Annex A. Detailed Comparison of Existing and Proposed Microbiological Standards

Table A1. Comparison of Existing and Proposed Non-RTE Product Categories

Existing Non-RTE Product Categories	Proposed Non-RTE Product Categories	Proposed Change
Chilled/frozen meat cuts/offals Frozen comminuted meat (including minced meat, paste, pate, patties, burgers, western sausages and similar products) Raw processed meat products (including Chinese sausage, waxed duck, raw ham, Jinhua ham)	Meat and meat products (includes poultry, beef, amphibian, reptile, lamb, pork, venison, game) Non-intact beef products (includes intact beef products intended for non-intact use)	Non-RTE meat and meat products are no longer differentiated by form/state as there may be difficulties in determining end-point usage at the point of import (e.g. raw intact meat may be further processed into non-intact products before retail stage). The exception to this is non-RTE non-intact beef products where a separate category has been proposed for STEC standards, due to the higher level of food safety concern posed by STEC in such products compared to intact raw beef cuts (e.g., STEC is less easily killed by heat as it is embedded within a tissue matrix instead of being exposed on the surface).
Frozen reptile meat (frog legs and crocodile meat)		Extension of microbiological standard to all other non-RTE amphibian and reptile meat and meat products (e.g. turtle meat)
Egg products	Raw poultry shell eggs and other raw egg products (excluding pasteurized egg products)	Extension of microbiological standard to raw shell eggs due to their potential to be consumed raw/undercooked
	Pasteurised poultry shell eggs and other pasteurised egg products	
Frozen oysters, frozen blood-cockle meat	Blood-cockles and oysters	Extension of microbiological standard to all non-RTE oysters and blood-cockles (regardless of whether they are in chilled, frozen, shelled or shucked state) due to their potential to be consumed undercooked in local cuisine. No standards have been proposed for all other non-RTE

		bivalves as they are infrequently associated with gastrointestinal cases, and are typically consumed fully cooked.

Table A2. Comparison of Existing and Proposed Standards for Non-RTE Meat and Meat Products

Product	Existing Parameter	Existing Standards				Comparison to Proposed Microbiological Standards
		n	c	m	M	
Chilled meat cuts/offals Frozen meat cuts/offals Frozen comminuted meat	Total Plate Count	Refer to SFA's website[1] for detailed sampling plan for the individual parameters and product categories.				• Removal of microbiological standards for hygiene indicator microorganisms
	Escherichia coli Count					
	Coagulase-positive *Staphylococcus aureus* Count					
	Salmonella spp.	5	1	All *Salmonella* spp. except SE, ST, SPt A & B	SE, ST, SPt A & B	• No change to microbiological standards for *Salmonella.* • Standardised the number of sampling units (n) to 5, except for small consignments (defined in paragraph 9) where 1 sampling unit will be taken.
		3/1	0	Not detected in 25g		
	Escherichia coli O157:H7, *Listeria monocytogenes*	5/3/1	0	Not detected in 25g		• Removal of microbiological standards for *Escherichia coli* O157:H7 in all meat except non-intact beef products • Removal of microbiological standards for *Listeria monocytogenes* (*L. monocytogenes* is associated with RTE food)

[1] https://www.sfa.gov.sg/regulatory-limits/limits-for-incidental-constituents-in-food

						• Inclusion of new standard on non-O157 Shiga-toxin producing *Escherichia coli* (O26, O45, O103, O111, O121, O145), STEC, for non-intact beef products due to the higher level of food safety concern posed by STEC in such products compared to intact raw beef cuts (e.g., STEC is less easily killed by heat as it is embedded within a tissue matrix instead of being exposed on the surface).
Raw processed meat products (includes Chinese sausage, waxed duck, raw ham, Jinhua ham)	Total Plate Count	Refer to SFA's website for detailed sampling plan for the individual parameters and product categories.				• Removal of microbiological standards for hygiene indicator microorganisms
	Escherichia coli Count					
	Coagulase-positive *Staphylococcus aureus* Count					
	Salmonella spp.	5/3/1	0	Not detected in 25g		• Alignment with *Salmonella* microbiological standards for other meat and meat products
	Escherichia coli O157:H7	5/3/1	0	Not detected in 25g		• Removal of microbiological standards for *Escherichia coli* O157:H7 in all meat except beef (cattle is known to be main reservoir)
Frozen reptile meat (frog legs and crocodile meat)	Total Plate Count	5	0	1.0×10^7 CFU/g	-	• Removal of microbiological standards for hygiene indicator microorganisms
	Salmonella spp.	5	1	All spp. except SE, ST, SPt A & B	SE, ST, SPt A & B	• Removal of microbiological standards for *Vibrio cholerae* and *Shigella* spp. as frozen reptile meat

	Vibrio cholerae, *Shigella* spp.	5	0	Not detected in 25g	are deemed to be of a low food safety concern (typically consumed fully cooked and infrequently associated with foodborne outbreaks). • Microbiological standards for *Salmonella* spp. were however retained as there are concerns with relaxing existing *Salmonella* standards in light of the increasing trend of Salmonellosis in Singapore.

Table A3. Comparison of Existing and Proposed Standards for Non-RTE Eggs and Egg Products

Product	Parameter	Standards				Comparison to Proposed Microbiological Standards
		n	c	m	M	
Shell Eggs	*Salmonella* Enteritidis	While SFA does not specify microbiological standards for raw shell eggs, the veterinary conditions for import of table eggs requires that shell eggs are to come from farms which are free from *Salmonella* Enteritidis				• No change to microbiological standards for *Salmonella* for raw shell eggs (zero-tolerance against *Salmonella* Enteritidis) as SE is known to be the major serotype of concern in shell eggs (transmitted vertically from layer hens to the interior of shell eggs)
Egg Products	Total Plate Count	-	-	-	1.0×10^5 CFU/g	• Removal of microbiological standards for hygiene indicator microorganisms • No change to microbiological standards for *Salmonella* for pasteurised eggs and egg products, as such products may be used for RTE applications (e.g. mayonnaise, egg-based desserts like cream, tiramisu etc.)
	Escherichia coli Count	-	-	-	1.0×10^2 CFU/g	
	Coagulase-positive *Staphylococcus aureus* Count	-	-	Not detected in 25g in 1g or mL		

	Salmonella spp., *Escherichia coli* O157:H7	-	-	Not detected in 25g in 25g or mL	• Inclusion of microbiological standards for *Listeria monocytogenes* as it has demonstrated the ability to grow in refrigerated liquid pasteurized egg products as a result of insufficient pasteurization/recontamination due to poor handling, which is a cause for concern as such products may be used directly by consumers. • Removal of microbiological standards for *Escherichia coli* O157:H7 as cattle are known to be its main reservoir

Table A4. Comparison of Existing and Proposed Standards for Non-RTE Oysters and Blood-Cockles

Product	Parameter	Standards				Comparison to Proposed Microbiological Standards
		n	c	m	M	
Frozen oysters	Total Plate Count	5	2	5.0×10^4 CFU/g	5.0×10^5 CFU/g	• Removal of microbiological standards for hygiene indicator microorganisms • Extension of microbiological standards for frozen blood cockle meat and frozen oysters to all non-RTE oysters and blood cockles (regardless of whether they are in chilled, frozen, shelled or shucked state), due to their potential to be consumed raw/undercooked in local cuisine. No standards have been proposed for all other non-RTE bivalves as they are infrequently associated with gastrointestinal cases and are typically consumed fully cooked. • No change to microbiological standards for *Salmonella*, *Vibrio parahaemolyticus* (for frozen oysters), *Vibrio cholerae* and *Shigella* • Inclusion of microbiological standards for *Vibrio vulnificus* due to severity of disease caused
	Escherichia coli Count	5	2	20	1.0×10^2 CFU/g	
	Salmonella spp., *Shigella* spp., *Vibrio cholerae*	5	0	Not detected in 25g		
	Vibrio parahaemolyticus	5	2	1.0×10^2 CFU/g	1.0×10^3 CFU/g	
Frozen blood-cockle meat	Total Plate Count	5	0	5.0×10^4 CFU/g	-	
	Escherichia coli Count	5	0	20	-	
	Salmonella spp., *Shigella* spp., *Vibrio cholerae*	5	0	Not detected in 25g		
	Vibrio parahaemolyticus	5	0	10^2 CFU/g		