	123	0	0	
Ceftiofur	63	63	0	0	
Cephalexin	63	63	0	0	
Cephalonium	63	63	0	0	
Cephuroxime	63	63	0	0	
Chloramphenicol	4	4	0	0	
Chlorbufam	123	123	0	0	
Chlordane (cis)	121	121	0	0	
Chlordane (trans)	121	121	0	0	
Chlorfenapyr	121	121	0	0	
Chlorfenvinphos	123	123	0	0	
Chloridazon	123	123	0	0	
Chlorimuron-ethyl	123	123	0	0	
Chlorobenzilate	121	121	0	0	
Chlorothalonil	121	121	0	0	
Chlorotoluron	123	123	0	0	
Chloroxuron	123	123	0	0	
Chlorpropham	123	123	0	0	
Chlorpyrifos	123	123	0	0	
Chlorpyrifos-methyl	123	123	0	0	
Chlorsulfuron	123	123	0	0	
Chlortetracycline	63	63	0	0	
Chlorthal-dimethyl	121	121	0	0	
Chlozolinate	121	121	0	0	
Chromafenozide	123	123	0	0	
Cinidon- ethyl	123	123	0	0	
Clethodim	123	123	0	0	
Clodinafop-propargyl	123	123	0	0	
Clofentezine	123	123	0	0	
Clomazone	123	123	0	0	
Cloquintocet-mexyl	123	123	0	0	

Compound Name	Samples	Not Detected	Detected below <sup>1</sup>	Detected Above <sup>2</sup>	Flag
Clothianidin	123	123	0	0	
Coumafos	123	123	0	0	
Coumaphos oxon	123	123	0	0	
Cyanazine	123	123	0	0	
Cyanophos	121	121	0	0	
Cyanuric acid	106	105	1	0	●
Cyazofamid	123	123	0	0	
Cyclanilide	123	123	0	0	
Cycloate	123	123	0	0	
Cyclosulfamuron	123	123	0	0	
Cyflufenamid	123	123	0	0	
Cyfluthrin	121	121	0	0	
Cyhalofop-butyl	121	121	0	0	
Cyhalothrin	121	121	0	0	
Cymoxanil	123	123	0	0	
Cypermethrin	121	121	0	0	
Cyproconazole	123	123	0	0	
Cyprodinil	123	123	0	0	
Cyromazine	122	122	0	0	
Daimuron	123	123	0	0	
DDD (o,p')	121	121	0	0	
DDD (p,p')	121	121	0	0	
DDE (o,p')	121	121	0	0	
DDE (p,p')	121	109	12	0	●
DDT (o,p')	121	121	0	0	
DDT (p,p')	121	121	0	0	
Deltamethrin	121	121	0	0	
Demeton-s-methyl	123	123	0	0	
Demeton-s-methyl-sulfoxide	123	123	0	0	
Desmedipham	123	123	0	0	
Dexamethasone	66	66	0	0	
Di-allate	123	123	0	0	
Diazinon	123	123	0	0	
Dichlobenil	121	121	0	0	
Dichlofenthion	123	123	0	0	
Dichlofluanid	123	123	0	0	
Dichloran	121	121	0	0	
Dichlorvos	121	121	0	0	
Diclobutrazol	123	123	0	0	
Diclocymet	123	123	0	0	
Diclofop-methyl	123	123	0	0	
Diclosulam	123	123	0	0	
Dicofol	121	121	0	0	
Dicrotophos	123	123	0	0	
Didecyl phthalate	77	76	1	0	●
Dieldrin	121	121	0	0	
Diethofencarb	123	123	0	0	
Diethyl phthalate	77	77	0	0	



Compound Name	Samples	Not Detected	Detected below <sup>1</sup>	Detected Above <sup>2</sup>	Flag
Difenoconazole	123	123	0	0	
Diflubenzuron	122	122	0	0	
Diflufenican	123	123	0	0	
Dihexyl phthalate	77	77	0	0	
Diisobutyl phthalate	77	77	0	0	
Diisodecyl phthalate	77	76	1	0	●
Diisononyl-phthalate	77	76	1	0	●
Diisopropyl phthalate	83	83	0	0	
Dimepiperate	123	123	0	0	
Dimethenamid	123	123	0	0	
Dimethoate	123	123	0	0	
Dimethomorph	123	123	0	0	
Dimethyl phthalate	77	77	0	0	
Dimethylvinphos	123	123	0	0	
Di-n-butyl phthalate	77	77	0	0	
Di-n-heptyl phthalate	83	83	0	0	
Di-n-octyl phthalate	77	77	0	0	
Di-n-pentyl phthalate	83	83	0	0	
Dioxabenzofos	121	121	0	0	
Dioxathion	122	122	0	0	
Diphenamid	123	123	0	0	
Diphenylamine	121	116	5	0	●
Disulfoton	123	123	0	0	
Dithiopyr	123	123	0	0	
Diuron	123	123	0	0	
Dodine	123	123	0	0	
Edifenphos	123	123	0	0	
Emamectin Benzoate	123	123	0	0	
Endosulfan (alpha)	121	121	0	0	
Endosulfan (beta)	121	121	0	0	
Endosulfan sulphate	121	121	0	0	
Endrin	121	121	0	0	
EPN	121	121	0	0	
Epoxiconazole	123	123	0	0	
EPTC	123	123	0	0	
Erythromycin	63	63	0	0	
Esfenvalerate	121	121	0	0	
Esprocarb	123	123	0	0	
Ethalfuralin	123	123	0	0	
Ethametsulfuron-methyl	123	123	0	0	
Ethiofencarb	121	121	0	0	
Ethion	123	123	0	0	
Ethiprole	123	123	0	0	
Ethoprofos	123	123	0	0	
Ethoxyquin	123	123	0	0	
Ethoxysulfuron	123	123	0	0	
Ethychlozate	123	123	0	0	
Etobenzanid	123	123	0	0	

Compound Name	Samples	Not Detected	Detected below <sup>1</sup>	Detected Above <sup>2</sup>	Flag
Etoxazole	123	123	0	0	
Etridiazole	121	121	0	0	
Etrimfos	123	123	0	0	
Famoxadone	123	123	0	0	
Famphur	123	123	0	0	
Fenamidone	123	123	0	0	
Fenamifos	123	123	0	0	
Fenamiphos	121	121	0	0	
Fenarimol	123	123	0	0	
Fenbuconazole	123	123	0	0	
Fenchlorphos	123	123	0	0	
Fenhexamid	123	123	0	0	
Fenitrothion	121	121	0	0	
Fenobucarb	123	123	0	0	
Fenothiocarb	123	123	0	0	
Fenoxanil	123	123	0	0	
Fenoxaprop	123	123	0	0	
Fenoxaprop-ethyl	123	123	0	0	
Fenoxycarb	123	123	0	0	
Fenpiclonil	123	123	0	0	
Fenpropathrin	123	123	0	0	
Fenpropimorph	123	123	0	0	
Fenpyroximate	123	123	0	0	
Fensulfothion	123	123	0	0	
Fenthion	123	123	0	0	
Fenthion sulfone	123	123	0	0	
Fenthion sulfoxide	123	123	0	0	
Fentrazamide	123	123	0	0	
Fenvalerate	121	121	0	0	
Ferimzone	123	123	0	0	
Fipronil	123	123	0	0	
Flamprop	123	123	0	0	
Flamprop-methyl	123	123	0	0	
Flazasulfuron	123	123	0	0	
Florfenicol	4	4	0	0	
Fluacrypyrim	123	123	0	0	
Fluazifop-p-butyl	123	123	0	0	
Fluazinam	121	121	0	0	
Flucythrinate	121	121	0	0	
Fludioxonil	123	123	0	0	
Flufenacet	123	123	0	0	
Flumethrin	121	121	0	0	
Flumiclorac pentyl	123	123	0	0	
Flumioxazin	123	123	0	0	
Fluometuron	123	123	0	0	
Fluquinconazole	123	123	0	0	
Fluridone	123	123	0	0	
Flusilazole	123	123	0	0	



Compound Name	Samples	Not Detected	Detected below <sup>1</sup>	Detected Above <sup>2</sup>	Flag
Flusulfamide	123	123	0	0	
Fluthiacet-methyl	123	123	0	0	
Flutolanil	123	123	0	0	
Flutriafol	123	123	0	0	
Fluvalinate	121	121	0	0	
Fomesafen	123	123	0	0	
Fonofos	123	123	0	0	
Forchlorfenuron	123	123	0	0	
Formetanate hydrochloride	123	123	0	0	
Fosthiazate	123	123	0	0	
Fuberidazole	123	123	0	0	
Furalaxyl	123	123	0	0	
Furametpyr	123	123	0	0	
Furathiocarb	123	123	0	0	
Gentamycin	63	63	0	0	
Halosulfuron-methyl	123	123	0	0	
Haloxypop-etotyl	123	123	0	0	
Haloxypop-methyl	123	123	0	0	
Heptachlor	121	121	0	0	
Heptachlor-epoxide	121	121	0	0	
Heptenophos	123	123	0	0	
Hexachlorobenzene	121	121	0	0	
Hexaconazole	123	123	0	0	
Hexaflumuron	123	123	0	0	
Hexazinone	123	123	0	0	
Hexythiazox	123	123	0	0	
Imazalil	123	123	0	0	
Imazamethabenz-methyl	123	123	0	0	
Imazosulfuron	123	123	0	0	
Imidacloprid	122	122	0	0	
Inabenfide	123	123	0	0	
Indanofan	123	123	0	0	
Indoxacarb	123	123	0	0	
Iodofenphos	123	123	0	0	
Iodosulfuron-methyl	123	123	0	0	
Iprobenfos	123	123	0	0	
Iprodion	121	121	0	0	
Iprovalicarb	123	123	0	0	
Isazophos	123	123	0	0	
Isofenphos	123	123	0	0	
Isofenphos-methyl	123	123	0	0	
Isoprocab	123	123	0	0	
Isoprothiolane	123	123	0	0	
Isoproturon	123	123	0	0	
Isoxathion	123	123	0	0	
Kanamycin	63	63	0	0	
Karbutilate	123	123	0	0	
Kresoxim-methyl	121	121	0	0	

Compound Name	Samples	Not Detected	Detected below <sup>1</sup>	Detected Above <sup>2</sup>	Flag
Lactofen	123	123	0	0	
Lasalocid	63	63	0	0	
Lead	56	45	11	0	●
Lenacil	123	123	0	0	
Leptophos	121	121	0	0	
Lindane	121	121	0	0	
Linuron	123	123	0	0	
Lufenuron	123	123	0	0	
Maduramicin	63	63	0	0	
Malathion	123	123	0	0	
Mandipropamid	123	123	0	0	
Mefenacet	123	123	0	0	
Mefenpyr-diethyl	123	123	0	0	
Melamine	106	106	0	0	
Mercury	56	56	0	0	
Mepanipyrim	123	123	0	0	
Mepronil	123	123	0	0	
Metalaxyl	123	123	0	0	
Metamitron	123	123	0	0	
Metconazole	123	123	0	0	
Methabenzthiazuron	123	123	0	0	
Methacrifos	123	123	0	0	
Methamidophos	123	123	0	0	
Methidathion	123	123	0	0	
Methiocarb	123	123	0	0	
Methomyl	123	123	0	0	
Methoxyfenozide	123	123	0	0	
Metobromuron	123	123	0	0	
Metolachlor	123	123	0	0	
Metominostrobin (E)	123	123	0	0	
Metominostrobin (Z)	123	123	0	0	
Metosulam	122	122	0	0	
Metribuzin	123	123	0	0	
Mevinphos	123	123	0	0	
Molinate	123	123	0	0	
Monensin	63	63	0	0	
Monocrotophos	123	123	0	0	
Monolinuron	123	123	0	0	
Myclobutanil	123	123	0	0	
Napropamide	123	123	0	0	
Narasin	63	63	0	0	
Nicotine	123	123	0	0	
Nitrofen	121	121	0	0	
Nitrothal-isopropyl	121	121	0	0	
Norflurazon	123	123	0	0	
Novaluron	123	123	0	0	
Oleandomycin	63	63	0	0	
Omethoate	123	123	0	0	



Compound Name	Samples	Not Detected	Detected below <sup>1</sup>	Detected Above <sup>2</sup>	Flag
Oryzalin	123	123	0	0	
Oxabetrinil	123	123	0	0	
Oxadiazon	123	123	0	0	
Oxadixyl	123	123	0	0	
Oxamyl	123	123	0	0	
Oxycarboxin	123	123	0	0	
Oxyfluorfen	121	121	0	0	
Oxytetracycline	63	63	0	0	
Paclobutrazol	123	123	0	0	
Parathion	121	121	0	0	
Parathion-methyl	121	121	0	0	
Penconazole	123	123	0	0	
Pencycuron	123	123	0	0	
Pendimethalin	123	123	0	0	
Penicillin G	63	63	0	0	
Permethrin (cis,trans)	121	121	0	0	
Phenmedipham	123	123	0	0	
Phenthoate	123	123	0	0	
Phorate	123	123	0	0	
Phorate sulphone	123	123	0	0	
Phorate sulphoxide	123	123	0	0	
Phosalone	123	123	0	0	
Phosmet	121	121	0	0	
Phosphamidon	123	123	0	0	
Phoxim	123	123	0	0	
Picolinafen	123	123	0	0	
Piperonyl butoxide	123	121	2	0	●
Piperophos	123	123	0	0	
Pirimicarb	123	123	0	0	
Pirimiphos-methyl	123	123	0	0	
Pretilachlor	123	123	0	0	
Prochloraz	123	123	0	0	
Procymidone	121	121	0	0	
Profenofos	123	123	0	0	
Promecarb	123	123	0	0	
Prometryn	123	123	0	0	
Propachlor	123	123	0	0	
Propamocarb	122	122	0	0	
Propanil	123	123	0	0	
Propaphos	123	123	0	0	
Propaquizafop	123	123	0	0	
Propargite	123	123	0	0	
Propazine	123	123	0	0	
Propetamphos	121	121	0	0	
Propham	123	123	0	0	
Propiconazole	123	123	0	0	
Propoxur	123	123	0	0	
Propyzamide	123	123	0	0	

Compound Name	Samples	Not Detected	Detected below <sup>1</sup>	Detected Above <sup>2</sup>	Flag
Prosulfocarb	123	123	0	0	
Prothiofos	121	121	0	0	
Pymetrozine	123	123	0	0	
Pyraclostrobin	123	123	0	0	
Pyraflufen ethyl	121	121	0	0	
Pyrazophos	123	123	0	0	
Pyributicarb	123	123	0	0	
Pyridaben	123	123	0	0	
Pyridafenthion	123	123	0	0	
Pyrifenox	123	123	0	0	
Pyrimethanil	123	123	0	0	
Pyrimidifen	123	123	0	0	
Pyriminobac-methyl(E)	123	123	0	0	
Pyriminobac-methyl(Z)	123	123	0	0	
Pyriproxyfen	123	123	0	0	
Pyroquilon	123	123	0	0	
Quinalphos	123	123	0	0	
Quinoclamine	123	123	0	0	
Quinoxifen	123	123	0	0	
Quintozene	121	121	0	0	
Quizalofop-ethyl	123	123	0	0	
Rimsulfuron	123	123	0	0	
Salinomycin	63	63	0	0	
Semduramacin	63	63	0	0	
Semicarbide	111	81	30	0	●
Sethoxydim	123	123	0	0	
Simazine	123	123	0	0	
Simeconazole	123	123	0	0	
Simetryn	123	123	0	0	
Spinosad	123	123	0	0	
Spiromesifen	123	123	0	0	
Spiromesifen-enol	123	123	0	0	
Spiromycin	63	63	0	0	
Spiroxamine	123	123	0	0	
Streptomycin	63	63	0	0	
Sulfentrazone	123	123	0	0	
Sulprofos	123	123	0	0	
Tebuconazole	123	123	0	0	
Tebufenozide	123	123	0	0	
Tebufenpyrad	123	123	0	0	
Tecnazene	121	121	0	0	
Teflubenzuron	123	123	0	0	
Tefluthrin	121	121	0	0	
Temephos	123	121	2	0	●
Tepraloxymdim	123	123	0	0	
Terbacil	121	121	0	0	
Terbufos	123	123	0	0	
Terbumeton	123	123	0	0	



Compound Name	Samples	Not Detected	Detected below <sup>1</sup>	Detected Above <sup>2</sup>	Flag
Terbutryn	123	123	0	0	
Terbutylazine	123	123	0	0	
Tetrachlorvinphos	123	123	0	0	
Tetraconazole	123	123	0	0	
Tetracycline	63	63	0	0	
Tetradifon	121	121	0	0	
Thenylchlor	123	123	0	0	
Thiabendazole	123	123	0	0	
Thiacloprid	123	123	0	0	
Thiamethoxam	123	123	0	0	
Thiazopyr	123	123	0	0	
Thidiazuron	123	123	0	0	
Thiobencarb	123	123	0	0	
Thiocyclam hydrogenoxalate	123	123	0	0	
Thiometon	123	123	0	0	
Tiadinil	123	123	0	0	
Tin	56	52	4	0	●
Tolclofos-methyl	123	123	0	0	
Tolyfluanid	123	123	0	0	
Tralkoxydim	123	123	0	0	
Triadimefon	123	123	0	0	
Triadimenol	123	123	0	0	
Triallate	123	123	0	0	
Triasulfuron	123	123	0	0	
Triazophos	121	121	0	0	
Tribenuron-methyl	123	123	0	0	
Tribuphos	123	123	0	0	
Trichlorfon	123	123	0	0	
Tricyclazole	123	123	0	0	
Trifloxystrobin	123	123	0	0	
Trifloxysulfuron sodium	123	123	0	0	
Triflumizole	123	123	0	0	
Triflumuron	123	123	0	0	
Trifluralin	121	121	0	0	
Triflusulfuron-methyl	123	123	0	0	
Triforine	123	123	0	0	
Tylosin	63	63	0	0	
Uniconazole P	123	123	0	0	
Vamidotion	123	123	0	0	
Vinclozolin	121	121	0	0	
XMC	123	123	0	0	
Zoxamide	123	123	0	0	
<b>Total</b>		<b>55,044</b>	<b>84</b>	<b>1</b>	

<sup>1</sup> The number of detections at or below the maximum allowable level. In some cases no limit applies.

<sup>2</sup> Non-conforming results: detection of a compound above the New Zealand or export market maximum limit for the residue or contaminant, or detection at or above the limit of quantitation for a compound not permitted for food producing animals.

**TABLE 2: SUMMARY OF DAIRY PRODUCTS SAMPLED IN 2012/2013**

Product Type	Proportion of Samples
<b>Powders</b> Includes: Whole milk powder; skim milk powder; buttermilk powder; colostrums powder.	34%
<b>Nutritional</b> Includes: infant formula; follow on formula; growing up milk powder.	31%
<b>Protein</b> Includes: Milk protein concentrate; whey powder, whey protein concentrate; casein and sodium caseinate.	11%
<b>Liquids</b> Includes: pasteurised and UHT milk and cream.	10%
<b>Fat</b> Includes: AMF; butter.	8%
<b>Cheese</b> Includes: various soft, firm and unripened cheeses.	6%

**TABLE 3: SURVEY OF CHEMICAL ELEMENTS AND COMPOUNDS NATURALLY OCCURRING IN DAIRY PRODUCTS - 2012/2013**

Compound Name	Samples Collected 2012 / 2013	Samples with Detectable levels
Bismuth	56	21
Boron	56	29
Cobalt	56	3
Copper	56	56
Iodine	56	51
Iron	56	18
Selenium	56	50
Sodium Thiocyanate	22	22
Zinc	56	50



**TABLE 4: DICYANDIAMIDE (DCD) MILK AND MILK PRODUCT - TESTS AND DETECTIONS BY MONTH TO FEBRUARY 2013**

Month	Tests	DCD Detections	Highest	Average (all results)	Average (detections)
Jun '12	11	5	2.1	0.4	0.88
Jul '12	24	4	0.16	0.02	0.11
Aug '12	202	42	2.4	0.11	0.52
Sep '12	671	284	1.4	0.1	0.24
Oct '12	342	35	0.32	0.01	0.13
Nov '12	419	1	0.056	<0.01	<0.01
Dec '12	245	0	-	-	-
Jan '13	76	0	-	-	-
Feb '13	4	0	-	-	-
<b>Total</b>	<b>1994</b>	<b>371</b>	<b>2.4</b>	<b>0.05</b>	<b>0.27</b>