New Zealand Food Safety
Haumaru Kai Aotearoa

Independent Verification Programme

Dairy Products (July 2018 to June 2019)

Microbiological Food Safety and Process Hygiene Parameter Results

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1 Summary

This New Zealand Food Safety 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 2018 to 30 June 2019 production period.

The objective of the IVP is to:

- confirm the New Zealand dairy products are safe, accurately labelled and manufactured under hygienic conditions;
- confirm 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 302 individual samples analysed for 1472 individual test results, with 100% compliant results. This indicates controls applied under the current regulatory framework are effective and continue to ensure 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 Legal Framework

The IVP is an official programme under the Animal Products Act 1999. The IVP is administered by New Zealand Food Safety.

3 Programme Design

At least 300 samples are obtained under the supervision of a recognised person from a Ministry for Primary Industries (MPI) recognised agency, during a performance-based verification (PBV) audit at the manufacturers' premises. Samples are dairy products deemed eligible for export at the time of sampling. The samples are tested at an MPI recognised laboratory, using ISO/IEC 17025[1] accredited test methods.

4 Sampling and Testing

4.1 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	
Escherichia coli	Total coliforms
Coagulase positive staphylococci	Sulphite-reducing clostridia spores

[1] ISO/IEC 17025: General requirements for the competence of testing and calibration laboratories

Microbiological food safety parameters	Microbiological process hygiene parameters
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[2] and DPC 1: Animal Products (Dairy): Approved Criteria for General Dairy Processing[3].

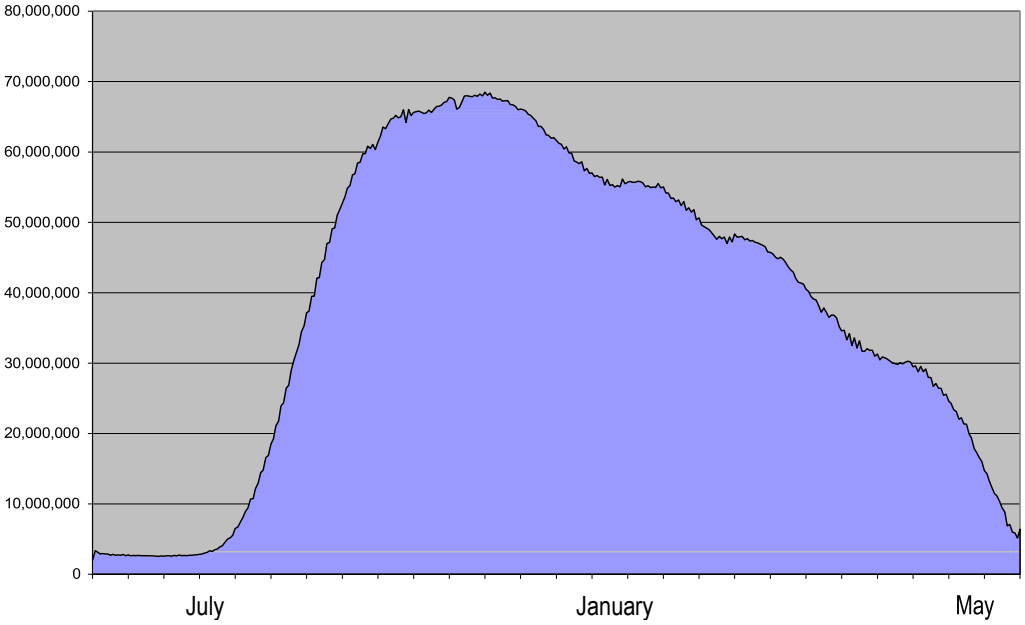
These microbiological process hygiene parameters, such as aerobic plate count and total coliforms tests, serve as tests to indicate the hygienic state throughout processing rather than product safety. A lapse in sanitation controls show a need for investigation and corrective action, but does not mean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

4.2 WHAT WE TESTED

There were 302 individual samples that were suitable for analysis. These samples were analysed for 1472 individual test results with 100% compliant results.

Samples were collected between 1 July 2018 and 30 June 2019. 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 buffalo, goat and sheep milk products are also included.

Figure 1: New Zealand milk supply curve



Grab samples[4] were collected at the point of packaging of final product across the majority of export eligible dairy manufacturing premises because this captures dairy products 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 from a MPI recognised agency, during a 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, because it is

[2] http://www.foodstandards.govt.nz/code/Pages/default.aspx
[3] https://www.mpi.govt.nz/dmsdocument/10145/direct
[4] A grab sample reflects performance only at the point in time the sample was collected.

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 2018/19

Product type		Proportion of samples (%)
Products for specified populations[1]:		
	Infant formula products	20
	Other high interest products	5
Products for general population:		
	Milk powders	28
	Protein products	8
	Cheese/yoghurt, butter, anhydrous milk fat	21
	Other dairy products	18

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.

4.3 WHAT WE SAMPLED

- 61 dairy products for specified populations;
- 241 dairy products for general population samples.

4.4 WHAT WE FOUND

Of the 1472 individual microbiological test results obtained, there were no (0) non-conforming results.

The samples were tested at an MPI recognised laboratory, using ISO/IEC 17025 accredited test methods.

4.5 MICROBIOLOGICAL ACTION LIMITS

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

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
E. coli	Not exceeding 10 cfu/g	Not exceeding 100 cfu/g
Coagulase positive staphylococci	Not exceeding 10 cfu/g or 100 cfu/g[4]	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)
4 The limit of 10 cfu/g applies to powdered infant formula products only

5 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.

5.1 GENERAL POPULATION DAIRY PRODUCTS

Table 4: Products for general population

Organism Tested	Total Not Detected	Total Detected	Total Tested
Coagulase positive staphylococci	241	0	241
E. coli	241	0	241
L. monocytogenes	241	0	241
Salmonella spp.	239	0	239
Grand Total	**962**	**0**	**962**

5.2 SPECIFIED POPULATIONS DAIRY PRODUCTS

Table 5: Products for specified populations

Organism Tested	Total Not Detected	Total Detected	Total Tested
Aerobic plate count	2	59	61
B. cereus	51	10	61
Coagulase positive staphylococci	61	0	61
Cronobacter spp.	22	0	22
E. coli	61	0	61
L. monocytogenes	61	0	61
Salmonella spp.	61	0	61
Sulphite-reducing clostridia spores	44	17	61
Total Coliforms	61	0	61
Grand Total	**424**	**86**	**510**

5.2.1 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. 59 of the 61 samples tested had aerobic plate count detections. These detections ranged from 10 to 250 cfu/g. These detections are well below the action limit of 5000 cfu/g applied for samples for specified populations.

5.2.2 *B. cereus*

There were 10 detections reported using the presumptive test for *B. cereus*. All of the detections were at 10 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.

5.2.3 Sulphite-reducing clostridia spores

There were 17 detections reported of sulphite-reducing clostridial spores in specified population products. These ranged from 1 to 17 cfu/g. Nine 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.

6 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.