

**Microbiological Guidelines
for
Ready-to-eat Food**

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Food and Environmental Hygiene Department

*This set of Guidelines is published by the
Food and Environmental Hygiene Department.
The technical content has been developed
making reference to the Guidelines of
Public Health Laboratory Services of the United Kingdom and
in consultation with
the Expert Panel on Microbiological Safety of Food
of the Food and Environmental Hygiene Department.*

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Microbiological Guidelines for Ready-to-eat Food

Preface

Microbiological hazards continue to be one of the biggest threats to food safety. With better understanding in microbiology and food safety, the Department is now in a better position to set safety limits for a range of pathogenic micro-organisms in foods. Under the advice of the Expert Panel on Microbiological Safety of Food, an expert group set up to advise the Director of Food and Environmental Hygiene, a set of microbiological guidelines for ready-to-eat food has been developed.

According to the Codex Alimentarius Commission of the United Nations, an international food standard setting authority, the functions of microbiological guidelines include formulation of design requirements, indication of required and expected microbiological status of the food commodities, and the verification of efficacy of hygienic practice. These guidelines stipulate the safety limits of nine major food borne pathogens such as *Salmonella* species, *Listeria monocytogenes*, *E coli O157* and *Vibrio cholerae*, as well as providing a classification of microbiological quality of ready-to-eat food for reflecting the hygienic status of the food concerned.

The guidelines signify a stride forward in our efforts to promote food safety, with microbiological limits explicitly set to facilitate the trade in devising measures to improve their food safety practices. Based on the specified limits and classification of respective food items as provided in the guidelines, the food trade can draw up relevant food control plans and focus on the priority control measures.

The trade is our important partner in enhancing food safety. With better knowledge on microbiological safety of food, the standards of their practices can be further improved. We hope this set of guidelines serves their needs in this area.

**Food and Environmental Hygiene Department
February 2002**

Expert Panel on Microbiological Safety of Food

Terms of Reference

- (a) To review and recommend to the Director of Food and Environmental Hygiene the microbiological criteria for the assessment of food safety;
- (b) To advise on strategies of the food surveillance programme in respect of microbiological safety of food;
- (c) To evaluate the scientific evidence, both international and local, which are relevant to the development of microbiological standards and guidelines on food; and
- (d) To propose priority issues in risk assessment in respect of microbiological hazards of food.

Membership

The Panel comprises five core members viz: two official members from FEHD, and three non-official members appointed by the Director of Food and Environmental Hygiene. The Panel is chaired by Consultant (Community Medicine) (Risk Assessment and Communication) with Secretariat support provided by Risk Assessment Section.

The non-official members for the term 2000 to 2002 are:

Dr KAM Kai Man	Consultant Medical Microbiologist, Public Health Laboratory, Department of Health
Dr TSANG Dominic	Consultant Medical Microbiologist, Queen Elizabeth Hospital
Professor YUEN Kwok Yung	Chair Professor in Infectious Disease, The University of Hong Kong

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- Recommendations for Food Safety Monitoring in Hong Kong -

Purpose

Food safety control aims to safeguard public health and provide assurance on food safety. To this end, microbiological analyses are useful ways to assess the safety and quality of food involved. This paper presents the recommended microbiological guidelines for ready-to-eat food.

Scope of the Guidelines

2. In the Hong Kong Special Administrative Region, the legal powers and instruments for the enforcement of microbiological safety of food are provided for in the Public Health and Municipal Services Ordinance, Chapter 132. Section 54 stipulates that it is an offence to sell food that is unfit for human consumption. General protection for purchasers of food is provided in Section 52 of the Ordinance when the food is not of the nature, substance, quality of the food demanded by the purchaser.

3. For enforcement purposes, microbiological limits are specified which are also used for assessment of microbiological safety and monitoring of food¹. This set of recommended microbiological guidelines for ready-to-eat food provides operational support for food safety monitoring and control.

Definition and Interpretation

4. Microbiological Guidelines are criteria indicating the microbiological condition of the food concerned so as to reflect its safety and quality. They can be introduced to the food industry to observe voluntarily or stipulated in legislation for compliance.

5. “Ready-to-eat” is defined as the status of the food being ready for immediate consumption at the point of sale. It could be raw or cooked, hot or

¹ The Frozen Confection Regulations and Milk Regulations under Cap 132 provide specification on the microbiological quality of frozen confections and milk and milk beverages. The Milk Regulations also include microbiological limits for milk in its raw state.

chilled, and can be consumed without further heat-treatment including re-heating.

6. “Aerobic colony count (ACC)” is a count of viable bacteria based on counting of colonies grown in nutrient agar plate. This is commonly employed to indicate the sanitary quality of foods. The incubation condition of ACC used in this guideline is **30° C for 48 hours**.

7. “Indicator organism” refers to the selected surrogate markers. The main objective of using bacteria as indicators is to reflect the hygienic quality of food. *E. coli* is commonly used as surrogate indicator. Its presence in food generally indicates direct or indirect faecal contamination. Substantial number of *E. coli* in food suggests a general lack of cleanliness in handling and improper storage.

8. “Specific pathogens” refer to bacteria that may cause food poisoning. Mechanisms involved may be toxins produced in food or intestinal infection. The symptoms of food poisoning vary from nausea and vomiting (e.g. caused by *S. aureus*), through diarrhoea and dehydration (*Salmonella* spp. and *Campylobacter* spp.) to paralysis and death in the rare cases of botulism. The infectious doses vary from less than 10 to more than 10⁶ organisms.

Components of Microbiological Criteria

9. The microbiological limits of this set of guidelines are organized under the following three components:

- (a) Aerobic Colony Count;
- (b) Indicator Organisms – *E. coli* count is the only indicator organism included; and
- (c) Specific Food Poisoning Pathogens – nine specific bacterial pathogens are included in this set of guidelines.

10. For assessment of hygienic quality, food items are grouped into five categories taking into account the raw ingredients used, and the nature and degree of processing before sale. The categorization is summarized in the *Food category table for ACC assessment* in the Annex.

Classification of Microbiological Quality

11. The microbiological assessment of ready-to-eat food on the above three components will lead to the classification of the food quality into one of the following four classes:

- (a) Class A: the microbiological status of the food sample is satisfactory.
- (b) Class B: the microbiological status of the food sample is less than satisfactory but still acceptable for consumption.
- (c) Class C: the microbiological status of the food sample is unsatisfactory. This may indicate a sub-optimal hygienic conditions and microbiological safety levels. Licensees of food premises should be advised to investigate and find out the causes and to adopt measures to improve the hygienic conditions. Taking of follow-up samples to verify the improvement may be required.
- (d) Class D: the microbiological status of the food sample is unacceptable. The food sample contains unacceptable levels of specific pathogens that is potentially hazardous to the consumer. In addition to giving advice to the licensee of the food premises as stated in (c) above, warning letters as well as other enforcement actions should be considered.

Table of Microbiological Limits

12. Microbiological limits in respect of the above components, and the associated microbiological quality of the food samples concerned are summarized in the table on next page.

Microbiological Limits

for

Assessment of Microbiological Quality of Ready-to-Eat Foods

Criterion		Microbiological quality colony-forming unit (cfu) per gram unless specified			
		Class A Satisfactory	Class B Acceptable	Class C Unsatisfactory	Class D Unacceptable
Aerobic colony count (ACC) [30°C/48hours]					
Food Category (see table next page)	1	$< 10^3$	$10^3 - < 10^4$	$\geq 10^4$	N/A
	2	$< 10^4$	$10^4 - < 10^5$	$\geq 10^5$	N/A
	3	$< 10^5$	$10^5 - < 10^6$	$\geq 10^6$	N/A
	4	$< 10^6$	$10^6 - < 10^7$	$\geq 10^7$	N/A
	5	N/A	N/A	N/A	N/A
Indicator organisms (apply to all food categories)					
<i>E. coli</i> (total)		< 20	$20 - < 100$	≥ 100	N/A
Pathogens (apply to all food categories)					
<i>Campylobacter</i> spp.		Not detected in 25g	N/A	N/A	Present in 25g
<i>E. coli</i> O157		Not detected in 25g	N/A	N/A	Present in 25g
<i>L. monocytogenes</i>		Not detected in 25g	N/A	N/A	Present in 25g
<i>Salmonella</i> spp.		Not detected in 25g	N/A	N/A	Present in 25g
<i>V. cholerae</i>		Not detected in 25g	N/A	N/A	Present in 25g
<i>V. parahaemolyticus</i>		< 20	$20 - < 100$	$100 - < 10^3$	$\geq 10^3$
<i>S. aureus</i>		< 20	$20 - < 100$	$100 - < 10^4$	$\geq 10^4$
<i>C. perfringens</i>		< 20	$20 - < 100$	$100 - < 10^4$	$\geq 10^4$
<i>B. cereus</i>		$< 10^3$	$10^3 - < 10^4$	$10^4 - < 10^5$	$\geq 10^5$

N/A denotes "Not applicable"

Annex: Food Category Table for Aerobic Colony Count Assessment

Food group	Food item	Category
Meat	Beefburgers and kebabs	1
	Dim sum	2
	Pate (meat, seafood or vegetable)	3
	Poultry (unsliced)	2
	Preserved meat	4
	Salami and fermented meat products	5
	Sausages	2
	Smoked meat	5
	Siu-mei & lo-mei	3
	Sliced meat (ham and tongue) (cold)	4
	Sliced meat (beef, haslet, pork, poultry, etc.) (dried)	3
	Steak and kidney / meat pies	2
	Tripe and other offal	4
Seafood	Crustaceans	3
	Pickled fish	1
	Other fish (cooked)	3
	Oysters (raw)	5
	Seafood meals	3
	Shellfish (cooked)	4
	Smoked fish	4
Dessert	Cakes, pastries, slices and desserts – with dairy cream	3
	Cakes, pastries, slices and desserts – without dairy cream	2
	Cheesecake	5
	Mousse / dessert	1
	Tarts, flans and pies	2
	Trifle	3

Food group	Food item	Category
Savoury	Bean curd	5
	Cheese-based bakery products	2
	Fermented foods	5
	Flan / quiche	2
	Dips	4
	Mayonnaise / dressings	2
	Samosa	2
	Satay	3
	Spring rolls	3
Vegetable	Coleslaw / salads (with or without meat)	3
	Fruit and vegetables (dried)	3
	Fruit and vegetables (fresh)	5
	Rice	3
	Vegetables and vegetable meals (cooked)	2
Dairy	Cheese	5
	Yoghurt	5
Ready-to-eat meals	Pasta / pizza	2
	Meals (others)	2
Sandwiches and filled rolls	With salad	4
	Without salad	3
Sushi & sashimi	Fish fillet and fish roe sashimi / sushi	3
	Sashimi other than fish fillet and fish roe	4

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