



National Chemical Contaminants Programme

Dairy product results summary 2013/2014

November 2015

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1 Summary

This National Chemical Contaminants Programme (NCCP) – Dairy product results summary provides results for dairy products sampled over the full 2013/14 dairy season, spanning the period July 2013 to June 2014.

The purpose of the NCCP is to:

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

Over 250 individual dairy products were analysed for more than 49,400 individual test results with 100% compliance. All results complied with the action limits.

The dairy product summary 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.

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

1.1 WHAT WE LOOKED FOR

We looked for 565 compounds, elements and dairy components 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- compounds withdrawn or not permitted for use on or with food producing animals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
- compounds with restrictions on their permitted use
- chemical contaminants
- radionuclides
- chemical elements, including heavy metals
- compositional parameters naturally present in milk and dairy products.

1.2 WHAT WE SAMPLED

Routine monitoring samples are collected by MPI recognised dairy verifiers (auditors).



Samples for radionuclide testing are collected under MPI direction. The samples are collected, without bias, from the range of dairy products manufactured in New Zealand over the period of July 2013 through to June 2014, 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.

The products sampled are set out in Table 1.

Table 1: Summary of dairy products sampled in 2013/2014

Product Type	Proportion of Samples
Powders (Includes whole milk powder, skim milk powder, butter milk powder, colostrum powder)	46.6%
Nutritional (Includes infant formula, follow-on formula and growing up milk powder)	26.1%
Protein (includes milk protein concentrate, whey powder, whey protein concentrate, casein and sodium caseinate)	15.0%
Liquids (Includes pasteurised and UHT milk and cream)	1.2%
Fat (Includes AMF and butter)	8.3%
Cheese (Includes various soft, firm and unripened cheeses)	2.0%
Lactose	0.8%

1.3 WHAT WE TESTED

We tested:

- 253 random product samples and obtained 49,414 individual chemical residue and contaminant test results for routinely monitored residues and contaminants (Table 3)
- 34 dairy powder samples and obtained 70 individual test results for routinely monitored radionuclides, and
- some of the random product samples were also tested for other residues and naturally occurring elements and other compounds, as well as 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 (Tables 4, 5 and 6).

1.4 ACTION LIMITS

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

- a product or food specific tolerance limit applies, or
- 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 Alimentarius (Codex) conventions.

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

1.5 WHAT WE FOUND – RESIDUES AND CONTAMINANTS

There were 49,414 individual test results reported.

There were 512 detections below ALs (1.04%). No detections exceeded ALs.

A summary of the detections of residues and contaminants in dairy products is in Table 2 and a full set of all the results including compounds and numbers of tests for routinely monitored residues and contaminants in dairy products is in Table 3.

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.

1.5.1 The detections of most interest were:

1.5.1.1 *Dicyandiamide (DCD)*

DCD is a nitrification inhibitor that has the potential to greatly reduce nitrogen loss to the environment and reduce the production of greenhouse gases in pastoral farming. Due to minor traces of this compound being detected in concentrated dairy products its use was suspended in New Zealand in late 2012 pending international agreement on a maximum residue limit (MRL).

100 samples were tested for DCD in AMF, butter, butter milk powder, casein, cheese, colostrum, follow-on formula, growing up milk powder, infant formula, milk protein concentrate, nutritional, powder, skim milk powder, whey protein concentrate and whole milk powder.

DCD was detected in in one growing up milk powder sample, below the AL (on a raw milk basis) of 0.1 mg/kg. The base powder for this blended product was produced in 2012, prior to DCD being removed from the farm production system and, as such, the result is of no concern.

1.5.1.2 *Nitrate & nitrite*

Nitrate and nitrite occur naturally in raw milk, however, their presence in dried dairy products above ALs may indicate excessive exposure to heat, fouling or “burn-on” during processing or contamination of liquid milk with cleaning solutions.



138 samples were tested for nitrates and nitrite in butter, casein, colostrum, cream, follow-on formula, growing up milk powder, infant formula, milk protein concentrate, nutritional, powder, skim milk powder, sodium caseinate, whey protein concentrate and whole milk powder.

Detections of nitrite were reported in all the products tested. Detections of nitrate were reported in all the product types but not all the samples tested. All the detections were below the AL for nitrate and nitrite set for dairy products.

1.5.1.3 *Cyanuric acid*

74 samples were tested for melamine and cyanuric acid in casein, cheese, colostrum, follow-on formula, growing up milk powder, infant formula, milk protein concentrate, nutritional, powder, skim milk powder, whey protein concentrate and whole milk powder.

Cyanuric acid was found in in one (sheep) whole milk powder sample, below the AL (on a raw milk basis) of 1 mg/kg. This sample was also tested for melamine, with no trace detected, confirming that the findings are not associated with melamine.

MPI has previously investigated low level findings and has confirmed that these are not linked to any form of milk or feed adulteration.

1.5.1.4 *Metals*

89 samples were tested for heavy metals in AMF, butter, casein, sodium caseinate, colostrum powder, cream, follow-on formula, growing up milk powder, infant formula, lactose, nutritionals, skim milk powder, whey protein concentrate and whole milk powder:

- **Arsenic** was detected in 2 samples (casein and sodium caseinate), below the AL (on a raw milk basis) of 0.01 mg/kg
- **Cadmium** was detected in 17 samples (cream, growing up milk powder, infant formula, nutritionals, sodium caseinate, whey protein concentrate and whole milk powder), below the AL (on a raw milk basis) of 1 mg/kg
- **Lead** was detected in 3 samples (cream, nutritionals and sodium caseinate), below the AL (on a raw milk basis) of 0.02 mg/kg
- **Tin** was detected in 10 samples (cream, follow-on formula, growing up milk powder, infant formula, nutritionals, skim milk powder and whole milk powder), well below the joint Australia New Zealand Food Standards Code limit.

These detections of metals in processed, concentrated dairy products are well below ALs and are not of concern.

1.5.1.5 *Semicarbazide (SEM)*

95 samples were tested for nitrofurans compounds including nitrofurazone, in butter milk powder, colostrum, follow-on formula, growing up milk powder, infant formula, milk protein concentrate, nutritional, powder, skim milk powder, whey protein concentrate and whole milk powder. SEM is a metabolite of the veterinary medicine nitrofurazone which is prohibited in some countries and not registered or available for use on milking animals in New Zealand.

SEM was detected in 25 samples (colostrum powder, follow-on formula, infant formula, milk protein concentrate, skim milk powder, whey protein concentrate and whole milk powder).



These detections do not represent a food safety concern and are not due to use of a withdrawn or prohibited medicine. The findings are consistent with previous studies that have demonstrated that SEM is an inherent component at very low levels 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. 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.

1.5.1.6 Pesticides

106 samples were tested for a wide range of pesticides in AMF, butter, casein, cheese, colostrum, cream, dairy blend, follow-on formula, growing up milk powder, infant formula, milk protein concentrate, nutritional, powder, skim milk powder, whey protein concentrate and whole milk powder:

- **DDE** was detected in 10 samples (AMF, butter, cheese, cream). These detections were 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/kg on a 4% milk fat basis) which is consistent with Codex limits. Periodic findings of DDE at low levels in the fat of dairy products are 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 *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

- **Diflubenzuron** was detected in one (sheep) whole milk powder sample below the AL (on a raw milk basis) of 0.01 mg/kg. Diflubenzuron is registered in New Zealand as an ectoparasiticide for sheep with an established milk withholding period. It is also registered as an insecticide for pastures and crops.

1.5.1.7 Phthalates

94 samples were tested for a range of phthalates in AMF, butter, butter milk powder, cheese, colostrum, cream, dairy blend, follow-on formula, growing up milk powder, infant formula, nutritional, powder, skim milk powder, whey protein concentrate and whole milk powder.

Phthalates were detected in 43 samples (AMF, butter, growing up milk powder, whole milk powder). The detections were all below the AL (on a raw milk basis) of 1 mg/kg, and do not represent a food safety concern.

17 results were for phthalates that have been removed from use in the formulation of food contact materials (16 x bis(2-ethylhexyl) phthalate (DEHP), 1 x diisodecyl phthalate (DIDP)). DEHP is known to have been included in the formulation of milk liners to provide the



required flexing of 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 detections of DEHP are likely to reflect legacy use of old formulation milk liners.

23 samples contained bis(2-ethylhexyl) adipate (DEHA). 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.

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.

1.5.1.8 Quaternary Ammonium Compounds (QACs)

86 samples were tested for a range of QACs in AMF, butter, butter milk powder, cheese, colostrum, cream, follow-on formula, growing up milk powder, infant formula, milk protein concentrate, nutritional, powder, skim milk powder, whey protein concentrate and whole milk powder.

QACs were detected in 73 samples (butter, butter milk powder, cheese, colostrum powder, cream, follow-on formula, growing up milk powder, infant formula, milk protein concentrate, nutritional powders, skim milk powder, whey protein concentrate and whole milk powder).

The detections were all below the AL (on a raw milk basis) of 0.1 mg/kg.

QACs are widely used as surfactants and disinfectants in food processing and several products have been approved for sanitising dairy equipment. More recently QACs have become compounds of interest in some markets, with studies suggesting that residues may carry over in many food products exposed to QACs. This presents an added complication for trade as many dairy products are highly concentrated ingredients, and these concentrated forms usually only represent a minor portion of the final food. For a number of years dairy maintenance compounds containing QACs have been approved in New Zealand with the condition that milk contact surfaces are to be rinsed after use.

1.6 WHAT WE FOUND – RADIONUCLIDES

34 dairy product samples were tested for radionuclides (caesium-134 and caesium-137, iodine-131, plutonium-239, strontium-90 and americium-241) in conjunction with the national survey undertaken by the New Zealand National Radiation Laboratory. The results of the testing confirm activity concentrations of anthropogenic radionuclides far below the Codex guideline levels and consistent with expected background levels.

1.7 WHAT WE FOUND – SURVEYS

1.7.1 Dairy components

Samples of follow-on formula, growing up milk powder, infant formula, milk protein concentrate, nutritional, powder, skim milk powder, whey protein concentrate and whole milk powder were tested for fat, protein, ash and moisture.



The results complied with the Codex standard for fat, protein and moisture for milk powders and cream powders¹ (noting the protein is reported on an as received basis and not on a SNF (solids non-fat) basis).

1.7.2 Hormones and resorcylic acid lactones

Samples of AMF, butter, colostrum powder, growing up milk powder, infant formula and whole milk powder were tested for a range of hormones and resorcylic acid lactones.

There were no detections reported for any of the hormones expected to be of exogenous origin.

Detections of α -testosterone, estrone, hydroxyprogesterone, oestradiol and progesterone were reported. These are all hormones expected to be of endogenous origin.

Detections of α and β -zearalenol and zearalenone were reported. These are endogenous compounds resulting from the presence of *Fusarium* species in grazed pasture.

These results align with those found during the testing at slaughter of food-producing animals raised on New Zealand pasture.

1.7.3 Naturally occurring elements and other compounds

Samples of AMF, butter, colostrum powder, cream, follow-on formula, growing up milk powder, infant formula, lactose, nutritionals, skim milk powder, milk protein concentrate whey protein concentrate and whole milk powder were tested for a range of endogenous and naturally occurring chemical elements and compounds.

The detections reported do not indicate manufacturing of dairy products using ingredients or additives that may contain metals at greater levels than that allowed for, or expected in raw milk.

¹ CODEX STANDARD FOR MILK POWDERS AND CREAM POWDER (CODEX STAN 207-1999) - This Standard replaced the Standard for Whole Milk Powder, Partly Skimmed Milk Powder and Skimmed Milk Powder (A-5-1971) and the Standard for Cream Powder, Half Cream Powder and High Fat Milk Powder (A-10-1971). Adopted in 1999. Amendments 2010, 2013, 2014.



2 Summary of dairy product results for 2013/2014

2.1 REPORTING OF RESIDUES AND CONTAMINANTS IN DAIRY PRODUCTS

Table 2: Detections of residues and contaminants in dairy products

Compound	Samples collected	Samples with no detections	Detections below the action limit	Detections above the action limit	Flag
Arsenic	89	87	2	0	●
Bis(2-ethylhexyl) phthalate (DEHP)	94	78	16	0	●
Bis(2-ethylhexyl) adipate (DEHA)	94	71	23	0	●
Cadmium	89	72	17	0	●
Cyanuric acid	74	73	1	0	●
DDE (p,p')	106	96	10	0	●
Dicyandiamide (DCD)	100	99	1	0	●
Diffubenzuron	106	105	1	0	●
Diisodecyl phthalate (DIDP)	94	93	1	0	●
Di-n-butyl phthalate (DBP)	94	91	3	0	●
Lead	89	86	3	0	●
N-benzyltrimethylhexadecylammonium chloride (BDM-C16)	86	81	5	0	●
N-benzyltrimethyltetradecylammonium chloride (BDM-C14)	86	18	68	0	●
N-didecyltrimethylammonium chloride (DM-DC10)	86	81	5	0	●
Nitrate	138	26	112	0	●
Nitrite	138	0	138	0	●
Nitrofurazone (SEM)	95	70	25	0	●
Tin	89	79	10	0	●
Benzyltrimethylundecylammonium chloride (BDM-C12)	86	15	71	0	●

Table 3: Reported results of residues and contaminants in dairy products

Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Abamectin	107	107	0	0	
Acephate	106	106	0	0	
Acetamiprid	106	106	0	0	
Acetochlor	106	106	0	0	
Acibenzolar-S-methyl	106	106	0	0	
Acifluorfen	106	106	0	0	
Alachlor	106	106	0	0	
Alanycarb	106	106	0	0	
Albendazole	2	2	0	0	
Aldicarb	106	106	0	0	
Aldicarb sulfone	106	106	0	0	
Aldicarb sulfoxide	106	106	0	0	
Aldrin	106	106	0	0	
Allidochlor	106	106	0	0	
Ametryn	106	106	0	0	
Amoxicillin	27	27	0	0	

² The number of detections reported at or below the maximum allowable level. In some cases no limit applies

³ 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



Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Ampicillin	27	27	0	0	
Anilofos	106	106	0	0	
Arsenic	89	87	2	0	●
Atrazine	106	106	0	0	
Azaconazole	106	106	0	0	
Azamethiphos	106	106	0	0	
Azinphos-methyl	106	106	0	0	
Azoxystrobin	106	106	0	0	
Benalaxyl	106	106	0	0	
Bendiocarb	106	106	0	0	
Benfluralin	106	106	0	0	
Benfuracarb	106	106	0	0	
Benodanil	106	106	0	0	
Benoxacor	106	106	0	0	
Bensulfuron-methyl	106	106	0	0	
Bensulide	106	106	0	0	
Benzyltrimethylammonium chloride (BDM-C12)	86	15	71	0	●
BHC (alpha)	106	106	0	0	
BHC (beta)	106	106	0	0	
BHC (delta)	106	106	0	0	
Bifenox	106	106	0	0	
Bifenthrin	106	106	0	0	
Bioresmethrin	106	106	0	0	
Bis(2-ethylhexyl) phthalate (DEHP)	94	78	16	0	●
Bis(2-ethylhexyl) adipate (DEHA)	94	71	23	0	●
Bisphenol A	7	7	0	0	
Bitertanol	106	106	0	0	
Boscalid	106	106	0	0	
Bromacil	106	106	0	0	
Bromobutide	106	106	0	0	
Bromophos	106	106	0	0	
Bromophos-ethyl	106	106	0	0	
Bromopropylate	106	106	0	0	
Bupirimate	106	106	0	0	
Buprofezin	106	106	0	0	
Butachlor	106	106	0	0	
Butafenacil	106	106	0	0	
Butamifos	106	106	0	0	
Butyl benzyl phthalate (BBP)	94	94	0	0	
Cadmium	89	72	17	0	●
Cadusafos	106	106	0	0	
Cafenstrole	106	106	0	0	
Captan	106	106	0	0	
Carbaryl	106	106	0	0	
Carbendazim	106	106	0	0	
Carbetamide	106	106	0	0	
Carbofuran	106	106	0	0	
Carboxin	106	106	0	0	
Carfentrazone-ethyl	106	106	0	0	
Carpropamid	106	106	0	0	
Ceftiofur	27	27	0	0	
Cephalexin	27	27	0	0	



Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Cephalonium	27	27	0	0	
Cephuroxime	27	27	0	0	
Chlorbufam	106	106	0	0	
Chlordane (cis)	106	106	0	0	
Chlordane (trans)	106	106	0	0	
Chlorfenapyr	106	106	0	0	
Chlorfenvinphos	106	106	0	0	
Chloridazon	106	106	0	0	
Chlorimuron-ethyl	106	106	0	0	
Chlorobenzilate	106	106	0	0	
Chlorothalonil	106	106	0	0	
Chlorotoluron	106	106	0	0	
Chloroxuron	106	106	0	0	
Chlorpropham	106	106	0	0	
Chlorpyrifos	106	106	0	0	
Chlorpyrifos-methyl	106	106	0	0	
Chlorsulfuron	106	106	0	0	
Chlortetracycline	27	27	0	0	
Chlorthal-dimethyl	106	106	0	0	
Chlozolate	106	106	0	0	
Chromafenozide	106	106	0	0	
Cinidon- ethyl	106	106	0	0	
Clethodim	106	106	0	0	
Clodinafop-propargyl	106	106	0	0	
Clofentezine	106	106	0	0	
Clomazone	106	106	0	0	
Cloquintocet-mexyl	106	106	0	0	
Clothianidin	106	106	0	0	
Coumafos	106	106	0	0	
Coumaphos oxon	106	106	0	0	
Cyanazine	106	106	0	0	
Cyanophos	106	106	0	0	
Cyanuric acid	74	73	1	0	●
Cyazofamid	106	106	0	0	
Cyclanilide	106	106	0	0	
Cycloate	106	106	0	0	
Cyclosulfamuron	106	106	0	0	
Cyflufenamid	106	106	0	0	
Cyfluthrin	106	106	0	0	
Cyhalofop-butyl	106	106	0	0	
Cyhalothrin	106	106	0	0	
Cymoxanil	106	106	0	0	
Cypermethrin	106	106	0	0	
Cyproconazole	106	106	0	0	
Cyprodinil	106	106	0	0	
Cyromazine	106	106	0	0	
Daimuron	106	106	0	0	
DDD (o,p')	106	106	0	0	
DDD (p,p')	106	106	0	0	
DDE (o,p')	106	106	0	0	
DDE (p,p')	106	96	10	0	●
DDT (o,p')	106	106	0	0	
DDT (p,p')	106	106	0	0	



Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Deltamethrin	106	106	0	0	
Demeton-s-methyl	106	106	0	0	
Demeton-s-methyl-sulfoxide	106	106	0	0	
Desmedipham	106	106	0	0	
Dexamethasone	30	30	0	0	
Di-allate	106	106	0	0	
Diazinon	106	106	0	0	
Dichlobenil	106	106	0	0	
Dichlofenthion	106	106	0	0	
Dichlofluanid	106	106	0	0	
Dichloran	106	106	0	0	
Dichlorvos	106	106	0	0	
Diclobutrazol	106	106	0	0	
Diclocymet	106	106	0	0	
Diclofop-methyl	106	106	0	0	
Diclosulam	106	106	0	0	
Dicofol	106	106	0	0	
Dicrotophos	106	106	0	0	
Dicyandiamide (DCD)	100	99	1	0	●
Didecyl phthalate (DDP)	94	94	0	0	
Dieldrin	106	106	0	0	
Diethofencarb	106	106	0	0	
Diethyl phthalate (DEP)	94	94	0	0	
Difenoconazole	106	106	0	0	
Diflubenzuron	106	105	1	0	●
Diflufenican	106	106	0	0	
Dihexyl phthalate (DHXP)	94	94	0	0	
Dihydrostreptomycin	27	27	0	0	
Diisobutyl phthalate (DIBP)	94	94	0	0	
Diisodecyl phthalate (DIDP)	94	93	1	0	●
Diisononyl-phthalate (DINP)	94	94	0	0	
Diisopropyl phthalate (DIP)	94	94	0	0	
Dimepiperate	106	106	0	0	
Dimethenamid	106	106	0	0	
Dimethoate	106	106	0	0	
Dimethomorph	106	106	0	0	
Dimethyl phthalate (DMP)	94	94	0	0	
Dimethylditetradecylammonium chloride (DM-DC14)	86	86	0	0	
Dimethylvinphos	106	106	0	0	
Di-n-butyl phthalate (DBP)	94	91	3	0	●
Di-n-heptyl phthalate (DNHP)	94	94	0	0	
Di-n-octyl phthalate (DNOP)	94	94	0	0	
Di-n-pentyl phthalate (DNPP)	94	94	0	0	
Dioxabenzofos	106	106	0	0	
Dioxathion	106	106	0	0	
Diphenamid	106	106	0	0	
Diphenylamine	106	106	0	0	
Disulfoton	106	106	0	0	
Dithiopyr	106	106	0	0	
Diuron	106	106	0	0	
Dodine	106	106	0	0	
Doramectin	2	2	0	0	



Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Edifenphos	106	106	0	0	
Emamectin Benzoate	106	106	0	0	
Endosulfan (alpha)	106	106	0	0	
Endosulfan (beta)	106	106	0	0	
Endosulfan sulphate	106	106	0	0	
Endrin	106	106	0	0	
EPN	106	106	0	0	
Epoxiconazole	106	106	0	0	
Eprinomectin	2	2	0	0	
EPTC	106	106	0	0	
Erythromycin	27	27	0	0	
Esfenvalerate	106	106	0	0	
Esprocarb	106	106	0	0	
Ethalfuralin	106	106	0	0	
Ethametsulfuron-methyl	106	106	0	0	
Ethiofencarb	106	106	0	0	
Ethion	106	106	0	0	
Ethiprole	106	106	0	0	
Ethoprosfos	106	106	0	0	
Ethoxyquin	106	106	0	0	
Ethoxysulfuron	106	106	0	0	
Ethychlozate	106	106	0	0	
Etobenzanid	106	106	0	0	
Etoxazole	106	106	0	0	
Etridiazole	106	106	0	0	
Etrimfos	106	106	0	0	
Famoxadone	106	106	0	0	
Famphur	106	106	0	0	
Fenamidone	106	106	0	0	
Fenamifos	106	106	0	0	
Fenarimol	106	106	0	0	
Fenbendazole	2	2	0	0	
Fenbuconazole	106	106	0	0	
Fenchlorphos	106	106	0	0	
Fenhexamid	106	106	0	0	
Fenitrothion	106	106	0	0	
Fenobucarb	106	106	0	0	
Fenothiocarb	106	106	0	0	
Fenoxanil	106	106	0	0	
Fenoxaprop	106	106	0	0	
Fenoxaprop-ethyl	106	106	0	0	
Fenoxycarb	106	106	0	0	
Fenpiclonil	106	106	0	0	
Fenpropathrin	106	106	0	0	
Fenpropimorph	106	106	0	0	
Fenpyroximate	106	106	0	0	
Fensulfothion	106	106	0	0	
Fenthion	106	106	0	0	
Fenthion sulfone	106	106	0	0	
Fenthion sulfoxide	106	106	0	0	
Fentrazamide	106	106	0	0	
Fenvalerate	106	106	0	0	
Ferimzone	106	106	0	0	



Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Fipronil	106	106	0	0	
Flamprop	106	106	0	0	
Flamprop-methyl	106	106	0	0	
Flazasulfuron	106	106	0	0	
Florfenicol	26	26	0	0	
Fluacrypyrim	106	106	0	0	
Fluazifop-p-butyl	106	106	0	0	
Fluazinam	106	106	0	0	
Flubendazole	2	2	0	0	
Flucythrinate	106	106	0	0	
Fludioxonil	106	106	0	0	
Flufenacet	106	106	0	0	
Flumethrin	106	106	0	0	
Flumiclorac pentyl	106	106	0	0	
Flumioxazin	106	106	0	0	
Fluometuron	106	106	0	0	
Fluquinconazole	106	106	0	0	
Fluridone	106	106	0	0	
Flusilazole	106	106	0	0	
Flusulfamide	106	106	0	0	
Fluthiacet-methyl	106	106	0	0	
Flutolanil	106	106	0	0	
Flutriafol	106	106	0	0	
Fluvalinate	106	106	0	0	
Fomesafen	106	106	0	0	
Fonofos	106	106	0	0	
Forchlorfenuron	106	106	0	0	
Formetanate hydrochloride	106	106	0	0	
Fosthiazate	106	106	0	0	
Fuberidazole	106	106	0	0	
Furalaxyl	106	106	0	0	
Furaltadone (AMAZ)	95	95	0	0	
Furametpyr	106	106	0	0	
Furathiocarb	106	106	0	0	
Furazolidone (AOZ)	95	95	0	0	
Gentamycin	27	27	0	0	
Halosulfuron-methyl	106	106	0	0	
Haloxyfop-etotyl	106	106	0	0	
Haloxyfop-methyl	106	106	0	0	
Heptachlor	106	106	0	0	
Heptachlor-epoxide	106	106	0	0	
Heptenophos	106	106	0	0	
Hexachlorobenzene	106	106	0	0	
Hexaconazole	106	106	0	0	
Hexadecylpyridiniumammonium chloride (C16-PY)	86	86	0	0	
Hexadecyltrimethylammonium chloride (TM-C16)	86	86	0	0	
Hexaflumuron	106	106	0	0	
Hexazinone	106	106	0	0	
Hexythiazox	106	106	0	0	
Imazalil	106	106	0	0	
Imazamethabenz-methyl	106	106	0	0	
Imazosulfuron	106	106	0	0	



Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Imidacloprid	106	106	0	0	
Inabenfide	106	106	0	0	
Indanofan	106	106	0	0	
Indoxacarb	106	106	0	0	
Iodofenphos	106	106	0	0	
Iodosulfuron-methyl	106	106	0	0	
Iprobenfos	106	106	0	0	
Iprodione	106	106	0	0	
Iprovalicarb	106	106	0	0	
Isazophos	106	106	0	0	
Isofenphos	106	106	0	0	
Isofenphos-methyl	106	106	0	0	
Isoprocarb	106	106	0	0	
Isoprothiolane	106	106	0	0	
Isoproturon	106	106	0	0	
Isoxathion	106	106	0	0	
Ivermectin	2	2	0	0	
Kanamycin	27	27	0	0	
Karbutilate	106	106	0	0	
Kresoxim-methyl	106	106	0	0	
Lactofen	106	106	0	0	
Lasalocid	43	43	0	0	
Lead	89	86	3	0	●
Lenacil	106	106	0	0	
Leptophos	106	106	0	0	
Levamisole	2	2	0	0	
Lindane	106	106	0	0	
Linuron	106	106	0	0	
Lufenuron	106	106	0	0	
Maduramicin	43	43	0	0	
Malathion	106	106	0	0	
Mandipropamid	106	106	0	0	
Mebendazole	2	2	0	0	
Mefenacet	106	106	0	0	
Mefenpyr-diethyl	106	106	0	0	
Melamine	74	74	0	0	
Mepanipyrim	106	106	0	0	
Mepronil	106	106	0	0	
Mercury	89	89	0	0	
Metalaxyl	106	106	0	0	
Metamitron	106	106	0	0	
Metconazole	106	106	0	0	
Methabenzthiazuron	106	106	0	0	
Methacrifos	106	106	0	0	
Methamidophos	106	106	0	0	
Methidathion	106	106	0	0	
Methiocarb	106	106	0	0	
Methomyl	106	106	0	0	
Methoxyfenozide	106	106	0	0	
Methyl prednisolone	30	30	0	0	
Metobromuron	106	106	0	0	
Metolachlor	106	106	0	0	
Metominostrobin (E)	106	106	0	0	



Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Metominostrobin (Z)	106	106	0	0	
Metosulam	106	106	0	0	
Metribuzin	106	106	0	0	
Mevinphos	106	106	0	0	
Molinate	106	106	0	0	
Monensin	43	43	0	0	
Monocrotophos	106	106	0	0	
Monolinuron	106	106	0	0	
Moxidectin	2	2	0	0	
Myclobutanil	106	106	0	0	
Napropamide	106	106	0	0	
Narasin	43	43	0	0	
N-benzyltrimethyldecylammonium chloride (BDM-C10)	86	86	0	0	
N-benzyltrimethylhexadecylammonium chloride (BDM-C16)	86	81	5	0	●
N-benzyltrimethyloctadecylammonium chloride (BDM-C18)	86	86	0	0	
N-benzyltrimethyltetradecylammonium chloride (BDM-C14)	86	18	68	0	●
N-benzyltrimethyltetradecylammonium chloride (BDM-C14)	86	86	0	0	
N-didecyltrimethylammonium chloride (DM-DC10)	86	81	5	0	●
Neomycin	27	27	0	0	
Nicotine	106	106	0	0	
Nitrate	138	26	112	0	●
Nitrite	138	0	138	0	●
Nitrofen	106	106	0	0	
Nitrofurantoin (AHD)	95	95	0	0	
Nitrofurazone (SEM)	95	70	25	0	●
Nitrothal-isopropyl	106	106	0	0	
Norflurazon	106	106	0	0	
Novaluron	106	106	0	0	
Oleandomycin	27	27	0	0	
Omethoate	106	106	0	0	
Oryzalin	106	106	0	0	
Oxabetrinil	106	106	0	0	
Oxadiazon	106	106	0	0	
Oxadixyl	106	106	0	0	
Oxamyl	106	106	0	0	
Oxycarboxin	106	106	0	0	
Oxyfluorfen	106	106	0	0	
Oxytetracycline	27	27	0	0	
Paclobutrazol	106	106	0	0	
Parathion	106	106	0	0	
Parathion-methyl	106	106	0	0	
Penconazole	106	106	0	0	
Pencycuron	106	106	0	0	
Pendimethalin	106	106	0	0	
Penicillin G	27	27	0	0	
Permethrin (cis,trans)	106	106	0	0	
Phenmedipham	106	106	0	0	
Phenthoate	106	106	0	0	
Phorate	106	106	0	0	



Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Phorate sulphone	106	106	0	0	
Phorate sulphoxide	106	106	0	0	
Phosalone	106	106	0	0	
Phosmet	106	106	0	0	
Phosphamidon	106	106	0	0	
Phoxim	106	106	0	0	
Picolinafen	106	106	0	0	
Piperonyl butoxide	106	106	0	0	
Piperophos	106	106	0	0	
Pirimicarb	106	106	0	0	
Pirimiphos-methyl	106	106	0	0	
Prednisolone	30	30	0	0	
Pretilachlor	106	106	0	0	
Prochloraz	106	106	0	0	
Procymidone	106	106	0	0	
Profenofos	106	106	0	0	
Promecarb	106	106	0	0	
Prometryn	106	106	0	0	
Propachlor	106	106	0	0	
Propamocarb	106	106	0	0	
Propanil	106	106	0	0	
Propaphos	106	106	0	0	
Propaquizafop	106	106	0	0	
Propargite	106	106	0	0	
Propazine	106	106	0	0	
Propetamphos	106	106	0	0	
Propham	106	106	0	0	
Propiconazole	106	106	0	0	
Propoxur	106	106	0	0	
Propyzamide	106	106	0	0	
Prosulfocarb	106	106	0	0	
Prothiofos	106	106	0	0	
Pymetrozine	106	106	0	0	
Pyraclostrobin	106	106	0	0	
Pyraflufen ethyl	106	106	0	0	
Pyrazophos	106	106	0	0	
Pyributicarb	106	106	0	0	
Pyridaben	106	106	0	0	
Pyridafenthion	106	106	0	0	
Pyrifenox	106	106	0	0	
Pyriftalid	106	106	0	0	
Pyrimethanil	106	106	0	0	
Pyrimidifen	106	106	0	0	
Pyriminobac-methyl(E)	106	106	0	0	
Pyriminobac-methyl(Z)	106	106	0	0	
Pyriproxyfen	106	106	0	0	
Pyroquilon	106	106	0	0	
Quinalphos	106	106	0	0	
Quinoclamine	106	106	0	0	
Quinoxifen	106	106	0	0	
Quintozene	106	106	0	0	
Quizalofop-ethyl	106	106	0	0	
Rimsulfuron	106	106	0	0	



Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Salinomycin	43	43	0	0	
Semduramacin	43	43	0	0	
Sethoxydim	106	106	0	0	
Simazine	106	106	0	0	
Simeconazole	106	106	0	0	
Simetryn	106	106	0	0	
Sodium monofluoroacetate (1080)	42	42	0	0	
Spinosad	106	106	0	0	
Spiramycin	27	27	0	0	
Spiromesifen	106	106	0	0	
Spiromesifen-enol	106	106	0	0	
Spiroxamine	106	106	0	0	
Streptomycin	27	27	0	0	
Sulfentrazone	106	106	0	0	
Sulprofos	106	106	0	0	
Tebuconazole	106	106	0	0	
Tebufenozide	106	106	0	0	
Tebufenpyrad	106	106	0	0	
Tebuthiuron	106	106	0	0	
Tecnazene	106	106	0	0	
Teflubenzuron	106	106	0	0	
Tefluthrin	106	106	0	0	
Temephos	106	106	0	0	
Tepraloxymid	106	106	0	0	
Terbacil	106	106	0	0	
Terbufos	106	106	0	0	
Terbumeton	106	106	0	0	
Terbutryn	106	106	0	0	
Terbutylazine	106	106	0	0	
Tetrachlorvinphos	106	106	0	0	
Tetraconazole	106	106	0	0	
Tetracycline	27	27	0	0	
Tetradifon	106	106	0	0	
Thenylchlor	106	106	0	0	
Thiabendazole	106	106	0	0	
Thiacloprid	106	106	0	0	
Thiamethoxam	106	106	0	0	
Thiazopyr	106	106	0	0	
Thidiazuron	106	106	0	0	
Thiobencarb	106	106	0	0	
Thiocyclam hydrogenoxalate	106	106	0	0	
Thiometon	106	106	0	0	
Tiadinil	106	106	0	0	
Tin	89	79	10	0	●
Tolclofos-methyl	106	106	0	0	
Tolyfluanid	106	106	0	0	
Tralkoxydim	106	106	0	0	
Triadimefon	106	106	0	0	
Triadimenol	106	106	0	0	
Triallate	106	106	0	0	
Triasulfuron	106	106	0	0	
Triazophos	106	106	0	0	
Tribenuron-methyl	106	106	0	0	



Compound	Samples collected	Samples with no detections	Detections below the action limit ²	Detections above the action limit ³	Flag
Tribuphos	106	106	0	0	
Trichlorfon	106	106	0	0	
Triclabendazole	2	2	0	0	
Tricyclazole	106	106	0	0	
Trifloxystrobin	106	106	0	0	
Trifloxysulfuron sodium	106	106	0	0	
Triflumizole	106	106	0	0	
Triflumuron	106	106	0	0	
Trifluralin	106	106	0	0	
Triflusulfuron-methyl	106	106	0	0	
Triforine	106	106	0	0	
Tylosin	27	27	0	0	
Uniconazole P	106	106	0	0	
Vamidothion	106	106	0	0	
Vinclozolin	106	106	0	0	
XMC	106	106	0	0	
Zoxamide	106	106	0	0	



2.2 REPORTING OF SURVEYS IN DAIRY PRODUCTS

Table 4: Dairy components

Product type	Samples collected			
	Ash	Fat	Moisture	Protein
Follow-on formula	3	3	3	4
Growing up milk powder	7	6	5	6
Infant formula	9	6	8	9
Milk protein concentrate	0	1	1	1
Nutritional	1	1	1	1
Skim milk powder	0	2	2	2
Whey protein concentrate	5	0	0	0
Whole milk powder	0	12	12	12

Table 5: Steroids and resorcylic acid lactones

Substance	Samples collected	AMF	Butter	Colostrum	Growing up milk powder	Infant formula	Skim milk powder	Whey protein concentrate	Whole milk powder
α - + β -boldenone	30	3	3	2	3	6	1	2	10
α -trenbolone	30	3	3	2	3	6	1	2	10
β -trenbolone	30	3	3	2	3	6	1	2	10
Dienestrol	30	3	3	2	3	6	1	2	10
Diethylstilbestrol	30	3	3	2	3	6	1	2	10
Hexestrol	30	3	3	2	3	6	1	2	10
Megesterol	30	3	3	2	3	6	1	2	10
Melengestrol	30	3	3	2	3	6	1	2	10
α -nortestosterone	30	3	3	2	3	6	1	2	10
α -testosterone	30	3	3	2	3	6	1	2	10
β -testosterone	30	3	3	2	3	6	1	2	10
Estriol	30	3	3	2	3	6	1	2	10
Estrone	30	3	3	2	3	6	1	2	10
Ethinylestradiol	30	3	3	2	3	6	1	2	10
Hydroxyprogesterone	30	3	3	2	3	6	1	2	10
Medroxyprogesterone	30	3	3	2	3	6	1	2	10
Oestradiol	30	3	3	2	3	6	1	2	10
Progesterone	30	3	3	2	3	6	1	2	10
α -zearalanol	30	3	3	2	3	6	1	2	10
β -zearalanol	30	3	3	2	3	6	1	2	10
α -zearalenol	30	3	3	2	3	6	1	2	10
β -zearalenol	30	3	3	2	3	6	1	2	10
Zearalanone	30	3	3	2	3	6	1	2	10
Zearalenone	30	3	3	2	3	6	1	2	10



Table 6: Naturally occurring chemical elements and compounds

Chemical elements	Samples collected	Product type collected													
		AMF	Butter	Casein	Colostrum	Cream	Follow-on formula	Growing up milk powder	Infant formula	Lactose	Nutritional	Skim milk powder	Whey protein concentrate	Whole milk powder	Milk protein concentrate
Aluminium	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Antimony	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Barium	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Bismuth	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Calcium	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Chromium	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Cobalt	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Copper	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Iodine	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Iron	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Magnesium	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Manganese	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Nickel	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Potassium	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Selenium	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Sodium	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0
Sodium thiocyanate	48	0	0	0	2	0	1	3	3	0	0	12	2	23	2
Zinc	89	3	3	1	2	1	6	13	16	2	3	8	5	26	0