New Zealand Food Safety
Haumaru Kai Aotearoa

Independent Verification Programme

Dairy Products (July 2017 to June 2018)

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 2017 to 30 June 2018 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 presented;
- 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 307 individual samples analysed for 1628 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
Salmonella spp.	Aerobic plate count at 30°C with an incubation time of 72 hours (also known as total plate count or standard plate count)
Listeria monocytogenes	
Campylobacter spp.	Total coliforms
Escherichia coli	Sulphite-reducing clostridia spores
Coagulase positive staphylococci	
Cronobacter spp. (infant formula for infants 0-6 months)	
Bacillus cereus	

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 Code[1] and DPC 1: Animal Products (Dairy): Approved Criteria for General Dairy Processing[2].

These 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.

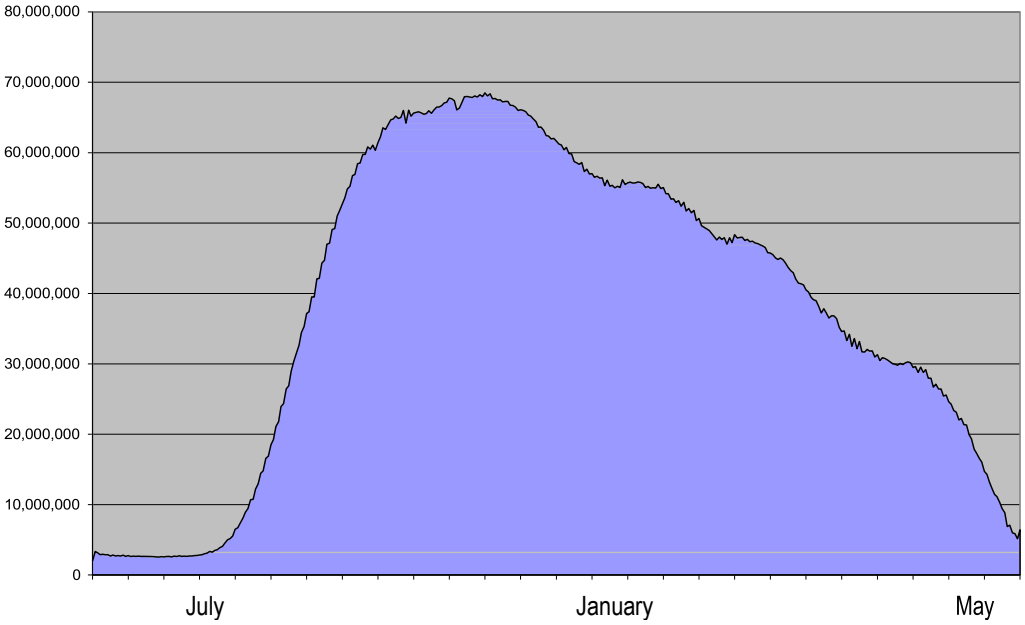
[1] http://www.foodstandards.govt.nz/code/Pages/default.aspx
[2] http://www.mpi.govt.nz/processing/dairy-products/dairy-manufacturing/manuals-and-guidelines/

2.2 WHAT WE TESTED

There were 307 individual samples that were suitable for analysis. These samples were analysed for 1628 individual test results with 100% compliant results.

Samples were collected between 1 July 2017 and 30 June 2018. 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 samples[3] 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.

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.

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

Table 2: Summary of dairy products sampled in 2017/18

Product type		Proportion of samples (%)
Products for specified populations[1]:		
	Infant formula products	19
	Other high interest products	6
Products for general population:		
	Milk powders	33
	Protein products	7
	Cheese/yoghurt, butter, anhydrous milk fat	14
	Other dairy products	21

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

- 76 dairy products for specified populations;
- 231 dairy products for general population samples.

2.4 WHAT WE FOUND

Of the 1628 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
Salmonella spp.	Absent in 250g	Absent in 25g
L. monocytogenes	Absent in 25g	Absent in 25g
Campylobacter spp.	Absent in 25g	Absent in 25g
E. Coli	Not exceeding 10 cfu/g	Not exceeding 100 cfu/g
Coagulase positive staphylococci	Not exceeding 10 cfu/g	Not exceeding 1,000 cfu/g
Cronobacter spp.	Absent in 300g (infant 0-6 months only)	Not tested
B. cereus	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
Campylobacter spp.	63	0	63
Coagulase positive staphylococci	231	0	231
E. coli	230	0	230
L. monocytogenes	231	0	231
Salmonella spp.	227	0	227
Grand Total	**982**	**0**	**982**

3.2 SPECIFIED POPULATIONS DAIRY PRODUCTS

Table 5: Products for Specified Populations

Organism Tested	Total Not Detected	Total Detected	Total Tested
Aerobic plate count	2	70	72
B. cereus	61	11	72
Campylobacter spp.	23	0	23
Coagulase positive staphylococci	76	0	76
Cronobacter spp.	33	0	33
E. coli	76	0	76
L. monocytogenes	76	0	76
Salmonella spp.	74	0	74
Sulphite-reducing clostridia spores	54	18	72
Total Coliforms	72	0	72
Grand Total	**547**	**99**	**646**

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. 70 of the 72 samples tested had aerobic plate count detections. These detections ranged from 10 to 330 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 11 detections reported using the presumptive test for *B. cereus*. The detections ranged from 10 to 20 cfu/g. These 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 18 detections reported of sulphite-reducing clostridial spores in specified population products. These ranged from 1 to 5 cfu/g. 10 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.