MICROBIOLOGICAL REFERENCE CRITERIA FOR FOOD

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Food Safety can only be assured by the use of food safety programmes based on the principles of HACCP. Reliance on microbiological criteria/product testing alone is not sufficient. These criteria are formulated as a guide to indicate when food can be considered unacceptable or unsafe.

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These reference criteria are formulated as a guide for regulators to assess when foods can be considered unacceptable or unsafe. They apply until the end of the given shelf life of a particular food. The Ministry of Health recommends industry strive for more stringent specifications.

Microbiological knowledge is expanding rapidly. Therefore regardless of what is printed here no food provided for public consumption should contain any microorganisms or biotoxin at a level identified as capable of causing foodborne disease.

These criteria will be reviewed regularly. Please ensure you have the latest version.

1 INTRODUCTION

There are two criteria referred to in this document, standards and reference criteria.

Microbiological Standards are part of the New Zealand Food Regulations 1984 which clearly establishes a microbiological content or level that it is unlawful to exceed. They are legislative and mandatory. As such they are identified separately to reference criteria.

Microbiological Reference Criteria are not part of a New Zealand law. They are to be used where no standard exists in law to monitor the microbiological safety of a manufacturing process or the safety of a food. They may be used as supplements to existing standards where public health concerns dictate.

The Microbiological Reference Criteria can be of prime importance in deciding if a food is unsound or in reinforcing other observations and providing reasons to suspect that a food may not meet sound public health practices. If the bacteriological quality is outside these reference criteria, an audit of the company's food safety programme will almost inevitably reveal unsatisfactory practices.

NB. Foods made with components which have their own criteria (eg cheese, cooked meat), but which are used in combination with other foods (eg prepared meals, sandwiches), should be assessed against criteria 5.8 or 5.9.

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These standards and reference criteria have been developed taking into consideration the following:

New Zealand Food Regulations 1984

Publications of the Codex Alimentarius Commission of the Food and Agriculture Organisation of the United Nations World Health Organisation

Publications of the United States Health and Welfare Food and Drug Agency

Publications of the International Commission of Microbial Specifications for Food

Publications of the Australian National Health and Medical Research Council

Publications of the Australian National Food Authority

Principles and Practice for the "Safe Processing of Foods" ed. David A and Norah F Shapton, Butterworth Heinemann 1991

British Food Manufacturing Industries Research Association, Food Legislation Survey, Microbiological Standards for Foodstuffs - 2nd ed.

The preferred methods of analysis are those described in the *Compendium of Methods for the Microbiological Examination of Foods, APHA, 1992*. - American Public Health Association (APHA).

Note: It is the Ministry of Health's intention that "Reference Criteria" will progressively replace existing microbiological "Standards" in the regulations. There will instead be reference in the regulations to appropriate criteria to assist with regulatory requirements for safe food.

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2 SAMPLING AND INTERPRETATION

The reference criteria are expressed in the format prepared by the International Commission on Microbiological Specifications for Foods (ICMSF). The ICMSF Scheme assists with the practical difficulties of representative sampling and interpretation of data provided by the laboratory. It permits some degree of tolerance to compensate for the difficulties of statistical sampling, and non-uniformity of bacterial load.

The following terms as used by the ICMSF are used in these reference criteria.

n = The number of sample units which must be examined from a lot of food to satisfy the requirements of a particular sampling plan.

c = The maximum allowable number of defective sample units. When more than this number are found, the lot is rejected by the sampling plan.

m = Represents an acceptable level and values above it are marginally acceptable or unacceptable in the terms of the sampling plan.

M = A microbiological criterion which separates marginally acceptable quality from defective quality. Values above M are unacceptable in the terms of the sampling plan and detection of one or more samples exceeding this level would be cause for rejection of the lot.

Sampling

Select at random 10% or 20 units, (individual packages) whichever is the less, from a lot or consignment (production batch or shipment). Where a consignment is made up of a variety of component units, a minimum of 5 units from each variety is randomly selected. This may result in more than 20 units. Wherever possible, unit samples of a product are submitted to the laboratory in the original unopened packaging, maintained in their physical state as at the time of sampling.

When establishing the overall standard of a variety of foods in assessing an individual food processing premise, (ie, takeaway food, restaurant) one grab sample of each individual selected food may be appropriate. The M value can be applied to one sample but c, n and m only apply when taking five samples. M values are useful for a broadbrush approach; but should be used under specific circumstances for premises or batches of product. It is important to know the objective for sampling when deciding which sampling plan to adopt.

It should be recognised that a sampling plan of n = 5 is a minimum, applicable often by a regulatory authority as a cost governed expediency for surveillance purposes, the stringency of such a sampling programme being governed by the value applied to m.

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Other sampling plans have been formulated by ICMSF which are responsive to given prevailing circumstances related to risk, or identified levels of concern for pathogenic microorganisms. Such sampling plans should only be applied after consultation, taking into account perceived risks and other specific factors pertaining to the food in question.

Interpretation

With the exception in some instances of nil tolerance, where the non-compliance of 1 unit from a lot or consignment constitutes rejection, the following assessment is generally applied.

Where 5 or more units of the same variety from a lot or consignment are analysed (n = 5), no more than 2 units (c = 2) should exceed the maximum tolerance (m) for microbiological levels stated in the reference criteria and no 1 unit should exceed the stated level for the maximum tolerance (M).

In some cases c may have a different value, eg, c = 3.

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3 MICROBIOLOGICAL STANDARDS

Found in the Food Regulations 1984.

3.1 Cheese

Regulation 113(2)b.
The cheese shall contain not more than:

100 *Escherichia coli* per gram.
100 *Staphylococcus aureus* (coagulase-producing) per gram.
A 50 g sample shall be free from Salmonella.

3.2 Ice cream, frozen confections

Regulations 121(9), 122(3). See also Reference Criteria No. 5.15.

When subjected to the test described in the Fourth Schedule to the Food Regulations 1984, 3 out of 5 replicate portions of 0.1 millilitre shall not give evidence of acid formation and gas formation as described in that schedule. In regulation 121 and 122 where combinations of fermentable sugars may be included in these foods there will be an additional step. Tubes showing evidence of acid and gas formation shall be subcultured to an additional tube of test media and incubated according to the test prescribed in the Fourth Schedule as a confirmatory test.

3.3 Milk

(a) Raw milk, raw cream

Regulations 92(5), 99(3). See also Reference Criteria No. 5.20 (b).

Standard plate count at 30°C <150,000 colonies/ml.

(b) Pasteurised milk and pasteurised milk products

Regulation 93(4). See also Reference Criteria No. 5.20(a).

Includes - standardised milk, recombined milk, flavoured milk, skim or non-fat milk, reduced-fat milk, cream, whipping cream or whipped cream, reduced cream or pouring cream, light cream, sour cream and recombined cream and any other milk product for which no standard is prescribed in Regulations 92 to 122.

Standard plate count at 35°C <50,000 colonies/ml (93(4)a).

When subjected to the test described in the Fourth Schedule to the Food Regulations 1984, 3 out of 5 replicate portions of 0.1 millilitres shall not give evidence of acid formation and gas formation as described in that schedule. (93(4)b).

(c) UHT (Ultra heat treated) milk and UHT (Ultra heat treated) milk products

Regulation 94(2).

UHT products shall be sterile when subjected to the test in the Sixth Schedule to the Food Regulations 1984.

3.4 Pulped egg

Regulation 133(2). See also Reference Criteria No. 5.6.

When subjected to the resazurin test described in the Seventh Schedule to the Food Regulations 1984 the reduction time shall be not less than 7 hours.

3.5 Yoghurt

Regulation 119(1) and (2).

pH <4.5.
Lactic acid producing bacteria $\geq 10^6$ per ml.

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3.6 Food containers

The Food Hygiene Regulations 1974, regulation 17, clause 3, subclause (b), contain requirements governing the "Microbiological Standards" for bottles, jars, or jugs, in that residual bacterial plate counts may not exceed:

(i) More than 1/millilitre of containing capacity, or
(ii) More than 1/square centimetre of surface area.

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4 GENERAL MICROBIOLOGICAL REFERENCE CRITERIA FOR *LISTERIA MONOCYTOGENES*

All foods, regardless of the categories listed below, should be produced in accordance with **Good Manufacturing Practice** using the principles of **Hazard Analysis Critical Control Points systems (HACCP).**

This reference criteria applies to the following two categories of foods.

4.1 Ready-to-eat foods

Foods which are generally eaten in the state in which they are sold or given a mild (ie, non-listeriocidal) heat treatment before consumption.

Foods that may come into this category include **but are not limited** to:

- cooked meals, eg cook/chill, sous vide type foods
- cooked meats and their products
- cooked seafoods and their products
- seafood products that are likely to be consumed in that state, eg cold smoked salmon, smoked mussels
- prepared desserts and bakery products containing cream or other fillings of high water activity
- dairy products including soft cheeses.

4.2 All foods produced by a process which is capable of achieving a Listeria-free product

Criteria

Listeria monocytogenes (/25g)

n = 5, c = 0, m = 0,

Note the reference criteria **does not** apply to the following foods:

- Raw fruit, raw vegetables, raw meats and raw seafoods

or

- Foods produced in accordance with good manufacturing practice that will not support the growth of *Listeria monocytogenes*

ie have pH of less than 4.6 or greater than 9.0
and/or water activity less than 0.9
and/or are stored or displayed below 1°C and/or

- Other foods produced in accordance with good manufacturing practice which are recommended for consumption within four days of manufacture and are clearly labelled as such. The calculation of four days shall commence from the date of manufacture or from further processing where a Listeria-free package is opened. This calculation is not altered by subsequent preparation or by the use of that food as an ingredient unless a further listeriocidal process is used. Foods which are expected to be consumed within four days should be labelled accordingly, with a packed-on date, storage instructions and use-by date, or displayed with this information if sold unpackaged.

4.3 Summary of actions to be taken by industry on food samples positive for *Listeria monocytogenes*

The following is a summary of the actions to be taken when a product which should fall within the nil tolerance of the microbiological reference criteria fails to comply.

Please note these actions generally **do not apply** to the following:

- foods which are given a listeriocidal process after purchase, such as raw meats or fish
- foods which are manufactured in accordance with good manufacturing practice (based on the principles of HACCP) and will not support the growth of *Listeria monocytogenes* (ie pH<4.6 or >9.0; or A_W<0.9; or stored at <1^{0}C)
- foods which are manufactured in accordance with good manufacturing practice (based on the principles of HACCP) have a shelf life of up to 4 days and are clearly labelled as such
- raw fruit, raw vegetables.

If a non complying sample is found:

- The owner must stop product sales immediately the defect is detected unless the product is given a further listeriocidal process.
- The owner must determine where the non-compliance was likely to have originated eg where the product was assembled, processed or stored where it could be contaminated on site, or at manufacture. This may be in consultation with a health protection officer.
- If the product contains components which are likely to support the growth of Listeria which were manufactured in other premises, the effectiveness of hazard controls must be investigated at the originating premises.
- If product is in the hands of consumers it must be recalled.

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N.B. The responsibility for carrying out recalls rests with the manufacturer of the non-complying product.

Action following a recall:

- Food safety plans must be assessed.
- If food safety plans are not adequate the owner must undertake an analysis of hazards and critical control points associated with their process and implement improvements where necessary.
- Before further product can be manufactured for sale the owner must verify food safety plans are adequate and implemented. Product safety must then to be verified by clearance sampling in accordance with acceptable sampling plans.
- After resumption of production the owner and teh health protection officer need to be assured that the food safety programme continues to operate effectively.

Enforcement:

Failure by an owner to either cease manufacture of product or withdraw/recall product from sale when requested to do so shall result in seizure of that product where the officer has reason to believe that it is contaminated. (Food Act 1981, section 9).

Clearance Sampling

The manufacturer will be expected to meet all costs of clearance sampling. The sampling must have statistical validity.

(a) Products with a long shelf life (ie > one month)

Three sample sets shall be taken, each from full production batches at least 48 hours apart. Each sample set shall comprise of a minimum of five samples of 100 grams each taken randomly from throughout the batch.

Only full production batches will be sampled for clearance.

All product manufactured must be held pending the results of clearance testing.

(b) Products with a short shelf life (< one month)

Clearance sampling will be as above but will be permitted to occur on trial batches (not for sale).

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5 GENERAL MICROBIOLOGICAL REFERENCE CRITERIA FOR FOODS

5.1 CHEESE

See Food Regulations 1984 : 113(2)b.
Cheese includes cottage cheese, cheese including herbs, etc.

(a) Soft cheeses

**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

5.2 CHOCOLATE PRODUCTS

Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.3 COCONUT (dried, grated)

Faecal coliform (/g)	n = 5	c = 2	m = <10	M = 10
Presumptive coliform (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.4 CREAM

See Food Regulations 1984 : 99-104.

**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

(a) Soured, cultured or acidified

Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.5 CULTURED SEEDS AND GRAINS (bean sprouts, alfalfa etc)

Escherichia coli (/g)	n = 5	c = 0	m = 0
Salmonella (/25 g)	n = 5	c = 0	m = 0

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5.6 EGG

See Food Regulations 1984 : 133(2).

(a) Liquid - unpasteurised

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^6
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Presumptive coliform (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Salmonella (/25 g)	n = 5	c = 0	m = 0	

(b) Liquid - pasteurised

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^5
Campylobacter (/ 10 g)	n = 5	c = 0	m = 0	
Presumptive coliform (/g)	n = 5	c = 1	m = 10	M = 10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	

(c) Whole content, table grade

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.7 FOODS - miscellaneous, dried

Bacillus cereus (/g)	n = 5	c = 2	m = 10^3	M = 10^4
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.8 FOODS - cooked, ready-to-eat (or with subsequent minimal heating < 70°C)

(a) All components cooked in manufacturing process

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^5
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Escherichia coli (/g)	n = 5	c = 0	m = 0	
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

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(b) Some components not cooked in manufacturing process (eg sandwiches)

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^5	M = 5 x 10^5
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

5.9 FOODS - requiring further cooking (> 70°C)

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 5 x 10^5	M = 5 x 10^6
Bacillus cereus (/g)	n = 5	c = 2	m = 10^3	M = 10^4
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.10 FROGS LEGS - uncooked, frozen

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 5 x 10^5	M = 5 x 10^6
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.11 FRUIT - dried

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^5	M = 10^6
Faecal coliform (/g)	n = 5	c = 2	m = <1.8	M = 10
Salmonella (/25 g)	n = 5	c = 0	m = 0	
Yeasts and moulds (/g)	n = 5	c = 2	m = 10^2	M = 10^3

5.12 GELATIN

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^5
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10	M = 10^2
Faecal coliform (/g)	n = 5	c = 1	m = <1.8	M = 10
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.13 HERBS AND SPICES

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 5 x 10^5	M = 5 x 10^6
Bacillus cereus (/g)	n = 5	c = 2	m = 10^3	M = 10^4
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.14 ICE

Aerobic plate count at 35°C (/ml)	n = 5	c = 1	m = 5 x 10^2	M = 10^3
Faecal coliform (/100 ml)	n = 5	c = 0	m = 0	

5.15 ICE CREAM

See Food Regulations 1984 : 121(9), 122(3).

Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.16 INFANT (BABY) FOODS

(a) Dried biscuits

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^3	M = 10^4
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = < 1.8	M = 10
Presumptive coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	
Staphylococcus aureus (/g)	n = 5	c = 1	m = 10	M = 10^2

(b) Dried and instant product (not requiring further cooking)

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^3	M = 10^4
Bacillus cereus (/g)	n = 5	c = 1	m = 10^2	M = 10^3
Clostridium perfringens (/g)	n = 5	c = 1	m = 10	M = 10^2
Coagulase producing staphylococcus (/g)	n = 5	c = 1	m = 10	M = 10^2
Faecal coliform (/g)	n = 5	c = 2	m = <1.8	M = 10
**Listeria monocytogenes* (/25g)	n = 5	c = 0	m = 0	
Presumptive coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
Salmonella (/50 g)	n = 5	c = 0	m = 0	

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(c) Dried and instant product (requiring further cooking)

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^5	M = 10^6
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Clostridium perfringens (/g)	n = 5	c = 2	m = 10	M = 10^2
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10	M = 10^2
Faecal coliform (/g)	n = 5	c = 2	m = <1.8	M = 10
Presumptive coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	

(d) Milk powder

See Reference Criteria 5.20.

5.17 MARGARINE AND SALTED BUTTER

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 2.5 x 10^4	M = 2.5 x 10^5
Coagulase producing staphylococcus (/g)	n = 5	c = 0	m = 0	
Faecal coliform (/g)	n = 5	c = 2	m = 50	M = 5 x 10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	
Yeasts and moulds (/g)	n = 5	c = 2	m = 50	M = 5 x 10^2

* When applying this criteria please refer to Section 4

5.18 MAYONNAISE

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^3	M = 10^4
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = <10	M = 20
Faecal coliform (/g)	n = 5	c = 1	m = <1.8	M = 10
Salmonella (/25 g)	n = 5	c = 0	m = 0	
Yeasts and moulds (/g)	n = 5	c = 2	m = 20	M = 2 x 10^2

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5.19 MEAT AND MEAT PRODUCTS

(a) Chopped, minced or manufactured meat - uncooked

Aerobic plate count at 35°C (/g)	n = 5	c = 3	m = 5×10^5	M = 5×10^6
Campylobacter (/10 g)	n = 5	c = 1	m = 0	
Clostridium perfringens (/g)	n = 5	c = 3	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 3	m = 10^2	M = 10^3
Salmonella (/25 g)	n = 5	c = 1	m = 0	

(b) Corned, cured, pickled or salted - uncooked

Aerobic plate count at 35°C (/g)	n = 5	c = 3	m = 5×10^5	M = 5×10^6
Clostridium perfringens (/g)	n = 5	c = 3	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 3	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 3	m = 10^2	M = 10^3
Salmonella (/25 g)	n = 5	c = 1	m = 0	

(c) Manufactured, cured or fermented meat - ready-to-eat

Bacillus cereus (/g)	n = 5	c = 2	m = 10^3	M = 10^4
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 20	M = 2×10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

(d) Meat paste or spread - including paté

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^5
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

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(e) Hot smoked

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^5
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

(f) Vacuum packed - semi-preserved but perishable products

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^6	M = 10^7
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Clostridium perfringens (/g)	n = 5	c = 2	m = 10	M = 10^2
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

5.20 MILK

See Food Regulations 1984 : 92, 93, 94, 99.

(a) Pasteurised

**Listeria monocytogenes* (/ 25 g)	n = 5	c = 0	m = 0
Salmonella (/25 g)	n = 5	c = 0	m = 0

* When applying this criteria please refer to Section 4

(b) Raw (for consumption)

Aerobic plate count at 30°C (/g)	n = 5	c = 2	m = 5 x 10^4	M = 15 x 10^4
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Faecal coliform (/g) .	n = 5	c = 2	m = 3	M = 9
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

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(c) Powder for infants

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^3	M = 10^4
Bacillus cereus (/g)	n = 5	c = 2	m = 10	M = 10^2
Clostridium perfringens (/g)	n = 5	c = 2	m = < 1	M = 10
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = <1	M = 10
Faecal coliform (/g)	n = 5	c = 0	m = 0	
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Presumptive coliform (/g)	n = 5	c = 2	m = <1.8	M = 10
Salmonella (/50 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

(d) Powder general use

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^5
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

(e) Milkshakes

Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10	M = 10^2
Faecal coliform (/g)	n = 5	c = 2	m = <1.8	M = 10
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.21 PACKAGED WATERS (including mineral waters and those bottled from natural underground sources)

Coliform (/100 ml)	n = 5	c = 1	m = 10	M = 10^2
Escherichia coli (/100 ml)	n = 5	c = 0	m = 0	
Group D streptococci (/100 ml)	n = 5	c = 1	m = 10	M = 10^2
Pseudomonas aeruginosa (/100 ml)	n = 5	c = 0	m = 0	

5.22 PASTA - (uncooked) fresh, frozen and dried (without filling)

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^5	M = 10^6
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	

Food Safety can only be assured by the use of food safety programmes based on the principles of HACCP. Reliance on microbiological criteria/product testing alone is not sufficient. These criteria are formulated as a guide to indicate when food can be considered unacceptable or unsafe.

5.23 POULTRY

(a) Raw

Campylobacter (/10 g) or(#)	n = 5	c = 2	m = 0	
Faecal coliform (/g)	n = 5	c = 2	m = 10^2	M = 2 x 10^3
Salmonella (/25 g) or(#)	n = 5	c = 1	m = 0	

(# per carcase rinse where a whole bird is sampled)

(b) Nuggets, patties, etc requiring further cooking (> 70°C)

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 5 x 10^5	M = 5 x 10^6
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Campylobacter (/10 g)	n = 5	c = 1	m = 0	
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Salmonella (/25 g)	n = 5	c = 0	m = 0	

(c) Cooked

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^5
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

(d) Cured and/or smoked

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^5
Campylobacter (/10 g)	n = 5	c = 0	m = 0	
Clostridium perfringens (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

Food Safety can only be assured by the use of food safety programmes based on the principles of HACCP. Reliance on microbiological criteria/product testing alone is not sufficient. These criteria are formulated as a guide to indicate when food can be considered unacceptable or unsafe.

5.24 PUDDINGS - powders

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^5	M = 10^6
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Clostridium perfringens (/g)	n = 5	c = 2	m = 10	M = 10^2
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10	M = 10^2
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	

* When applying this criteria please refer to Section 4

5.25 SALADS - vegetable or fruit - excluding combination with meat

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^5	M = 10^6
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.26 SEAFOODS

(a) Fish - raw, breaded, frozen

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^5	M = 10^6
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Salmonella (/25 g)	n = 5	c = 0	m = 0	

(b) Shellfish - processed, requiring cooking, (> 70°C)

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 5 x 10^5	M = 5 x 10^6
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Salmonella (/25 g)	n = 5	c = 0	m = 0	

Food Safety can only be assured by the use of food safety programmes based on the principles of HACCP. Reliance on microbiological criteria/product testing alone is not sufficient. These criteria are formulated as a guide to indicate when food can be considered unacceptable or unsafe.

(c) Shellfish - processed, requiring no further cooking

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^5
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	
Vibrio parahaemolyticus (/g)	n = 5	c = 2	m = 10^2	M = 10^3

* When applying this criteria please refer to Section 4

(d) Prawns and shrimps - cooked, frozen

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^5	M = 10^6
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
**Listeria monocytogenes* (/25 g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	
Vibrio cholerae (/g)	n = 5	c = 0	m = 0	
Vibrio parahaemolyticus (/g)	n = 5	c = 2	m = 10^2	M = 10^3

* When applying this criteria please refer to Section 4

(e) Prawns and shrimps - raw, frozen

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 5 x 10^5	M= 5 x 10^6
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Salmonella (/25 g)	n = 5	c = 0	m = 0	
Vibrio cholerae (/g)	n = 5	c = 0	m = 0	

(f) Rock lobster / crayfish (cooked)

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^4	M = 10^5
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	

Food Safety can only be assured by the use of food safety programmes based on the principles of HACCP. Reliance on microbiological criteria/product testing alone is not sufficient. These criteria are formulated as a guide to indicate when food can be considered unacceptable or unsafe.

(g) Shellfish harvested, unprocessed - (NZ National Shellfish Sanitation Programme)

For oysters, mussels and other bivalves, each sample unit shall consist of a minimum of 12 shellfish. Where smaller species of shellfish are sampled a greater number may be required. Approximately 500 g of flesh is required to analyse for both microbiological and marine biotoxin levels. 125 g of flesh is required for microbiological levels alone.

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 5×10^5	M = 1.5×10^6
Faecal coliform (/100 g)	n = 5	c = 2	m = 2.3×10^2	M = 3.3×10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	

Note:

1 For paralytic shellfish poison (PSP) the toxin concentration shall not equal or exceed 80 micrograms per 100 g (of edible portion of raw shellfish).

2 For domoic acid the toxin concentration shall not equal or exceed 20 ppm (ie. 20 mg/kg) in the edible portion of raw shellfish.

3 For neurotoxic shellfish poisoning (NSP) the toxin concentration shall not equal or exceed 20 mouse units (MU) per 100 g (of edible portion of raw shellfish).

4 For diarrhoeic shellfish poison (DSP) the toxin concentration shall not equal or exceed 5 mouse units (MU) per 100g (of edible portion of raw shellfish).

5.27 SOUPS - dried

Aerobic plate count at 35°C (/g)	n = 5	c = 2	m = 10^5	M = 10^6
Bacillus cereus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Clostridium perfringens (/g)	n = 5	c = 2	m = 10	M = 10^2
Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10^2	M = 10^3
Faecal coliform (/g)	n = 5	c = 2	m = 10	M = 10^2
Salmonella (/25 g)	n = 5	c = 0	m = 0	

5.28 SPICES

See Reference Criteria 5.13

5.29 YOGHURT

See Food Regulations 1984 : 119.

Coagulase producing staphylococcus (/g)	n = 5	c = 2	m = 10	M = 10^2
Escherichia coli (/g)	n = 5	c = 0	m = 0	
Salmonella (/25 g)	n = 5	c = 0	m = 0	