

Independent Verification Programme

Dairy products (July 2016 to June 2017)

Microbiological Parameter (Food Safety and Process Hygiene)
Results

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1 Summary

This MPI Independent Verification Programme (IVP) report provides a summary of results for microbiological food safety and process hygiene parameter tests in a range of dairy products sampled during the 1 July 2016 to 30 June 2017 production period.

The purpose of the IVP is to:

- confirm that the New Zealand dairy products are safe, accurately labelled and manufactured under hygienic conditions;
- confirm that the regulatory framework delivers dairy products that are wholesome and accurately represented;
- confirm that risk management programme (RMP) sampling and testing plans and procedures are appropriate, reliable and capable of identifying non-conformances;
- monitor for emerging hazards; and
- identify any RMP operator not fully meeting expected performance criteria.

There were 295 individual samples analysed for 1729 individual test results, with 100% compliant results. This indicates that controls applied under the current regulatory framework are effective and continue to ensure that dairy products manufactured in New Zealand meet microbiological integrity and food safety outcomes.

The IVP verifies that New Zealand dairy manufacturers have sound quality programmes in place and that the self-monitoring programmes in place (sampling and testing of dairy material and products) are reliable and sufficiently robust. This IVP monitoring programme complements the National Chemical Contaminants Programme (NCCP) which monitors chemical residues and contaminants in raw milk and processed dairy products. These two programmes combine to provide a high level of confidence in the safety and suitability of New Zealand dairy products.

2 IVP Sampling and Testing

2.1 WHAT WE LOOKED FOR

We looked for a range of microbiological food safety and process hygiene parameters listed in Table 1.

Table 1: Microbiological food safety and process hygiene parameters

Microbiological food safety parameters	Microbiological process hygiene parameters
<i>Salmonella</i> spp.	Aerobic plate count at 30°C with an incubation time of 72 hours
<i>Listeria monocytogenes</i>	(also known as total plate count or standard plate count)
<i>Campylobacter</i> spp.	Total coliforms
<i>Escherichia coli</i>	Sulphite-reducing clostridia spores
Coagulase positive staphylococci	
<i>Cronobacter</i> spp. (infant formula for infants 0-6 months)	
<i>Bacillus cereus</i>	

These microbiological food safety parameters are considered to be of most interest with respect to dairy product safety, consistent with the microbiological criteria set out in the joint

Australia New Zealand Food Standards Code¹ and DPC 1: Animal Products (Dairy): Approved Criteria for General Dairy Processing².

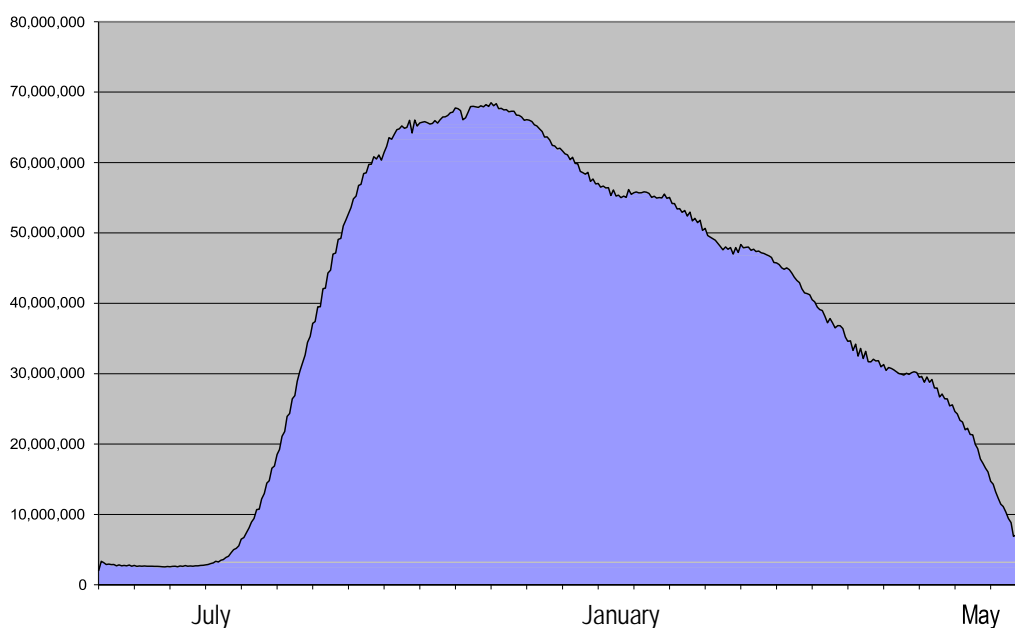
The microbiological process hygiene parameters such as aerobic plate count and total coliforms tests serve as indicator tests to indicate the hygienic state throughout processing rather than product safety. A lapse in sanitation controls indicate a need for investigation and corrective action but does not mean that food safety has been compromised. Nonetheless, these hygiene indicator tests must meet the regulatory limits applied for infant formula products.

2.2 WHAT WE TESTED

More than 300 individual dairy product samples were collected. Not all samples were suitable for testing. Reasons included insufficient sample size, sample leakage during transport, delayed delivery to the laboratory. There were 295 individual samples that were suitable for analysis. These samples were analysed for 1729 individual test results with 100% compliant results.

Samples were collected between 1 July 2016 and 30 June 2017. Most were collected in the seven month period from mid-August through to mid-March, following the highly seasonal pasture based milk production curve (See Figure 1). Samples are predominantly from bovine dairy products, though goat and sheep milk products are also included.

Figure 1: New Zealand Milk Supply Curve



Grab samples³ were collected at the point of packaging of final product across the majority of export eligible dairy manufacturing premises as this captures dairy products that are deemed eligible for export at the time of sampling. This also enables remedial action to be taken at the earliest opportunity should a non-conformance be identified.

¹ <http://www.foodstandards.govt.nz/code/Pages/default.aspx>

² <http://www.mpi.govt.nz/processing/dairy-products/dairy-manufacturing/manuals-and-guidelines/>

³ A grab sample reflects performance only at the point in time that the sample was collected.

Samples were obtained under the supervision of a recognised person, who is part of a MPI recognised agency, as part of a performance based verification (PBV) audit at the manufacturers' premises.

Samples obtained under the IVP are a check on a dairy processor's own sampling and testing programme. The grab sample sampling technique is most appropriate for the IVP as it is impractical to take composite samples from continuously sampling across a full product manufacturing lot that typically runs for 24 hours.

The products sampled are set out in Table 2.

Table 2: Summary of dairy products sampled in 2016/17

Product type	Proportion of samples (%)
Products for specified populations ¹ :	
Infant formula products	19
Other high interest products	4
Products for general population:	
Milk powders	31
Protein products	6
Cheese/yoghurt, butter, anhydrous milk fat	15
Other dairy products	25

Note

¹ Products that are specifically designated for, and are likely to form, a substantial part of the dietary intake of more susceptible members of the population (i.e. infants and young children, the old, pregnant, and immune-compromised). Samples obtained in final retail form, formulated base products, or dairy ingredients.

2.3 WHAT WE SAMPLED

- 67 dairy products for specified populations;
- 228 dairy products for general population samples.

2.4 WHAT WE FOUND

Of the 1729 individual microbiological test results obtained there were no (0) non-conforming results.

The samples were tested at an MPI recognised dairy laboratory, using ISO/IEC 17025 accredited test methods, except for some matrices tested for *Campylobacter* spp. MPI specified the testing for *Campylobacter* spp. was undertaken for an on-going survey. This survey will not continue after 30 June 2018.

2.5 MICROBIOLOGICAL ACTION LIMITS

The microbiological action limits in Table 3 are taken from the Product Safety Limits (PSLs) set out in the DPC 1: Animal Products (Dairy): Approved Criteria for General Dairy Processing, and microbiological criteria set out in the joint Australia New Zealand Food Standards Code.

Table 3: Microbiological action limits

Parameter	Products for specified populations (including infant formula)	Products for general population
<i>Salmonella</i> spp.	Absent in 250g	Absent in 25g
<i>L. monocytogenes</i>	Absent in 25g	Absent in 25g
<i>Campylobacter</i> spp.	Absent in 25g	Absent in 25g
<i>E. Coli</i>	Not exceeding 10 cfu/g	Not exceeding 100 cfu/g

Parameter	Products for specified populations (including infant formula)	Products for general population
Coagulase positive staphylococci	Not exceeding 10 cfu/g	Not exceeding 1,000 cfu/g
<i>Cronobacter</i> spp.	Absent in 300g (infant 0-6 months only)	Not tested
<i>B. cereus</i>	Not exceeding 100 cfu/g	Not exceeding 1,000 cfu/g
Aerobic plate count	Not exceeding 5,000 cfu/g ¹	Not exceeding 100,000 cfu/g
Total coliforms	Not exceeding 10 cfu/g	Not exceeding 100 cfu/g
Sulphite-reducing clostridia spores	Process hygiene only ² 50 cfu/g in powdered formulae 100 cfu/g in dairy ingredients for formulae	Process hygiene only ² 10 cfu/ml in milk processed products corrected according to concentration factors

Notes

- 1 Excludes fermented products or products supplemented with bacterial cultures
- 2 Traceback initiated and concentration factors reviewed if threshold limit is exceeded, with measures taken by the dairy processor to rectify the situation
- 3 Colony-forming units (cfu)

3 Results

Each test result obtained is compared against both the Australia New Zealand Food Standards Code and DPC 1: Animal Products (Dairy): Approved Criteria for General Dairy Processing for each parameter, as well as being compared to the requirements of those markets that the product is eligible for export.

3.1 GENERAL POPULATION DAIRY PRODUCTS

Table 4: Products for General Population

Organism Tested	Total Not Detected	Total Detected	Total Tested
<i>Campylobacter</i> spp.	226	0	226
Coagulase positive staphylococci	226	1	227
<i>E. coli</i>	227	0	227
<i>L. monocytogenes</i>	227	0	227
<i>Salmonella</i> spp.	228	0	228
Grand Total	1134	1	1135

3.1.1 Coagulase +ve Staphylococci

A detection for coagulase +ve staphylococci can indicate poor hygiene activities during milk collection or may be as a result of mastitis in the animal. There was one detection reported of 10 cfu/g in a cheese sample. This detection was well below the action limit of 1000 cfu/g for this product for the general population.

3.2 SPECIFIED POPULATIONS DAIRY PRODUCTS

Table 5: Products for Specified Populations

Organism Tested	Total Not Detected	Total Detected	Total Tested
Aerobic plate count	4	56	60
<i>B. cereus</i>	56	4	60
<i>Campylobacter</i> spp.	67	0	67
Coagulase positive staphylococci	66	0	66
<i>Cronobacter</i> spp.	20	0	20
<i>E. coli</i>	67	0	67
<i>L. monocytogenes</i>	67	0	67
<i>Salmonella</i> spp.	67	0	67
Sulphite-reducing clostridia spores	41	19	60
Total Coliforms	60	0	60
Grand Total	515	79	594

3.2.1 Aerobic plate count

Aerobic plate count indicates the level of bacterial population in a sample and can be used to assess hygiene state throughout processing. 56 of the 60 samples tested had aerobic plate count detections. These detections ranged from 10 to 650 cfu/g. These detections are well below the action limit of 5000 cfu/g applied for samples for specified populations.

3.2.2 *B. cereus*

There were four detections reported using the presumptive test for *B. cereus*. All of the detections were at 10 cfu/g. The detections did not exceed the action limit for specified populations for this organism of 100 cfu/g. *Bacillus cereus* is an aerobic, spore-forming bacterium prevalent in the environment, and naturally occurs in many foods hence detections are not unexpected.

3.2.3 Sulphite-reducing clostridia spores

There were 19 detections reported of sulphite-reducing clostridial spores in specified population products. These ranged from 1 to 8 cfu/g. 17 of these samples were at 1 cfu/g. All detections were well below the action limits, which vary depending on the product and range from 50 – 100 cfu/g. *Clostridium* spp. are anaerobic, spore-forming bacteria. The spores are prevalent in the environment and hence detections are not unexpected. A measure of sulphite-reducing clostridia spores can be used as a hygiene indicator for dairy process control systems.

4 Conclusion

These results indicate that New Zealand dairy products meet process hygiene and food safety criteria for all intended uses and markets. They serve to provide further confidence that good manufacturing and hygienic practices are being applied under the New Zealand regulatory framework.