

Validation Trial of Riva Dispensing System for Swirlo Pty Ltd

Overview

Biotech Laboratories Pty Ltd is a NATA accredited biological testing facility. All the analyses reported in this document are included in our terms of accreditation. The Standard Plate Count of ice-cream analysis was performed as per the FSANZ requirement for agar plate incubation of 3 days at 30 °C.

The two flavour Riva Dispensing System unit and storage cabinet was installed and commissioned by Swirlo Pty Ltd into the office area of our laboratory on 20 August 2020.



The lower section is the storage cabinet set at -14 °C, upper section is the dispenser set at -14 °C. The safe provision of food as stated in the Australia New Zealand Food Standards Code– Standard 3.2.2 ‘Food Safety Practices and General Requirements’ state the following

- Temperature control means maintaining food at a temperature of
 - 5 °C or below, or
 - 60 °C or above or
 - Another temperature - if the food business demonstrates that maintenance of the food at this temperature for the period of time for which it will be so maintained, will not adversely affect the microbiological safety of the food.
- A food business must, when storing potentially hazardous food
 - Store it under temperature control; and
 - if it is food that is intended to be stored frozen, ensure the food remains frozen during storage.

The aim of this trial is to demonstrate that

1. That the supplied dispensing machine does not adversely affect the microbiological safety of the ice-cream.
2. That the holding of the ice-cream at -14 °C for prolonged periods does not adversely affect the safety of the ice-cream.

The following is a statement by Swirlo Pty Ltd.

The ice-cream is supplied in plastic containers from a HACCP certified company. The buckets are to be stored at or below -18 °C and then transferred to the lower storage cabinet for at least 24 hours before moving to the upper dispenser. The product should not be in the -14 °C dispenser or stored in the tempering unit below at -14 °C for any longer than 2 weeks.

Trial Descriptions

Trial 1

Biotech Laboratories Pty Ltd will use the dispensing machine throughout the day (Monday to Friday) to mimic a minimal usage rate. The daily specified shut down procedure and weekly cleaning procedure will be performed as specified by Swirlo Pty Ltd.

This is to evaluate if the ice-cream product held at -14 °C and the dispensing unit does not adversely affect the microbiological safety of the food and if the ice-cream was held in either the storage cabinet or the dispenser for a total of 4 weeks. Both chocolate and vanilla ice-cream samples and machine outlet swabs shall be collected by Biotech Laboratories' staff each week immediately before the weekly cleaning procedure is performed.

As there are no specific Food Standards Australia and New Zealand (FSANZ) microbial standards for Ice-cream, samples will be tested as per the "USA Code of Federal Regulations: 7 CFR § 58.664 - Microbiological requirements for ice cream" for Coliforms and Standard Plate Count. The acceptable limits for these analyses are as follows:

Vanilla ice-cream

- Coliforms: ≤10 cfu/gram
- Standard Plate Count: ≤50,000

Chocolate ice-cream

- Coliforms: ≤20 cfu/gram
- Standard Plate Count: ≤50,000

Over each period of testing a fail will be designated as any of the following:

Vanilla ice-cream

- Standard Plate Count: >50,000 cfu/gram
- Coliforms: >10 cfu/gram

Chocolate ice-cream

- Standard Plate Count: >50,000 cfu/gram
- Coliforms: >20 cfu/gram

Swab samples from the machine vanilla and chocolate ice-cream dispensing nozzle and analysed for the presence or absence of the following indicator and applicable pathogenic bacteria as specified in the “FSANZ Compendium of Microbiological Criteria for Food - Revised Sept 2018”

- Escherichia coli
- Bacillus cereus
- Clostridium perfringens
- Staphylococcus (coagulase positive)
- Listeria monocytogenes
- Salmonella

Over each period of testing a fail will be designated as any of the following:

- Presence of any of the bacteria under investigation

Trial 2

Biotech Laboratories Pty Ltd will not use the dispensing machine. The container of ice-cream will remain in the dispensing unit for the entire testing period. The daily specified shut down procedure and weekly cleaning procedure will be performed as specified by Swirlo Pty Ltd.

To demonstrate that holding a single container of chocolate ice-cream at -14 °C for a period of 6 weeks does not adversely affect the microbiological safety of the food. Chocolate ice-cream samples will be collected immediately before the weekly cleaning procedure is performed.

Samples will be tested as per the applicable analyses from the “FSANZ Compendium of Microbiological Criteria for Food - Revised Sept 2018” and also the “USA Code of Federal Regulations: 7 CFR § 58.664 - Microbiological requirements for ice cream” for Coliforms and Standard Plate Count. A fail will be designated as any of the following:

- Plate Count: >50,000 cfu/gram
- Coliforms: >20 cfu/gram
- Escherichia coli: ≥3 cfu/gram
- Staphylococcus (coagulase positive): ≥100 cfu/gram
- Bacillus cereus: ≥100 cfu/gram
- Clostridium perfringens: ≥100 cfu/gram
- Listeria monocytogenes: Detected in 25 grams
- Salmonella: Detected in 25 grams

Results

Trial 1 - Ice-cream

Table 1a shows the results for the vanilla and chocolate ice-cream during the four week period with regular daily dispensing of product.

Table 1a. Ice-cream

Results expressed as cfu/gram				
Testing Round	Vanilla ice-cream		Chocolate ice-cream	
	Plate Count	Coliforms	Plate Count	Coliforms
On Receipt	<50	<10	250	<10
Week 1	<50	<10	150	<10
Week 2	<50	<10	150	<10
Week 3	50	<10	20	<10
Week 4	100	<10	200	<10
Acceptable Result →	≤50,000	<10	≤50,000	<20

1 – Dispensing nozzle

Table 1b shows the results for swabbing of the vanilla ice-cream outlet nozzle during the four week period with regular daily dispensing of product. All analyses were performed as a presence/absence for each of the bacteria listed.

Table 1b. Vanilla ice-cream dispensing nozzle swab testing

Testing Round	E. coli	Staphylococcus (coagulase positive)	Bacillus cereus	Clostridium perfringens	Listeria monocytogenes	Salmonella
Week 1	ND	ND	ND	ND	ND	ND
Week 2	ND	ND	ND	ND	ND	ND
Week 3	ND	ND	ND	ND	ND	ND
Week 4	ND	ND	ND	ND	ND	ND
Acceptable Result →	ND	ND	ND	ND	ND	ND

ND = Not detected in swab

Table 1c shows the results for swabbing of the chocolate ice-cream outlet nozzle during the four week period with regular daily dispensing of product. All analyses were performed as a presence/absence for each of the bacteria listed.

Table 1c. Chocolate ice-cream dispensing nozzle swab testing

Testing Round	E. coli	Staphylococcus (coagulase positive)	Bacillus cereus	Clostridium perfringens	Listeria monocytogenes	Salmonella
Week 1	ND	ND	ND	ND	ND	ND
Week 2	ND	ND	ND	ND	ND	ND
Week 3	ND	ND	ND	ND	ND	ND
Week 4	ND	ND	ND	ND	ND	ND
Acceptable Result →	ND	ND	ND	ND	ND	ND

ND = Not detected in swab

Trial 2 – Chocolate ice-cream

Table 2a and 2b show the results for the same chocolate ice-cream container held in the dispensing unit during a six week period without daily dispensing of product.

Table 2a and 2b. Chocolate ice-cream container held for 6 weeks in the dispensing unit without daily use.

Table 2a

Testing Round	Standard Plate Count	Coliforms	E. coli	Staphylococcus (coagulase positive)
Week 0	<50	<3	<3	<100
Week 1	<50	<3	<3	<100
Week 2	200	<3	<3	<100
Week 3	150	<3	<3	<100
Week 4	200	<3	<3	<100
Week 5	<50	<3	<3	<100
Week 6	100	<3	<3	<100
Acceptable Result* →	≤50,000	<20	<3	<100

Results expressed as cfu/gram.

Table 2b

Testing Round	Bacillus cereus	Clostridium perfringens	Listeria monocytogenes	Salmonella
Week 0	<100	<100	ND	ND
Week 1	<100	<100	ND	ND
Week 2	<100	<100	ND	ND
Week 3	<100	<100	ND	ND
Week 4	<100	<100	ND	ND
Week 5	<100	<100	ND	ND
Week 6	<100	<100	ND	ND
Acceptable Result* →	<100	<100	ND	ND

Numeric results expressed as cfu/gram. ND = Not detected in 25 grams

*Acceptable results for Standard Plate Count and Coliforms referenced from “USA Code of Federal Regulations: 7 CFR § 58.664 - Microbiological requirements for ice cream”. All other acceptable results referenced from “FSANZ Compendium of Microbiological Criteria for Food - Revised Sept 2018”.

Conclusions

The aim of this trial was to demonstrate that

1. That the supplied dispensing machine does not adversely affect the microbiological safety of the ice-cream.
2. That the holding of the ice-cream at -14 °C for prolonged periods does not adversely affect the safety of the ice-cream.

Based on the results obtained, I have found no evidence that when the dispensing unit is used and maintained as per the manufacturer's directions that the holding temperature of -14 °C adversely affects the microbiological safety of the ice-cream.



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