File No. 11014/07/2021-QA

Food Safety and Standards Authority of India

(A statutory Authority established under the Food Safety and Standards Act, 2006)

(Quality Assurance Division)

FDA Bhawan, Kotla Road, New Delhi – 110002

Dated, the 7th October, 2022

Order

Subject: FSSAI General Guidelines on Sampling for Microbiological Analysis - reg.

The FSSAI Manual on General Guidelines on Sampling for Microbiological Analysis which has been approved by the Food Authority in its 39th meeting held on 13.07.2022 is enclosed herewith.

2. The manual shall be used by the laboratories with immediate effect.

3. Since the process of updation of test methods is dynamic, any changes happening from time to time will be notified separately. Queries/concerns, if any, may be forwarded to email: sp-sampling@fssai.gov.in, dinesh.k@fssai.gov.in.

Encl: as above

(Harinder Singh Oberoi)
Advisor (QA)

To:

1. All FSSAI Notified Laboratories
2. All State Food Testing Laboratories
3. CEO, National Accreditation Board for Testing and Calibration Laboratories (NABL)

फा. सं. 11014/07/2021 – **क्यूए**

भारतीय खाद्य सुरक्षा और मानक प्राधिकरण

(खाद्य सुरक्षा और मानक अधिनियम, **2006** के अंतर्गत स्थापित एक वैधानिक प्राधिकरण)

(गुणवत्ता आश्वासन विभाग)

एफडीए भवन, कोटला रोड, नई दिल्ली-110002

दिनांक: 7 अक्टूबर , **2022**

आदेश

विषय: माइक्रोबायोलॉजिकल विश्लेषण के लिए नमूनाकरण पर एफएसएसएआई सामान्य दिशानिर्देश- के संबंध में

माइक्रोबायोलॉजिकल विश्लेषण के लिए नमूनाकरण पर सामान्य दिशानिर्देशों पर एफएसएसएआई मैनुअल, जिसे खाद्य प्राधिकरण ने 13.07.2022 को आयोजित अपनी 39वीं बैठक में अनुमोदित किया है, इसके साथ संलग्न है।

2. इस मैनुअल का प्रयोग प्रयोगशालाओं द्वारा तत्काल प्रभाव से किया जाएगा।

3. चूंकि परीक्षण विधियों के अद्यतन की प्रक्रिया गत्यात्मक है, समय-समय पर होने वाले किसी भी परिवर्तन को अलग से अधिसूचित किया जाएगा। प्रश्न/चिंताएं, यदि कोई हों, ईमेल: sp-sampling@fssai.gov.in, dinesh.k@fssai.gov.in पर अग्रेषित की जा सकती हैं ।

संलग्नक: उपरोक्त अनुसार

(हरिंदर सिंह ओबेरॉय)
सलाहकार (गुणवत्ता आश्वासन)

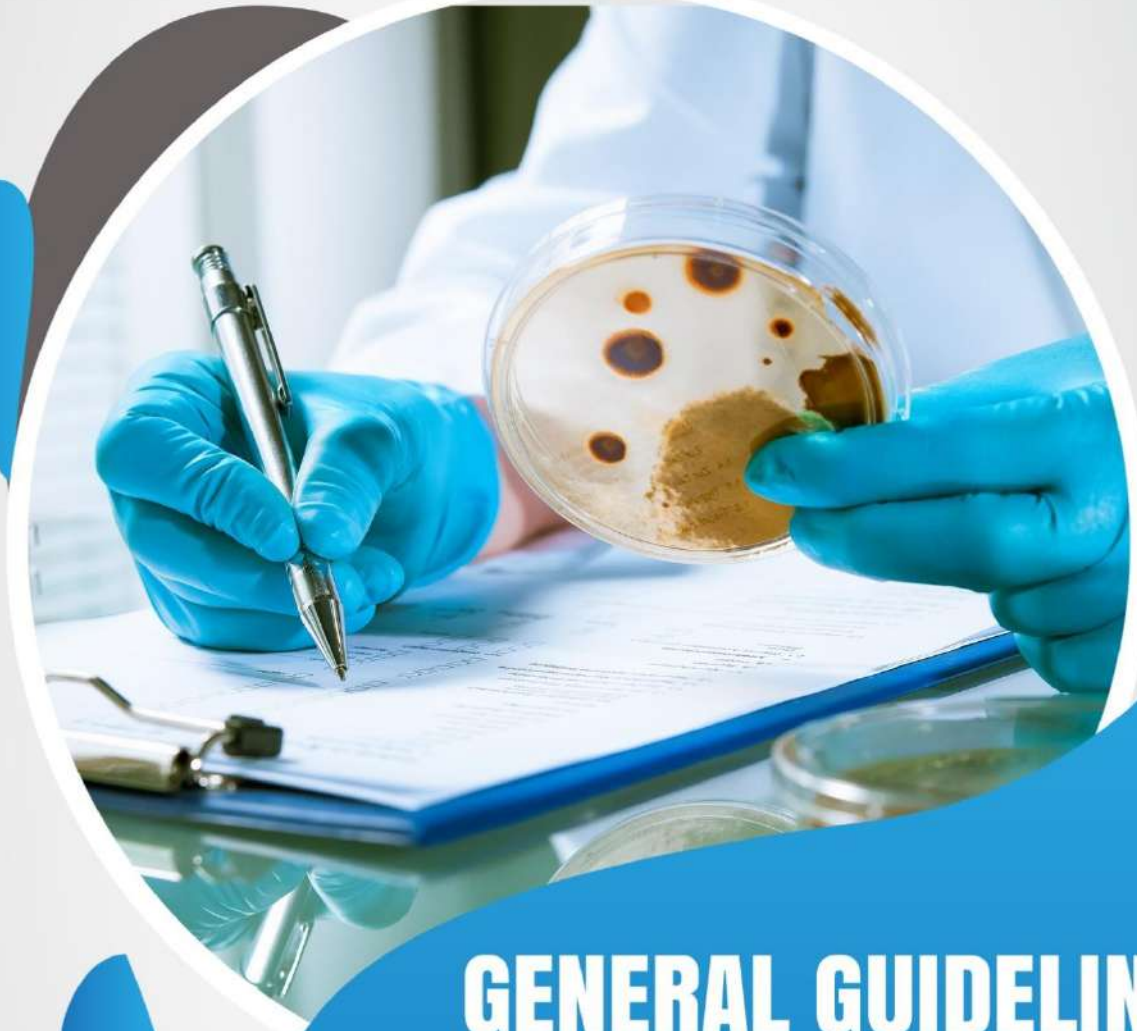
प्रति:

1. सभी एफएसएसएआई अधिसूचित प्रयोगशालाएं
2. सभी राज्य खाद्य परीक्षण प्रयोगशालाएं
3. सीईओ, राष्ट्रीय परीक्षण और अंशशोधन प्रयोगशाला प्रत्यायन बोर्ड

FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA

Inspiring Trust, Assuring Safe & Nutritious Food

Ministry of Health and Family Welfare, Government of India



GENERAL GUIDELINES ON SAMPLING FOR MICROBIOLOGICAL ANALYSIS

FOREWORD

The Food Safety and Standards Authority of India, in collaboration with various stakeholders, has been working towards fulfilling its mandate of ensuring the availability of safe and wholesome food to meet the health and nutritional needs of the country. Microbiological sampling and testing is important aspect of Food Safety for the purpose of food safety management system/process control, Monitoring & surveillance and investigation of suspected food-borne outbreaks, customer complaints etc.

To fulfil above objectives, I am pleased to launch **1st edition of 'General Guidelines on Sampling for Microbiological Analysis'.** These Guidelines have been developed to provide guidance to Food Safety Officers in collection of samples for microbiological analysis with particular emphasis on uniform approach to ensure transparency and consistency towards implementation and compliance of regulatory provisions.

Food Safety Officer are the frontline officers engaged in ensuring food safety compliance to protect the health and wellbeing of consumers. Therefore, it is our responsibility to strengthen their capacity by providing training and guidance materials. The Enforcement Officer/Food Safety Officer shall follow these guidelines for collecting samples as per the Food Safety and Standards Act, 2006 and Food Safety and Standards Regulations, 2011.

I am hopeful that this manual will enhance the knowledge of FSOs and it can be used as ready reckoner towards discharge of their duties in a professional manner.

Shri Arun Singhal
Chief Executive Officer
Food Safety and Standards Authority of India
FDA Bhawan, Kotla Road
New Delhi – 110002

September 2022

PREFACE

Food safety is an assurance that food will not cause any harm to the consumer, when it is prepared and/or consumed according to its intended use. There is a significant challenge in ensuring food safety to protect public health, given the complexities in collection, storage and transport of samples by Food Safety Officers.

These General Guidelines have been created for Enforcement Officers/ Food Safety Officers. This Guidance document serves as a quick reference book and covers subjects, such as sampling plan, sampling tools, quantity of material to be sampled, sampling procedure, labelling, etc. through the chain of sample collection including its storage and transportation. The objective here is to provide food category-wise sampling procedure for process hygiene as well as food safety purpose. This is approved by FSSAI for use in surveillance and implementing its regulatory program.

I am extremely appreciative of the work done by all the Members of the Panel on "General Guidelines on Sampling for Microbiological Analysis" especially Dr. Kiran N Bhilegaonkar, Principal Scientist, ICAR-IVRI, Pune and Panel Chairman Dr Rajan Sharma. I am thankful to the Chairperson, FSSAI and CEO, FSSAI for their support and constant encouragement without which the work would not have seen the light of day.

Any suggestions/feedback from the stakeholders, which will contribute towards updating the manual from time to time are welcome.

September 2022

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FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA

Inspiring Trust, Assuring Safe & Nutritious Food

Ministry of Health and Family Welfare, Government of India

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PART - A: General guidelines

1. PURPOSE OF MICROBIOLOGICAL SAMPLING AND TESTING

1.1. To verify the compliance with the criteria laid down in Food Safety and Standards Regulations.

1.2. To verify food safety management system/process control.

1.3. To check the compliance of individual batches.

1.4. To obtain general information on the microbiological status of certain products placed on the market.

1.5. Monitoring and surveillance.

1.6. To investigate suspected food-borne outbreaks, customer complaints.

2. DEFINITIONS

2.1. Lot/Batch: Identified quantity of some commodity, manufactured or produced under conditions that are presumed uniform.

2.2. Sampling: It is the selection of a certain portion, number of container/pack of the product units from a particular lot of the same food.

2.3. Sampling Plan: Predetermined procedure for the selection, withdrawal, and preparation of samples from a lot to yield the required information so that a decision can be made regarding the acceptance of the lot.

2.4. Representative sample: Sample drawn so as to reflect, as accurately as possible, the properties of interest of the lot from which it is taken.

2.5. Sample size (n): Sampling size is the number of sample units comprising the total sample drawn from a lot or production.

2.6. Sample Unit: Sample unit is one of a number of individual containers, or a portion of a food or primary container examined or evaluated as a single unit.

2.7. Bulk products: Products that are not separated into individual items or units

2.8. Packaged products: Products separated into units or items, sealed or wrapped by the manufacturer

2.9. Random sample: A random sample is one in which all elements in the lot have an equal and independent chance of being included in the sample.

3. GENERAL REQUIREMENTS FOR MICROBIOLOGICAL SAMPLING

3.1. Sampling for microbiological analysis shall be undertaken by an authorized person, experienced and trained in the technique of sampling for microbiological purpose.

3.2. The reliability of the analysis and interpretation of the results exclusively depend on the process of sampling/sample preparation. The condition of the sample received for examination is of primary importance. If samples are improperly collected and mishandled or are not representative of the sampled lot, the laboratory results will be meaningless.

3.3. The interpretations (acceptance/rejection, etc.) about a large consignment of food are based on a relatively small sample of the lot; hence it is very important that the sample should be uniform, homogenous and a true representative of the entire Lot/Batch.

3.4. A representative sample is essential when microbes are unevenly and sparsely distributed within the food, for this an established sampling procedure and plan must be applied uniformly.

3.5. Extraneous organisms from hands, clothing, sampling equipment, or the processing environment may contaminate samples and may lead to erroneous analytical results. Aseptic sampling techniques should be followed to ensure accurate results that are representative of the product and process. Samples must be protected against any extraneous contamination.

3.6. Further, improper transportation and storage especially at temperatures that may significantly alter the micro flora must be avoided.

4. SAMPLING PLAN

4.1. Number and quantity of samples to be collected by Food Safety Officers for regulatory compliance shall be as per the sampling plan specified in Appendix B of Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011 and amendments Gazette notifications issued from time to time.

4.2. Three sets, each set containing 'n' number of samples (n as defined in sampling plan, e.g. n=5 or n=10, etc.) shall be drawn. Each of these sets shall be tested in three different accredited laboratories. The final decision shall be based on results of three accredited laboratories. There will be no provision for retesting or re-sampling for microbiological testing. (Gazette Notification of 23 June, 2020 - published on 27th July, 2020))

4.3. For quick reference category wise indicative number and quantity of samples in line with current Appendix B is given under respective category.

B

5. SAMPLING TOOLS, EQUIPMENTS AND MATERIAL

5.1. Tools/Devices

Sampling tools/devices (Fig.1 – 6) used for the sample collection for the microbiological testing should be clean, sterile and should be wrapped properly for sample collection. Following tools/devices may be used depending on the type of food material to be sampled.

i. Spoons, scoops, spatula, triers

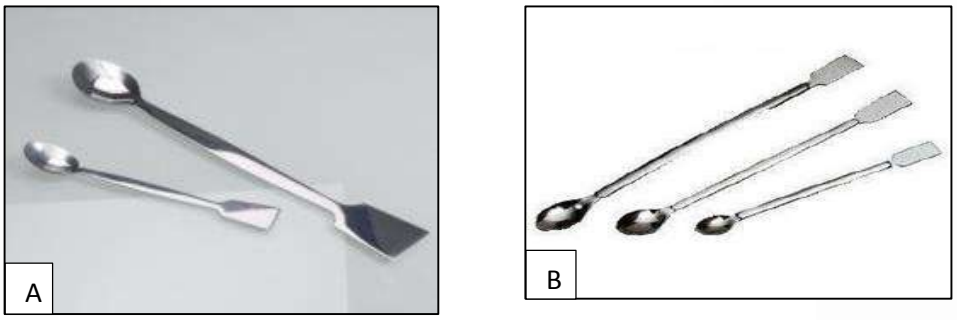
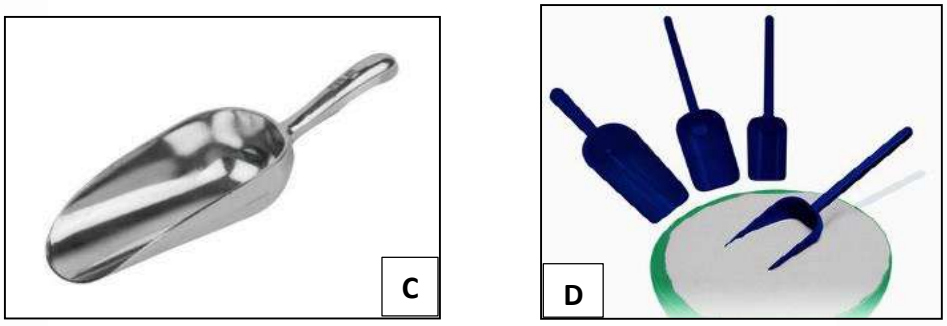


Fig 1 A &B: Spatula cum spoons



C & D: Scoops

E: Trier

ii. Butcher's knife, scissors, forceps, tongs

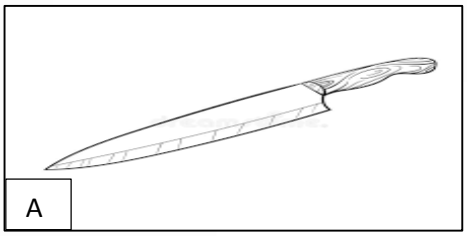
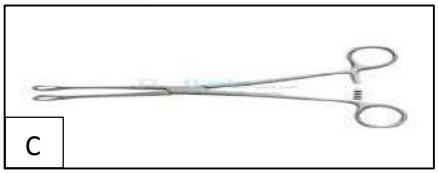


Fig 2 A- Butcher's knife B- Scissors, forceps



C- Tongs

D- Hand Drill

iii. Electric drill, drill bits (if frozen foods to be sampled)

Fig 3 A - Electric drill B- Drill bits

iv. Sterilized hammer and chisel (frozen/solid foods)

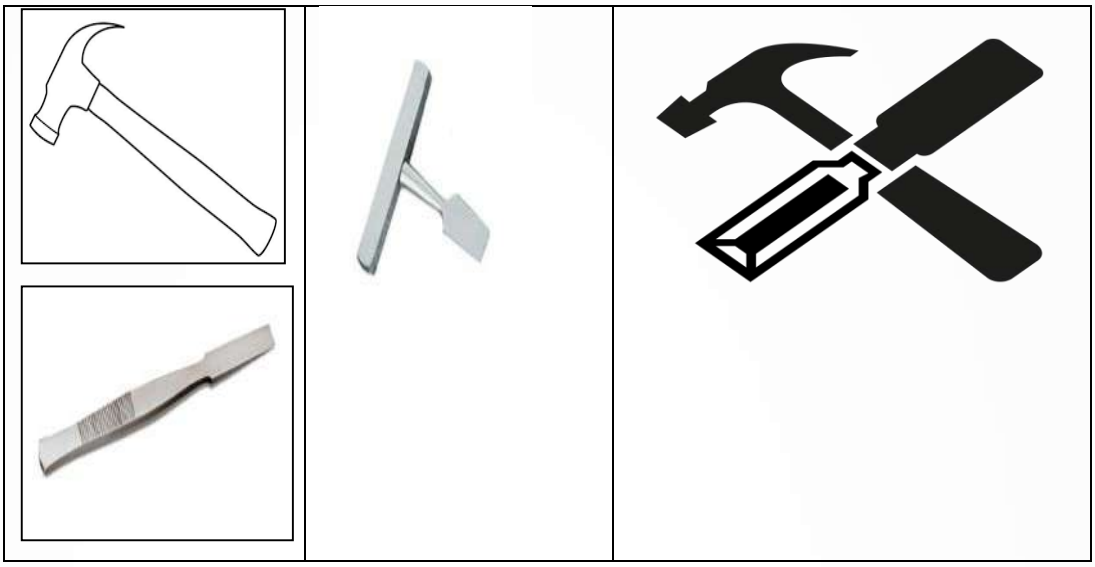


Fig 4 – Sterilized hammer and chisel

v. Swabs, Sponges (for surfaces)

Fig 5 – Swabs, Sponges

vi. Large syringes/liquid sample collecting devices (for liquid samples)

Fig 6 –large syringes, liquid sample collecting devices

5.2. Equipments

i.Portable Refrigerators (2-8°C)

ii. Portable Freezers (-15 to -18 °C)

5.3. Other material

i. Sterile jar/bottle/container/polythene bag for sample collection.

ii. Sterile peptone salt diluent, dispensed in 10.0 Ml amounts in tubes or bottles.

iii. Sterile square templates, with hollow internal area of for example, 50 cm^2 or larger.

iv. Sterile cotton wool swabs, large size with wooden/plastic shaft.

v. Sterile specimen sponge (free of inhibitory substances), in a sterile plastic bag.

vi. Sterile square template, with hollow internal area of 100 cm^2 (10 cm × 10 cm).

vii. Sterilizing agents for sterilizing the tools/surface: IPA/70% ethanol, Propane torch (Fig.7), etc.

Fig 7 – Propane torch

viii. Sanitizing solution for cleaning and sanitizing the work area and for sanitizing the hands/sample tools in between collection of two samples.

ix. Personal Protective clothing: coat, hat, shoes, gloves etc.

x. Cool box: Insulated chest or box.

xi. Refrigerant packs/dry ice packs.

xii. Food temperature measurement device/thermometer.

xiii. Labels, marking pen (waterproof).

xiv. Adhesive tapes.

xv. Sterile cotton.

5.4. Sterilization of sampling tools/equipment

i. Whenever possible, sterilization of equipments and accessories shall be performed by one of the following two methods:

a) Method A: Exposure to hot air at 170°C for 30 minutes, 160°C for 60 minutes, and 150°C for 150 minutes.

b) Method B: Exposure to steam at 121 °C + 1°C for not less than 20 min in an autoclave.

After sterilization by method A or Method B, sampling equipment shall be stored under sterile conditions prior to use.

If, in a particular situation, sterilization by Method A or B is not possible, the following alternative methods, which shall be regarded as secondary methods only, can be used, provided that the sampling equipment is used immediately after sterilization:

c) Method C: Exposure to a suitable flame so that all working surfaces of the sampling equipment come into contact with the flame;

d) Method D: Immersion in at least 70% (V/V) ethanol solution;

e) Method E: Ignition with 96% (V/V) ethanol.

f) Method F: Exposure to a sufficient dose of gamma radiation.

After sterilization by method C or E, sampling equipment shall be cooled under sterile conditions

6. SAMPLING PROCEDURE

6.1. Pre-sampling preparation

i. An area should be designated as a sampling site for sampling. Sanitizable surface, such as a stainless steel table or wheeled cart, can be used.

ii. Before initiating the sample collection, it is important to assemble sampling appliances/tools, such as sterile gloves, sterile SS scissors, forceps, spatulas, scoops, spoons, drills, sample

collecting jar/bottle/container/polythenebag, sanitizing solution, sterile sampling solutions (if required, e.g. for swab sample collection), etc.

iii. All sampling equipment/instruments/appliances shall be cleaned and sterilized before use.

iv. Containers for sample collection should be sterile, clean, dry and leak-proof. It should have wide mouth for easily placing the sample inside the container (without touching the rim). The size should be suitable for sampling of the desired quantity.

v. Disposable plastic bags, jars with screw-caps, bottles, metal cans with tightly fitting lids, sterile sealable stomacher bags may be used for microbiological sampling depending on the type of products, etc. Avoid glass containers as they may break during handling/transport and can contaminate the food product. Polythene bags must be protected from puncture- No wire closure or staple closure.

6.2. Sampling Procedure

In addition to the procedure for taking samples specified in the sub-rule 2.4.1 of rule 2.4 of Food Safety and Standards Rules,2011, the following specific requirements shall be followed for microbiological sampling:

i. Whenever possible, samples may be drawn as the original unopened packages/containers. If products are in bulk or in containers too large for submission to the laboratory, transfer representative portions to sterile sample collection containers under aseptic conditions. The sample shall be of uniform, homogenous and a true representative of the entire Lot/Batch and in case of liquids the sample shall be properly mixed before sampling.

ii. Depending upon the nature and type of food, use the containers that are clean, dry, leak-proof, wide-mouthed, sterile, and of a size suitable for samples of the product. Whenever possible, avoid glass containers, which may break and contaminate the food product. Sample container shall be closed with the stopper or sealed air tight immediately after drawing the samples. Sterile container/bags used for sampling shall not be over filled or punctured by any wire closure/stapler.

iii. The sampler shall keep their hands away from the mouth, nose, eyes and face. During sampling, hands shall be sanitized with 70% isopropyl alcohol /70% ethanol and sterilized hand gloves shall be used during the collection of the sample. Care should be taken to prevent contamination of the external surface of the gloves prior to or during the sample collection process. Do not touch any other surface to avoid cross-contamination. Sampler shall not touch the inside of the sterile container lip or lid and open lid shall not be allowed to become contaminated.

iv. Drawing of samples:

a) **Packaged Products:** In case of all types of foods and food products sold in sealed containers (bottles, tins, cans, cartons, cans etc.), the original unopened containers should be selected randomly as per requirement and send to the laboratory.

b) **Bulk Products:** Samples of unfrozen food and food products in the form of liquid, semi liquids, jellies, powder or grains of uniform consistency held in large tins, cans, bags etc. shall be drawn in the following manner:

(1) After cleaning and sterilizing the site by flaming or IPA, open the lid aseptically as far as possible or pierce holes of convenient size on the top of the container (use sterile knife or any other sharp sterile instrument).

(2) With the help of sterile sampling devices such as spoon, scoops, pipette, etc. take equal quantities of materials from different part of the container and transfer to the sterile container.

(3) In case of liquid samples, the material shall be properly mixed with the help of sterile dipper or other equipment before drawing the samples.

(4) Samples shall be drawn from each container of the selected lot and transferred to separate sterile sampling container.

(5) Do not overfill and avoid touching the edges of mouth while filling the sample container.

v. Immediately after collection, samples bottles/bags etc. shall be placed in protective container maintaining required temperature for storage.

vi. Aseptic conditions shall be maintained during the sampling and care shall be taken to see that good sanitation and hygienic conditions are maintained.

vii. Sample parcel shall bear the temperature at the time of sampling, time of sampling and transportation and storage condition.

viii. Container shall be marked with full details of the sampling in a manner depicted in the sampling plan.

ix. Samples shall be protected against extraneous contamination and improper handling.

x. As soon as the samples are collected they shall be kept at appropriate storage temperature i.e. chilled/refrigerated samples at 2-8 ˚C (in ice box/refrigerator, etc.), frozen sample in frozen conditions (-18 ˚C, dry ice/freezer, etc.). Dry/canned products and products that are not perishable and can be stored at ambient temperatures but avoid exposure/close contact with heat direct sunlight. Refrigerated products should not be frozen, unless otherwise specified.

xi. Samples shall be sealed and labelled as per clause 7.

xii. Preservatives shall not be added to samples intended for microbiological or sensory examination.

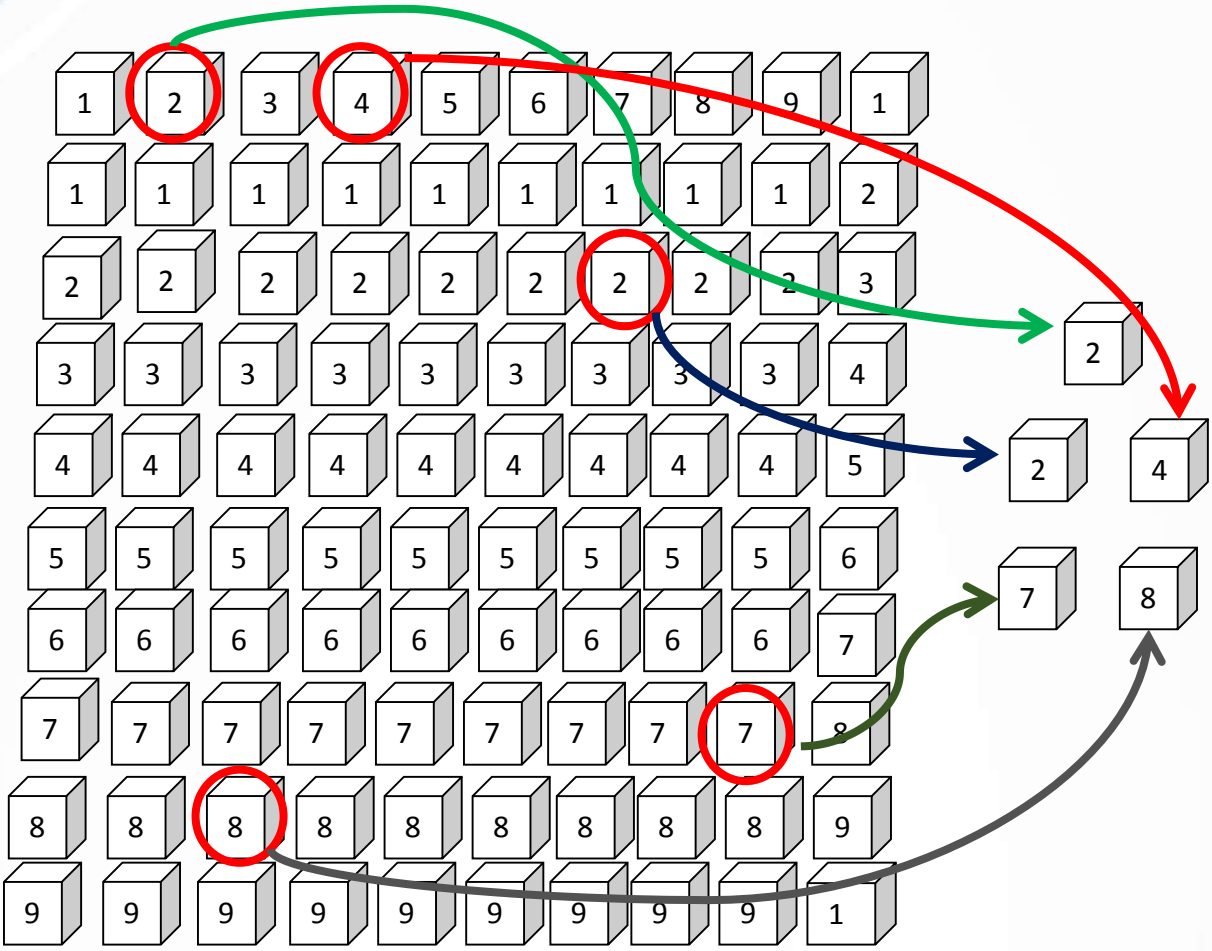
xiii. Deliver samples to the laboratory promptly at the required storage conditions.

6.3. Selection of Sample from the lot/batch

i. A sample should represent a population as adequately as possible. Representative sample units drawn from the lot/batch should reflect as far as possible, the composition of the lot or batch. During selection of the sample avoid bias and draw number of sample units from the lot/batch as per the regulations. Selection of sample units/cartons/packs shall be done by using following sampling procedures.

a) Random sampling: Random sampling is universally recognized way to avoid bias. In random sampling each unit/packet/sample in the lot has equal chance of getting selected. If there are 100 cartoons /packs in a lot. Number them from 1 to 100 (N= Number 1 to 100). If 5 samples to be drawn for analysis (n=5) randomly from anywhere in this lot, use random number generator tools which are available online e.g. random.org; onlinenumbertools.com; onlinerandomtools.com. These tools will give you five random numbers from 1 to 100. Collect/draw the samples for analysis from those packs as given below in the figure.

e.g.:5 random packs to be are 79th, 27th 2nd, 4th and 83rd



In case of heterogeneous or big lot size, divide the lot in strata and select the sample unit from each strata using random number generator tools.

(Reference: Statistical Aspects of Microbiological Criteria Related to Foods, 24 Microbiological Risk Assessment Series, FAO/WHO 2016).

E.g. From a big lot of 5000 packs/cartoons, if five samples are to be collected. The lot can be divided in 5 strata each containing 1000 packs. Using random number generator tool, collect one random sample unit from each of these strata.

Stratum 1 **1 -1000**	**Stratum 2** **1 -1000**	**Stratum 3** **1 -1000**	**Stratum 4** **1 -1000**	**Stratum 5** **1 -1000**
↓	↓	↓	↓	↓
23	**777**	**284**	**6**	**491**

7. LABELLING OF SAMPLE

7.1. Label all the samples collected, reproducing clearly the identification of the product, the nature of the product and, at least, the identification number, name and the signature (or initials) of the person responsible for taking the samples. If necessary, additional information may be included, such as the purpose of sampling, the mass or volume of the sample, the unit from which the sample was taken and the condition of the product storage as well as the conditions at the time of sampling. Proper labeling of samples is essential for tracking and future correspondence. Note down the numbers of sample collected and make a record to identify the same The label of sample collected shall bear the following minimum information

i. Code number of the sample
ii. Name and sender with his official designation
iii. Date, time and place of collection
iv. Name and nature of sample
v. Storage temperature

8. STORAGE AND TRANSPORTATION

8.1. The sample shall be stored and transported to the laboratory under the conditions specified in the Appendix B of Food Safety and Standards (Food Products Standards and Food Additives) Regulations, 2011.

8.2. All samples collected should be transported to the laboratory at the earliest not more than 24 h of collection.

8.3. Chilled samples shall be transported to the laboratory for testing as quickly as possible at the temperature (2-8 °C) (but not frozen), so as to enable initiation of analysis within 24 h of sampling.

8.4. Frozen or refrigerated products shall be transported in insulated containers of rigid construction under frozen conditions and prescribed temperature of the products.

8.5. Samples which were not frozen before sampling shall not be frozen after sampling.

8.6. Dehydrated and dry foods may be shipped and stored without refrigeration and should not be allowed to absorb any atmospheric moisture. These shall be stored in a clean, cool and dust free place. The samples should be protected from direct sunlight or other sources of heat.

8.7. Meat and meat products, poultry and fish should preferably be transferred under wet ice refrigeration to avoid dehydration at the surface of the sample.

8.8. Samples having different storage temperature shall be transported in separate transport container.

8.9. The packaged water sample shall be stored and transported to the laboratory under the ambient conditions avoiding any kind of physical damage and cross contamination.

PART-B: Food Category-wise Sampling Procedure

1. Fish and Fish Products

(a) Sampling of non-frozen bulk fish products:

This category includes chilled, dried, salted, fermented, and smoked fish products (fish, crustaceans and mollusc) which are normally not frozen during sale, transport or storage.

Take samples of chilled/iced products quickly without avoiding temperature increases. The aggregate sample must include appropriate number of incremental samples as mentioned in the sampling plan. The sample size must be at least 1.0 kg. Whole fish should be taken as samples and should not be cut or subdivided, where practical. Each sample should be taken from that part of the consignment presenting the highest risk e.g. having noticeable heterogeneous parts.

Pre-sterilized plastic bags or wide mouth plastic bottles should be used as containers for sampling. Thermo-insulation boxes should be used for transportation. The temperature of the sample must be maintained at or below 4 °C throughout the transport. If the sample cannot be delivered for analysis within 24 h, freeze the samples at -18 °C or lower. The collected sample must be protected from sources of contamination (odour, liquids, etc.) and contact with other substances during storage and transport.

(b) Sampling of Frozen Fish Products:

This category includes either block frozen or individually quick frozen (IQF) packages of fish, crustaceans and molluscs. This also includes frozen fish mince and surimi analogues as well as battered & breaded fish products.

Take samples of frozen products in aseptic condition using appropriate tools. For small blocks 1-2 kg, take entire block as sample. For large frozen blocks (>2 kg), use electric or hand drill with suitable bits or corer to make holes at specified points in the block. For non-homogenous blocks make number of perforations radially across the block. For homogeneous products make 3 or more equally spaced perforations covering whole depth of the block. Speed of the electric drill must be set at approximately 900 revolutions/min to avoid fusion by heating or dispersal of the shavings. Use a spatula or spoon to collect the resultant shavings and place them in the container or bag.

The aggregate sample must include appropriate number of incremental samples as mentioned in the sampling plan. The sample size must be at least 1.0 kg. Whole fish should be taken as samples and should not be cut or subdivided, where practical.

For separated frozen products (i.e. IQF products) transfer required amount of sample to pre-sterilized plastic bags or wide mouth bottles using scoop or spatula.

Keep the samples frozen at -18 °C or lower throughout transport. The collected sample must be protected from sources of contamination (odour, liquids, etc.) and contact with other substances during storage and transport.

(c) Sampling of Live shellfish (bivalve molluscs):

While sampling live shellfish, specific care should be taken to avoid contamination by microorganisms adhering to marine sediments, disturbance of surrounding environments. Once removed from the water and only when they are in closed condition, the shellfish should be cleaned by rinsing or scrubbing with clean seawater or fresh potable water. Shellfish shall not be re-immersed in water after cleaning the exteriors. A minimum of 10 live individuals (of normal commercial size) should be taken for testing. The number of live individuals should be adequate to provide a minimum of 50 g of flesh and intra-valvular liquid. Additional animals shall be collected to allow for a proportion of individuals received at the laboratory to be in a moribund state. Place each sample in a separate intact plastic bag with a waterproof label in a cool box with cold packs or in refrigerated condition. This bag may be placed inside a second bag to prevent leakage. The collected shellfish samples should never be in direct contact with ice/cold packs and should never be frozen as testing of live shellfish is required.

(d) Sampling of packaged fish products stored in ambient conditions:

This category includes thermally processed fish products (preserved in cans or retortable pouches), fish pickles, suitably packaged convenience products and powdered fish products, which are kept in ambient conditions 18 °C to 27 °C during storage, sale and transport.

Collect required number of packages as per the testing requirement given in microbiological specifications without damaging the wrapping or label. Do not open the packages at any stage and take adequate care to prevent breakage of glass containers and other non-rigid packs during transport. The collected samples need not be refrigerated or frozen during transport.

(e) Number and quantity of samples should meet the minimum requirement of Table 1 A and 1 B of Appendix B, Chapter 3 - FSSR, 2011 (Food Product Standards and Food Additives) and different Gazette notifications issued from time to time. A consolidated **Table 1** is given below for the ease of understanding.

Table 1: Microbiological Sampling Requirement of Fish and Fish Products

Product Categories as per FSSR	**Microbiological Criteria**		**Number of sample units to be collected from batch/lot and minimum quantity of each sample unit to be collected**	
	Hygiene Indicator	**Food Safety**	**Bulk Products**	**Packaged Products**
Chilled/Frozen Finfish	APC	*E. coli*; *Salmonella*; *V. cholerae* (O1 & O139)	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Chilled/Frozen Crustaceans	APC	*E. coli*; *Salmonella*; *V. cholerae* (O1 & O139)	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Chilled/Frozen Cephalopods	APC	*E .coli*; *Salmonella*; *V. cholerae* (O1 & O139)	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Live Bivalve Molluscs	---	*E.coli*	15 live bivalve molluscs (about 50 g of flesh) will form a single sample unit. Send a set of 5 sample unit to 3 accredited labs	NA

Chilled/Frozen Bivalves	APC	*E. coli*; *Salmonella*; *V. cholerae* (O1 & O139)	10 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	30 sample units, each weighing 150-200g. Send a set of 10 sample units to 3 accredited labs
Frozen cooked Crustaceans or Frozen heat shucked Mollusca	APC; Coagulase positive Staphylococci	*E. coli*; *Salmonella*; *V. cholerae* (O1 & O139); *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Dried /Salted & Dried fishery Products	APC; Y&M count	*E. coli*; *Salmonella*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Thermally Processed Fishery Product	Commercial Sterility	*Clostridium botulinum*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Fermented Fishery Product	Coagulase positive Staphylococci; Y&M count	*E. coli*; *Salmonella*; *Clostridium botulinum*	10 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	30 sample units, each weighing 150-200g. Send a set of 10 sample units to 3 accredited labs
Smoked Fishery Product	APC; Coagulase positive Staphylococci	*E. coli*; *Salmonella*; *V. cholerae* (O1 & O139); *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs

Accelerated Freeze dried Fishery Product	APC; Coagulase positive Staphylococci	*E. coli*; *Salmonella*; *V. cholerae* (O1 & O139); *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Fish Mince/Surimi and analogues	APC; Coagulase positive Staphylococci	*E. coli*; *Salmonella*; *V. cholerae* (O1 & O139); *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Fish Pickle	APC; Coagulase positive Staphylococci; Y&M count	*E. coli*; *Salmonella*; *V. cholerae* (O1 & O139);	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Battered and Breaded Fishery Product	APC; Coagulase positive Staphylococci; Y&M count	*E. coli*; *Salmonella*; *V. cholerae* (O1 & O139); *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Convenience Fishery Products	APC; Coagulase positive Staphylococci	*E. coli*; *Salmonella*; *V. cholerae* (O1 & O139); *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Powdered fish based product	APC; Coagulase positive Staphylococci; Y&M count	*Salmonella*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs

2. Fruits and Vegetables Products

(a) Number and quantity of samples should meet the minimum requirement of Table 4 A and 4 B of Appendix B, Chapter 3 - FSSR, 2011 (Food Product Standards and Food Additives) and different Gazette notifications issued from time to time. A consolidated **Table 2**is given below for the ease of understanding.

Table 2: Microbiological Sampling Requirement of Fruits and Vegetables Products

Product Categories as per FSSR	**Microbiological Criteria**		**Number of sample units to be collected from batch/lot and minimum quantity of each sample unit to be collected**	
	Process Hygiene	**Food Safety**	**Bulk Products**	**Packaged Products**
Cut or minimally processed and packed, including juices	Aerobic Plate Count, Yeast and Mold Count, *Enterobacteriaceae*, *Staphylococcus aureus* (Coagulase +ve)	*Salmonella*, *Listeria monocytogenes*, *E. coli 0157 and Vero or Shiga toxin producing E. coli*, *Vibrio cholera*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Fermented or pickled or acidified or with preservatives	Yeast and Mold Count, *Enterobacteriaceae*, *Staphylococcus aureus* (Coagulase +ve)	*Salmonella*, *Listeria monocytogenes*, *E. coli 0157 and Vero or Shiga toxin producing E. coli*, *Vibrio cholera*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Pasteurized Juices /Carbonated Fruit beverages	Aerobic Plate Count, Yeast and Mold Count, *Enterobacteriaceae*, *Staphylococcus aureus* (Coagulase +ve)	*Salmonella*, *Listeria monocytogenes*, *E. coli 0157 and Vero or Shiga toxin producing E. coli*, *Vibrio cholera*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Frozen Products	Aerobic Plate Count, Yeast and Mold Count, *Enterobacteriaceae*, *Staphylococcus*	*Salmonella*, *Listeria monocytogenes*, *E. coli 0157 and Vero or Shiga toxin producing*	5 sample units, each weighing 500-600 g.	15 sample units, each weighing 150-200g.

	aureus (Coagulase +ve)	*E. coli, Vibrio cholera*	Send 150 - 200 g of each sample unit to 3 accredited labs	Send a set of 5 sample units to 3 accredited labs
Dehydrated or Dried	Aerobic Plate Count, Yeast and Mold Count, *Enterobacteriaceae, Staphylococcus aureus* (Coagulase +ve)	*Salmonella, Listeria monocytogenes, E. coli 0157 and Vero or Shiga toxin producing E. coli, Vibrio cholera*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Thermally processed (other than pasteurization at less than 100°C)	Aerobic Plate Count, Yeast and Mold Count, *Enterobacteriaceae, Staphylococcus aureus* (Coagulase +ve)	*Salmonella, Listeria monocytogenes, E. coli 0157 and Vero or Shiga toxin producing E. coli, Vibrio cholera*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Retort processed	Aerobic Plate Count, *Enterobacteriaceae, Staphylococcus aureus* (Coagulase +ve)	*Salmonella, Listeria monocytogenes, E. coli 0157 and Vero or Shiga toxin producing E. coli, Vibrio cholerae,* Sulphite Reducing Clostridia (SRC)	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs

3. Milk and Milk Products

(a) **Pasteurized milk, Buttermilk, fermented milk, flavored milk**: For retail packages, pick randomly a number of pouches/ cans from entire lot and for bulk packages (Cans, tanks/ silos, vats, weighing bowl, weighing bowl, rail tanks, etc.), mix a bulk samples using plunger/ mechanical stirrer (at least 5 min) and pick 500 mL of representative sample. When sampling from the closed system, the working instructions for the installed sampling equipment should be observed.

(b) **Pasteurized cream**: Before sampling mix the cream at the bottom of the container with the upper layers using plunger / mechanical stirrer (incorporation of air should be avoided). To

avoid foaming, whipping or churning of the cream, do not raise the disc of the plunger above the surface of the cream during plunging.

(c) **Pasteurized butter** – For Retail samples, the content of the intact and unopened container constitutes the sample. A butter trier of suitable size should be passed from the edge diagonally through the product ensuring that the trier does not penetrate the bottom surface. The trier should be rotated through a half turn and be withdrawn with the core. The upper 25 mm of the core should be discarded to avoid taking a non-representative portion of the butter due to moisture loss at the surface. The rest of the core should be removed from the trier by using a spatula. For sampling from a large container (> 2 kg), a knife (14.2.3) should be used to cut a block of the product that fits into the sample box. Frozen butter. If the block of butter to be sampled is frozen (i.e. below 0 °C), the temperature of the butter should be raised to enable samples to be taken by using a butter trier. The samples should be transferred either directly or after wrapping in aluminum foil to the container. Sampling of butter stored under deep-freezing conditions requires special care and experience.

(d) **Cheese** –

(1) For an entire cheese or Packed cheese: sufficient number of packets or portions should be taken to obtain the sample.

(2) For cutting sectors or slices or by taking core, outer wrapping should be removed from the cheese. Inner wrapping, e.g. wax or plastic film, should not be removed. The sample should be cut by using a knife of sufficient size or a cutting wire. The sectors or slices should be of sufficient thickness. The cores should be wrapped in aluminum foil, special waxed paper (cheese paper) or closable plastic bags before placing them in the sample container if analysis is not performed immediately after sampling.

(3) For Sample including surface layer, a cheese trier of sufficient length should be inserted into the cheese. The trier should be rotated through one complete turn and be withdrawn with the core. By using the knife, the entire core should be transferred to a sample container. This procedure should be repeated until the sample is obtained. The core hole should be sealed with a suitable sealing compound.

(4) In case for excluding surface layer, a cheese trier of a larger diameter than the sampling trier should be inserted to a depth of approximately 25 mm into the cheese. The trier should be rotated through one complete turn. This short core should not be withdrawn, be kept separately and used later for closing the core hole. A smaller sampling trier of sufficient length should be inserted through the inner surface of the cheese exposed by the above core hole. The

trier should be rotated through one complete turn and be withdrawn with the core. With the aid of a knife transfer the entire core to a sample container.

(5) Sampling of cheese sold in brine, oil etc. -cheese should be sampled by taking fragments of minimum sample size each (without brine, oil etc.). The testing laboratory should specify whether the sample should include brine, oil etc. or not. Normally brine, oil etc. are included. Whenever possible, the original ratio of cheese and liquid should be maintained and the latter should completely cover the cheese. If brine is included, a sufficient amount of brine should be taken so as to cover the cheese completely. If brine is not included, the cheese or cheese fragments should be dried with filter paper and be placed in the sample container.

(e) **Evaporated milk**- Thoroughly mix the evaporated milk by plunging or stirring using a manual stirrer, by mechanical agitation, until sufficient homogeneity is obtained. Care should be taken to minimize foam formation. For retail containers, randomly collect the required number of cans randomly from entire lot.

(f) **Sweetened condensed milk** – For retail containers, randomly collect the required number of cans randomly from entire lot. For bulk containers/ drums, sterilize the surface of bulk cans/ drums/ containers by flamed with alcohol. The content should be mixed thoroughly using a combination of rotary and vertical movement with the stirrer (avoid the incorporation of air into the sample). For enclosed containers with outlet (bungs) at one end or at the side, inserting a rod through the bunghole should mix the content while agitating and stirring as far as possible in all directions.

(g) **Dried milk products/milk powder** – Clean and sterilize the dry borer and it should be passed into or through the product, if necessary, with the container laid on its side, the slit oriented downwards and an even rate of penetration being used. When the borer reaches the desired point in the container, it should be rotated through 180° and withdrawn. Its contents should be discharged into the sample container. Close the sample container immediately once sampling is completed. For retail packages, pick randomly a number of pouches.

(h) **Ice cream and frozen desserts**- The treated spoon, knife or spatula should be used to remove the surface layer of the product in the center of the container from the sampling area to a depth of at least 10 mm. A sample of adequate size should be taken with a treated instrument from the removed area. If required, a “surface sample” should be obtained by uniformly scraping the product surface to be tested by using a treated spoon or spatula to a minimum depth. For the retailer's vending operations normally used for dispensing should be applied for the purpose of sampling. For retail containers, samples should be collected and dispatched in

their original containers while keeping the samples deep-frozen until analyzed. After sampling, the sample should immediately be transferred into the precooled transport container.

(i) **Khoa and paneer** – For Retail samples, the content of the intact and unopened container constitutes the sample. One or more containers should be taken to obtain a sample. For bulk containers, a trier of suitable size should be passed from the edge diagonally through the product ensuring that the trier does not penetrate the bottom surface. The trier should be rotated through a half turn and be withdrawn with the core. The upper 25 mm of the core should be discarded to avoid taking a non-representative portion of the butter. The rest of the core should be removed from the trier by using a spatula and be transferred either directly or after wrapping in aluminum foil to the container.

(j) Number and quantity of samples should be as per the Table 2 A and 2 B of Appendix B, Chapter 3 - FSSR, 2011 (Food Product Standards and Food Additives) and different Gazette notifications issued from time to time. A consolidated **Table 3** is given below for the ease of understanding.

Table 3: Microbiological Sampling Requirement of Milk and Milk Products

Product Categories as per FSSR	**Microbiological Criteria**		**Number of sample units to be collected from batch/lot and minimum quantity of each sample unit to be collected**	
	Process Hygiene	**Food Safety**	**Bulk Products**	**Packaged Products**
Pasteurized/boiled Milk/ Flavoured Milk	Aerobic plate count and coliform	*Salmonella* spp., and *Listeria monocytogenes*	5 sample units, each weighing 500-600g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Pasteurized cream	Aerobic plate count and coliform	*Salmonella* spp., and *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Sterilized milk/ UHT milk/ evaporated milk	Sterilized /UHT milk products shall comply with a test for commercial sterility as per IS: 4238		5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs

Sterilized / UHT cream	Sterilized/UHT cream product shall comply with a test for commercial sterility as per IS : 4884		5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Sweetened condensed milk	Aerobic plate count and coliform, *Staphylococcus aureus* (Coagulase positive), Yeast and Mold count	*Salmonella* spp., and *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Pasteurized butter	Aerobic plate count and coliform, *Staphylococcus aureus* (Coagulase positive), Yeast and Mold count	*Salmonella* spp., and *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Milk powder	Aerobic plate count and coliform, *Staphylococcus aureus* (Coagulase positive), Yeast and Mold count	*Salmonella* spp., *Listeria monocytogenes*, *Bacillus cereus*, Sulphite reducing Clostridia (SRC)	5 sample units, each weighing min. 100 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Infant milk foods, infant milk formulae, infant milk substitute	Aerobic plate count, *Staphylococcus aureus* (Coagulase positive), Yeast and Mould count	***Salmonella* spp., *Listeria monocytogenes*, *Bacillus cereus*, Sulphite reducing Clostridia (SRC), and *Enterobacter sakazakii* (Cronobacter sp.)	60 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	180 sample units, each weighing 150-200 g. Send a set of 60 sample units to 3 accredited labs

Follow Up formula	Aerobic plate count and coliform, *Staphylococcus aureus* (Coagulase positive), Yeast and Mould count, *E.coli*	**Salmonella* spp., *Listeria monocytogenes*, *Bacillus cereus*, Sulphite reducing Clostridia (SRC),	15 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	45 sample units, each weighing 150-200 g Send a set of 15 sample units to 3 accredited labs
Cereal Based Complimentary food	Aerobic plate count and coliform, *Staphylococcus aureus* (Coagulase positive), Yeast and Mould count, *E.coli*	**Salmonella* spp., *Listeria monocytogenes*, *Bacillus cereus*, Sulphite reducing Clostridia (SRC)	15 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	45 sample units, each weighing 150-200 g. Send a set of 15 sample units to 3 accredited labs
Ice Cream, Frozen Dessert, Milk Lolly, Ice Candy	Aerobic plate count, coliform, *Staphylococcus aureus* (Coagulase positive), *E.coli*	*Salmonella* spp., and *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Processed Cheese/ Cheese Spread	Aerobic plate count, coliform, *Staphylococcus aureus* (Coagulase positive)	*Salmonella* spp., and *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
All other cheeses categories including fresh cheeses / Cheddar / Cottage /Soft /Semi Soft 5	Coliform, *Staphylococcus aureus* (Coagulase positive), Yeast and Mould count, *E. coli*	*Salmonella* spp., and *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Fermented Milk Products	Coliform, *Staphylococcus aureus* (Coagulase	*Salmonella* spp., and *Listeria monocytogenes*	5 sample units, each weighing 500-600 g.	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs

	positive), Yeast and Mould count, *E. coli*		Send 150 - 200 g of each sample unit to 3 accredited labs	
Paneer/ Chhana/ chhana based sweets	Aerobic plate count, Coliform, *Staphylococcus aureus* (Coagulase positive), Yeast and Mould count, *E. coli*	*Salmonella* spp., and *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Khoa/ Khoa based sweets	Aerobic plate count, Coliform, *Staphylococcus aureus* (Coagulase positive), Yeast and Mould count, *E.coli*	*Salmonella* spp., and *Listeria monocytogenes*	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs

4. Meat and Meat Products

a) Dressed Carcasses

The sampling from carcasses may be a matter of difficulty, particularly when the carcasses of various species need to be sampled. In case of whole dressed and eviscerated carcasses of animals/birds, select the carcasses after chilling at random.

Two Types of Sampling can be done from dresses carcasses

(1) Destructive sampling: For regulatory or surveillance purpose

(2) Non Destructive: For surveillance purpose

(1) Destructive sampling:

The samples are collected from different locations of carcasses or cut-up parts in case of dresses carcasses (as given below – Fig.08, Fig.09, Fig.10, Fig.11). Use the sterilized knife, scissors, forceps, tongs, meat steakers to remove the surface layer of the carcass at specific locations from the sampling area to a depth of at least 10 mm. Take the sample of adequate size with a sterilized instrument from the area marked. If required, obtain a surface sample by uniformly scraping the product surface to be tested using a sterilized scalpel or meat steaker to 10 mm

depth. For frozen carcasses use electric drills with meat steaker or sterile chisel and hammer to draw portions from different parts. Transfer the sample as quickly as possible into the sterile sample container which shall be closed immediately. Place the container immediately in pre-cooled transport containers

Sampling locations on carcass for various species of meat is as below

- **Beef**: Sample locations are rump, brisket, flank and neck

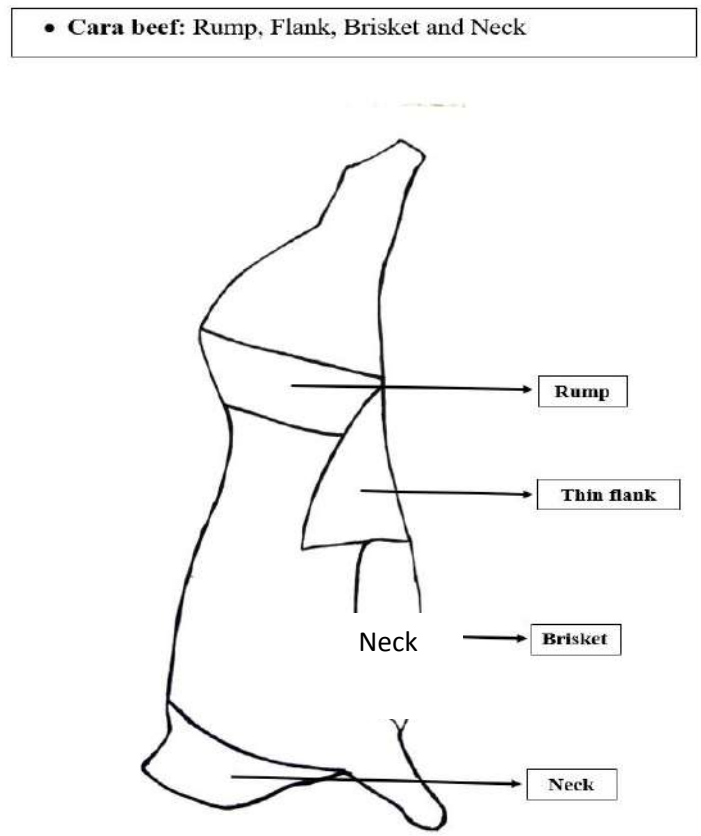


Fig 8 – Sampling Locations: Beef

- **Pork:** Ham, Back, Belly and Jawl

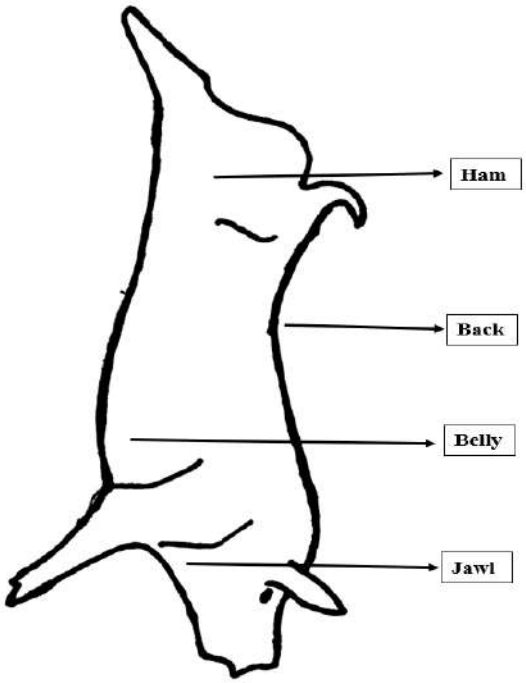


Fig 9 – Sampling Locations: Pork

- **Mutton/Chevon:** Rump, Flank, Brisket and Neck

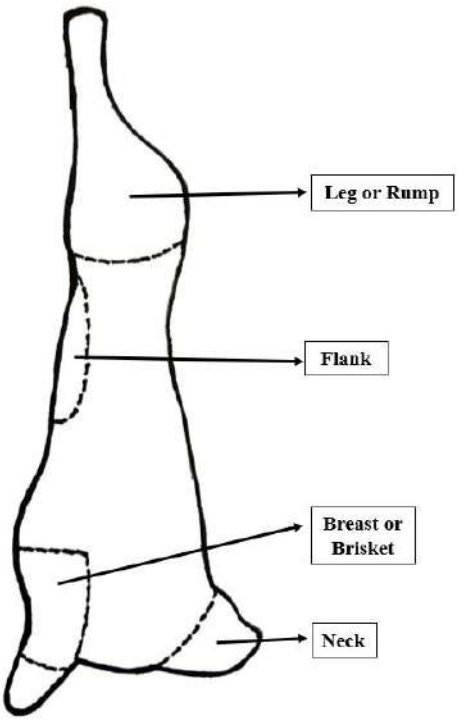


Fig 10 – Sampling Locations: Mutton/Chevon

- **Chicken:** Legs, Breast, Wings and Neck

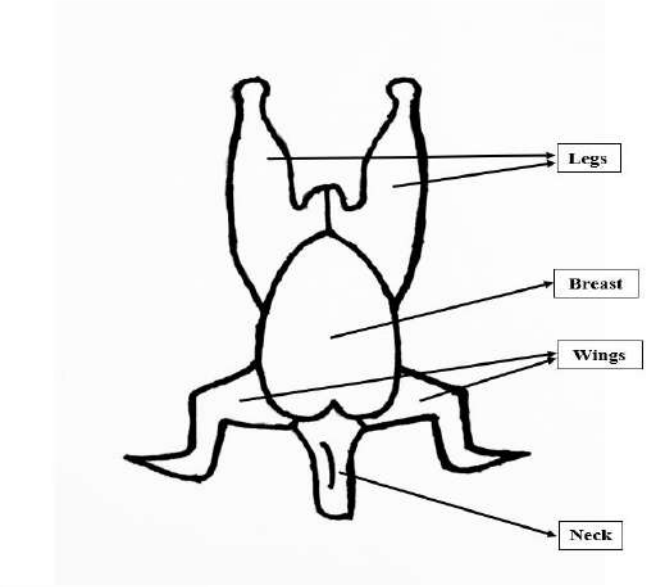


Fig 11 – Sampling Locations: Chicken

(2) Non - Destructive Sampling of carcasses:

When sponge or swabs are taken, minimum 10 cm^2 area should be swabbed form specific location mentioned above for non-destructive sampling of raw carcasses.

- **Wet and dry swab method**

Moisten a swab in 10 mL peptone salt diluent. At each selected carcass test side, press the template hard onto the surface. Rub the swab over the whole area using pressure, moving first horizontally and turning the swab so that all sides are used. Place the swab into the diluent used to wet the swab, breaking off the wooden shaft against the inside of the bottle. Then, with a dry swab, sample the area again, as above and place this swab into the same container of diluent.

- **Sponge sampling method**

Locate the sampling sites. Open the bag containing the sterile sponge and add sufficient peptone salt diluent to wet the sponge without excess fluid being visible. Massage the sponge from outside the bag to moisten it thoroughly. Put on a pair of sterile gloves and carefully remove the sponge from the bag. Place the template over the location. Wipe the sponge over the enclosed sampling site (10 cm × 10 cm) for a total of approximately 10 times in the vertical

and 10 times in the horizontal direction. After swabbing, place the sponge back in the sponge sample bag. Add further diluent to the sample bag to make a total of 25 mL.

- **Gauze tampon method**

At the sampling site, open the plastic bag containing the tampon and add about 10 mL of peptone salt diluent. Squeeze and massage the tampon from outside the bag to thoroughly moisten it. Place the template over the test area. Either hold the bag outside and turn inside out (use as a glove) or use a fresh pair of sterile gloves to wipe the tampon over the test surface, 10 times in the horizontal direction then 10 times in the vertical direction. Place the tampon back in its plastic bag and add further diluent to make a total of 25 mL.

- **Carcass rinsing method for poultry carcass:**

Poultry carcasses are usually sampled in the slaughterhouse, either after the inside/outside washer or immediately after chilling (before further processing, such as freezing, cutting or packaging).

Carcasses are normally taken off the moving production line. Open a large stomacher-type bag without touching the sterile interior of the bag. Enclose a carcass, while it is still on the line, with the bag and, using both hands, but holding the legs of the carcass through the bag, lift the carcass off the line (i.e. detach its legs from the shackles). Try to avoid taking carcasses with significant volumes of water still draining off them. If such carcasses are taken, remove them, under aseptic conditions, to a separate, disinfected set of shackles and allow the water to drain off before enclosing it in a bag. Rest the bottom of the bag containing the carcass on a flat surface. Holding the top of the bag slightly open, add sterile diluent, usually in a quantity of 400 mL, to the bag, pouring the solution into the carcass cavity and over the exterior of the carcass. Expel most of the air from the bag and then close the top of the bag with, e.g., a tie wrap. Holding the bag securely, rinse the carcass inside and out, using a rocking motion, for approximately 1 min. Do this by holding the carcass through the bottom of the bag with one hand and the closed top of the bag with the other hand. Holding the carcass securely in this way, move it through an arc, shifting the weight of the carcass from one hand to the other to ensure that all surfaces (interior and exterior) of the carcass are rinsed. Rest the bag with the carcass on a flat surface and, while supporting the carcass, open the bag. With a gloved hand, remove the carcass from the bag, first letting any excess fluid drain back into the bag. Take care not to touch the interior of the bag with the gloved hand. Secure the top of the bag so that the rinse fluid will not spill out or become contaminated. Alternatively, transfer the rinse fluid

under aseptic conditions from the bag to a sterile container. Proceed with the microbiological analysis.

- **Carcass swabbing method for poultry carcass:**

Swabbing of poultry carcasses can be applied to larger carcasses (Turkey). Procedure as mentioned in Non - Destructive Sampling of carcasses

b) Packed meat products: Small packs (up to 500 g) may be taken unopened (direct packs) as one sample unit. For bigger packs clean and sanitize the surface of packet. Open the packet and collect the desired quantity of sample aseptically from different areas of packet (centre, corners, sides, etc.) taking precaution to avoid cross contamination. For frozen and dried meat product use electric drills with meat steaker or sterile chisel and hammer to draw portions from different parts.

c) Meat Blocks (Deboned Meat/Minced Meat): For an entire meat block or minced deboned meat in pre packs, sufficient number of packets or portions should be taken to obtain the sample. The outer wrapping should be removed from the block. Inner wrapping plastic film should be removed. Take the test portion at depth /and/or surface samples from various sites (four corner and center) of block. Remove a surface layer of 2 – 5 mm thick from the upper surface. Take sample from 5cm x 5cm area using sterile knife, forceps and scalpel with depth of 1 cm from exposed area and place it in sterile container or bag.

d) Blocks of frozen meat: These products are an intermediate case between packaged unit products and bulk product. Sampling apparatus like electric or hand drill with suitable bits or corer, spatula or spoon to collect shavings generated by drilling. Using an electric drill or with an appropriately sized bit or other implement or the hand drill, make the holes at the specified points. Use a spatula or spoon to collect the resultant shavings and place them in the container or bag.

e) Semisolid formed products with or without other ingredients (Salami, Sausages, Patty, Nuggets, etc.): The sampling of these varying products from large containers may be a matter of extreme difficulty, particularly when the product contains constituents which may contribute to a particular extent to in homogeneity. Mixing shall, therefore, be adjusted to the particular requirements of the product. If possible, preference should be given to lots of retail containers. If it is difficult to obtain sufficient homogeneity, take samples from different portions of the product container to obtain a representative total sample.

f) Curry/Gravy based Meat Products: Curry meat products should be sampled by taking fragments of minimum sample size each. It is essential that curry/gravy is included in

sample as it is food product. The original ratio of meat and liquid curry shall be maintained while collecting the sample as per the facts mentioned as ingredients on the label. If semisolid curry or gravy is included, a sufficient amount of gravy shall be taken along with meat portion as per the meat gravy ratio.

g) Canned/Retort Pouch Meat Products: The contents intact unopened cans/retort pouches are selected randomly as per the sampling plan.

h) Retail Containers of Raw Meat: The content of an intact, unopened container constitutes the sample.

i) Number and quantity of samples to be taken should be as per the Table 5 A and 5 B of Appendix B, Chapter 3 - FSSR, 2011 (Food Product Standards and Food Additives) and different Gazette notifications issued from time to time. A consolidated **Table 4** is given below for the ease of understanding.

Table 4: Microbiological Sampling Requirement of Meat and Meat Products

Product Categories as per FSSR	**Microbiological Criteria**		**Number of sample units to be collected from batch/lot and minimum quantity of each sample unit to be collected**	
	Process Hygiene	**Food Safety**	**Bulk Products**	**Packaged Products**
Fresh/Chilled Meat	APC, Y & M counts, *E. coli, Staph. aureus* (coagulase positive)	*Salmonella*	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Frozen Meat	APC, Y & M counts, *E. coli, Staph. aureus* (coagulase positive)	*Salmonella*	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Raw Marinated/Minced/ Comminuted Meat	APC, Y & M counts, *E. coli, Staph. aureus* (coagulase positive)	*Salmonella*	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs

Semi-cooked /Smoked Meat/ Meat Food Product	APC, Y & M counts, *E. coli, Staph. aureus* (coagulase positive)	*Salmonella*, *Campylobacter* spp.**	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Cured/Pickled Meat	APC, Y & M counts, *E. coli, Staph. aureus* (coagulase positive)	*Salmonella*, *Listeria monocytogenes*, Sulphite reducing clostridia (SRC)	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Fermented Meat Products	APC, Y & M counts, *E. coli, Staph aureus* (coagulase positive)	*Salmonella*, *Listeria monocytogenes*, Sulphite reducing clostridia (SRC)	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Dried/dehydrated Meat Product	APC, Y & M counts, *E. coli, Staph. aureus* (coagulase positive)	*Salmonella*, *Listeria monocytogenes*, Sulphite reducing clostridia (SRC)	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Cooked Meat Products	APC, Y & M counts, *E. coli, Staph. aureus* (coagulase positive)	*Salmonella*, *Listeria monocytogenes*, Sulphite reducing clostridia (SRC), *Campylobacter* spp.**	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Canned/Retort Pouch Meat Products	*E. coli, Staph. aureus* (coagulase positive)	*Salmonella*, *Listeria monocytogenes*, Sulphite reducing clostridia (SRC), *Clostridium botulinum*, *Campylobacter* spp.**	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs

** *Campylobacter* spp. to be tested only for Poultry Products.

5. Spices and Herbs

a) Number and quantity of samples to be taken should be as per the Table 3 A and 3 B of Appendix B, Chapter 3 - FSSR, 2011 (Food Product Standards and Food Additives) and different Gazette notifications issued from time to time. A consolidated **Table 5** is given below for the ease of understanding.

Table 5: Microbiological Sampling Requirement for Spices and Herbs

Product Categories as per FSSR	**Microbiological Criteria**		**Number of sample units to be collected from batch/lot and minimum quantity of each sample unit to be collected**	
	Process Hygiene	**Food Safety**	**Bulk Products**	**Packaged Products**
Fresh	Aerobic colony count, Yeast and Mould, *Enterobacteriaceae*, *Staphylococcus aureus*	*Salmonella*, *Bacillus cereus*, Sulphite reducing Clostridia (SRC)	5 sample units, each weighing 500-600g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Dried or Dehydrated	Aerobic colony count, Yeast and Mould, *Enterobacteriaceae*, *Staphylococcus aureus*	*Salmonella*, *Bacillus cereus*, Sulphite reducing Clostridia (SRC)	5 sample units, each weighing 500-600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Ground/Powdered	Aerobic colony count, Yeast and Mould, *Enterobacteriaceae*, *Staphylococcus aureus*	*Salmonella*, *Bacillus cereus*, Sulphite reducing Clostridia (SRC)	5 sample units, each weighing 500-600g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Extracted	Aerobic colony count, Yeast and Mould, *Enterobacteriaceae*, *Staphylococcus aureus*	*Salmonella*, *Bacillus cereus*, Sulphite reducing Clostridia (SRC)	5 sample units, each weighing 500-600g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs

Wet ground (paste)/preserved or pickled	Aerobic colony count, Yeast and Mould, *Enterobacteriaceae*, *Staphylococcus aureus*	*Salmonella*, *Bacillus cereus*, Sulphite reducing Clostridia (SRC)	5 sample units, each weighing 500-600g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs

6. Egg and Egg Products

a) Number and quantity of samples to be taken should be as per the Table 8 A and 8 B of Appendix B, Chapter 3 - FSSR, 2011 (Food Product Standards and Food Additives) and different Gazette notifications issued from time to time. A consolidated **Table 6** is given below for the ease of understanding.

Table 6: Microbiological Sampling Requirement for Egg and Egg Products

Product Categories as per FSSR	**Microbiological Criteria**		**Number of sample units to be collected from batch/lot and minimum quantity of each sample unit to be collected**	
	Process Hygiene	**Food Safety**	**Bulk Products**	**Packaged Products**
Pasteurized Liquid egg products (whole, yolk or albumin liquid)	APC, *Enterobacteriaceae*	*Salmonella* and *Listeria monocytogenes*	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Frozen /dried/ egg products	APC, *Enterobacteriaceae*	*Salmonella* and *Listeria monocytogenes*	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200g. Send a set of 5 sample units to 3 accredited labs
Cooked/ready-to-eat egg products including mayonnaises	APC, *Enterobacteriaceae*	*Salmonella* and *Listeria monocytogenes*	5 sample units, each weighing 500 - 600 g. Send 150 - 200 g of each sample unit to 3 accredited labs	15 sample units, each weighing 150-200 g. Send a set of 5 sample units to 3 accredited labs

7. Water

a) Packaged water

(1) The bottles/pouches/cups shall be drawn at random from the lot.

(2) Cartons/Bags containing the packaged water shall be examined visually for condition of packing, external appearance and the fill. Only if the physical appearance of the lot is found satisfactory for these characteristics, the same shall be considered for sampling.

(3) Samples of products shall always be drawn in original unopened containers or packages.

b) Drinking Water (Purified)

(1) Disinfect the tap with 70% ethanol/IPA and allow it to dry. Open tap and discard the water for 2-3 min.

(2) Collect water samples aseptically in clean sterilized glass bottle of 250/500 mL capacity.

(3) If the water to be sampled contains or is likely to contain chlorine, sodium thiosulphate shall be added to the clean, dry sampling bottles before sterilization for neutralization. This can be done by adding 0.5 mL of 5 percent thiosulphate solution to a 250 mL bottle. Sterilize in an autoclave.

A consolidated **Table 7** is given below for the ease of understanding.

Table7: Microbiological Sampling Requirement of Water

Product Categories as per FSSR	**Microbiological Criteria**	**Number of sample units to be collected from batch/lot and minimum quantity of each sample unit to be collected**
Mineral water (2.10.7)	Total coliform, *E. coli*, Fecal streptococci, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, Sulphite-reducing anaerobes, *Vibrio cholerae*, *Vibrio parahaemolyticus*, *Salmonella*, *Shigella*, Yeast and Mould	Send 5 sample units (each sample unit having 3 liter sample quantity) to each of 3 accredited labs
Packaged Drinking water(2.10.8)	Total coliform, *E. coli*, Fecal streptococci, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, Sulphite-reducing anaerobes, *Vibrio cholerae*, *Vibrio parahaemolyticus*, *Salmonella*,	Send 5 sample units (each sample unit having 3 liter sample quantity) to each of 3 accredited labs

	Shigella, Yeast and Mould, Aerobic Microbial Count	
Drinking water (Purified)	Coliform, *E.coli*	Send 5 sample units (each sample unit having 250 mL sample quantity) to each of 3 accredited labs

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