(f) *Sealing of sample containers*

In certain situations, such as where the food is the subject of a dispute or is suspect in an outbreak of food-borne illness, it may be necessary to place an 'official' seal on the container from which the sample unit was taken, preferably in the presence of persons authorized to represent all parties concerned. The seal may be glued paper or other material which makes it impossible to tamper with the contents or the label without irreparably damaging it. Identify the seal with the date, sample number, and identifying mark of the person collecting the sample. When, for official purposes, multiple samples are required, treat each sample unit identically.

(g) *Transporting and storing samples*

1 Examine sample units as soon as practicable after they are taken. Otherwise transport and/or store sample units under conditions which minimize the possibility of change.
2 Transport sample units to the laboratory for analysis as rapidly as practicable. If the product is canned (shelf-stable) or is in a dry condition, cooling the sample units is unnecessary but avoid temperatures above 40°C. Canned products considered likely to 'blow' should be refrigerated.
3 If the product is perishable and unfrozen, cool sample units rapidly to 0 to 5°C (e.g., in an ice or a water bath) and maintain this temperature during transport (see (a) above). Do not freeze the sample. In transporting sample units ensure that the containers will be held vertically and that liquid from thawed ice in direct contact with the containers does not contaminate the sample units.
4 Until analysis maintain sample units of frozen products in the frozen state.

(h) *Collecting samples during investigations of outbreaks of food-borne disease*

Sampling during the investigation of disease outbreaks (investigational sampling) may be quite different from routine sampling. Using professional judgment, samples of food or equipment surfaces should be collected at the point of operation considered most likely to yield food-borne pathogens; that is, where contamination, survival, or growth might occur (Bryan, 1980; Bryan et al., 1976).

National Beef Ex. 1027
029

Check storage facilities for food left from the suspect meal or lot. If none are available, collect sample units of food prepared in a manner similar to that used in the preparation of the suspect food as well as of the corresponding raw food (particularly that of animal origin) and ingredients used.

Collect samples of each component of a food (e.g., meringue and filling for custard pies). These have different ingredients and they could have been prepared by different persons or prepared or stored in different ways prior to final assembly.

If the mode of spread or source of aetiological agent is sought, and if definitive typing of isolates is contemplated, swabs of food contact surfaces and other environmental samples can be taken. When collecting swab samples, rub sterile swabs or sponges randomly over large areas of foods of animal origin and over contact surfaces of utensils and equipment used to process, store, or prepare suspect foods. Sample units should be labelled, sealed, transported, and stored as stated in Sections (e) to (g) above.

(i) *Legal requirements*

Before examining foods likely to be the subject of litigation, it is essential that the legal requirements for sampling be determined and followed.

(j) *Sampling report*

1 Complete a detailed sampling report, signed by the person responsible for collecting the samples, and countersigned by representatives of the other parties concerned, if they are present. This report should contain the following information relevant to each lot in the consignment:

a name and address of the person collecting the samples
b names and addresses of appropriate representatives of the parties concerned
c date, place, and time of sampling
d reason(s) for sampling
e nature of the food
f names of the manufacturer, importer, seller, buyer, as appropriate
g number and size of the units constituting the lot
h number and marking of the lot

National Beef Ex. 1027
030

i type and identification of the transport vehicle
j origin of shipment
k place of destination
l dates of shipment and arrival of the lot
m number of the bill of lading or contract
n method of sampling (random throughout lot, random throughout accessible units, or otherwise)
o size, number, and reference numbers of sample units
p temperature of the product at the moment of sampling
q means of transporting samples to the laboratory and by whom
r name and address of laboratory analysing samples
s tests to be made (e.g., APC, *Salmonella*, *Clostridium perfringens*)

2 The report should also include information on factors, conditions, or circumstances which may have influenced sampling or be pertinent to the investigation; for example, the condition of the individual packages, breakage, sanitation, humidity.

(k) *Preparing sample units for analysis*

Withdraw a representative analytical unit from the sample unit.
1 Begin the analysis as soon as possible after the sample material arrives at the laboratory.
2 If the sample is frozen, use one of the following methods:
(a) If the frozen material can be easily comminuted, do so and proceed without thawing. (b) Partially thaw sample units in their original containers (or in the containers in which they were received at the laboratory) in a refrigerator at 2 to 5°C.
3 Agitate thoroughly any food that is liquid, suspended, or free-flowing, before opening the sample container.
4 Avoid contamination when opening the sample container. Destroy surface contamination on and near the lid area of the container (or where the opening is to be made, in the case of foods in closed packages) by (a) flaming or (b) wiping with 70% alcohol and air-drying or burning away the excess alcohol, as appropriate.
5 Take special care in opening sample containers or packages of powdered materials to avoid contaminating the working area and other samples. If practicable open such containers in a room separate from the testing area or in a cabinet where the powder can be contained. Avoid sudden movements and keep doors and windows closed.
6 When a product is composed of several components or layers (e.g.,

National Beef Ex. 1027
031

turkey and dressing, cream pie with meringue topping), it is desirable to determine the microbial population or contamination of each component. Such testing can reveal possible sources of contamination or identify an area where improper processing, handling, and/or storage has occurred. Therefore, sample the parts separately while preventing cross-contamination as much as possible.

7 Observe any abnormal appearance or aroma of the sample units and note observations on the record form.

8 Use aseptic technique to withdraw and transfer samples to a sterile blender or stomacher bag.

9 For preparation and dilution of the food homogenate, follow directions given on pages 108–111 of ICMSF, 1978.

10 Store unused portions of the sample units in a refrigerator or a freezer as in (g) above, for replicate analyses if required.

11 Clean and disinfect all surfaces used.

REFERENCES

Bryan, F.L. 1980. Procedures to use during outbreaks of food-borne disease. In *Manual of Clinical Microbiology*, 3rd ed. ed. E.H. Lennette, A. Barlows, W.J. Hausler, Jr, and J.P. Truant, 40–51. American Society for Microbiology, Washington, DC

Bryan, F.L., Anderson, H.W., Anderson, R.K., Baker, K.J., Matsuura, H., McKinley, T.W., Swanson, R.C., and Todd, E.C.D. 1976. *Procedures to Investigate Food-Borne Illness*, 3rd ed. International Association of Milk, Food and Environmental Sanitarians, Ames, Iowa

ICMSF 1978. *Microorganisms in Foods. 1. Their Significance and Methods of Enumeration*, 2nd ed. University of Toronto Press, Toronto

National Beef Ex. 1027
032

Glossary

acceptance sampling The application of a predetermined sampling plan to decide whether or not the lot meets defined criteria of acceptance.

aerobic plate count (APC) The number of colony-forming units of aerobic mesophilic microorganisms present per gram or per ml in the analytical unit as determined by a standard method.

aliquot The portion of food that is inoculated into a container of bacteriological medium in accordance with a specified method. For example, from a 1 kg sample unit, a 25 g analytical unit may be blended with 225 ml of diluent to give a 1:10 dilution. A 1 ml portion of this suspension would be an aliquot of 0.1 g.

analytical unit That amount of product withdrawn from a sample unit for an analysis.

attributes plan A sampling plan in which each selected sample unit is classified according to the quality characteristics of the product and in which there are only two or three grades of quality: for example, acceptable, defective; absent, present; acceptable, marginally acceptable, defective; low count, medium count, high count.

c The maximum allowable number of defective sample units (2-class plan) or marginally acceptable sample units (3-class plan). When more than this number are found in the sample, the lot is rejected.

case A set of circumstances related to the hazard a food represents and to its anticipated subsequent treatment.

consignment A quantity, large or small, of food destined, in commerce, to a particular recipient, usually consisting of multiple containers of food from one or more lots.

consumer's risk The probability that a lot will be accepted on the basis of results of testing analytical samples when in reality the lot as a whole is substandard relative to the stated criteria of acceptability.

defective Not suitable for the intended purpose.

frame That portion of the lot from which the sample units are drawn. Ideally it should be the whole lot; in practice it may be the accessible portion of the lot.

Good Commercial Practice (GCP) A general term defining conditions of Good Manufacturing Practice combined with acceptable conditions of distribution and storage.

Good Manufacturing Practice (GMP) Those procedures in a food-processing plant which consistently yield products of acceptable quality. GMP is usually described in a code defining processes, equipment, plant layout, sanitation, hygiene, and laboratory tests; but, as used here, it does not apply to any particular code now in use.

hazard The potential to cause (i) disease when eaten or (ii) organoleptic spoilage in a period shorter than the normal shelf-life of the food.

Hazard Analysis Critical Control Point (HACCP) A system in which observations and/or tests are made to identify actual or potential hazards in operations and to identify critical control points in a process. Control measures are designed and implemented, and the control points are monitored to ensure that control is maintained.

indicator Historically, an organism itself non-pathogenic, but often associated with pathogens, used to portray a risk of the presence of pathogens for which feasible methods of detection were not generally available (sometimes called 'index organisms'). This usage is currently expanded to denote groups or species of organisms whose presence in a food reveals exposure to conditions that might introduce hazardous organisms and/or allow their growth. Specific indicators are now used to reveal excessively contaminated raw materials; unsanitary manufacturing practice; contamination from faecal, nasopharyngeal, or suppurative sources; unsuitable time-temperature conditions of storage; or failure of a process. The indicator groups and their methods of enumeration are described in- ICMSF, *Microorganisms in Foods, 1. Their Significance and Methods of Enumeration* (1978).

lot In the commercial sense, a lot is a quantity of food supposedly produced under identical conditions, all packages of which would normally bear a lot number that identifies the production during a particular time interval, and usually from a particular 'line,' retort, or other critical processing unit (see Chapter 3, Section A). Statistically, a lot is considered as a collection of units of a product from which a sample is to be drawn to determine acceptability of the lot.

m A microbiological limit which, in a 2-class plan, separates good quality from defective quality or, in a 3-class plan, separates good quality from marginally acceptable quality. In general, values equal to *m*, or below, represent an acceptable product and values above it are either marginally acceptable or unacceptable.

M A microbiological limit which, in a 3-class plan, separates marginally acceptable quality from defective quality. Values above *M* are unacceptable.

microbiological criterion A criterion concerning the presence or quantity of microorganisms or their toxins per unit of mass, volume, or area, established by use of defined procedures and applied in acceptance sampling of foods (see Appendix 6: General Principles for the Establishment and Application of Microbiological Criteria for Foods).

microbiological guidelines A microbiological criterion used by a manufacturer or regulatory agency to monitor a food, ingredient, process, or system; often used also to describe a microbiological criterion where no standard has been prescribed. The Codex Alimentarius definition is more restrictive (see Appendix 6: General Principles for the Establishment and Application of Microbiological Criteria for Foods).

microbiological purchasing specification The microbiological criterion or criteria

National Beef Ex. 1027
034

conditional to acceptance of a specific food or food ingredient by a food manufacturer or other private or public purchasing agency.

microbiological standard A microbiological criterion in a law or regulation controlling foods produced, processed, or stored in the area of jurisdiction of a regulatory agency, or imported into the area.

moderate hazard The hazard associated with ingestion of a food containing a pathogen or toxin which can cause a short-term disease not critically severe in its manifestations and normally without sequelae: for example, salmonellosis, staphylococcal food-poisoning.

Most Probable Number (MPN) A statistically estimated number (per unit of mass or volume) of the test organism present in a sample unit, based upon its presence or absence in replicate aliquots (see also ICMSF, *Microorganisms in Foods, 1. Their Significance and Methods of Enumeration* [1978]).

n The number of sample units which are examined from a lot to satisfy the requirements of a particular sampling plan.

population (epidemiological) The number of people estimated to be at risk from a particular food.

population (microbiological) The number of microorganisms, total or of a species or group(s), dispersed within a defined quantity of food and detectable by the methods used. Hence, a total microbial population or a population of staphylococci, coliforms, etc.

population (statistical sampling) The aggregate of units about which an inference is to be made from analytical results. In this book, population usually relates to the totality of hypothetical individual portions within a lot, each identical in quantity with the defined sample unit.

probability of acceptance The likelihood that a lot of known quality would be accepted on the basis of results of testing analytical samples relative to the stated criteria.

producer's risk The probability that a lot of acceptable quality will be rejected on the basis of results of testing analytical samples relative to the stated criteria.

random sample of size *n* A collection of *n* sample units obtained in such a way that every sample of size *n* has an equal chance of selection, hence excluding bias. Reference to a table of random numbers is usually involved (see Chapter 3, Section C).

sample The total number (one or more) of individual sample units drawn from a lot (ideally at random) which will be tested in accordance with a specific sampling plan and method(s).

sample unit The individual portion or container of food taken as part of the sample and from which one or more analytical units may be drawn for analysis.

sampling plan Used synonymously in this text with *lot acceptance sampling plan*, and meaning a statement of the criteria of acceptance to be applied to a lot, based on examination of a required number of sample units by defined analytical methods.

severe hazard The hazard associated with the presence of a pathogen or toxin in a food which when ingested is likely to cause severe disease, either in a healthy population or in a particularly susceptible group to which the food in question is often destined. Severity of hazard is largely determined by clinical severity of the disease induced, but many ancillary factors are pertinent (see Chapter 5 and Tables 6 and 7). Pathogens of concern in this category include *Brucella* spp.,

National Beef Ex. 1027
035

Clostridium botulinum, Cl. perfringens type A, *Salmonella typhi, Shigella dysenteriae, Vibrio cholerae* O1 (Table 7); they are normally sought by application of investigational sampling (see Chapter 5, Section N).

shelf-life The period after processing during which a food remains in acceptable condition under appropriate conditions of storage.

stratification A technique for dividing consignments into logical groupings such as size of cans, grades, box, cases, which controls known sources of variation. It may be used where prior knowledge exists that the consignment is potentially not of uniform quality.

stringency The probability that a lot of food of defined microbiological quality will be rejected by a prescribed sampling plan, relative to other sampling plans.

subsample The several individual swabs or portions of food taken from a single carcass or carton and which make up a single sample unit.

variables plan A sampling plan in which the criteria employ statistics of a sample, such as the mean and standard deviation, rather than the segregation of sample units into attribute classes (*see* attributes plans). In the context of this book the variables plans referred to are based on the application of the mean ($\bar{x}$) and standard deviation (s) of the sample log counts. These parameters are combined with a constant or constants (k_1, k_2) selected for the appropriate number of sample units (n) for comparison with a limit value (v or V).

National Beef Ex. 1027
036

Exhibit 1027
Mullins Decl. Appendix D-2
(WorldCat Entry for ICMSF 1986)

Screen capture completed by J L Mullins from *WorldCat* on December 15, 2023 at URL:
https://search.worldcat.org/title/14409407

WorldCat

Items

Home Libraries Topics Lists About For Librarians

Microorganisms in foods 2 : sampling for microbiological analysis : principles and specific applications

Authors: J. H. B. Christian, T. A. Roberts, International Commission on Microbiological Specifications for Foods

Summary: Abstract: This instructional tool presents the microorganisms that are important in the different foods and how limits might be set. Also described are practical applications of the principles set in part I.

Show more

Print Book, English, ©1986
Edition: 2nd ed View all formats and editions
Publisher: University of Toronto Press, Toronto, ©1986

Series:	Microorganisms in foods, 2
Physical Description:	xxiv, 293 pages : illustrations ; 24 cm
ISBN:	9780802056931, 0802056938
OCLC Number / Unique Identifier:	14409407
Subjects:	Aliments Analyse Aliments Microbiologie Échantillonnage (Statistique) Food Analysis Food Microbiology Show more

Show less information

Find a Copy at a Library

Filter by: Any format Any edition Distance within 200+ mi

10 editions in 221 libraries

Featured libraries All libraries

Showing 165 libraries near Wisconsin, United States

Only public libraries

University of Wisconsin - Madison General Library System

58 miles from your current location.
Memorial Library, 728 State Street, Madison, WI, 53706, United States

Borrow

Favorite Library

Academic

Exhibit 1027
Mullins Decl. Appendix D-3
(OPAC Record for ICMSF 1986)

Books

Microorganisms in foods 2 : sampling for microbiological analysis : principles and specific applications

AUTHOR / CREATOR

International Commission on Microbiological Specifications for Foods

AVAILABLE AS

Physical

Request a Copy

Save to Lists

Citation

Physical Locations

This item is also held by UW-Eau Claire and UW-River Falls

Verona Shelving Facility

by request only

TX543 I6 1986

National Beef Ex. 1027
040

Publication Details

CREATOR
editorial committee, T.A. Roberts (chairman) ... [and others] ; contributors, J.H.B. Christian ... [and others]

FORMAT
Books

LANGUAGE
English

CONTRIBUTORS
Christian, J. H. B
Roberts, T. A

PUBLICATION
Second edition
Toronto ; Buffalo : University of Toronto Press, 1986

PHYSICAL DETAILS
xxiv, 293 pages ; 24 cm

ISBNS
9780802056931, 0802056938

OCLC
ocm14409407

Notes

Includes bibliographies and index.

Subjects

Food -- Analysis.

Food -- Microbiology.

Food Analysis.

Medical Subject Heading

Food Microbiology.

Medical Subject Heading

Items Related By Call Number

Shelf Browse

Books

Food microstructures : microscopy, measurement an...

TX543 .F66 2013

Books

Food microscopy

Physical

TX543 F66

Library Staff Details