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المعايير الميكروبيولوجية للسلع والمواد الغذائية
MICROBIOLOGICAL CRITERIA FOR FOODSTUFFS

ICS : 67.040

MICROBIOLOGICAL CRITERIA FOR FOODSTUFFS

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Foreword

GCC Standardization Organization (GSO) is a regional Organization which consists of the National Standards Bodies of GCC member States. One of GSO main functions is to issue Gulf Standards /Technical regulations through specialized technical committees (TCs).

GSO through the technical program of committee TC No (5) "Technical committee for standards of food and agriculture products" has updated the GSO Technical regulation No. : GSO 1016/1998"MICROBIOLOGICAL CRITERIA FOR FOODSTUFFS" The Draft Technical regulation has been prepared by State of Qatar .

This Technical regulation has been approved by GSO Board of Directors in its meeting No.(22), held on 23/01/1437h(05/11/2015), The approved standard will replace and supersede the standard No. GSO 1016/1998 .

CONTENTS

Page

PREFACE

This GSO technical regulation is concerned with the microbiological criteria for foodstuffs and for some food ingredients used as raw materials in food processing. These limits are based on those proposed by the international commission of microbiological specifications for foods (ICMSF) and the international standards in the field of food safety and quality. Components of microbiological criterion in particular food are chosen according to the following factors:

1) The seriousness of the type of health hazard on consuming a contaminated food.
2) Available information on treatments the food products was subjected to, and the conditions of its handling and storage expected.
3) Type of changes or spoilage to the foodstuffs.
4) The environmental conditions within which the food product was produced or circulated.
5) The category or categories of consumers concerned.

These limits were formulated in the form of a system known as working of sample, including levels of acceptance and the number of samples to be analyzed. These criteria show stringency according to the type of food product, and the purpose for which it is used; for instance, the food products intended for consumer groups with increased susceptibility e.g. children, infants, aged people, or dietetic foods and relief foods, such as low sugar and low fat foods. In such cases the microbial sampling plans employed are more stringent.

Precautions are being taken that these limits be within attainable limits in production units by following good manufacturing practice (GMP). This standard of microbiological quality will have to be followed for any food product irrespective of any specific parameters mentioned in any other standards of specific food product, *i.e.* any standard specific to any product should comply with the limits stipulated in this standard with respect to microbial quality.

MICROBIOLOGICAL CRITERIA FOR FOODSTUFFS

1. SCOPE

This GSO technical regulation is concerned with microbiological limits for some foodstuffs intended for human consumption and for some food ingredients used in food industry.

2. COMPLEMENTARY REFERENCES

2.1 GSO 261 Microbiological methods of food examination - Part 1: Preparation of samples

2.2 GSO 1373 Microbiological methods for testing of foods Part 2: Direct microscopic count.

2.3 GSO 590 Microbiological methods of food examination Part 3: Commercial sterility test for canned food.

2.4 GSO 810 Microbiology- General guidance for microbiological examinations.

2.5 GSO CAC/GL 63 Principles and guidelines for the conduct of microbiological risk management (MRM).

2.6 GSO ISO 19458 Water quality- Sampling for microbiological analysis.

2.7 Refer to GSO standards test methods for the microbiological analysis in food products.

3. DEFINITIONS

3.1 **Microbiological criteria**

A criterion defining the acceptability of a product, a batch of foodstuffs or a process, based on the absence, presence or number of microorganisms, and/or on the quantity of their toxins/ metabolites, per unit(s) of mass, volume, area or batch.

3.2 **Lot**

A definitive quantity of a commodity produced essentially under the same conditions.

3.3 **Sampling plan**

A statement specifying the microbiological criteria for acceptance or rejection of the sample depending on the examination of a sufficient number of sample units via particular analytical methods. It comprises the following:

n = Number of sample units to be examined.

c = The maximum number of sample units allowed to have a microbiological criterion value greater than "m" and not to exceed the value of "M".

m = The acceptable microbial level in the sample unit; which separates the acceptable quality of marginal-quality acceptance. The product shall be acceptable if the value is equal to or less than "m"; if the value is above "m", the product is marginally acceptable or rejected.

M = The maximum criterion value that should not be exceeded in any of "n" units.

Sample unit = A sample from the food product examined as one unit from "n". It is either a single or a part of a package or a mixed compound of the product.

3.3.1 **Two-class attributes plan**

The plan provides a simple means of inspection where the sampling plan is defined by two values, "n" and "c". "n" is the number of sample units to be examined to meet the plan's requirements. "c" is the maximum number of the defective sample units. "m" for microbial criteria to identify defects. For example; inspection of the presence of *Salmonella* in 25 g of fresh vegetables; should not be detected in ten sample units (n = 10, c = 0, m = 0).

3.3.2 **Three-class attributes plan**

The plan attributes are defined by the values "n", "c", "m" and "M". "m" is the minimum acceptable value of microorganism in the examined units. "M" differentiates between samples minimally acceptable of the defective units. For example; the number of colony forming unit (CFU) of any of the five sample units tested must not exceed 10^6 and not more than 3×10^4 from three or more of the five samples tested (n= 5, c= 2, m= 3×10^4, M= 10^6).

3.4 **Defect sample**

The Sample unit that gives a microbiological criterion value higher than the value of "M".

3.5 **Marginally acceptable**

Sample units have a microbial count higher than "m" but not more than "M".

4. REQUIREMENTS

4.1 Microbiological criteria for foodstuffs and food ingredients shall be as indicated against each in the table.

5. CRITERIA OF TECHNICAL CONFORMITY

5.1 Samples are considered unacceptable in the following cases:

5.1.1 When the microbiological criterion value exceeds "M" in one or more sample units "n".

5.1.2 If the number of marginally acceptable samples is higher than c value set in the sampling plan.

Microbiological criteria for foods and food ingredients

1. Dairy Products

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Pasteurized milk (with or without added flavour)	– Aerobic plate count	5	1	$3x10^4$	10^5
	– Enterobacteriaceae	5	2	3	5
	– *Escherichia coli*	5	0	0	–
	– *Salmonella**	5	0	0	–
UHT milk- (with or without added flavour)	– Incubation at 37 °C/15 days or 55 °C/7days:				
	– Aerobic plate count	5	0	10	–
	– Enterobacteriaceae	5	0	0	–
	– *Salmonella**	10	0	0	–
Fermented milk products (with or without added flavour), e.g. yoghurt, laban, labena	– Yeasts and moulds	5	1	10	10^2
	– Enterobacteriaceae	5	1	5	10
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10	10^2
Condensed and sweeten condensed milk	– Aerobic plate count	5	2	10^2	10^3
	– Enterobacteriaceae	5	1	0	–
	– *Staphylococcus aureus*	5	1	5	10
Evaporated milk	Requirements for canned products (Item 8) shall be applied				
Pasteurized cream (with or without added flavour)	– Aerobic plate count	5	1	$5x10^4$	10^5
	– Yeasts and moulds	5	1	20	10^2
	– Enterobacteriaceae	5	1	10	20
	– *Escherichia coli*	5	0	0	–
	– *Salmonella**	5	0	0	–
Whipped cream	– Aerobic plate count	5	2	$5x10^4$	$5x10^5$
	– Enterobacteriaceae	5	1	10	20
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
Fermented cream	– Yeasts and moulds	5	1	10	10^2
	– Enterobacteriaceae	5	1	10	20
	– *Escherichia coli*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2

* Only in the case of added flavour.

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Sterilized cream	Requirements for canned products (Item 8) shall be applied				
Powdered milk (full, skimmed, semi-skimmed), whey (dried or powdered condensed)	– Aerobic plate count	5	2	$5x10^4$	$3x10^5$
	– Enterobacteriaceae	5	1	10	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
Powdered whipped cream (with or without added flavour	– Aerobic plate count	5	2	10^4	10^5
	– Yeasts and moulds	5	1	10	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
Soft cheese (made from pasteurized milk)	– Enterobacteriaceae	5	2	10^2	10^3
	– *Escherichia coli*	5	1	10	10^2
	– *Salmonella*	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10^2	10^3
Hard and semi–hard cheese	– Enterobacteriaceae	5	1	10^2	10^3
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10^2	10^3
Processed cheese packed in non-metal containers	– Aerobic plate count	5	2	10^3	10^4
	– Enterobacteriaceae	5	1	10	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
Caseinate	– Aerobic plate count	5	2	$3x10^4$	$2x10^5$
	– Enterobacteriaceae	5	1	10	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
Edible ices (Ice cream (with nut*)– ice milk –water ice)	– Aerobic plate count	5	2	$5x10^4$	10^5
	– Moulds*	5	2	10^2	10^4
	– Enterobacteriaceae	5	2	10	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
Dehydrated ice cream mixes	– Aerobic plate count	5	2	$5x10^4$	$2x10^5$
	– Enterobacteriaceae	5	1	10	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	10	0	0	–
Milkshakes	– Coliforms	5	2	1	10
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10	10^2

* In case of ice cream containing nuts.

2. Infants, Children and Certain Categories of Dietetic Foods

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Biscuits (plain, dried)	– Enterobacteriaceae	5	1	0	10^2
	– Yeasts and moulds	5	1	50	10^2
	– *Salmonella*	5	0	0	–
	– *Escherichia coli* O157	5	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
	– *Bacillus cereus*	5	2	10^2	10^3
Shelf–stable dried biscuits coated or filled with chocolate or others	– Enterobacteriaceae	5	1	10	10^2
	– *Salmonella*	30	0	0	–
	– *Escherichia coli* O157	5	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
	– *Bacillus cereus*	5	1	10^2	10^3
Dried and instant products requiring reconstitution	– Aerobic plate count	5	1	10^4	10^5
	– Enterobacteriaceae	10*	0	0	–
	– *Salmonella*	60	0	0	–
	– *Escherichia coli* O157**	5	0	0	–
	– *Cronobacter sakazakii* (infant food 6 months and younger)	30	0	0	–
	– *Staphylococcus aureus*	5	0	0	–
	– *Bacillus cereus****	5	1	10^2	10^3
	– *Clostridium perfringens*****	5	1	10	10^2
Cereal based foods for infant	– Aerobic plate count**	5	2	10^3	10^4
	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
	– *Bacillus cereus*	5	1	10^2	10^3
	– *Listeria monocytogenes*	5	0	0	–
	– *Clostridium perfringens*	5	1	10	10^2
Powdered infant formula, including those with lactic acid-producing cultures	– Enterobacteriaceae	10	2	0	10^2
	– *Salmonella*	5	0	0	–
	– *Cronobacter sakazakii* (infant food 6 months and younger)	30	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
	– *Bacillus cereus*	5	1	0	10
	– *Listeria monocytogenes*	5	0	0	–
	– *Clostridium perfringens*	5	2	1	10
Dried products requiring heating to boiling before consumption	– Aerobic plate count	5	3	10^5	10^6
	– Enterobacteriaceae	10	2	0	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	15	0	0	–
	– *Cronobacter sakazakii* (infant food 6 months and younger)	30	0	0	–
	– *Bacillus cereus****	10	1	0	–

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
	– *Clostridium perfringens*****	10	1	10	0
Thermally processed products in sealed containers	Shall meet the microbiological requirements for canned foods specified in this standard (8)				
Dietetic foods to be eaten by high risk category of consumers (according to the type of the product)	– Aerobic plate count	5	1	10^3	10^4
	– *Escherichia coli*	5	2	0	10
	– *Salmonella*	60	0	0	–
	– *Escherichia coli* O157****	5	0	0	–
	– *Campylobacter jejuni*	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	10	1	10	10^2
	– *Bacillus cereus*	10	1	10^2	10^3
	– *Clostridium perfringens*	10	1	10^2	10^3
Body building foods	– Aerobic plate count	5	0	0	10^4
	– Yeasts and moulds	5	0	0	$3x10^2$
	– Coliforms	5	0	0	10
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	0	0	–

* 10 samples for infant younger than 6 months, 5 samples for infants older than 6 months

** Optional

*** In case of the product contains milk and/or rice

**** In case of the products contains meat

3. Meat, Poultry and its Products

Item	Microorganisms	Limit per gram or cm^{2*}			
		n	c	m	M
Raw meat (chilled/frozen); whole or half carcasses; pieces with or without bones	– Aerobic plate count	5	2	10^5	10^6
	– *Salmonella*	5	0	0	–
	– *Escherichia coli* O157	5	0	0	–
Fresh poultry (chilled/ frozen)	– Aerobic plate count	5	3	$5x10^5$	$5x10^6$
	– *Salmonella***	5	1	0	–
	– *Campylobacter jejuni****	5	0	0	–
Raw minced (meat and poultry);chilled/frozen	– Aerobic plate count*****	5	2	$5x10^5$	$5x10^6$
	– Enterobacteriaceae******	5	2	10^2	10^3
	– *Salmonella*	5	0	0	–
	– *Escherichia coli* O157	5	0	0	–
	– *Staphylococcus aureus****	5	2	10^2	10^3
	– *Clostridium perfringens******	5	2	10^2	10^3
Raw minced/pieces meat (chilled/ frozen) with soy or marinated (e.g. kubba; meat balls, fresh sausage, meat burgers)	– Aerobic plate count	5	3	10^6	10^7
	– *Salmonella*	5	0	0	–
	– *Escherichia coli* O157	5	0	0	–
	– *Staphylococcus aureus*	5	2	$5x10^2$	10^3
	– *Clostridium perfringens*	5	2	10^2	10^3
Raw edible offal (chilled/frozen) e.g. liver testes, kidney, gizzard	– Aerobic plate count	5	2	10^5	10^6
	– *Salmonella*	5	0	0	–
Cured and/or smoked meat; mortadella; luncheon meat, basterma	– Aerobic plate count	5	3	$5x10^5$	$5x10^6$
	– *Salmonella*	10	0	0	–
	– *Escherichia coli* O157	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	2	$5x10^2$	$5x10^3$
	– *Bacillus cereus*	5	2	10^2	10^3
	– *Clostridium perfringens*	5	2	10^2	10^3
Cured and/or smoked poultry meat; mortadella, frankfurters, turkey, smoked turkey breast	– Aerobic plate count	5	3	10^4	10^5
	– *Salmonella*	10	0	0	–
	– *Campylobacter jejuni*	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	10	2	10^3	10^4
	– *Bacillus cereus*	5	2	10^2	10^3
	– *Clostridium perfringens*	5	2	10^2	10^3

*Limit per cm^2 in case of red meat only

** Sample is rejected if the sample unit is positive to *Salmonella typhimurium* and *Salmonella enteritidis* test.

*** In case of chilled minced meat and chilled poultry.

**** This criterion shall not apply to minced meat produced at retail level when the shelf-life of the product is less than 24 hours.

***** Optional.

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Cooked sausages	– Aerobic plate count	5	2	10^4	10^5
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10^2	10^3
	– *Clostridium perfringens*	5	2	10^2	10^3
Cooked poultry meat, frozen to be reheated before eating (e.g. prepared frozen meals; chicken burgers; chicken/ turkey rolls, chicken nuggets, others breaded poultry products	– Aerobic plate count	5	3	10^4	10^5
	– *Salmonella*	5	0	0	–
	– *Campylobacter jejuni**	5	0	0	–
	– *Escherichia coli* O157	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10^3	10^4
	– *Bacillus cereus**	5	2	10^2	10^3
	– *Clostridium perfringens**	5	2	10^2	10^3
Meat & poultry soup (concentrated, powder)	– Aerobic plate count	5	1	10^4	10^5
	– Enterobacteriaceae	5	1	10	10^2
	– *Salmonella*	10	0	0	–
	– *Bacillus cereus***	5	1	10^3	10^4
	– *Clostridium perfringens*	5	1	10^2	10^3
Dehydrated meat/poultry or their components; protein concentrates from meat/poultry	– *Salmonella*	10	0	0	–
	– *Listeria monocytogenes**	5	0	0	–
	– *Staphylococcus aureus*	5	3	10^2	10^3
	– *Clostridium perfringens*	5	2	10^2	10^3
Vacuum packed-semi-preserved but perishable meat and poultry products	– Aerobic plate count	5	2	10^6	10^7
	– *Salmonella*	5	0	0	–
	– *Campylobacter jejuni*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10^2	10^3
	– *Clostridium perfringens*	5	2	10	10^2

* Optional

** In case of products containing rice or corn flour as ingredient.

4. Fish and Shellfish their Products

Item	Microorganisms	Limit per gram or cm^2			
		n	c	m	M
Raw fish and its products (chilled/frozen) e.g. fish blocks, comminuted, minced, and sliced	– Aerobic plate count	5	2	10^5	10^6
	– *Escherichia coli*	5	3	10	$5x10^2$
	– *Vibrio parahaemolyticus*	5	0	10^2	10^3
	– *Clostridium botulinum*	5	0	0	–
	– *Aeromonas spp.*	5	0	10^2	10^3
Raw (chilled/ frozen) crustaceans (e.g. shrimp, prawns, lobsters and crab)	– Aerobic plate count	5	2	$5x10^5$	10^7
	– *Escherichia coli*	5	3	10	$5x10^2$
	– *Salmonella*	5	0	0	–
	– *V. parahaemolyticus*	5	1	10^2	10^3
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10^2	10^3
Live mollusks such as bivalve (oysters, clams, mussels, etc.), cephalopods (squids, cuttlefish, octopus, etc.), gastropods (snails, etc.)	– *Escherichia coli*	5	1	$2.3x10^2$	$7x10^2$
	– *Salmonella*	5	0	0	–
	– *V.parahaemolyticus* *	10	1	10^2	10^3
Frozen/chilled breaded fish, crustaceans and mollusks products (e.g. fish sticks (fingers), fish protein, and fish cakes)	– Aerobic plate count	5	2	$5x10^5$	10^7
	– *Escherichia coli*	5	2	10	$5x10^2$
	– *Salmonella**	5	0	0	–
	– *V. parahaemolyticus*	5	1	10^2	10^3
	– *Staphylococcus aureus*	5	1	10^3	10^4
Smoked fish including herring, cooked prior to eating and eaten uncooked	– Aerobic plate count	5	3	10^5	10^6
	– *Escherichia coli*	5	3	10	$5x10^2$
	– *V. parahaemolyticus*	5	0	10^2	10^3
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10^3	10^4
Dried sea food, dehydrated fish and fish protein	– Aerobic plate count	5	2	10^5	10^6
	– Yeasts and moulds	5	2	10^2	10^4
	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10^2	10^3
	– *Clostridium perfringens*	5	1	10^2	10^3
Salted and/or fermented fish	– Aerobic plate count	5	2	10^5	10^6
	– *Escherichia coli*	5	1	10	4×10^2
	– *Escherichia coli* O157	5	0	0	–
	– *Salmonella*	10	0	0	–
	– *V. parahaemolyticus*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
	– *Clostridium perfringens*	5	1	10^2	10^4
Cooked (chilled/ frozen) crustaceans, molluscans	– Aerobic plate count	5	2	10^5	10^6
	– *Escherichia coli*	5	1	10	$5x10^2$
	– *Salmonella*	5	0	0	–
	– *V. parahaemolyticus*	10	1	10^2	10^3
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10^2	10^3

* Optional

5. Egg and Egg Products

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Fresh whole eggs	– Enterobacteriaceae	5	2	10	10^2
	– *Salmonella*	10	0	0	–
	_ *Campylobacter jejuni*	5	0	0	–
Liquid pasteurised egg (whole, yolk or white), chilled or frozen	– Aerobic plate count	5	2	10^4	10^5
	– Enterobacteriaceae	5	1	10	10^2
	– *Salmonella*	5	0	0	–
	– *Campylobacter jejuni*	5	0	0	–
Any egg product intended for special dietary purposes (infants, aged, relief foods, etc.)	– Aerobic plate count	5	1	$5x10^4$	10^6
	– Enterobacteriaceae	5	2	10	10^2
	– *Salmonella*	30	0	0	–
Pudding with egg (powders)	– Aerobic plate count	5	2	10^4	10^5
	– Enterobacteriaceae	5	2	10	10^2
	– *Escherichia coli*	5	2	0	10
	– *Salmonella*	10	0	0	–
	_ *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^3
	– *Bacillus cereus*	5	2	10^2	10^3
	– *Clostridium perfringens*	5	2	10	10^2
Egg mix dehydrated	– Aerobic plate count	5	2	10^4	10^5
	– Enterobacteriaceae	5	2	10	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	0	10	–
Dried cake mixes with high egg content	– Enterobacteriaceae	5	2	10	10^2
	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10^2	10^3
	– *Bacillus cereus*	5	0	10^2	–

6. Fats and Oils

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Butter (Salted and Unsalted)	– Lipolytic bacteria	5	1	10^2	10^3
	– Enterobacteriaceae	5	1	10	20
	– Yeasts and moulds	5	1	10	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	0	0	–
Ghee (Butter oil) Fats from milk	– Enterobacteriaceae	5	1	0	10
	– Yeasts and moulds	5	0	10	–
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	0	10
Margarine	– Aerobic plate count	5	2	10^4	10^5
	– Yeasts and moulds	5	1	50	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	0	0	–
All kinds of Nut butters	– Aerobic plate count	5	2	10^3	10^4
	– Moulds	5	2	$5x10^1$	$5x10^2$
	– Enterobacteriaceae	5	2	10	10^2
	– *Salmonella*	10	0	0	–

7. Tomato Concentrates, Sauces, Vinegar, Spices and Herbs

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
All kinds of canned tomato products	Requirements for canned products (Item 8) shall be applied				
All kinds of tomato products	– Moulds	5	2	0	–
	– *Salmonella**	5	0	0	–
Mayonnaise, mustard, salad sauce and other sauces	– Aerobic plate count	5	2	10^3	10^4
	– Yeasts and moulds	5	2	20	10^2
	– Enterobacteriaceae	5	1	10	10^2
	– *Escherichia coli*	5	2	2	10
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
Vinegar	– Aerobic plate count	5	1	30	10^2
Dried herbs and Spices, ready to eat herbs and spices	– Aerobic plate count	5	2	10^5	10^6
	– Moulds	5	2	10^2	10^4
	– Faecal Coliforms	5	2	10	10^2
	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10^2	10^3
	– *Bacillus cereus*	5	2	10^3	10^4
	– *Clostridium perfringens*	5	2	10^2	10^3
Dried herbs (roselle, camomile, others)	– Aerobic plate count	5	2	10^3	10^4
	– Anerobic plate count	5	2	10^2	10^3
	– Yeasts and moulds	5	2	0	10^2
	– Coliforms	5	1	10^2	10^4
All types of tea	– Coliforms	5	1	10	10^2
Coffee and derivatives	– Yeasts and moulds	5	2	10^2	10^3
	– Coliforms	5	1	10	10^2

*Optional

8. Canned Foods and Ingredients for Canning

Commercially sterilized canned foods shall pass sterility test described in GSO 590/1995 "Microbiological Methods of Foods Examination – Commercial Sterility Test for Canned Food", in accordance with the following procedure:

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
First Action	– Must be the number of cans tested 24 cans and the absence of defects; lock; welding or swelling during incubation indicates the efficiency of the commercial sterilization process and the safety of batch production.	24	–	0	–
Second Action	– When there are 1-2 defective cans or swelling should; therefore larger numbers of cans should be sorted from the batch. – In case of presence of more than 1 % of defective cans; reject the batch, but the presence of 1 % or less; the third action is taken.	–	1 %	0	–
Third Action	– Examine 24 cans during the incubation period for not less than 10 days in the incubator at a temperature of 30-37 °C for non-acid canned, or in the incubator at 25 °C for acidic canned. – Production is not identical in the case of a can or more defective or welding or swelling after incubation.	24	0	0	–
Fourth Action	– Being in the absence of any swelling or defects lock and welding after the third action. – Open and lifting the welding and examine 10 cans. – Accept the batch in the absence of any defects in the weld or lock.	10	0	0	–

*** Food products being used in the manufacture of canned food:**

Flour - milk - sugars - pectin - acids - grains - starch – cereals by products

Microorganisms	Limit per ml or gram			
	n	c	m	M
Thermophilic bacteria:	5 units must be examined; 10 g each			
1- Aerobic	5	125/10 g	150/10 g	
2- Flat- sour bacteria	5	50/10 g	75/10 g	
3- Anaerobic non H_2S producing	5	3 samples negatives		
4- Anaerobic H_2S producing	5	4 samples negatives (blackening)		

9. Cereals; Legumes and their Products

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Cereal grains	– Moulds	5	2	10^2	10^4
	– *Salmonella*	5	0	0	–
Cereals, cereal flours and by-products such as bran	– Moulds	5	2	10^2	10^4
	– *Bacillus cereus*	5	2	10^3	10^4
	– *Clostridium perfringens*	5	0	10^2	–
Soya flours, concentrates and isolates	– Moulds	5	2	10^2	10^4
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Bacillus cereus*	5	0	10^2	–
Starch and starch containing products (e.g. custard powder)	– Aerobic plate count*	5	2	10^4	10^5
	– Yeasts and moulds	5	2	10^2	10^3
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10	10^2
	– *Bacillus cereus*	5	1	10^3	10^5
	– *Clostridium perfringens*	5	0	10^2	–
Pasta / Macaroni & Noodles (uncooked, wet & dry) with or without filling	– Coliforms*	5	2	10	10^2
	– Yeasts and moulds	5	2	10^2	10^3
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Bacillus cereus*	5	2	10^2	10^3
	– Sulphite-reducing *Clostridia*	5	2	20	10^2
Pizza, meat pies, frozen dough with or without filling	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10^2	10^4
Bread	– Yeast and moulds	5	1	$2x10^3$	10^4
	– Enterobacteriaceae	5	1	50	10^2
Special breads (sweetened) with egg, or milk	– Yeasts and moulds	5	1	10^3	$2x10^3$
	– Enterobacteriaceae	5	1	50	10^2
	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
Cakes and bakery products (ready to eat)	– Aerobic plate count	5	2	10^4	10^5
	– Enterobacteriaceae	5	1	10^2	10^3
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	20	0	0	–
	– *Listeria monocytogenes**	5	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
	– *Bacillus cereus*	5	0	10	–
Puffed, flaked cereal Products	– Aerobic plate count	5	1	10^4	10^5
	– Moulds	5	1	10^2	10^4
	– *Salmonella*	5	0	0	–
	– *Bacillus cereus*	5	1	10^4	10^5
	– *Clostridium perfringens*	5	0	0	–

* Optional

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Entrees (soup) containing rice or corn flour as main ingredient (frozen or dried)	– *Bacillus cereus*	5	1	10^3	10^4
Cakes, desserts and bakery products (frozen or dehydrated)	– Aerobic plate count	5	2	10^4	10^6
	– *Escherichia coli*	5	2	0	10
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10	10^2
Malt, Malt derivatives	– Aerobic plate count	5	1	$5x10^4$	10^5
	– Yeasts and moulds	5	1	10^3	$5x10^3$
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10^2	10^3

10. Fruit and Vegetables

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Fresh fruits and vegetables (precut and crudités) to be consumed raw	– *Escherichia coli*	5	2	10	10^2
	– *Salmonella*	5	0	0	–
	– *Escherichia coli* O157	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10^2	10^3
Dried vegetables	– *Escherichia coli*	5	2	10^2	10^3
Dried fruits; dates (including date paste), figs, apricot, grape (raisons), etc)	– Yeasts	5	2	10	10^2
	– Moulds	5	2	10^2	10^3
	– *Escherichia coli*	5	2	0	10
	– *Salmonella*	5	0	0	–
Frozen vegetables and frozen fruits, pH equal or higher than 4.5	– *Escherichia coli*	5	2	10^2	10^3
Frozen vegetables and frozen fruits, pH less than 4.5	pH measured at the time of sampling	pH values shall be less than 4.5 in all tested samples			
Vegetable soup (powder)	– Aerobic plate count	5	1	10^4	10^5
	– Yeasts and Moulds	5	1	10^2	10^3
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Bacillus cereus*	5	1	10^3	10^4
	– *Clostridium perfringens*	5	1	10^2	10^3
Pickled/Fermented vegetable/Fruits (e.g. sauerkraut, pickles, table olive, etc.)	– Yeasts	5	0	0	2
	– Moulds	5	0	0	–
Fried potatoes (e.g. chips, fingers, etc.)	– Aerobic plate count	5	1	$5x10^4$	10^5
	– *Salmonella*	5	0	0	–
	– *Bacillus cereus*	5	1	10^4	10^5
	– *Clostridium perfringens*	5	0	0	–
Concentrated tamarind	– Moulds	5	0	0	–
	– *Escherichia coli*	5	0	0	–

11. Jelly, Jam and Marmalade

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Jam, jelly and marmalade	– Yeasts and moulds	5	1	10^3	10^4
Jelly powder	– *Salmonella*	5	0	0	–
Fruit whole/pieces in sugar syrup (canned)	Requirements for canned products (Item 8) shall be applied				

12. Chocolate, Sweets and their Ingredients

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Chocolate (plain or sweetened- with milk, or filled or covered with nuts), toffee, nougat, fudge etc.	– Aerobic plate count	5	2	10^4	10^6
	– Enterobacteriaceae	5	2	0	10
	– *Salmonella*	10	0	0	–
Dehydrated desserts, (bonbons, caramels and other similar products)	– Aerobic plate count	5	2	10^4	10^6
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10	10^3
Hard & soft candy	– Aerobic plate count	5	2	0	$5x10^3$
	– Yeasts and moulds	5	2	0	10^2
	– Enterobacteriaceae	5	0	0	–
	– *Salmonella*	5	0	0	–
Cocoa	– Yeasts and moulds	5	2	10^2	10^4
	– Enterobacteriaceae	5	2	0	10
	– *Salmonella*	10	0	0	–
Coconut (grated/desiccated)	– Moulds	5	2	10	10^2
	– Enterobacteriaceae	5	2	10^2	10^4
	– *Salmonella*	10	0	0	–
Nuts	– Moulds	5	2	10^2	10^4
	– *Escherichia coli*	5	2	0	10
Chewing gum	– Yeasts and moulds	5	1	$5x10^2$	10^3
	– *Salmonella*	5	0	0	–
Honey	– Yeasts and moulds	5	1	10^2	10^3
	– Sulphite-reducing anaerobes	5	2	10^2	10^3
	– *Clostridium botulinum**	5	0	0	–
Arabic sweets	– Coliforms	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Escherichia coli* O157	5	0	0	–
	– *Listeria monocytogenes**	5	0	0	–
	– *Staphylococcus aureus*	5	0	0	–
Molasses, debs (date syrup), hard brown sugar	– Yeasts and moulds	5	1	$5x10^2$	10^3
	– *Escherichia coli*	5	1	0	10
	– *Salmonella*	5	0	0	–
Concentrated cane syrup	– Yeasts and moulds	5	1	–	10
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–

* Optional

13. Ingredients for Food Industries

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Enzymes	– *Escherichia coli*	5	2	0	10
	– *Salmonella*	10	0	0	–
Dyes (food colours)	– Aerobic plate count	5	2	10^4	10^6
	– *Salmonella*	10	0	0	–
Gums	– Aerobic plate count	5	2	10^4	10^6
	– Enterobacteriaceae	5	2	10	10^3
Eggs products	– Aerobic plate count	5	2	10^4	10^6
	– *Salmonella*	10	0	0	–
	– Enterobacteriaceae	5	2	10	10^2
Yeasts	– Spores of rope-forming bacteria	5	1	10^2	10^3
	– *Escherichia coli*	5	2	0	10
	– *Salmonella*	20	0	0	–
Gelatine	– Aerobic plate count	5	3	$5x10^3$	10^5
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10^2	10^3
	– *Clostridium perfringens*	5	1	10^2	10^4

14. Drinking Water

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Bottled drinking water: a) Non-carbonated (including flavoured)	Coliforms *E.coli* *Pseudomonas aeruginosa*	5 5 5	0 0 0	0 0 0	– – –
b) Carbonated waters	pH	5	0	3.5	–
		If any sample unit is greater than pH 3.5, proceed with the above sampling plans for non-carbonated waters			
Water for human consumption; at source, bottling operation	Coliforms	10	1	0	10/100 ml
	Fecal streptococci Sulphite-reducing clostridia	} Absent in 100 ml of sample			
Natural mineral water	**First Examination**	**Decision**			
	E.coli or Thermotolerant coliforms 1 x 250 ml	Must not be detectable in any sample			
	Total coliform bacteria 1 x 250 ml *Enterococcus fecalies* 1 x 250 ml	If ≥ 1 or ≤ 2, second examination is carried out			
	Pseudomonas aeruginosa 1 x 250 ml *Sulphite-reducing anaerobes* 1 x 250 ml	If > 2, rejected			
Second Examination*					
Natural mineral water	**Microorganisms**	**Limit per ml or gram**			
		n	c	m	M
	Total coliform bacteria Fecal streptococci Sulphite-reducing anaerobes *Pseudomonas aeruginosa*	4 4 4 4	1 1 1 1	0 0 0 0	2 2 2 2
Edible packaged ice	Aerobic plate count Coliforms (100 ml) *E. coli* (100 ml) *Pseudomonas aeruginosa* (250 ml)	5 5 5 5	1 0 0 0	$5x10^2$ 0 0 0	10^3 – – –

* If the count is > 2; re-sampling from the same point of source for second examination.

15. Beverages

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Carbonated beverages (non-alcoholic)	– Aerobic plate count	5	1	10^2	$3x10^2$
	– Yeasts and moulds	5	1	2	10
	– Coliforms	5	1	0	10
Un-pasteurized juices (fresh)	– Yeasts and moulds	5	2	10^3	10^4
	– *Escherichia coli*	5	2	10^2	10^3
	– *Salmonella*	5	0	0	–
Pasteurized fruit juice and drink (including concentrated)	– Aerobic plate count	5	2	$5x10^3$	10^4
	– Yeasts and moulds	5	2	10^2	10^3
	– Coliforms	5	3	5	10^2
Flavoured drink & its concentrates	– Aerobic plate count	5	1	10	10^2
	– Yeasts and moulds	5	0	0	–
Drink powder (dry)	– Aerobic plate count	5	2	10^3	10^4
	– Yeasts and moulds	5	1	10	10^2
	– Coliforms	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Escherichia coli* O157	5	0	0	–
	– *Staphylococcus aureus*	5	0	0	–
	– *Bacillus cereus*	5	1	10^2	–
Liquorice root extract; concentrates or drink	– Aerobic plate count	5	2	0	10^4
	– Enterobacteriaceae	5	2	10	10^2
	– Yeasts and moulds	5	2	0	10^2
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	0	0	–
Pasteurized soya drink	– Aerobic plate count	5	1	10^4	10^5
	– Coliforms	5	1	5	10
	– *Escherichia coli* O157	5	0	0	–
Sterilized soya drink	– Aerobic plate count	5	1	0	10
	– Coliforms	5	0	0	–
	– Yeasts and moulds	5	0	0	–
	– *Staphylococcus aureus*	5	0	0	–
Low calories beverages	– Aerobic plate count	5	2	10	10^2
	– Yeasts and moulds	5	1	0	2
	– Coliforms (100 ml)	5	1	0	1
	– *Escherichia coli*	5	0	0	–

16. Ready to Eat Foods

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Sandwiches and filled rolls with salad	– *Escherichia coli*	5	1	20	10^2
	– *Salmonella*	5	0	0	–
	– *Escherichia coli* O157	5	0	0	–
	– *Listeria monocytogenes* *	5	1	20	10^2
	– *Bacillus cereus*	5	1	10^3	10^4
Sandwiches and filled rolls without salad	– Aerobic plate count **	5	1	10^6	10^7
	– Enterobacteriaceae	5	1	10^2	10^4
	– *Escherichia coli*	5	1	20	10^2
	– [1]*Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	20	10^2
	– *Bacillus cereus*	5	1	10^3	10^4
Coleslaw (cabbage)	– Aerobic plate count	5	1	10^5	10^6
	– *Escherichia coli*	5	2	10	10^2
	– *Escherichia coli* O157	5	0	0	–
	– *Listeria monocytogenes*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10^2	10^4
Sandwiches and filled rolls with cheese- Ready to eat meals (pasta/pizza, others)	– Enterobacteriaceae	5	1	10^2	10^4
	– *Escherichia coli*	5	1	20	10^2
	– [1]*Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	20	10^2
	– *Bacillus cereus*	5	1	10^3	10^4
Rice	– Aerobic plate count	5	1	10^5	10^6
	– Enterobacteriaceae	5	1	10^2	10^4
	– *Escherichia coli*	5	1	20	10^2
	– [2]*Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	20	10^2
	– *Bacillus cereus*	5	1	10^3	10^4
	– *Clostridium perfringens*	5	1	20	10^2
(1) Bhaji, Falafel	– Aerobic plate count	5	1	10^3	10^4
(2) Soup (all kinds), Samosa, Mashed potato, Desserts (tarts, flans, and sweet pies)	– Aerobic plate count	5	1	10^4	10^5
(3) Spring rolls- Trifle	– Aerobic plate count	5	1	10^5	10^6
(4) Homous, Tzatziki, and other dips.	– Aerobic plate count	5	1	10^6	10^7

[1] *Salmonella* is tested only when the sample is found to have any count of Enterobacteriaceae.
[2] In case if the rice contains meat or poultry.
* This limit applies to shelf-stable foods (kept at room temperature or deep freezer). If it is refrigerated or meant for children the approach should be "not detected in 25 g".
** Optional.

Item	Microorganisms	Limit per ml or gram			
		N	c	m	M
Parameters given below apply to all the above products (1- 4):					
	– Enterobacteriaceae	5	1	10^2	10^4
	– *Escherichia coli*	5	1	20	10^2
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	20	10^2
	– *Bacillus cereus*	5	1	10^3	10^4
	– *Clostridium perfringens**	5	1	20	10^2
Jelly	– Aerobic plate count	5	2	10^2	10^3
	– Enterobacteriaceae	5	0	0	–
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	20	10^2
	– Sulphite-reducing anaerobes	5	1	0	10
	– *Clostridium perfringens**	5	0	0	–

* Optional.

17. Miscellaneous Foods

Item	Microorganisms	Limit per ml or gram			
		n	c	m	M
Tofu (not UHT)	– *Escherichia coli*	5	0	0	–
	– *Staphylococcus aureus*	5	2	10^2	10^3
	– *Bacillus cereus*	5	2	10^2	10^3
Sesame seed products (Tahini, Halwa)	– Moulds	5	1	10^2	10^3
	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^2
Cultured Seeds and Grains (bean sprouts, alfalfa, etc)	– *Escherichia coli*	5	0	0	–
	– *Salmonella*	5	0	0	–
Edible essential water (rose & flower water, others)	– Aerobic plate count	5	2	10	10^2
	– Yeasts	5	2	0	20
	– *Candida*	5	0	0	–
	– Coliforms	5	2	0	10
	– *Escherichia coli*	5	0	0	–
	– *Pseudomonas aeruginosa*	5	0	0	–
	– *Bacillus cereus*	5	0	0	–
Nutritious powder	– Aerobic plate count	5	2	10^3	10^4
	– Coliforms	5	1	0	10
	– *Salmonella*	15	0	0	–
	– *Staphylococcus aureus*	5	0	0	–
	– *Bacillus cereus*	5	1	10^2	–
Cream caramel powder	– Aerobic plate count	5	2	10^4	10^6
	– *Escherichia coli*	5	2	0	10
	– *Salmonella*	10	0	0	–
	– *Staphylococcus aureus*	5	1	10	10^3

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