

# codex alimentarius commission

FOOD AND AGRICULTURE  
ORGANIZATION  
OF THE UNITED NATIONS

WORLD HEALTH  
ORGANIZATION

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ALINORM 79/13

CODEX ALIMENTARIUS COMMISSION  
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REPORT OF THE FIFTEENTH SESSION OF THE  
CODEX COMMITTEE ON FOOD HYGIENE  
Washington, D.C., USA, 18-22 September 1978

## INTRODUCTION

1. The Fifteenth Session of the Codex Committee on Food Hygiene was held in the Main Conference Room, Department of State, Washington, D.C., from 18-22 September 1978. The session was attended by representatives and observers from 25 countries and observers from two international organizations (see Appendix I for list of participants).
2. The participants were welcomed on behalf of the Government of the United States by Dr. Howard Roberts, Deputy Director of the Bureau of Foods, Food and Drug Administration, who particularly stressed the importance to the Committee of the expert consultations and working groups which developed microbiological criteria and codes of hygienic practice for priority commodities. Dr. J.C. Olson was Chairman of the Session.

## ADOPTION OF THE AGENDA

3. The agenda was adopted without change.

## INFORMATION ON ACTIVITIES WITHIN WHO AND FAO OF INTEREST TO THE COMMITTEE

4. The representative of WHO reviewed recent WHO activities relating to the work of the Codex Committee on Food Hygiene. He referred to the increased emphasis presently being given in the Organization to matters related to nutrition, food safety and to control and prevention of foodborne diseases.
5. A joint FAO/WHO consultation on Food Control Strategy reviewed in December 1977 all aspects of a food control system and recommended a programme of action including priorities and target dates for each component of the system. The World Health Assembly dealt at its session in May 1978 with the WHO programmes in food hygiene and endorsed the recommendations of the consultation on Food Control Strategy.
6. To date five comprehensive criteria documents reviewing in detail existing knowledge on the relationship of certain pollutants to human health had been issued under the WHO Environmental Health Criteria Programme.
7. The representative of WHO also referred to the progress made by: the Joint FAO/WHO Food and Animal Food Contamination Monitoring Programme; the WHO Programme for Diarrhoeal Diseases; the WHO Surveillance Programme for Control of Foodborne Infections and Intoxications in Europe; the WHO coordinated post-graduate training courses in food microbiology; and to the forthcoming meetings on microbiological criteria for foods, parasitic zoonoses and paralytic shellfish poisoning.
8. The attention of the Committee was further drawn to the recently published Guide to Hygiene and Sanitation in Aviation and to the Food Inspectors' Manual presently under preparation in collaboration with FAO.

## ACTIVITIES OF ISO

9. The Chairman informed the Committee of recent progress in the work of the sub-committee "Microbiology" (SC9) of Committee ISO/TC 34 "Agricultural Food Products" which had held its Fifth Session in London in March 1978.

10. The following International Standards had now been published:

- ISO 4832 - Microbiology - General guidance for enumeration of coliforms - Colony count technique at 30°C
- ISO 4833 - Microbiology - General guidance for enumeration of micro-organisms - Colony count technique at 30°C
- ISO 4831 - Microbiology - General guidance for enumeration of coliforms - Most probable number technique at 30°C.

11. A draft proposal of a method for the detection of Salmonella which was very similar to the method already published by AOAC had been accepted for submission as a draft International Standard. In addition two draft proposals, one for the enumeration of faecal coliforms and the other for E. coli had been circulated for comments. The programme of future work included the following:

General guidance documents for:

- the preparation of dilutions
- enumeration of Staphylococcus aureus

12. SC9 had emphasized that other TC34 sub-committees should follow as far as possible the provisions of the general methods modified only where necessary to take account of the characteristics of the particular commodities with which they were concerned.

13. Another ISO Sub-Committee, ISO/TC 147/SC 4 had held its 5th session in Ottawa in 1978 and had made a comprehensive review of its programme with regard to microbiological criteria for water.

14. The Sub-Committee had decided to begin work on a general guide for the enumeration of microorganisms by exploring combining general guides for spreading by surface technique, the membrane filtration technique, and the technique using seeding in a liquid medium. At a later date it planned to work on the standardization of the techniques of verification of the filtration membranes for counting bacteria.

15. Two draft proposals were in preparation by SC4; the first on the enumeration of coliforms and of thermotolerant coliforms, and the second on enumeration of presumptive E. coli and of E. coli.

16. Preparatory work was in progress for the development of draft proposals relating to:

- Pseudomonas (fluorescens and aeruginosa)
- Faecal streptococci
- Sulphite reducing Clostridium
- Nitrogen cycle bacteria
- Salmonella
- Vibrios

17. The delegation of Norway pointed out that the Nordic body concerned with the methodology for food control, Nordisk Metodikkomitee for Levnedsmidler (NMKL), had also developed microbiological methods which had been collaboratively tested and which were official methods in the member countries of NMKL. In his opinion, reference to NMKL microbiological methods, when appropriate, would facilitate the general acceptance of standards in these countries.

18. The Committee expressed the hope that at some future date NMKL methods would be harmonized with the microbiological specifications being developed by ISO.

MATTERS RELEVANT TO THE CODEX COMMITTEE ON FOOD HYGIENE AS DISCUSSED BY THE CODEX ALIMENTARIUS COMMISSION AND BY CODEX COMMITTEES

19. The Committee noted that at the 12th Session (ALINORM 78/41, paras 237-266) of the Codex Alimentarius Commission the Draft Code of Hygienic Practice for Molluscan Shellfish had been adopted as a Recommended Code at Step 8 of the Procedure. The Commission had also adopted the Microbiological Specifications for Pasteurized Egg Products at Step 8 for inclusion in the Recommended International Code of Hygienic Practice for Egg Products (CAC/RCP 15-1976).

Working Group on Microbiological Criteria for Raw Meat and Raw Poultry Meat

20. The Committee noted that the Commission had endorsed the recommendation of the Executive Committee that WHO in consultation with FAO and the Chairman of the Codex Committee on Food Hygiene should convene a Working Group to provide, as far as commodities were concerned, advice to the Committee on microbiological criteria for the above products.

21. The Executive Committee was of the opinion that highly specialized advice on microbiological matters in general and on health hazards associated with microorganisms was necessary to facilitate the work of the Codex Committee on Food Hygiene and that the logical way to provide such advice was to establish a Joint FAO/WHO Expert Committee on Microbiological Specifications for Foods. However, recognizing that this would not be feasible at the present time, the Executive Committee proposed that the interim solution suggested by the Codex Committee on Food Hygiene might be adopted with some slight modification. The Executive Committee recommended that WHO, in consultation with FAO and the Chairman of the Codex Committee on Food Hygiene, should invite experts to participate in a working group which would be convened in Geneva in early 1979 to advise the Committee on Microbiological Criteria for Raw Meat and Raw Poultry, it being understood that expenses of the experts will be borne by their governments or their sponsoring bodies. (ALINORM 78/4, para 55). (See also paras 81-88 of this Report.)

22. Some concern was expressed that the development of such criteria might overlap with the work of the Codex Committee on Meat Hygiene. The Committee stressed that the task of the working group would be to determine the utility in terms of public health relevance of the establishment of microbiological criteria for raw foods in general after which the conclusions of the working group would be available to the Codex Committee on Meat Hygiene and to any other interested body.

ECE Agreement on Special Equipment for the Transport of Perishable Foodstuffs (ATP)

23. The Committee noted that at the 12th Session of the Commission the delegation of Denmark had made the point that the ATP agreement should not be reviewed by the Food Hygiene Committee because it did not contain any hygiene requirements but specifications as to the temperatures to be maintained during transport, especially for quick frozen foods. Several delegations at the present session, however, pointed out that there was an increasing trade in chilled foods and that in their opinion the time/temperature relationships during transport were of importance to the microbiological quality of foods.

24. The Committee decided not to pursue the matter at this stage but to leave it open to the ECE to seek its advice on hygiene requirements if it considered this necessary at some future date.

Hygiene Provisions in Draft Standards for Fruit Juices and Nectars

25. The Committee was informed that the Joint ECE/FAO Group of Experts on Standardization of Fruit Juices had at its 13th Session (1978) advanced the following draft standards to Step 8 of the Procedure:

- (i) Blackcurrant Juice Preserved Exclusively by Physical Means (ALINORM 79/14, Appendix I);
- (ii) Concentrated Blackcurrant Juice Preserved Exclusively by Physical Means (ALINORM 79/14, Appendix II); and
- (iii) Pulpy Nectars of Certain Small Fruits Preserved Exclusively by Physical Means (ALINORM 79/14, Appendix III).

26. Two proposed draft standards had also been advanced:

- (i) Nectars of Certain Citrus Fruits Preserved Exclusively by Physical Means (Step 5 - ALINORM 79/14, Appendix VI); and
- (ii) Pulpy Mango Nectar Preserved Exclusively by Physical Means (Step 3 - ALINORM 79/14, Appendix VIII).

The five standards contained hygiene provisions identical to those already endorsed in all Standards for Fruit Juices and Nectars at Step 9. The Committee agreed to extend the endorsement of the same hygiene provisions to the above five standards.

REVISION OF CODE OF PRACTICE - GENERAL PRINCIPLES OF FOOD HYGIENE AT STEP 7

27. The Committee considered the revised Code of Practice - General Principles of Food Hygiene (ALINORM 78/13A, Appendix V) in the light of government comments received from Australia, Norway, Sweden, Switzerland, United Kingdom and USA. The delegation of the United Kingdom, one of the co-authors of the revised Code, acted as rapporteur.

28. In introducing the Code, the rapporteur reminded the Committee that the present text was a result of a complete revision of the original Code (CAC/RCP 1-1969), which had been carried out by a working group (Netherlands, United Kingdom, USA, WHO and Codex Secretariat).

29. The Committee considered a proposal made by the delegation of Switzerland to delete any reference to the "official agency having jurisdiction" throughout the text. The delegation held the view that the Code was not intended to deal with administrative matters but rather with technical issues.

30. The Committee noted that a number of codes reflected the need to refer to official bodies when special hygienic precautions were necessary. Several delegations were of the opinion that not to make reference to the official agency having jurisdiction would diminish the usefulness of the Code as a basic document. The Committee decided to retain the provision in the Code.

Scope (1.1)

31. The Committee agreed to replace the word "production" by "growing and harvesting" to describe more precisely what stages of production were covered by the Code. A consequential change was made in the definition of food handling (2.6).

Contamination (2.3)

32. It was pointed out that the definition for "contamination" in the Code should be consistent with the definition for "contaminant" as it appeared in the CAC/FAL series relating to food additives. The definition for "contaminant" was also given for the purposes of the Codex Alimentarius in the Procedural Manual. In contrast to the present definition, the definition for "contaminant" specifically excluded such extraneous matter as insect fragments and rodent hairs.

33. Following extensive discussion it was agreed that the definition elaborated by the Codex Committee on Food Additives for "contaminant" was too restrictive for use in relation to food hygiene. It was decided that the definition for contamination should also cover extraneous matter and should read: "Contamination - the occurrence of any objectionable matter in the product".

34. It was agreed to draw the attention of the Commission to the existence within the Codex framework of definitions covering related terms but at variance with each other. The desirability of harmonization of definitions was again stressed.

Packaging Material (2.8)

35. The Committee discussed a proposal that a distinction be made between the initial wrapping, such as plastic film, and the outer packaging, such as cardboard cartons. It was noted that making the suggested distinction would require the use of unequivocal terminology, which presented problems. It was further noted that the provision dealing with packaging (7.5) did not require a differentiation between types of packaging materials. The Committee agreed not to change the definition.

Equipment and Containers (3.2.2)

36. It was pointed out that potentially there was a considerable health hazard when containers previously used for toxic materials were subsequently used for holding foods or food ingredients. The Committee agreed to amend the provision to exclude the re-use of such containers.

Walls (4.3.7)

37. The Committee agreed that "where appropriate, angles between walls, between walls and floors, and between walls and ceilings should be sealed and coved to facilitate cleaning". The provision was amended accordingly. The delegations of Norway and Sweden expressed the view that in particular coved junctions between walls and ceilings were rare and that the requirement was unnecessary.

Non-potable Water (4.4.1.4)

38. It was noted that water was in many areas of the world becoming an increasingly scarce and/or expensive commodity. For this reason, where possible, use of recycled water should not be excluded. In addition, for certain purposes use of non-potable water

which was bacteriologically acceptable but with, e.g. a high mineral load, was admissible. The Committee agreed to delete the provision prohibiting the use of non-potable water for cleaning/disinfection.

#### Lighting

39. Several delegations pointed out that it was not always desirable that light should not alter colours. The Committee agreed to amend the provision to take account of this. It also agreed to delete the figures for light intensity in square brackets.

#### Containers for Inedible Material and Waste (4.5.2.2)

40. It was pointed out that the present text did not provide for the use of disposable containers for inedible material and waste. The Committee agreed to amend the provision.

#### Hygiene Control Programme

41. Several delegations were of the opinion that especially in smaller establishments it was not always possible to assign to a single individual, who would be independent of production, the responsibility for the hygiene control programme. The Committee agreed with this point of view and amended the text accordingly.

#### Exclusion of Domestic Animals (5.6)

42. After some discussion the Committee recognized that in some countries intrusion by both domestic and wild animals could constitute a health hazard in food processing establishments. At the same time it was also recognized that certain domesticated animals which were essential to the proper functioning of the establishment should not be excluded from the premises. The Committee agreed to a rewording of the provision to cover these points.

#### Product Coding (7.5.4)

43. The Committee agreed to revise this provision and to distinguish between "Lot Identification" (7.5.4) and "Processing and Production Records" (7.5.5). There was considerable discussion on what constituted a lot.

44. It was pointed out that for the purpose of the Code a lot should be so constituted as to be a readily identified part of the production in the case of a recall. The Committee ultimately agreed to use the same definition as had been used in the microbiological specifications for Pasteurized Egg Products.

#### Sampling and Laboratory Control Procedures (7.7)

45. Because of the potential health risk it was agreed to include a provision (new 7.7.4) stating that laboratories checking for pathogenic microorganisms should be well separated from food processing areas.

#### Cleaning and Disinfection (Annex I)

46. The Committee had before it a document on cleaning and disinfection initially prepared by the delegation of the United Kingdom and discussed and amended by an ad hoc working group (Canada, Netherlands, United Kingdom, USA) which had met in London in March 1978. The revised document was considered in the light of government comments received from Sweden and the United Kingdom.

47. The Committee agreed to incorporate most of the suggested amendments. It further agreed to several additional changes as a consequence of provisions proposed by delegations during the discussion of the document.

#### Status of the Code and Annex

48. The Committee held the view that the (Revised) Code of Practice - General Principles of Food Hygiene was a document for which there was an urgent need, both for incorporation into other codes under elaboration and as a source of reference for many standards. It was agreed unanimously to advance the Code to Step 8 of the Procedure for submission to the 13th Session of the Codex Alimentarius Commission.

49. With regard to the Annex to the Code dealing with "Cleaning and Disinfection" which had been considered at Step 4, the Committee noted that its 16th Session would precede the 13th Session of the Commission and that advancement of the Code to Step 5 at this stage would thus retard its progress. It was therefore decided to return the

document to Step 3 of the Procedure for a further round of government comments so that following discussion at the 16th Session of the Committee it would be possible to advance the "Annex" to Step 5 with the recommendation that: (i) Steps 6 and 7 be omitted; and (ii) the document be published as an integral part of the Revised Code.

50. The Committee expressed its appreciation to the successive working groups for their valuable contributions to the elaboration of the Code and the Annex. The Revised Code and the Annex are contained in Appendix II to this Report.

#### DRAFT CODE OF HYGIENIC PRACTICE FOR PEANUTS (GROUNDNUTS) AT STEP 7

51. The Committee considered the Draft Code of Hygienic Practice for Peanuts (ALINORM 78/13A, Appendix II) at Step 7 in the light of government comments received from the Netherlands, Sweden, United Kingdom and the USA. It was again noted with regret that no comments from developing countries had been forthcoming. The delegation of the USA, author country of the Code, acted as rapporteur.

52. The delegation of Nigeria pointed out that at the 3rd Session of the Coordinating Committee for Africa some delegations had been of the opinion that the Code as it stood was too complex to satisfy the needs of developing countries. In particular, the regional methods of storage such as the "pyramid" method, were not covered by the Code (ALINORM 78/28, para 44). Similarly, the delegation of the United Kingdom had stated in its written comments that it considered the Code to be somewhat idealistic in relation to the groundnut producing countries of the third world.

53. The delegation of Sweden drew the attention of the Committee to the recommendations - pertinent to the Code - of the Joint FAO/WHO/UNEP Conference on Mycotoxins, held in Nairobi in September 1977. It gathered from the discussions that the main problem was the difficulty of transferring available knowledge of good farming practices to the individual farmer.

54. The Committee agreed that it was desirable that the Code should be of practical use both to countries with a lesser advanced agronomic industry and countries with large scale mechanized agriculture. It further agreed to review the Code with this goal in mind. A large number of changes were made to the Code and where applicable the text of the revised General Principles of Food Hygiene was incorporated. The most important amendments made to the text are listed hereunder.

#### Scope (1)

55. The Committee agreed to include as synonymous for groundnuts the terms "monkey nuts" and "earth nuts".

#### Curing

56. There was a lengthy discussion on how best to describe forced drying as opposed to natural drying, both methods of reducing the moisture level being covered by curing. As no general agreement could be reached, it was decided not to make reference to the means of drying in relation to curing.

#### Safe Moisture Level

57. In line with the decisions taken at the 13th Session of the Committee introducing the concept of water activity, the term "moisture level" was replaced by "water activity" ( $a_w$ ).

#### Protection of Peanuts from Contamination (III.B.5)

58. It was agreed to include pyramid stacking as an example of raw nuts held for processing and storage under covering. A cross reference to the provision on controlled storage conditions for the end product was inserted (7.8.2).

#### Receiving and Inspection (III.D.2)

59. The Committee was presented with a document prepared by the delegation of the USA on A. flavus detection. It was noted that the 3rd Session of the Coordinating Committee for Africa, when reviewing the Kenyan Conference on Mycotoxins, had considered the need for the development of a "detection kit" for aflatoxin. It appeared, however, that a good field test was not yet available and consequently no method was appended to the Code.

60. The delegation of the Netherlands stated that in its view it would be desirable to include in the Code guidance on the sequence of steps to be taken when receiving and inspecting farmers' stock peanuts at the shelling plant. It felt that, depending on the local situation and available means of examination, progressively more accurate decisions on accepting or rejecting were possible according to the following chart:

- (i) Excessive mould growth - no further investigation = rejection
- (ii) Mould growth - presence of mould resembling A. flavus - microscopic test not available - no further investigation = rejection
- (iii) Mould growth - presence of mould resembling A. flavus - screening test indicating that aflatoxin might be present - chemical test not available - no further investigation = rejection
- (iv) Mould growth - presence of mould resembling A. flavus - screening test indicating that aflatoxin might be present - chemical test for aflatoxin = rejection if test is positive.

The Committee agreed to include the proposal of the delegation of the Netherlands under 7.1.1 Acceptance Criteria.

#### Optimum Storage Conditions (IV.D.6(c))

61. In line with the general considerations expressed at the beginning of the discussions on the Code (see paras 51-54) it was agreed that reference to storage at 0-6°C was of little practical value, especially as it was evident that the water activity was the critical factor.

62. The Committee decided to delete reference to an optimum storage temperature range and amended the heading of the provision (IV.B.6(b)(i)) to read "Controlled storage conditions". It was agreed to revise the provision dealing with control of infestation of stored products (IV.B.6(b)(ii)) and to give it a separate heading "Control of infestation by insects, moths and other arthropods".

#### End Product Specifications (V)

63. The Committee revised the section to follow the form of wording generally used. In view of the potential hazard of mycotoxins other than aflatoxins it was agreed to delete specific reference to aflatoxin and to refer to mycotoxins in general. The Committee considered that it was unable at present to propose mycotoxin limits for the end product specifications. It noted, however, that many countries had already established limits for aflatoxins in peanuts.

#### Status of the Code

64. In view of the number of changes made in the document the Committee agreed to return the Code to Step 6 of the Procedure, to allow for a further round of comments, in particular from producing developing countries. The document as amended, renumbered in the decimal system, and with provisions of the Revised General Principles of Food Hygiene incorporated is contained in Appendix III to this Report.

#### DRAFT CODES OF PRACTICE FOR LOW-ACID CANNED FOODS AND FOR ACIDIFIED LOW-ACID CANNED FOODS AND PRODUCTS PACKED IN SEMI-RIGID CONTAINERS AND FLEXIBLE POUCHES

65. The Committee noted that the Draft Code of Practice for Low-acid Canned Foods (ALINORM 78/13A, Appendix VI) had been advanced to Step 6 of the Procedure by the Commission at its 12th Session (ALINORM 78/41, para 254).

66. At about the same time an ad hoc Working Group under the Chairmanship of Canada had met in London to draw up a Code of Practice for Acidified Low-acid Canned Foods and Products Packed in Semi-rigid Containers and Flexible Pouches (see ALINORM 78/13A, paras 103-105). Because many similarities were found between the two Codes, the Working Group had decided to amalgamate where possible their provisions. Those provisions of the Code for the acidified low-acid products which differed were contained in Annex (I) to the Combined Code. The Working Group had also added an Annex (II) containing reference methods for the determination of pH since no other organization had developed such a method specifically for this purpose. The Committee agreed to request ISO to give this matter attention.

67. The new Combined Code had been circulated for government comments which had been considered by another Working Group which met just before the present session of the Committee. As a result, the text had been further amended and although not now available for consideration by the Committee it would be later appended to the Report.

68. The delegation of Australia proposed that consideration be given to consolidating Annex I into the main Code.

#### Status of the Code

69. The Committee agreed that the Code and Annexes covering the Non-acidified and the Acidified Low-acid Canned Foods and Products Packed in Semi-rigid Containers and Flexible Pouches should be returned to Step 6 of the Procedure to give governments a further opportunity to comment on the revised document. The Committee expressed its appreciation to the Working Groups for their valuable work in elaborating the Code. The Code as amended is contained in Appendix IV to this Report. 1/

#### DRAFT CODE OF HYGIENIC PRACTICE FOR FOODS FOR INFANTS AND CHILDREN AT STEP 7

70. The Committee considered the above Draft Code (ALINORM 78/13A, Appendix VII) in the light of government comments (CX/FH 78/8).

71. The delegation of the Federal Republic of Germany, co-author with the USA of the Code, acted as rapporteur. The Committee was informed by the rapporteur that in its written comments the United Kingdom had pointed out that many of the items in this Code had been incorporated into the revised General Principles and that much of the rest was covered by the Code for Low-Acid Canned Foods. It was therefore proposed that the Code was now redundant and its purpose could be served by using the General Principles in conjunction with an annex containing microbiological guidelines for infant foods.

72. The delegations of France and Norway were also of the opinion that the Code should be treated in this way. A number of other delegations thought that for reasons of convenience of reference and because of the importance placed on the development of the Code in many countries it should be issued as a separate publication.

73. The Committee agreed that the Code should be published as a separate document which would include any amendments made to the General Principles of Food Hygiene and the Low-acid Canned Food Code. The Committee then considered the document in the light of the government comments.

#### Storage of raw materials and ingredients (7.1.3)

74. The Committee noted that it had not been possible to find an adequate definition of "perishable" and deleted reference to storage conditions for such products.

#### Vacuum checking (7.6.3)

75. The delegation of Australia observed that the provision required that all containers should be vacuum tested and questioned whether this was realistic. The Committee noted that both manual and electronic techniques existed for testing all vacuum packed containers and agreed that the text should remain unchanged. It agreed that reference to the type of containers to be used should be re-located under "Packaging material" (7.5.1).

76. The delegation of Australia expressed concern regarding the requirement that vacuum packed containers sealed with quick-twist, screw-on or snap-on lids, which have annular space between the inner edge of the lid's rim and the container itself should have such space eliminated by the lid or container design or be made inaccessible by sealing. It considered that the provision was unnecessarily stringent and would prevent the use of many of the closures currently in use. The delegation of the United States explained that residual food product remaining in the annular space allows growth of microorganisms and infestation by insects in this space. This contaminated material could be drawn into the product when the jar is opened. The Committee decided to make no change to this provision.

#### Instructions for storage

77. The Committee noted that the Codex Committee on Food Labelling (ALINORM 78/22, para 31) was of the opinion that instructions for storage should appear on the label of prepackaged foods but that no such provisions appeared in the revised "General Principles of Food Hygiene".

1/ This Code is being issued as a separate document in order to allow Governments to comment in time for a further meeting of the Working Group.



78. Several delegations were of the opinion that, particularly in the case of foods for infants and children, there was a danger of microbial contamination after opening of the container and preparation of the product and that a provision requiring some instruction to the user should be inserted in the Code.

79. Other delegations, while agreeing in principle that all possible measures should be taken to advise on how to avoid microbial contamination in such foods, pointed out that any text included in the Code should avoid apportioning legal responsibility and should be of an advisory nature. The Committee agreed to the following text:

" 7.5.5 Storage and use of product

In order to encourage safe handling, advice on how to avoid contamination and deterioration of the prepared food should be given on the label or on a leaflet attached to each consumer package."

Status of the Code

80. The Committee advanced the Draft Code of Hygienic Practice for Foods for Infants and Children to Step 8 of the Procedure. It expressed its appreciation to the author countries, the Federal Republic of Germany and the USA for their valuable contribution to the development of the Code. The Code is attached as Appendix V to this Report.

GENERAL PRINCIPLES FOR THE ESTABLISHMENT OF MICROBIOLOGICAL CRITERIA FOR FOODS

81. The Committee had before it the proposed text of the General Principles for the Establishment of Microbiological Criteria for Foods (ALINORM 78/13A, Appendix VIII), the relevant sections of the Reports of the 24th Session of the Executive Committee (ALINORM 78/4, para 4) and the 12th Session of the Codex Alimentarius Commission (ALINORM 78/41, paras 257-262) and government comments (CX/FH 78/9).

82. The Committee was informed that the microbiological criteria for foods and the principles governing their application which had been proposed de novo at the 2nd Joint FAO/WHO Expert Consultation on Microbiological Specifications for Foods had not been tested in practice. It was the intention that such testing would begin with the preparation of the background documents in preparation for the FAO/WHO Working Group on Microbiological Specifications for Foods, which would meet in Geneva 20-26 February 1979 to consider the need for microbiological criteria for raw meat and raw poultry. The practical application of these principles would therefore come under close scrutiny and would also be discussed as an agenda item.

83. Dr. J.H.B. Christian (Australia) who had acted as rapporteur at the 2nd Session of the Joint FAO/WHO Expert Consultation on Microbiological Specifications for Foods reviewed government comments which had been received from Australia, Poland, Sweden, Switzerland and the United States. The Committee agreed that government comments so far received should not be discussed in detail since this would be done by the Working Group.

84. In the general discussion that followed the delegation of Switzerland pointed out that clarification was needed as to the point of application of microbiological specifications. This should be made clear for the use of those for whom they are intended, e.g. the manufacturer or an official agency. The delegation supposed that they were to be applied as end product specifications immediately after manufacture. This would distinguish them from microbiological standards that are to be applied at the point of entry into an importing country where the history of the product after leaving the plant will often be unknown. For that reason, it was pointed out that it would in many cases not be possible to convert directly a specification to a standard since sometimes different organisms may have to be determined.

85. The delegation of the United Kingdom was of the opinion that specifications should be used by the person responsible for applying the Code on the end product; this could be the official agency having jurisdiction. The results of the control should not be the basis for an accept/reject decision on the product. The specifications could also be applied voluntarily by the manufacturer but the point at which they were relevant should be specified.

86. In addition, the delegation was of the opinion that discussions at the 12th Session of the Codex Alimentarius Commission (ALINORM 78/41, paras 259-60) had demonstrated that there was some uncertainty as to the purpose of specifications and that for this reason the text should place greater emphasis on developing criteria only where real health hazards existed. The financial burden imposed on both manufacturer and consumer in developing unnecessary specifications should also be taken into account.

87. The delegation of Sweden expressed the view that the Codes should contain microbiological criteria which would allow for differentiation between food which was of poor quality but which could be used for purposes other than direct human consumption, and food which presented a hazard to health.

88. The Committee noted that there would be an opportunity at its 16th Session to study the conclusions of the FAO/WHO Working Group and to prepare a text for consideration by the Commission at its 13th Session. It invited governments to send any further comments direct to Dr. Reinius (WHO) with a copy to the Chairman of the Committee so that they would be received in time for the meeting of the Working Group.

#### DRAFT CODES OF PRACTICE FOR SMOKED FISH, LOBSTERS AND SALTED FISH

89. The Committee considered the Draft Codes of Practice for Smoked Fish (CX/FFP 77/6), Lobsters (ALINORM 78/18A, Appendix X) and Salted Fish (ALINORM 78/18A, Appendix XI) in the light of recommendations of an ad hoc working group which met during the present session of the Committee (Australia, Canada, Denmark, France, New Zealand, Norway, Sweden, United Kingdom, USA (Chairman), South Africa and FAO (Rapporteur)).

90. The Committee noted that all written government comments had been reviewed by the Working Group and for the major part were included in the proposed changes to the Codes. The Committee agreed to the suggested amendments to the Codes of Practice for Lobster and Salted Fish and, with one exception, also agreed to the proposed changes to the Code of Practice for Smoked Fish.

91. In considering the substantive changes proposed to the Code on Smoked Fish, a lengthy debate ensued on the safe temperature for storage of vacuum or gas packed products. It was generally accepted that this form of packaging required low temperature storage to prevent the possible development of Clostridium botulinum in some types of smoked fish. There was considerable disagreement, however, on the actual temperature requirement to be imposed to secure a safe and sound product.

92. Some delegations held the view that freezing was indispensable as in practice a recommended keeping temperature of  $\approx 3^{\circ}\text{C}$  would often mean exposure of the product to substantially higher temperatures for extended periods of time, with the inherent danger of undesirable microbiological activity.

93. Other delegations - Denmark, Norway and Sweden - stated that experience gained over a large number of years in their countries had shown that storage temperatures above freezing for smoked fish presented no risk to the consumer and that no cases of botulinum poisoning had been associated with consumption of their vacuum packed smoked fish. The delegation of Sweden further stated that there was a difference in microbiological spoilage between vacuum and gas-packed smoked fish products.

94. In discussions during the meeting of the ad hoc Working Group it was pointed out that although air was removed when a product was vacuum packed in a plastic bag the proportion of constituent gases contained in the residual air remained unchanged. The delegation of Denmark observed that in its experience the growth of spoilage organisms in vacuum packages still took place, possibly associated with the growth of Clostridium botulinum, and would be noted by the consumer. The delegation of Denmark also expressed the view that the growth of C. botulinum could be prevented either by freezing or by appropriate chilling and whether or not vacuum packaging should be restricted to frozen products depended largely on the efficiency of the national food control system.

95. A compromise wording was adopted:

#### "4.4.5.3 VACUUM OR GAS PACKED PRODUCTS SHOULD BE STORED AT AN APPROPRIATE SAFE TEMPERATURE"

If storage temperatures are above  $3^{\circ}\text{C}$  ( $37^{\circ}\text{F}$ ) there is a risk that Clostridium botulinum may grow in some types of smoked fish and may produce toxins. The process of vacuum or gas packaging involves the removal of air and, therefore, may give rise to favourable growth conditions for this organism and may suppress the growth of moulds and other aerobic microorganisms which indicates improper storage. Therefore the use of such packaging should be restricted to frozen products; however, in cases where a particular product does not support the growth of Clostridium botulinum other storage temperatures can be used.

Frozen products should be kept frozen until required for consumption. When the frozen product is thawed, the package should be opened.

Appropriate date marking and corresponding instructions on storage conditions should appear on the label."

96. The Committee endorsed the hygiene requirements of the Codes of Practice for Lobsters, Salted Fish and Smoked Fish (as amended) and noted that if any changes to the hygiene provisions of the Codes were made during the next session of the Codex Committee on Fish and Fishery Products these should again be referred to this Committee.

97. The Committee agreed to refer two technological comments from the Netherlands for consideration to the Commodity Committee. In the Code of Practice for Smoked Fish, sub-section 4.4.3 referred to dry-salting, but no reference to the technology appeared in the Code. It was suggested that sub-section 5.4.5 of the Code for Salted Fish be incorporated into the Code for Smoked Fish. The Code of Practice for Salted Fish did not contain description and hygiene requirements for desalting. It was suggested that such requirements be included.

98. The Committee expressed the view that harmonization of the various Codes for fish and fishery products was desirable and that earlier developed Codes should be revised taking into account changes made to the present Codes and the General Principles of Food Hygiene.

99. The delegation of Norway stated that in its opinion efforts should be made to increase the practical value of the Codes to developing countries. The representative of FAO informed the Committee that the Fisheries Department was preparing a series of illustrated guidelines based on various Codes of Practice for use by extension services in developing countries.

100. The representative of FAO mentioned that the Fisheries Department, in addition to the illustrated guidelines, was preparing a series of filmstrip training aids on quality control and fish handling. The first two filmstrips: "A Question of Quality" and "A Quality Control Programme for Fish Processing Plants", were shown to the Committee. Nine filmstrips were in preparation including a cartoon filmstrip on sanitation; the others related to handling of fish at sea, on shore, and marketing in tropical countries.

101. In addition, a number of technical papers resulting from recommendations from past Government Consultations on Codes of Practice had been written, such as: Ice in Fisheries, Freezing in Fisheries, The Production of Dried Fish, and Smoke Curing of Fish. Papers on Transport of Fish and Retailing of Fish were still in preparation. These and others would be referenced in an appendix to the Codes of Practice.

102. The delegation of the USA informed the Committee of official action taken relative to the Codes of Practice for Fish and for Canned Fish. The US Department of Commerce had announced in the Federal Register (4 August 1978) that it would publish and distribute to industry these two codes of practice. Further, the Fishery Inspection Service of the Department of Commerce would use the codes as a continuing reference source of advisory information in connection with its inspectional and related activities.

103. As additional codes for fish products were completed, published and distributed by the Codex Alimentarius Commission, they would be given similar use. Notification of official action on these two codes was being communicated to the Codex Alimentarius Commission. The delegation stressed that the codes would be used in an advisory manner in the way it was intended and expressed by the Codex Alimentarius Commission.

RECOMMENDED INTERNATIONAL CODE OF PRACTICE FOR SHRIMPS AND PRAWNS,  
MICROBIOLOGICAL SPECIFICATIONS FOR FROZEN COOKED PEELED READY-TO-EAT SHRIMPS AND  
PRAWNS

104. The Committee considered the Appendix to the Code of Practice for Shrimps and Prawns at Step 7 in the light of the recommendations of the same ad hoc Working Group which had met to consider the fish codes.

105. It was thought by the Working Group that as microbiological specifications were not officially on the agenda the Working Group could not discuss the subject in depth. It was proposed that the limits recommended by the Committee (see EC/Microbiol/77/ Report 2, pages 3-5) be referred to the Commodity Committee for consideration. It was suggested that the Secretariat issue a circular letter requesting government comments and that this subject be placed on the agenda of the next session of the Codex Committee on Fish and Fishery Products.

106. The Committee endorsed the recommendation of the Working Group and further suggested that the Secretariat send to members of the Fish and Fishery Products Committee a copy of the report of the Geneva Working Group on Microbiological Specifications for Foods which would contain the Revised General Principles for the Establishment of Microbiological Criteria which would give guidance to the Commodity Committee.

PROPOSED DRAFT CODE OF HYGIENIC PRACTICE FOR DRIED MILK (AT STEP 4)

107. The Committee had before it the Proposed Draft Code of Hygienic Practice for Dried Milk with an Annex containing microbiological specifications for dried milk products (CX/FH 78/16). The delegation of Australia (author country of the code) acted as rapporteur.

108. In introducing the Dried Milk Code, the Chairman explained that it had been considered in detail at Step 4 of the Procedure for the Elaboration of Milk and Milk Products by the 19th Session of the Joint FAO/WHO Committee of Government Experts on the Code of Principles Concerning Milk and Milk Products (June 1978). The Milk Committee, noting a directive from the Commission that following consideration of the Code at its 19th Session it would be further developed by the Codex Committee on Food Hygiene, had expressed the wish to have an opportunity to review the Code before it was finalized.

109. The rapporteur drew the attention of the Committee to the fact that in common with other Codes under elaboration, the present Code would have to be aligned with the Revised General Principles of Food Hygiene. He also informed the Committee that in addition to end product specifications based on replicate sampling plans, the Code included routine sampling plans and microbiological limits intended for use by the manufacturer (Annex 1, Section 5).

Status of the Code

110. The Committee agreed to return the Code to Step 3 of the Procedure for the elaboration of Codex Standards. In order to assist in the further development of the Draft Code, the Committee established an ad hoc Working Group comprising Australia (Convenor), the Federal Republic of Germany, the Netherlands, New Zealand, Switzerland, the United Kingdom and the United States. It was agreed that the Working Group would meet during the two days preceding the next session of the Committee to review written comments received and to prepare recommendations for consideration by the Committee.

111. The Chairman advised the Committee that IDF had indicated that it had a number of comments on the Code and had expressed a wish to participate in its development. The Committee decided that as the Code would now be distributed for comments at Step 3 IDF and other International Organizations would have the opportunity to submit comments.

PROPOSED DRAFT CODE OF HYGIENIC PRACTICE FOR PROCESSING OF FROGLEGS AT STEP 4

112. The Committee had before it the Proposed Draft Code of Hygienic Practice for Processing of Froglegs and a table: "Example of a Step-wise Procedure for Froglegs Operation" (ALINORM 78/13A, Appendix IV and Addendum) and government comments received from Poland. The delegation of the USA (co-author country of the Code) acted as rapporteur.

113. It was noted that, as requested by the Food Hygiene Committee (ALINORM 78/13A, para 10(4)), the FAO Fisheries Department had issued a questionnaire to agencies and organizations in producing and importing countries requesting information on Salmonella contamination on the surface of froglegs using the routine methodology developed by the 2nd Joint FAO/WHO Expert Consultation on Microbiological Specifications for Foods. They were also requested to comment on the Code. The Committee was informed by the FAO representative about the replies received to the questionnaire.

114. It was agreed that those changes in the General Principles of Food Hygiene which related to the present Code would be incorporated into the text by the Secretariat. In reviewing the written comments presented by Poland, the Committee agreed to the deletion of the square brackets around provisions 4.3.5.2 and 4.3.12-14. It was pointed out that the other Polish proposals were already covered elsewhere in the Code; no changes were made. Observations made by India and Indonesia in reply to the above-mentioned questionnaire were discussed and several amendments were made to the text.

115. It was noted that rather high concentrations of chlorine were apparently used in the washing water used to clean froglegs. A proposal was made to request the Codex Committee on Food Additives to give its views on the use of such heavily chlorinated water as wash water. Several delegations pointed out that such consideration could not be carried out effectively without taking into account current technology. It was further noted that the high concentrations of chlorine and resultant products might not necessarily be found in the end product.

116. It was agreed that the Salmonella data provided in answer to the questionnaire should be reviewed and classified by a working group which would meet before the 16th Session of the Committee.

#### Status of the Code

117. The Committee noted that its next session (16th) would take place before the 13th Session of the Commission. Even though a rather limited number of government comments had been forthcoming and the present discussions had taken the Code to an advanced stage, the Committee decided to return it to Step 3 of the Procedure to allow for a further final round of government comments so that at its next session it could advance the Code to Step 5 with the recommendation to the Commission that Steps 6 and 7 be omitted and the Code be adopted at Step 8. The revised Code is contained in Appendix VI to this Report.

#### CODE OF PRACTICE FOR EDIBLE ICES AND ICE MIXES

118. The Committee noted that at its last session (ALINORM 78/13A, para 102(2)) it had endorsed a recommendation by the 2nd Joint FAO/WHO Expert Consultation on Microbiological Specifications for Foods that the development of a Code of Practice for Ice Mixes be undertaken. The Consultation had reviewed but not agreed to the microbiological standards proposed by the Codex Committee on Edible Ices (ALINORM 78/11, Appendix II) and had instead recommended guidelines (see ALINORM 78/13A, Appendix IX).

119. The Committee noted the criteria applicable for the establishment of Codex Codes of Practice among which were (Procedural Manual 4th Edition, page 53);

- Protection of the health of the consumer; and
- Volume of production and consumption in individual countries and volume and pattern of trade between countries.

120. It was pointed out that the volume of international trade in edible ices outside Europe was small and could not alone justify the elaboration of a Code. In addition, the wide range of ices covered in the Standard for Edible Ices and Ice Mixes, and the different processing methods used in their preparation, would make the development of a comprehensive Code difficult.

121. On the other hand, the Expert Consultation (EC/Microbiol/77/Report 2) had accepted that there was a need for the establishment of microbiological criteria aimed at minimizing public health risks in edible ices and ice mixes. For this reason the Consultation had recommended guidelines since it did not think mandatory criteria were appropriate and no code existed to which specifications could be attached. The Committee recognized that this was the first time that it had been suggested that guidelines as defined by the Joint Expert Consultation had been proposed for a product for which a Codex Standard was available.

122. Some delegations were of the opinion that the codes of hygienic practice in general had already demonstrated their value in assisting countries to develop legislation and for this reason supported the elaboration of such a code for edible ices. Other delegations, while agreeing that the codes so far elaborated by the Committee had proven useful in many instances, held the view that as a commodity edible ices did not have high priority since the standards required a pasteurization treatment.

123. The Committee noted that the microbiological criteria were still in a preliminary stage and would in due course undergo further detailed discussion by the Geneva Working Group on Microbiological Specifications for Foods. It was therefore decided to defer further discussion on the need for a Code of Practice for Edible Ices and Ice Mixes until its next session at which time it expected to be in a better position to make a firm proposal to the 13th Session of the Codex Alimentarius Commission.

#### VENDING MACHINES

124. The Committee had before it "Hygienic Aspects Related to the Construction and Operation of Vending Machines" (CX/FH 78/13) which had been prepared by the delegation of Belgium.

125. The Committee noted that the document suggested two ways of establishing hygiene provisions for vending machines - either by drawing up an independent code or by appending hygiene provisions particular to vending machines to the revised General Principles of Food Hygiene.

126. Some uncertainty was expressed as to the purpose of the Code - whether it was intended as a hygienic engineering standard or whether it would eventually be attached as an annex to a standard for the construction and design of machines. Several delegations expressed the view that a large number of hygienic aspects appeared to be covered by the Revised General Principles of Food Hygiene and by the Low-acid Foods Code.

127. The Committee noted that there was some concern over the hygienic condition of the connecting and delivering tubes in vending machines dispensing liquid products. It also noted that the delegation of Japan was in favour of a code of practice for vending machines for foods but was not in favour of discussing moral problems of whether alcoholic beverages should be sold from such machines.

128. The delegation of the USA informed the Committee that a detailed document on the hygienic construction of vending machines would soon be published by the Food and Drug Administration, and it undertook to edit the text to Codex format and to circulate it to Codex Contact Points and members of the Committee for comments before its next session. The Committee could then make suitable recommendations on the possible elaboration of a code of hygienic practice for vending machines for consideration by the Commission at its 13th Session.

#### MICROBIOLOGICAL SPECIFICATIONS FOR DRIED FOOD AND DRIED FOOD INGREDIENTS

129. The Committee had before it a summary of discussions on microbiological specifications for dried foods which had taken place since the last meeting of the Committee (CX/FH 78/14).

130. At its 14th Session the Codex Committee on Food Hygiene had discussed the findings of the 2nd Joint FAO/WHO Expert Consultation on Microbiological Specifications for Foods and noted that the Consultation had received a request originating from the 20th Session of the Joint FAO/WHO Expert Committee on Food Additives (JECFA) for advice on some matters relating to the establishment of microbiological specifications for a number of food additives (EC/Microbiol/77/Report 2, Annex IX). Some of these substances had been included in the list of foods and ingredients for which the establishment of microbiological criteria should be explored further.

131. At its 22nd Session held in Rome in mid-1978 JECFA had noted the remarks and recommendations of the Expert Consultation and the deliberations of the Committee and had concluded that further information would be needed from, for instance, suppliers, on typical total bacterial counts of products of natural origin. Such information, once gathered, would enable the experts to identify areas where work would be warranted. It had therefore recommended writing to both governments and private sectors seeking their views and their advice and available publications on the subject.

132. Concerning a different area of dried foods the Committee was informed that the Commission at its 12th Session (ALINORM 78/41, paras 485-496) had decided to form a Codex Committee on Vegetable Proteins. The Committee noted that such products might require microbiological specifications.

133. The Committee noted that for other types of dried foods such as soups and broths and milk powders the elaboration of microbiological criteria was already in progress. Several delegations were of the opinion that the elaboration of a general code to cover dried foods and food additives was unrealistic and that it would be better to approach the problem by classifying such products into groups which received similar processing treatment as, for example, enzymes which should receive special treatment in order to maintain their biological activity.

134. The Committee agreed that progress in considering whether a Code or Codes of Hygienic Practice for Dried Foods and Dried Food Ingredients should be undertaken would be greatly assisted by the preparation of a background document which classified the products into homogeneous groups, either by similarity of processing treatment or similarity of functional properties. This would allow a more informed approach to the development of microbiological criteria. The delegation of the Netherlands offered to look into the matter of providing such information.

#### CONSIDERATION OF HYGIENIC ASPECTS OF BOTTLED WATER

135. The Committee noted that at its 14th Session (ALINORM 78/13A, para 102(8)) it had endorsed a recommendation made by the 2nd Joint Expert Consultation to consider the hygienic aspects of bottled waters including the cleaning and filling of bottles and that it should also take into account the work of the Regional Coordinating Committee for Europe which had elaborated a Standard for Mineral Waters.
136. The Committee was informed that the Commission at its 12th Session had decided to adopt as a Recommended European Regional Standard the Draft Standard for Natural Mineral Waters. It was understood that the various sections of the Standard requiring endorsement or elaboration would be considered by the appropriate Codex Committees and that the Standard would not be published until the completion of such work.
137. The Committee noted that the Standard contained microbiological criteria which were in close agreement with those proposed in the EEC directive on Natural Mineral Waters. These criteria contained in 5.2 of the hygiene section had already been agreed on by the Coordinating Committee for Europe and were now submitted to this Committee for endorsement.
138. The Committee noted that the relevant sub-section 5.2 considered microbiological requirements in terms of limits for certain microorganisms but that no methods for their detection had been provided. It was decided to suspend endorsement until such time as the hygiene section had been completed, by the addition of methods of sampling and determination of the microorganisms concerned.
139. The Committee agreed to attach the Hygiene section of the Regional European Standard for Mineral Waters (see Appendix VII) so that it could be evaluated for comment and reviewed by the Committee at its next session.

#### OTHER BUSINESS

##### Microbiological Criteria - Dry Bouillons

140. The delegation of Switzerland informed the Committee that provisional microbiological criteria for dry bouillons, drawn up according to the ICMSF system, were now being tested by AIIBP members.
141. The Committee noted that AIIBP was awaiting the outcome of discussions on the application of General Principles for the Establishment of Microbiological Criteria for Foods, which would take place at the meeting of the Geneva Working Group, and hoped to submit the results of the microbiological testing in time for the 16th Session of the Committee.

##### World Congress on Foodborne Infections and Intoxications

142. The Committee was informed that the Institute of Veterinary Medicine - Robert von Osterstag Institut (FAO/WHO Collaborating Centre for Research and Training in Food Hygiene) would hold the above Congress from 29 June - 3 July 1980 and would discuss many subjects of interest to members of the Committee. Further information could be obtained from Professor Dr. K. Gerigk, Institute of Veterinary Medicine, FAO/WHO Collaborating Centre for Research and Training in Food Hygiene, Thielallee 88-92, D-1000 Berlin 33.

##### Low-acid Canned Foods and Acidified Low-acid Canned Foods

143. During the discussions on the Code of Hygienic Practice for Low-acid Canned Foods and for Acidified Low-acid Canned Foods, it had been observed that certain similar products were not covered by the Code, namely low-acid foods which e.g. (1) were not heat processed and packed in either hermetically sealed or non-hermetically sealed containers, or (2) are packed in bulk containers which are not heat processed and are either hermetically sealed or non-hermetically sealed, or (3) require refrigeration. As these products are of importance in international trade it was thought desirable to develop a separate code for them.
144. The Committee accepted an offer by the delegation of the Netherlands to convene a working group to consider the elaboration of a Code as proposed or to prepare an Annex to the Low-acid Canned Foods Code. The working group would convene in conjunction with an ISO meeting to be held in the Netherlands. The delegations of Canada, Norway, United Kingdom and USA expressed their interest in participating in the working group.

#### DATE AND PLACE OF NEXT MEETING

145. The Committee noted that the 16th Session would take place in Washington, D.C. in June 1979 at a date to be agreed between the Government of the United States and the Codex Secretariat.

SUMMARY STATUS OF WORK  
(prepared by the Secretariat)

Subject	Status Step	To be dealt with by	Document ref.	Comments
Canned Fruit and Vegetable Products	9	Governments	CAC/RCP 2-1969	
Dried Fruits	9	Governments	CAC/RCP 3-1969	
Desiccated Coconut ) Dehydrated Fruits and Vegetables ) including Edible Fungi )	9	Governments	CAC/RCP 4/5-1971	
Tree Nuts	9	Governments	CAC/RCP 6-1972	
Fresh Fish 3/	9	Governments	CAC/RCP 9-1976	
Canned Fish 3/	9	Governments	CAC/RCP 10-1976	
Meat Hygiene 1/	9	Governments	CAC/RCP 11-1976	
Processed Meat Products 2/	9	Governments	CAC/RCP 12-1976	
Ante-Mortem and Post-Mortem Inspection 1/	9	Governments	CAC/RCP 13-1976	
Poultry Processing	9	Governments	CAC/RCP 14-1976	
Egg Products	9	Governments	CAC/RCP 15-1976	
Code of Hygienic Practice - Peanuts (Ground Nuts)	6	Governments	ALINORM 79/13 Appendix III	
Code of Hygienic Practice - Molluscan Shellfish	9 *		CAC/RCP 18-1978	
Code of Hygienic Practice - Froglegs	5 /	13th Session CAC	ALINORM 79/13 Appendix VI	
Revision of General Principles of Food Hygiene	6	Governments 16th CCFH	ALINORM 79/13 Appendix II	
Code of Hygienic Practice - Low-acid Canned Foods	6	Governments 16th CCFH	ALINORM 79/13 Appendix IV	Appendix IV issued independently of ALINORM 79/13
Code of Hygienic Practice - Foods for Infants and Children	8	Governments	ALINORM 79/13 Appendix V	
General Principles for the Establishment of Microbiological Specifications for Foods	-	FAO/WHO WG on Microb. Criteria for Foods 16th CCFH	ALINORM 78/13A Appendix VIII and EC/Microbiol/77/Report 2, p.3 and Annex II	Working Group meets in Geneva in February 1979
Harmonization of Definitions	-	25th Executive Committee	ALINORM 78/13A paras 61-63	Australia to prepare glossary of definitions

- \* To be distributed in due course
- / Recommended omission of Steps 6 and 7
- 1/ Elaborated independently by the Codex Committee on Meat Hygiene
- 2/ Elaborated independently by the Codex Committee on Processed Meat Products
- 3/ Elaborated in collaboration with the Codex Committee on Fish and Fishery Products
- 4/ To be included in the Code of Hygienic Practice for Egg Products (CAC/RCP 15-1976).



Subject	Status Step	To be dealt with by	Document ref.	Comments
Code of Practice - Smoked Fish	6	Governments 16th CCFH	CX/FFP 77/6	
Code of Practice - Shrimps and Prawns	9 *		CAC/RCP 17-1978	
Egg Products - Microbiological Specifications 4/	9		ALINORM 78/13 Appendix VI	
Code of Hygienic Practice for Vending Machines dispensing Food and Beverages	-	USA/ Belgium 16th CCFH	CX/FH 78/13	May be discussed by Canning Working Group in March 1979
Enumeration of enteropathogenic vibrio parahaemolyticus	-	ICMSF et al	EC/Microbiol/ 77/Report 2, p.19	
Code of Practice for Ice Mixes and Edible Ices	-	16th CCFH	EC/Microbiol/ 77/Report 2, p.19	
Information on methods of detection and enumeration of S. aureus in Ice Mixes and Edible Ices	-	FAO/WHO WG on Microb. Criteria for Foods	EC/Microbiol/ 77/Report 2, p.19	Working Group meets in Geneva in February 1979
Microbiological Guidelines for Edible Ices	-	FAO/WHO WG on Microb. Criteria for Foods	EC/Microbiol/ 77/Report 2, Annex VII, ALINORM 78/13A Appendix IX	Working Group meets in Geneva in February 1979
Salmonella contamination of Froglegs		CCFH WG Governments/ WHO 16th CCFH	EC/Microbiol/ 77/Report 2, p.19 and Annex VI	Working Group to meet before 16th CCFH
Sampling and Inspection for Microbiological Examination of Processed Meat Products	5	11th CCPMP	ALINORM 79/16 Appendix III	
Code of Practice for the Manufacture of Dried Foods and Dried Food Ingredients		16th CCFH	EC/Microbiol/ 77/Report 2, p.19	Background paper to be prepared by Netherlands
Hygienic Aspects of Bottled Waters		Governments CC for Europe 16th CCFH	EC/Microbiol/ 77/Report 2, p. 20 ALINORM 79/13 Appendix VII	
Draft Code of Practice for Dried Milk	3	WG and 16th CCFH Governments IDF	CX/FH 78/16	Ad hoc WG to meet immediately before 16th CCFH
Acidified Low-acid Canned Foods	6	Governments Canning WG 16th CCFH	ALINORM 79/13 Annex I to Appendix IV	Appendix IV issued independently of ALINORM 79/13
Microbiological Criteria - Dry Bouillons		FAO/WHO WG on Microb. Criteria for Foods AIIBP/ 16th CCFH		Working Group to meet in Geneva in February 1979 Microb. Crit. under test by AIIBP members

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REVISED DRAFT CODE OF PRACTICE

GENERAL PRINCIPLES OF FOOD HYGIENE  
(Advanced to Step 8)

SECTION I - SCOPE

1.1 This Code recommends general hygienic practices for use in the handling (including growing and harvesting, preparation, processing, packaging, storage, transport, distribution and sale) of food for human consumption in order to ensure a safe, sound and wholesome product.

1.2 It is further intended to provide a basis for establishing codes of hygienic practice for individual commodities or groups of commodities which have specific requirements relating to food hygiene.

SECTION II - DEFINITIONS

2. For the purposes of this Code the following expressions have the meaning stated:

2.1 Adequate - sufficient to accomplish the intended purpose of this code.

2.2 Cleaning - the removal of soil, food residues, dirt, grease or other objectionable matter.

2.3 Contamination - the occurrence of any objectionable matter in the product.

2.4 Disinfection - the reduction, without adversely affecting the food, by means of hygienically satisfactory chemical agents and/or physical methods, of the number of micro-organisms to a level that will not lead to harmful contamination of food.

2.5 Establishment - any building(s) or area(s) in which food is handled after harvesting and the surroundings under the control of the same management.

2.6 Food Handling - any operation in the growing and harvesting, preparation, processing, packaging, storage, transport, distribution and sale of food.

2.7 Food Hygiene - all measures necessary to ensure the safety, soundness and wholesomeness of food at all stages from its growth, production or manufacture until its final consumption.

2.8 Packaging Material - any containers such as cans, bottles, cartons, boxes, cases and sacks, or wrapping and covering material such as foil, film, metal, paper, wax-paper and cloth.

2.9 Pests - any animals capable of directly or indirectly contaminating food.

SECTION III - HYGIENE REQUIREMENTS IN PRODUCTION/HARVESTING AREA

3.1 Environmental Hygiene in areas from which raw materials are derived

3.1.1 Unsuitable growing or harvesting areas

Food should not be grown or harvested where the presence of potentially harmful substances would lead to an unacceptable level of such substances in the food.

3.1.2 Protection from contamination by wastes

3.1.2.1 Raw food materials should be protected from contamination by human, animal, domestic, industrial and agricultural wastes which may be present at levels likely to be a hazard to health. Adequate precautions should be taken to ensure that these wastes are not used and are not disposed of in a manner which may constitute a health hazard through the food.

3.1.2.2 Arrangements for the disposal of domestic and industrial wastes in areas from which raw materials are derived should be acceptable to the official agency having jurisdiction.

3.1.3 Irrigation Control

Food should not be grown or produced in areas where the water used for irrigation might constitute a health hazard to the consumer through the food.

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3.1.4 Pest and disease control

Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health, particularly those which may arise from residues in the food. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

3.2 Harvesting and production

3.2.1 Techniques

Methods and procedures associated with harvesting and production should be hygienic and such as not to constitute a potential health hazard or result in contamination of the product.

3.2.2 Equipment and containers

Equipment and containers used for harvesting and production should be so constructed and maintained as not to constitute a hazard to health. Containers which are re-used should be of such material and construction as will permit easy and thorough cleaning. They should be cleaned and maintained clean and, where necessary, disinfected. Containers previously used for toxic materials should not subsequently be used for holding foods or food ingredients.

3.2.3 Removal of obviously unfit raw materials

Raw materials which are obviously unfit for human consumption should be segregated during harvesting and production. Those which cannot be made fit by further processing should be disposed of in such a place and in such a manner as to avoid contamination of the food and/or water supplies or other food materials.

3.2.4 Protection against contamination and damage

Suitable precautions should be taken to protect the raw materials from being contaminated by pests or by chemical, physical or microbiological contaminants or other objectionable substances. Precautions should be taken to avoid damage.

3.3 Storage at the place of production/harvesting

Raw materials should be stored under conditions which provide protection against contamination and minimize damage and deterioration.

3.4 Transportation

3.4.1 Conveyances

Conveyances for transporting the harvested crop or raw materials from the production area or place of harvest or storage should be adequate for the purpose intended and should be of such material and construction as will permit easy and thorough cleaning. They should be cleaned and maintained clean, and where necessary disinfected and disinfested.

3.4.2 Handling procedures

All handling procedures should be such as will prevent raw materials from being contaminated. Care should be taken to prevent spoilage, to protect against contamination and to minimize damage. Special equipment - such as refrigeration equipment - should be used if the nature of the product or distances involved so indicate. If ice is used in contact with the product it should be of the quality required in paragraph 4.4.1.2.

SECTION IV - ESTABLISHMENT: DESIGN AND FACILITIES

4.1 Location

Establishments should be located in areas which are free from objectionable odours, smoke, dust or other contaminants and are not subject to flooding.

4.2 Roadways and areas used by wheeled traffic

Such roadways and areas serving the establishment which are within its boundaries or in its immediate vicinity should have a hard paved surface suitable for wheeled traffic. There should be adequate drainage and provision should be made to allow for cleaning.

4.3 Buildings and Facilities

4.3.1 Buildings and facilities should be of sound construction and maintained in good repair.

4.3.2 Adequate working space should be provided to allow for satisfactory performance of all operations.



4.3.3 The design should be such as to permit easy and adequate cleaning and to facilitate proper supervision of food hygiene.

4.3.4 The buildings and facilities should be designed to prevent the entrance and harbouring of pests and the entry of environmental contaminants such as smoke, dust, etc.

4.3.5 Buildings and facilities should be designed to provide separation, by partition, location or other effective means, between those operations which may cause cross-contamination.

4.3.6 Buildings and facilities should be designed to facilitate hygienic operations by means of a regulated flow in the process from the arrival of the raw material at the premises to the finished product, and should provide for appropriate temperature conditions for the process and the product.

4.3.7 In food handling areas:

- Floors, where appropriate, should be of water-proof, non-absorbent, washable, non-slip and non-toxic materials, without crevices, and should be easy to clean and disinfect. Where appropriate, floors should slope sufficiently for liquids to drain to trapped outlets.
- Walls, where appropriate, should be of water-proof, non-absorbent, washable and non-toxic materials and should be light coloured. Up to a height appropriate for the operation they should be smooth and without crevices, and should be easy to clean and disinfect. Where appropriate angles between walls, between walls and floors, and between walls and ceilings should be sealed and coved to facilitate cleaning.
- Ceilings should be so designed, constructed and finished as to prevent the accumulation of dirt and minimize condensation, mould development and flaking, and should be easy to clean.
- Windows and other openings should be so constructed as to avoid accumulation of dirt and those which open should be fitted with screens. Screens should be easily movable for cleaning and kept in good repair. Internal window sills, if present, should be sloped to prevent use as shelves.
- Doors should have smooth, non-absorbent surfaces and, where appropriate, be self-closing and close fitting.
- Stairs, lift cages and auxiliary structures such as platforms, ladders, chutes, should be so situated and constructed as not to cause contamination to food. Chutes should be constructed with inspection and cleaning hatches.

4.3.8 In food handling areas all overhead structures and fittings should be installed in such a manner as to avoid contamination directly or indirectly of food and raw materials by condensation and drip, and should not hamper cleaning operations. They should be insulated where appropriate and be so designed and finished as to prevent the accumulation of dirt and to minimize condensation, mould development and flaking. They should be easy to clean.

4.3.9 Living quarters, toilets and areas where animals are kept should be completely separated from and should not open directly on to food handling areas.

4.3.10 Where appropriate, establishments should be so designed that access can be controlled.

4.3.11 The use of material which cannot be adequately cleaned and disinfected, such as wood, should be avoided unless its use would clearly not be a source of contamination.

#### 4.4 Sanitary Facilities

##### 4.4.1 Water supply

4.4.1.1 An ample supply of potable water under adequate pressure and of suitable temperature should be available with adequate facilities for its storage, where necessary, and distribution, and with adequate protection against contamination. The standards of potability should not be less than those contained in the latest edition of "International Standards of Drinking Water" (WHO).

4.4.1.2 Ice should be made from potable water and should be manufactured, handled and stored so as to protect it from contamination.

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4.4.1.3 Steam used in direct contact with food or food contact surfaces should contain no substances which may be hazardous to health or may contaminate the food.

4.4.1.4 Non-potable water used for steam production, refrigeration, fire control and other similar purposes not connected with food should be carried in completely separate lines, identifiable preferably by colour, and with no cross-connection with or back-siphonage into the system carrying potable water (see also 7.3.2).

4.4.2 Effluent and waste disposal

Establishments should have an efficient effluent and waste disposal system which should at all times be maintained in good order and repair. All effluent lines (including sewer systems) should be large enough to carry peak loads and should be so constructed as to avoid contamination of potable water supplies.

4.4.3 Changing facilities and toilets

Adequate, suitable, and conveniently located changing facilities and toilets should be provided in all establishments. Toilets should be so designed as to ensure hygienic removal of waste matter. These areas should be well lit, ventilated and where appropriate heated and should not open directly on to food handling areas. Hand washing facilities with warm or hot and cold water, a suitable hand-cleaning preparation, and with suitable hygienic means of drying hands, should be provided adjacent to toilets and in such a position that the employee must pass them when returning to the processing area. Where hot and cold water are available mixing taps should be provided. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided near to each washing facility. Taps of a non-hand operable type are desirable. Notices should be posted directing personnel to wash their hands after using the toilet.

4.4.4 Hand washing facilities in processing areas

Adequate and conveniently located facilities for hand washing and drying should be provided wherever the process demands. Where appropriate, facilities for hand disinfection should also be provided. Warm or hot and cold water and a suitable hand-cleaning preparation should be provided. Where hot and cold water are available mixing taps should be provided. There should be suitable hygienic means of drying hands. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided adjacent to each washing facility. Taps of a non-hand operable type are desirable. The facilities should be furnished with properly trapped waste pipes leading to drains.

4.4.5 Disinfection facilities

Where appropriate adequate facilities for cleaning and disinfection of working implements and equipment should be provided. These facilities should be constructed of corrosion resistant materials, capable of being easily cleaned, and should be fitted with suitable means of supplying hot and cold water in sufficient quantities.

4.4.6 Lighting

Adequate natural or artificial lighting should be provided throughout the establishment. Where appropriate, the lighting should not alter colours and the intensity should not be less than:

540 lux (50 foot candles) at all inspection points

220 lux (20 foot candles) in work rooms

110 lux (10 foot candles) in other areas.

Light bulbs and fixtures suspended over food materials in any stage of production should be of a safety type and protected to prevent contamination of food in case of breakage.

4.4.7 Ventilation

Adequate ventilation should be provided to prevent excessive heat, steam condensation and dust and to remove contaminated air. The direction of the air flow should never be from a dirty area to a clean area. Ventilation openings should be provided with a screen or other protecting enclosure of non-corrodible material. Screens should be easily removable for cleaning.

4.4.8 Facilities for storage of waste and inedible material

Facilities should be provided for the storage of waste and inedible material prior to removal from the establishment. These facilities should be designed to prevent access to waste or inedible material by pests and to avoid contamination of food, potable water, equipment, buildings or roadways on the premises.

4.5 Equipment and Utensils

4.5.1 Materials

All equipment and utensils used in food handling areas and which may contact food should be made of material which does not transmit toxic substances, odour or taste, is non-absorbent, is resistant to corrosion and is capable of withstanding repeated cleaning and disinfection. Surfaces should be smooth and free from pits and crevices. The use of wood and other materials which cannot be adequately cleaned and disinfected should be avoided except when their use would clearly not be a source of contamination. The use of different materials in such a way that contact corrosion can occur should be avoided.

4.5.2 Sanitary design, construction and installation

4.5.2.1 All equipment and utensils should be so designed and constructed as to prevent hygienic hazards and permit easy and thorough cleaning and disinfection and, where practicable, be visible for inspection. Stationary equipment should be installed in such a manner as to permit easy access and thorough cleaning.

4.5.2.2 Containers for inedible material and waste should be leak-proof, constructed of metal or other suitable impervious material which should be easy to clean or disposable and able to be closed securely.

4.5.2.3 All refrigerated spaces should be equipped with temperature measurement or recording devices.

4.5.3 Equipment identification

Equipment and utensils used for inedible materials or waste should be so identified and should not be used for edible products.

SECTION V - ESTABLISHMENT: HYGIENE REQUIREMENTS

5.1 Maintenance

The buildings, equipment, utensils and all other physical facilities of the establishment, including drains, should be maintained in good repair and in an orderly condition. As far as practicable, rooms should be kept free from steam, vapour and surplus water.

5.2 Cleaning and Disinfection

5.2.1 Cleaning and disinfection should meet the requirements of this code. For further information on cleaning and disinfection procedures see Annex I.

5.2.2 To prevent contamination of food, all equipment and utensils should be cleaned as frequently as necessary and disinfected whenever circumstances demand.

5.2.3 Adequate precautions should be taken to prevent food from being contaminated during cleaning or disinfection of rooms, equipment or utensils by water and detergents or by disinfectants and their solutions. Detergents and disinfectants should be suitable for the purpose intended and should be acceptable to the official agency having jurisdiction. Any residues of these agents on a surface which may come in contact with food should be removed by thorough rinsing with potable water before the area or equipment is again used for handling food.

5.2.4 Either immediately after cessation of work for the day or at such other times as may be appropriate, floors, including drains, auxiliary structures and walls of food handling areas should be thoroughly cleaned.

5.2.5 Changing facilities and toilets should be kept clean at all times.

5.2.6 Roadways and yards in the immediate vicinity of and serving the premises should be kept clean.

5.3 Hygiene Control Programme

A permanent cleaning and disinfection schedule should be drawn up for each establishment to ensure that all areas are appropriately cleaned and that critical areas, equipment and material are designated for special attention. A single individual who should preferably be a permanent member of the staff of the establishment and whose duties should be independent of production, should be appointed to be responsible for the cleanliness of the establishment. He should have a thorough understanding of the significance of contamination and the hazards involved. All cleaning personnel should be well-trained in cleaning techniques.

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5.4 By-Products

By-products should be stored in such a manner as to avoid contamination of food. They should be removed from the working areas as often as necessary and at least daily.

5.5 Storage and Disposal of Waste

Waste material should be handled in such a manner as to avoid contamination of food or potable water. Care should be taken to prevent access to waste by pests. Waste should be removed from the food handling and other working areas as often as necessary and at least daily. Immediately after disposal of the waste, receptacles used for storage and any equipment which has come into contact with the waste should be cleaned and disinfected. The waste storage area should also be cleaned and disinfected.

5.6 Exclusion of Domestic Animals

Animals that are uncontrolled or that could be a hazard to health should be excluded from establishments.

5.7 Pest Control

5.7.1 There should be an effective and continuous programme for the control of pests. Establishments and surrounding areas should be regularly examined for evidence of infestation.

5.7.2 Should pests gain entrance to the establishment, eradication measures should be instituted. Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health resulting from the use of these agents, including those which may arise from residues retained in the product. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

5.7.3 Pesticides should only be used if other precautionary measures cannot be used effectively. Before pesticides are applied, care should be taken to safeguard all food, equipment and utensils from contamination. After application, contaminated equipment and utensils should be thoroughly cleaned to remove residues prior to being used again.

5.8 Storage of Hazardous Substances

5.8.1 Pesticides or other substances which may represent a hazard to health should be suitably labelled with a warning about their toxicity and use. They should be stored in locked rooms or cabinets used only for that purpose and dispensed and handled only by authorized and properly trained personnel or by persons under strict supervision of trained personnel. Extreme care should be taken to avoid contaminating food.

5.8.2 Except when necessary for hygienic or processing purposes, no substance which could contaminate food should be used or stored in food handling areas.

5.9 Personal Effects and Clothing

Personal effects and clothing should not be deposited in food handling areas.

SECTION VI - PERSONNEL HYGIENE AND HEALTH REQUIREMENTS

6.1 Hygiene Training

Managers of establishments should arrange for adequate and continuing training of every food handler in hygienic handling of food and in personal hygiene so that they understand the precautions necessary to prevent contamination of food. Instruction should include relevant parts of this Code.

6.2 Medical Examination

Persons who come in contact with food in the course of their work should have a medical examination prior to their employment if the official agency having jurisdiction, acting on medical advice, considers that this is necessary, whether because of epidemiological considerations, the nature of the food prepared in a particular establishment or the medical history of the prospective food handler. Medical examination of a food handler should be carried out at other times when clinically or epidemiologically indicated.

### 6.3 Communicable Diseases

The management should take care to ensure that no person, while known or suspected to be suffering from, or to be a carrier of a disease likely to be transmitted through food or while afflicted with infected wounds, skin infections, sores or with diarrhoea, is permitted to work in any food handling area in any capacity in which there is any likelihood of such a person directly or indirectly contaminating food with pathogenic microorganisms. Any person so affected should immediately report to the management that he is ill.

### 6.4 Injuries

Any person who has a cut or wound should not continue to handle food or food contact surfaces until the injury is completely protected by a waterproof covering which is firmly secured, and which is conspicuous in colour. Adequate first-aid facilities should be provided for this purpose.

### 6.5 Washing of Hands

Every person engaged in a food handling area should wash his hands frequently and thoroughly with a suitable hand cleaning preparation under running warm, potable water while on duty. Hands should always be washed before commencing work, immediately after using the toilet, after handling contaminated material and whenever else necessary. After handling any material which might be capable of transmitting disease, hands should be washed and disinfected immediately. Notices requiring hand-washing should be displayed. There should be adequate supervision to ensure compliance with this requirement.

### 6.6 Personal Cleanliness

Every person engaged in a food handling area should maintain a high degree of personal cleanliness while on duty, and should at all times while so engaged wear suitable protective clothing including head covering and footwear, all of which articles should be cleanable unless designed to be disposed of and should be maintained in a clean condition consistent with the nature of the work in which the person is engaged. Aprons and similar items should not be washed on the floor. During periods where food is manipulated by hand, any jewellery that cannot be adequately disinfected should be removed from the hands. Personnel should not wear any insecure jewellery when engaged in food handling.

### 6.7 Personal Behaviour

Any behaviour which could result in contamination of food, such as eating, use of tobacco, chewing (e.g. gum, sticks, betel nuts, etc.) or unhygienic practices such as spitting, should be prohibited in food handling areas.

### 6.8 Gloves

Gloves, if used in the handling of food products, should be maintained in a sound, clean and sanitary condition. The wearing of gloves does not exempt the operator from having thoroughly washed hands.

### 6.9 Visitors

Precautions should be taken to prevent visitors to food handling areas from contaminating food. These may include the use of protective clothing. Visitors should observe the provisions recommended in paragraphs 5.9, 6.3, 6.4 and 6.7.

### 6.10 Supervision

Responsibility for ensuring compliance by all personnel with all requirements of paragraphs 6.1 - 6.9 inclusive should be specifically allocated to competent supervisory personnel.

## SECTION VII - ESTABLISHMENT: HYGIENIC PROCESSING REQUIREMENTS

### 7.1 Raw Material Requirements

7.1.1 No raw material or ingredient should be accepted by the establishment if known to contain parasites, microorganisms or toxic, decomposed or extraneous substances which will not be reduced to acceptable levels by normal plant procedures of sorting and/or preparation or processing.

7.1.2 Raw materials or ingredients should be inspected and sorted prior to being moved into the processing line and where necessary laboratory tests should be made. Only clean sound raw materials or ingredients should be used in further processing.

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APPENDIX II

7.1.3 Raw materials and ingredients stored on the premises of the establishment should be maintained under conditions that will prevent spoilage, protect against contamination and minimize damage. Stocks of raw materials and ingredients should be properly rotated.

7.2 Prevention of Cross-contamination

7.2.1 Effective measures should be taken to prevent contamination of food material by direct or indirect contact with material at an earlier stage of the process.

7.2.2 Persons handling raw materials or semi-processed products capable of contaminating the end product should not come into contact with any end product unless and until they discard all protective clothing worn by them during the handling of raw materials or semi-processed products which have come into direct contact with or have been soiled by raw material or semi-processed products and have changed into clean protective clothing.

7.2.3 If there is a likelihood of contamination, hands should be washed thoroughly between handling products at different stages of processing.

7.2.4 All equipment which has been in contact with raw materials or contaminated material should be thoroughly cleaned and disinfected prior to being used for contact with end products.

7.3 Use of Water

7.3.1 As a general principle only potable water, as defined in the latest edition of "International Standards of Drinking Water" (WHO), should be used in food handling.

7.3.2 Non-potable water may be used with the acceptance of the official agency having jurisdiction for steam production, refrigeration, fire control and other similar purposes not connected with food. However, non-potable water may, with specific acceptance by the official agency having jurisdiction, be used in certain food handling areas provided this does not constitute a hazard to health.

7.3.3 Water re-circulated for re-use within an establishment should be treated and maintained in a condition so that no health hazard can result from its use. The treatment process should be kept under constant surveillance. Alternatively, re-circulated water which has received no further treatment may be used in conditions where its use would not constitute a health hazard and will not contaminate either the raw material or the end product. Re-circulated water should have a separate distribution system which can be readily identified. The acceptance of the official agency having jurisdiction should be required for any treatment process and for the use of re-circulated water in any food process.

7.4 Processing

7.4.1 Processing should be supervised by technically competent personnel.

7.4.2 All steps in the production process, including packaging, should be performed without unnecessary delay and under conditions which will prevent the possibility of contamination, deterioration, or the development of pathogenic and spoilage micro-organisms.

7.4.3 Rough treatment of containers should be avoided to prevent the possibility of contamination of the processed product.

7.4.4 Methods of preservation and necessary controls should be such as to protect against contamination or development of a public health hazard and against deterioration within the limits of good commercial practice.

7.5 Packaging

7.5.1 All packaging material should be stored in a clean and sanitary manner. The material should be appropriate for the product to be packed and for the expected conditions of storage and should not transmit to the product objectionable substances beyond the limits acceptable to the official agency having jurisdiction. The packaging material should be sound and should provide appropriate protection from contamination.

7.5.2 Product containers should not have been used for any purpose which may lead to contamination of the product. Where practicable containers should be inspected immediately before use to ensure that they are in a satisfactory condition and where necessary cleaned and/or disinfected; when washed they should be well drained before filling. Only packaging material required for immediate use should be kept in the packing or filling area.

7.5.3 Packing should be done under conditions that preclude the introduction of contamination into the product.

7.5.4 Lot Identification. Each container shall be permanently marked in code or in clear to identify the producing factory and the lot. A lot is a quantity of food produced under identical conditions, all packages of which should bear a lot number that identifies the production during a particular time interval, and usually from a particular "line" or other critical processing unit.

7.5.5 Processing and Production Records. Permanent, legible and dated records of pertinent processing and production details should be kept concerning each lot. These records should be retained for a period that exceeds the shelf life of the product, but unless a specific need exists they need not be kept for more than two years. Records should also be kept of the initial distribution by lot.

7.6 Storage and Transport of the End Product

The end product should be stored and transported under such conditions as will preclude the contamination with and/or proliferation of microorganisms and protect against deterioration of the product or damage to the container. During storage, periodic inspection of the end product should take place to ensure that only food which is fit for human consumption is despatched and that end product specifications should be complied with when they exist. The product should be despatched in the sequence of the lot numbers.

7.7 Sampling and Laboratory Control Procedures

7.7.1 It is desirable that each establishment should have access to laboratory control of the products processed. The amount and type of such control will vary with the food product as well as the needs of management. Such control should reject all food that is unfit for human consumption.

7.7.2 Where appropriate, representative samples of the production should be taken to assess the safety and quality of the product.

7.7.3 Laboratory procedures used should preferably follow recognized or standard methods in order that the results may be readily interpreted.

7.7.4 Laboratories checking for pathogenic microorganisms should be well separated from food processing areas.

SECTION VIII - END PRODUCT SPECIFICATIONS

8. Specifications such as microbiological, chemical or physical may be required depending on the nature of the food. Such specifications should include sampling procedures, analytical methodology and limits for acceptance.

ANNEX I

CLEANING AND DISINFECTION  
(Returned to Step 3)

1. GENERAL PRINCIPLES

1.1 Good hygiene demands effective and regular cleaning to remove food residues and dirt which may contain food poisoning and spoilage microorganisms and act as a source of food contamination. This cleaning process may where necessary be followed by, or associated with, disinfection to reduce the number of any microorganisms remaining after cleaning to a level which will not cause harmful contamination of food. Sometimes the cleaning and disinfection stages are combined by the use of a detergent sanitizer, although it is generally considered that this is less efficient than a two-stage cleaning and disinfection process.

1.2 The methods of cleaning and disinfection should be considered satisfactory by the official agency having jurisdiction.

1.3 Cleaning and disinfection procedures should be properly established for all parts of the plant, equipment and vehicles by a hygiene specialist after consultation with production management, plant engineers, and detergent and disinfectant manufacturers. The cleaning and disinfection procedures should be designed to meet the particular needs of the process and product concerned, and should be set down in written schedules which should be made available for the guidance of employees and management. Procedures should be established not only for cleaning and disinfecting the food equipment and food surfaces but also for cleaning and disinfection of the equipment which is itself used for cleaning e.g. mops, swabs, buckets, etc. There must be adequate supervision by management to ensure that the procedures set down are carried out in an effective manner at the specified intervals of time.

1.4 A single individual, who should preferably be a permanent member of the staff of the establishment and whose duties should be independent of production, should be appointed to be responsible for cleaning and disinfection procedures and for supervision.

1.5 Industrial detergents and disinfectants require careful handling. Alkaline and acidic products must not be mixed. Hypochlorite solutions must not be mixed with acidic products as chlorine gas will be released. Operators handling alkaline or acid products must wear protective clothing and goggles. Containers in which such liquids are kept should be clearly marked.

2. CLEANING

2.1 Cleaning Procedures

2.1.1 Cleaning procedures will require:

2.1.1.1 The removal of gross debris from surfaces by brushing, vacuuming and scraping of deposits or other methods where necessary followed by the application of clean potable water. The temperature of the water used will depend upon the type of soil to be removed.

2.1.1.2 The application of detergent solution to loosen soil and bacterial film and hold them in solution or suspension.

2.1.1.3 Rinsing with clean potable water to remove loosened soil and residues of detergent.

2.1.2 When these requirements have been met they may be followed by a disinfection process (see section 3 Disinfection).

2.2 Cleaning Methods

2.2.1 Cleaning is achieved by the separate or combined use of physical methods, e.g. scrubbing or turbulent flow, and chemical methods, e.g. by the use of detergent alkalis or acids. Heat is an important adjunct to the use of physical and chemical methods. Care must be employed in the selection of the temperatures depending on the detergents and the nature of the soil and working surfaces. Some synthetic organic materials can absorb constituents of food, such as milk fat, and the amount absorbed rises with the temperature.



2.2.2 One or more of the following methods is used according to the circumstances:

2.2.2.1 Manual: involving removal of soil by scrubbing in the presence of a detergent solution. Soaking in detergent solution in a separate receptacle may be necessary to loosen the soil prior to the scrubbing process.

2.2.2.2 In place cleaning: The cleaning of equipment with water and detergent solution through fixed equipment including pipe runs. The equipment must be properly designed for this cleaning method. A minimum velocity of 1.5 metres per second (5 feet per second) is required for effective cleaning. "Dead spots" or "dead legs" in the equipment should be identified and eliminated as far as possible. If these are present they should be dismantled for cleaning to prevent build up of contamination (General Principles 4.5.2.1).

2.2.2.3 Low pressure high volume spray: The application of a water or detergent solution in large volumes at pressures up to approximately 6.8 bar (100 psi).

2.2.4 High pressure low volume spray: The application of water or detergent solution in low volume at a high pressure, i.e. up to 68 bar (1,000 psi).

2.2.2.5 Washing machines: Some containers and equipment used in food processing can be washed by machines. These machines carry out the cleaning procedures set out above with the addition of disinfection by hot water rinse at the completion of the cleaning cycle. Good results can be obtained with such machines provided that the effectiveness and efficiency of the machine is maintained by adequate and regular servicing.

### 2.3 Detergents

Detergents must have a good wetting capacity and the ability to remove soil from surfaces and to hold the soil in suspension. They must also have good rinsing properties so that residues of soil and detergent can be easily removed from equipment. There are many types of detergent and advice should be sought to ensure that the detergent used in any particular circumstances is suitable to remove the type of soil resulting from a particular food process and is used at the correct concentration. The detergent used should be non-corrosive and compatible with other materials including disinfectants used in the sanitation programme. Whilst cold solutions of detergent may be effective in some circumstances, removal of animal fat residues requires the use of heat. The deposition of mineral salts on equipment may form a hard scale ("stone") especially in the presence of fats or proteins; the use of an acid or alkaline detergent or both sequentially may be necessary to remove such deposits. The "stone" can be a major source of bacterial infection. It can be easily detected by its fluorescence under ultra-violet light which will detect deposits usually missed by ordinary visual inspection.

### 2.4 Drying After Cleaning

2.4.1 If equipment is left wet after cleaning microbial growth may occur in the water film. It is important to ensure that equipment is left dry as soon as possible after cleaning and where possible to allow equipment to air-dry naturally. Single use tissue or absorbent materials may be used for drying but they should be used once and discarded. In some cases drying is not necessary and some equipment may be kept in an appropriate solution after cleaning.

2.4.2 Adequate drainage points should be provided in equipment that cannot be dismantled and drying racks provided for small pieces of equipment that are dismantled for the purpose of cleaning.

2.4.3 Any equipment that remains wet for a period during which significant microbial growth might occur should be disinfected immediately before use or at least thoroughly rinsed in clean potable water.

## 3. DISINFECTION

### 3.1 General Considerations

Disinfection results in the reduction of numbers of living microorganisms. It does not usually kill bacterial spores. Effective disinfection does not necessarily kill all microorganisms present but reduces their numbers to a level at which they can be reasonably assumed to present no risk to health. No disinfection procedure can exert its full effect unless its use is preceded by thorough cleaning. Disinfectants should be chosen according to the microorganisms to be killed. The continued use of certain chemical disinfectants may lead to the selection of resistant microorganisms. Chemical disinfectants should be used where use of heat would not be practicable. The methods used for cleaning under 2.2 could also be used for the application of disinfectants.

APPENDIX IIANNEX I3.2 Disinfection by heat

3.2.1 The application of moist heat to raise the surface temperature to at least 70°C (160°F) is one of the commonest and most useful forms of disinfection. High temperatures, however, will denature protein residues and bake them on to the surface of food equipment. It is therefore essential that all material such as residual food is removed by thorough cleaning before the application of heat for disinfection.

3.2.1.1 Hot water disinfection

This is the method of choice and is commonly used throughout the food industry. Removable parts of machinery and smaller items of equipment can be submerged in a sink or tank containing water at disinfection temperature for a suitable period of time e.g. at 80°C (176°F) for two minutes. The disinfectant rinse in mechanical washing machines should reach this disinfection temperature and the period of immersion should be sufficient to allow the equipment surfaces to reach this temperature. Water at disinfection temperature will scald bare hands so basket racks or some other type of receptacle will have to be used where the process is manual.

3.2.1.2 Steam disinfection

It may not be practicable to have steam available for disinfection throughout the premises. Lances producing steam jets are useful to disinfect areas of machinery and surfaces which are difficult to reach or which must be disinfected in situ on the factory floor. The heating of surfaces during the application of high temperature steam promotes their subsequent drying. The use of steam can present problems by creating condensation on other equipment and other parts of the structure. High pressure steam can strip paint from painted surfaces and lubricants from the working parts of machinery. Moreover some types of materials, such as plastics, are unsuitable for treatment with live steam. Steam jets should only be used by trained personnel as they can be dangerous in unskilled hands.

3.3 Chemical Disinfection

3.3.1 The following factors affect the performance of chemical disinfectants:

3.3.1.1 Inactivation by dirty conditions

The effectiveness of all chemical disinfectants is reduced by the presence of dirt and other soiling matter. Disinfectants will not act at all where there is gross soiling. Disinfection with chemicals must, therefore, always follow or be combined with a cleaning process.

3.3.1.2 Temperature of solution

In general, the higher the temperature the more effective the disinfection. A warm or hot solution is therefore preferable to a cold solution of disinfectant. There are, however, limitations to the temperature that may be used, and the manufacturer's guidance should be followed. Iodophors release iodine at temperatures above 43°C (110°F) which can result in staining of materials. The corrosive action of chlorine is increased when hot hypochlorite solutions are used.

3.3.1.3 Time

All chemical disinfectants need a minimum contact time to be effective. This minimum contact time will vary according to the activity of the disinfectant but generally will not be less than 10 minutes.

3.3.1.4 Concentration

The concentration of the chemical solution which is required will vary according to the intended use and must be adequate for the particular purpose. The solutions should therefore be made up strictly according to the manufacturer's instructions.

3.3.1.5 Stability

All disinfectant solutions should be freshly made in clean utensils. Topping up existing solutions or prolonged keeping of ready-to-use dilute solutions may render the disinfectant solution ineffective or may allow it to become a reservoir of resistant organisms. Disinfectants may be inactivated if mixed with detergents or other disinfectants. Easy-to-use, inexpensive test kits are available to test solution strength of most chemicals in their preparation, and to detect loss of strength during use.

### 3.4 Chemicals suitable for Disinfection in Food Premises

3.4.1 Chemical disinfectants that are liable to taint the food such as phenolics should not be used in food premises or vehicles. Care should be taken that chemical disinfectants do not cause harm to personnel and when used in slaughterhouse lairages do not cause distress to animals.

#### 3.4.1.1 Chlorine and chlorine based products including hypochlorite compounds

Properly used, these substances are among the most suitable for food plants and vehicles. They can be obtained as liquid hypochlorite solutions containing 100,000 to 120,000 milligrammes of available chlorine per litre, or they can be combined with a detergent in a chlorinated crystal form. These disinfectants act rapidly against a wide range of microorganisms and are relatively cheap. They are the most suitable for general purpose disinfection in food premises. These disinfectants should be used at concentrations of 100 to 250 milligrammes of available chlorine per litre. This group of disinfectants is corrosive to metals and they also have a bleaching action. Surfaces disinfected with them should therefore be subjected to a final rinsing with clean potable water after an adequate contact time. Chlorine disinfectants with the exception of chlorine dioxide are readily inactivated by the presence of organic soil.

#### 3.4.1.2 Iodophors

These substances are always blended with a detergent in an acid medium and they are therefore particularly suitable in those circumstances where an acid cleaner is required. They have a rapid action and a wide range of antimicrobial activity. A solution of about 25-50 milligrammes per litre of available iodine is required for disinfection of clean surfaces. Iodophors have a corrosive action on metals and thorough rinsing with potable water is required after a suitable contact time. They are readily inactivated by organic matter. Iodophors give a visual indication of their effectiveness since they lose their colour when the residual iodine has dropped to ineffective levels. They are not toxic when used in normal concentrations but may add to the total dietary iodine load. They have little taste or smell, but may combine with substances in the food to cause taint. For these reasons they should be thoroughly rinsed away after use.

#### 3.4.1.3 Quaternary ammonium compounds

All these compounds are combined detergents and disinfectants and have good detergent characteristics. They are colourless and are relatively non-corrosive to metal and non-toxic but may have a bitter taste. They are not as effective against Gram-negative bacteria as are chlorine, chlorine-based disinfectants and iodophors. The solutions tend to adhere to surfaces and thorough rinsing is necessary. They should be used at a concentration of approximately 200 - 1000 milligrammes per litre. They are readily inactivated by magnesium and calcium compounds in hard water and are not compatible with soaps and anionic detergents.

#### 3.4.1.4 Amphoteric surfactants

This comparatively recent type of disinfectant consists of active agents with detergent as well as bactericidal properties. They are of low toxicity, relatively non-corrosive, tasteless and odourless and are efficient disinfectants when used according to the manufacturer's recommendations. They are inactivated by organic matter.

### 4. CHECKS ON EFFECTIVENESS OF PROCEDURES

4.1 Where practicable, the efficiency of cleaning and disinfection procedures should be checked by microbiological monitoring of the product and food contact surfaces after the specified procedures have been completed. Similar regular microbiological monitoring of the product at all stages of production will also give information on the effectiveness of cleaning and disinfection procedures.

4.2 When sampling for microbiological monitoring of equipment and food contact surfaces the use of a quenching (neutralizing) agent is required to eliminate any residual disinfectant.

PROPOSED DRAFT CODE OF HYGIENIC PRACTICE FOR PEANUTS (GROUND NUTS)  
(Retained at Step 6)

SECTION I - SCOPE

1.1 This Code of Hygienic Practice applies to peanuts, also known as ground nuts, monkey nuts or earth nuts (*Arachis hypogaea* L.).

It contains the minimum requirements of hygiene for farm handling, transportation, storage, in-shell operations and commercial shelling. It covers all types and forms of raw, dried peanuts in-shell and shelled.

SECTION II - DEFINITIONS

2.1 "Blows" (pops) means in-shell nuts which are unusually light-weight due to extensive damage from physiological, mould, insect, or other causes and which can be removed, for example, by an air-separation process.

2.2 "Curing" means drying of in-shell peanuts to a safe moisture level.

2.3 "Farmer's stock peanuts" means in-shell peanuts as they come from the farm, after separation from the vines by hand and/or mechanical means.

2.4 "Safe (water activity) moisture level" means a water activity of in-shell and shelled peanuts that will prevent growth of microorganisms normal to the nut harvesting, processing and storage environment. Water activity ( $a_w$ ) is a measure of free moisture in a product and is the water vapour pressure of the substance divided by the vapour pressure of pure water at the same temperature. An  $a_w$  exceeding 0.70 at 25°C (77°F) is unsafe.

SECTION III - HYGIENE REQUIREMENTS IN PRODUCTION/HARVESTING AREAS

3.1 Environmental Hygiene in Areas from which Raw Materials are derived

3.1.1 Unsuitable growing or harvesting areas

Food should not be grown or harvested where the presence of potentially harmful substances would lead to an unacceptable level of such substances in the food.

3.1.2 Protection from contamination by wastes

Adequate precautions should be taken to ensure that human and animal wastes are disposed of in such a manner as not to constitute a public health or hygiene hazard, and extreme care should be taken to protect the products from contamination with these wastes. Vine and peanut waste should not be permitted to accumulate in such a manner as to promote mould growth or to attract rodents or insects.

3.1.3 Irrigation control

Food should not be grown or produced in areas where the water used for irrigation might constitute a health hazard to the consumer through the food.

3.1.4 Pest and disease control

Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health, particularly those which may arise from residues in the food. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

3.2 Harvesting and Production

3.2.1 Curing. After being dug, pods should be exposed for maximum rate of drying. This may be accomplished by turning the vines to leave the pods uppermost where they are away from the ground and exposed to sun and wind. Curing should be completed as rapidly as possible to a safe moisture level so as to prevent growth of microorganisms, particularly moulds that produce aflatoxins. When curing by supplemental heat excessive heat should be

avoided since this impairs the general quality of the nuts, e.g. splitting of kernels after shelling. Close checks of moisture content or water activity of lots of farmer's stock peanuts should be maintained.

### 3.2.2 Techniques

Methods and procedures associated with harvesting and production should be hygienic and such as not to constitute a potential health hazard or result in contamination of the product.

### 3.2.3 Equipment and containers

Equipment and containers used for harvesting and production should be so constructed and maintained as not to constitute a hazard to health. Containers which are re-used should be of such material and construction as will permit easy and thorough cleaning. They should be cleaned and maintained clean and, where necessary, disinfected. Containers previously used for toxic materials should not subsequently be used for holding foods or food ingredients.

### 3.2.4 Removal of obviously unfit materials

Damaged or imperfect peanuts and lots that contain any obvious contamination with human or animal wastes, insect infestation, decomposition, broken shells, embedded dirt, blows, or other defects to an extent which would render them unfit for human consumption, should be segregated during harvesting and production to the fullest extent practicable. Such segregated unfit peanuts should be disposed of in such a place and in such a manner as to avoid contamination of sound nuts, water supplies, or other crops.

### 3.2.5 Protection of peanuts from contamination

Suitable precautions should be taken to protect the nuts from contamination by domestic animals, rodents, birds, insects, mites and other arthropods, or other biological agents, or with chemical or other objectionable substances during handling and storage. The nuts should be moved to suitable storage, or to the processing area for immediate processing, as soon as possible after harvesting or drying. Where nuts are likely to become infested with insects, mites (and other arthropods) during or after harvesting, suitable treatment such as fumigation or application of a pesticide spray should be carried out as a preventive measure. Nuts held for processing should be stored in covered containers, buildings, or under covering (e.g. pyramid stacking). Fumigation or spray methods and chemicals used should be approved by the official agency having jurisdiction. High humidities which are conducive to proliferation of mould and elaboration of mycotoxins should be avoided in storage areas in order to maintain peanuts at a safe moisture level (see 7.8.2).

## 3.3 Transportation

### 3.3.1 Conveyances

Conveyances for transporting the harvested crop from the place of harvest or storage should be adequate for the purpose intended and should be of such material and construction as will permit thorough cleaning and treatment with pesticides and should be so cleaned and maintained as not to constitute a source of contamination to the product. In addition, bulk transport such as ship or rail car should be well ventilated with dry air to remove moisture resulting from respiration of the peanuts and to prevent moisture condensation as the vehicle moves from warm to cool regions or from day to night.

### 3.3.2 Handling procedures

All handling procedures should be such as will prevent the product from becoming contaminated. Extreme care should be taken in transporting peanuts with an unsafe moisture level to prevent spoilage or deterioration. Special equipment - such as refrigerated transport - should be used if the nature of the product or distances involved indicate the need.

## 3.4 Shelling Plant

### 3.4.1 Purchasing of farmer's stock

Most of the damage may have already been done to the peanuts during growing, harvesting, curing, handling and storage. A buyer for a shelling plant, whether located at the plant or at an outlying commission buying point, should monitor the quality of peanut

lots offered to him, and with the cooperative extension service assist suppliers in eliminating improper practices. Buyers should encourage suppliers of farmer's stock peanuts to follow good production practices as described herein.

#### 3.4.2 Receiving and inspection

Farmer's stock peanuts received at the shelling plant should be inspected on arrival. It is advisable to know the origin and history of each lot of peanuts. The transport vehicle should be examined for cleanliness, insect infestation, dampness or unusual odours. If the vehicle is not fully enclosed, it should have available a covering such as a tarpaulin to keep out the rain or other forms of water. The general appearance of the peanuts should be observed during the process of unloading. If the peanuts are wet to the touch, insect infested, insect damaged, or contain an unusual amount of dirt, debris or other foreign material, they should not be co-mingled with known good peanuts in a bulk warehouse. The vehicle should be set aside until a decision is made for its disposition. If possible, remove a sample from each lot, separate the "loose shelled" kernels and shell the remainder for peanut grade observation before an acceptance decision is made. Examine all "loose shelled", damaged and under-sized kernels for possible presence of mould. If no external mould is seen, split the kernels to disclose possible hidden mould growth. Excessive mould or presence of mould resembling A. flavus warrants a chemical test for aflatoxin or rejection of the lot.

If the peanuts are to be stored in a bulk warehouse or storage bin, the warehouse or bin should be thoroughly cleaned of all debris and extraneous material and fumigated or otherwise treated with a pesticide before use. Peanuts should not be stored in a warehouse containing any openings which may permit entrance of rodents or birds or which may have leaks in the roof or walls that can allow the rain to enter. The warehouse should be checked frequently for leaks or infestation, both before and after filling. To prevent condensation drippage, warehouses should be ventilated as, for example, by screening around tops or eaves.

#### 3.4.3 Unloading equipment and area

Unloading equipment such as an unloading hopper, conveyor belt, bucket elevator, and dirt removing equipment should be so designed as to prevent accumulation of debris. Only areas which can be easily inspected and cleaned should be used for processing peanuts. A programme of periodic cleaning together with preventive pest control measures should be carried out. Peanuts should be handled so as to avoid cracking or tearing of hulls which may permit damage to the kernels.

#### 3.4.4 Precleaning

The maximum possible amount of dust and dirt should be removed from the farmer's stock peanuts before they enter the shelling plant. Sand screens and aspirators will take out much of the dust and dirt and improve the overall sanitation of the shelling plant. The maximum possible amount of foreign material, loose shell, loose kernels, and blows should be removed. Foreign material not removed by the cleaner can cause mechanical problems by clogging the sheller, as well as by requiring more picking and sorting of the shelled peanuts. Removal of loose kernels and blows before shelling will improve the quality of the peanuts as well as the sheller and plant performance.

#### 3.4.5 Shelling and sizing

All foreign material should be removed from the shelled peanuts (using stoners, magnets, sorters, etc.). The shelled peanuts should be continuously inspected to determine whether the plant equipment is performing properly and the peanuts are free of foreign material, damage, and contamination. Any equipment adjustments indicated by the inspection should be made promptly.

Once the shelled peanuts are size graded, additional stoning should be done in order to remove small light stones, dirt balls and other foreign material which could not be removed in the farm stock stoners. Special care should be taken to avoid over-loading size grading equipment.

#### 3.4.6 Sorting

Sorting is the final step for removing debris and defective kernels. It can be done by hand picking or photo-electric sorting machines or a combination of both. Sorting belts should be well lighted, loaded no more than one layer deep, and operated at a speed and with the number of sorters to assure removal of foreign material and defective kernels. Photo-electric sorting machines should be adjusted as often as

practicable against standards selected to assure removal of foreign material and defective kernels. Adjustment should be checked frequently and regularly. One contaminated kernel may contain sufficient aflatoxin to endanger as many as 10,000 co-mingled kernels. Foreign material and defective kernels (mouldy, discoloured, rancid, decayed, shrivelled, insect or otherwise damaged) should be bagged separately and tagged as unsuitable for human or animal consumption. Bags of defective peanuts should be removed as soon as practicable from the processing room. Materials which carry the danger of contamination by mycotoxin, or which are contaminated, should be detoxified or destroyed.

#### 3.4.7 Cleaning of special areas

3.4.7.1 Boots or wells of elevators accumulate peanuts and peanut material. Accumulated material should be removed and the boots (wells) cleaned and sprayed and/or fumigated regularly to prevent insect and rodent infestation. Fumigation or spray methods and chemicals used should be approved by the official agency having jurisdiction.

3.4.7.2 Canvas conveyor belts will accumulate product between belt and conveyor pan. Pulleys can accumulate crushed material. Undersides of moulding on conveyors can accumulate particles of peanuts. These areas should be cleaned and sprayed and/or fumigated on a regular basis to prevent insect and rodent infestation.

3.4.7.3 Storage and surge hoppers should be cleaned and sprayed between runs.

3.4.7.4 Every piece of machinery whether open or enclosed should be cleaned of lodged material on a regular schedule.

3.4.7.5 The area immediately surrounding the plant should be kept clean of all debris that might attract insects, rodents or birds, and subjected to an adequate pest control programme.

3.4.7.6 Dry clean-up procedures should be utilized to avoid wet spots in which micro-organisms can propagate and contaminate contacted peanut kernels. Even though water may not be used directly on equipment, spray and elevated humidity from continuous use can increase moisture in organic matter trapped in crevices in equipment, such as conveyors, to the point where microorganisms can proliferate.

### SECTION IV - ESTABLISHMENT: DESIGN AND FACILITIES

#### 4.1 Location

Establishments should be located in areas which are free from objectionable odours, smoke, dust or other contaminants and are not subject to flooding.

#### 4.2 Roadways and Areas used by Wheeled Traffic

Such roadways and areas serving the establishment which are within its boundaries or in its immediate vicinity should have a hard paved surface suitable for wheeled traffic. There should be adequate drainage and provision should be made to allow for cleaning.

#### 4.3 Buildings and Facilities

4.3.1 Buildings and facilities should be of sound construction and maintained in good repair.

4.3.2 Adequate working space should be provided to allow for satisfactory performance of all operations.

4.3.3 The design should be such as to permit easy and adequate cleaning and to facilitate proper supervision of food hygiene.

4.3.4 The buildings and facilities should be designed to prevent the entrance and harbouring of pests and the entry of environmental contaminants such as smoke, dust, etc.

4.3.5 Buildings and facilities should be designed to provide separation, by partition, location or other effective means, between those operations which may cause cross-contamination.

4.3.6 Buildings and facilities should be designed to facilitate hygienic operations by means of a regulated flow in the process from the arrival of the raw material at the premises to the finished product, and should provide for appropriate temperature conditions for the process and the product.

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4.3.7 In food handling areas:

- Floors, where appropriate, should be of water-proof, non-absorbent, washable, non-slip and non-toxic materials, without crevices, and should be easy to clean and disinfect. Where appropriate, floors should slope sufficiently for liquids to drain to trapped outlets.
- Walls, where appropriate, should be of water-proof, non-absorbent, washable and non-toxic materials and should be light coloured. Up to a height appropriate for the operation they should be smooth and without crevices, and should be easy to clean and disinfect. Where appropriate, angles between walls, between walls and floors and between walls and ceilings should be sealed and coved to facilitate cleaning.
- Ceilings should be so designed, constructed and finished as to prevent the accumulation of dirt and minimize condensation, mould development and flaking, and should be easy to clean.
- Windows and other openings should be so constructed as to avoid accumulation of dirt and those which open should be fitted with screens. Screens should be easily movable for cleaning and kept in good repair. Internal window sills, if present, should be sloped to prevent use as shelves.
- Doors should have smooth, non-absorbent surfaces and, where appropriate, be self-closing and close fitting.
- Stairs, lift cages and auxiliary structures such as platforms, ladders, chutes, should be so situated and constructed as not to cause contamination to food. Chutes should be constructed with inspection and cleaning hatches.

4.3.8 In food handling areas all overhead structures and fittings should be installed in such a manner as to avoid contamination directly or indirectly of food and raw materials by condensation and drip, and should not hamper cleaning operations. They should be insulated where appropriate and be so designed and finished as to prevent the accumulation of dirt and to minimize condensation, mould development and flaking. They should be easy to clean.

4.3.9 Living quarters, toilets and areas where animals are kept should be completely separated from and should not open directly on to food handling areas.

4.3.10 Where appropriate, establishments should be so designed that access can be controlled.

4.3.11 The use of material which cannot be adequately cleaned and disinfected, such as wood, should be avoided unless its use would clearly not be a source of contamination.

4.4 Sanitary Facilities

4.4.1 Water supply

4.4.1.1 An ample supply of potable water under adequate pressure and of suitable temperature should be available with adequate facilities for its storage, where necessary, and distribution, and with adequate protection against contamination. The standards of potability should not be less than those contained in the latest edition of "International Standards of Drinking Water" (WHO).

4.4.1.2 Non-potable water used for steam production, refrigeration, fire control and other similar purposes not connected with food should be carried in completely separate lines, identifiable preferably by colour, and with no cross-connection with or back-siphonage into the system carrying potable water.

4.4.2 Effluent and waste disposal

Establishments should have an efficient effluent and waste disposal system which should at all times be maintained in good order and repair. All effluent lines (including sewer systems) should be large enough to carry peak loads and should be so constructed as to avoid contamination of potable water supplies.

4.4.3 Changing facilities and toilets

Adequate, suitable, and conveniently located changing facilities and toilets should be provided in all establishments. Toilets should be so designed as to ensure hygienic removal of waste matter. These areas should be well lit, ventilated and where appropriate heated and should not open directly on to food handling areas. Hand washing facilities with warm or hot and cold water, a suitable hand-cleaning preparation, and with suitable hygienic means of drying hands, should be provided adjacent to toilets. Where hot and



cold water are available mixing taps should be provided. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided near to each washing facility. Taps of a non-hand operable type are desirable. Notices should be posted directing personnel to wash their hands after using the toilet.

#### 4.4.4 Hand washing facilities in processing areas

Adequate and conveniently located facilities for hand washing and drying should be provided wherever the process demands. Where appropriate, facilities for hand disinfection should also be provided. Warm or hot and cold water and a suitable hand-cleaning preparation should be provided. Where hot and cold water are available mixing taps should be provided. There should be suitable hygienic means of drying hands. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided adjacent to each washing facility. Taps of a non-hand operable type are desirable. The facilities should be furnished with properly trapped waste pipes leading to drains.

#### 4.4.5 Disinfection facilities

Where appropriate adequate facilities for cleaning and disinfection of working implements and equipment should be provided. These facilities should be constructed of corrosion resistant materials, capable of being easily cleaned, and should be fitted with suitable means of supplying hot and cold water in sufficient quantities.

#### 4.4.6 Lighting

Adequate natural or artificial lighting should be provided throughout the establishment. Where appropriate, the lighting should not alter colours and the intensity should not be less than:

540 lux (50 foot candles) at all inspection points

220 lux (20 foot candles) in work rooms

110 lux (10 foot candles) in other areas.

Light bulbs and fixtures suspended over food materials in any stage of production should be of a safety type and protected to prevent contamination of food in case of breakage.

#### 4.4.7 Ventilation

Adequate ventilation should be provided to prevent excessive heat, steam condensation and dust and to remove contaminated air. The direction of the air flow should never be from a dirty area to a clean area. Ventilation openings should be provided with a screen or other protecting enclosure of non-corrodible material. Screens should be easily removable for cleaning.

#### 4.4.8 Facilities for storage of waste and inedible material

Facilities should be provided for the storage of waste and inedible material prior to removal from the establishment. These facilities should be designed to prevent access to waste or inedible material by pests and to avoid contamination of food, potable water, equipment, buildings or roadways on the premises.

### 4.5 Equipment and Utensils

#### 4.5.1 Materials

All equipment and utensils used in food handling areas and which may contact food should be made of material which does not transmit toxic substances, odour or taste, is non-absorbent, is resistant to corrosion and is capable of withstanding repeated cleaning and disinfection. Surfaces should be smooth and free from pits and crevices. The use of wood and other materials which cannot be adequately cleaned and disinfected should be avoided except when their use would clearly not be a source of contamination. The use of different materials in such a way that contact corrosion can occur should be avoided.

#### 4.5.2 Sanitary design, construction and installation

4.5.2.1 All equipment and utensils should be so designed and constructed as to prevent hygienic hazards and permit easy and thorough cleaning and disinfection and, where practicable, be visible for inspection. Stationary equipment should be installed in such a manner as to permit easy access and thorough cleaning.

4.5.2.2 Containers for inedible material and waste should be leak-proof, constructed of metal or other suitable impervious material which should be easy to clean or disposable and able to be closed securely.

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4.5.2.3 All refrigerated spaces should be equipped with temperature measurement or recording devices.

4.5.3 Equipment identification

Equipment and utensils used for inedible materials or waste should be so identified and should not be used for edible products.

SECTION V - ESTABLISHMENT: HYGIENE REQUIREMENTS

5.1 Maintenance

The buildings, equipment, utensils and all other physical facilities of the establishment, including drains, should be maintained in good repair and in an orderly condition. As far as practicable, rooms should be kept free from steam, vapour and surplus water.

5.2 Cleaning and Disinfection

5.2.1 Cleaning and disinfection should meet the requirements of this code. For further information on cleaning and disinfection procedures see Annex I, General Principles of Food Hygiene.

5.2.2 To prevent contamination of food, all equipment and utensils should be cleaned as frequently as necessary and disinfected whenever circumstances demand.

5.2.3 Adequate precautions should be taken to prevent food from being contaminated during cleaning or disinfection of rooms, equipment or utensils by water and detergents or by disinfectants and their solutions. Detergents and disinfectants should be suitable for the purpose intended and should be acceptable to the official agency having jurisdiction. Any residues of these agents on a surface which may come in contact with food should be removed by thorough rinsing with potable water before the area or equipment is again used for handling food.

5.2.4 Either immediately after cessation of work for the day or at such other times as may be appropriate, floors, including drains, auxiliary structures and walls of food handling areas should be thoroughly cleaned.

5.2.5 Changing facilities and toilets should be kept clean at all times.

5.2.6 Roadways and yards in the immediate vicinity of and serving the premises should be kept clean.

5.3 Hygiene Control Programme

A permanent cleaning and disinfection schedule should be drawn up for each establishment to ensure that all areas are appropriately cleaned and that critical areas, equipment and material are designated for special attention. A single individual who should preferably be a permanent member of the staff of the establishment and whose duties should be independent of production, should be appointed to be responsible for the cleanliness of the establishment. He should have a thorough understanding of the significance of contamination and the hazards involved. All cleaning personnel should be well-trained in cleaning techniques.

5.4 By-Products

By-products should be stored in such a manner as to avoid contamination of food. They should be removed from the working areas as often as necessary and at least daily.

5.5 Storage and Disposal of Waste

Waste material should be handled in such a manner as to avoid contamination of food or potable water. Care should be taken to prevent access to waste by pests. Waste should be removed from the food handling and other working areas as often as necessary and at least daily. Immediately after disposal of the waste, receptacles used for storage and any equipment which has come into contact with the waste should be cleaned and disinfected. The waste storage area should also be cleaned and disinfected.

5.6 Exclusion of Domestic Animals

Animals that are uncontrolled or that could be a hazard to health should be excluded from establishments.

5.7 Pest Control

5.7.1 There should be an effective and continuous programme for the control of pests. Establishments and surrounding areas should be regularly examined for evidence of infestation.

5.7.2 Should pests gain entrance to the establishment, eradication measures should be instituted. Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health resulting from the use of these agents, including those which may arise from residues retained in the product. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

5.7.3 Pesticides should only be used if other precautionary measures cannot be used effectively. Before pesticides are applied, care should be taken to safeguard all food, equipment and utensils from contamination. After application, contaminated equipment and utensils should be thoroughly cleaned to remove residues prior to being used again.

#### 5.8 Storage of Hazardous Substances

5.8.1 Pesticides or other substances which may represent a hazard to health should be suitably labelled with a warning about their toxicity and use. They should be stored in locked rooms or cabinets used only for that purpose and dispensed and handled only by authorized and properly trained personnel or by persons under strict supervision of trained personnel. Extreme care should be taken to avoid contaminating food.

5.8.2 Except when necessary for hygienic or processing purposes, no substance which could contaminate food should be used or stored in food handling areas.

#### 5.9 Personal Effects and Clothing

Personal effects and clothing should not be deposited in food handling areas.

### SECTION VI - PERSONNEL HYGIENE AND HEALTH REQUIREMENTS

#### 6.1 Hygiene Training

Managers of establishments should arrange for adequate and continuing training of every food handler in hygienic handling of food and in personal hygiene so that they understand the precautions necessary to prevent contamination of food. Instruction should include relevant parts of this Code.

#### 6.2 Medical Examination

Persons who come in contact with food in the course of their work should have a medical examination prior to their employment if the official agency having jurisdiction, acting on medical advice, considers that this is necessary, either because of epidemiological considerations, the nature of the food prepared in a particular establishment or the medical history of the prospective food handler. Medical examination of a food handler should be carried out at other times when clinically or epidemiologically indicated.

#### 6.3 Communicable Diseases

The management should take care to ensure that no person, while known or suspected to be suffering from, or to be a carrier of a disease likely to be transmitted through food or while afflicted with infected wounds, skin infections, sores or with diarrhoea, is permitted to work in any food handling area in any capacity in which there is any likelihood of such a person directly or indirectly contaminating food with pathogenic microorganisms. Any person so affected should immediately report to the management that he is ill.

#### 6.4 Injuries

Any person who has a cut or wound should not continue to handle food or food contact surfaces until the injury is completely protected by a waterproof covering which is firmly secured, and which is conspicuous in colour. Adequate first-aid facilities should be provided for this purpose.

#### 6.5 Washing of Hands

Every person engaged in a food handling area should wash his hands frequently and thoroughly with a suitable hand cleaning preparation under running warm, potable water while on duty. Hands should always be washed before commencing work, immediately after using the toilet, after handling contaminated material and whenever else necessary. After handling any material which might be capable of transmitting disease, hands should be washed and disinfected immediately. Notices requiring hand-washing should be displayed. There should be adequate supervision to ensure compliance with this requirement.

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6.6 Personal Cleanliness

Every person engaged in a food handling area should maintain a high degree of personal cleanliness while on duty, and should at all times while so engaged wear suitable protective clothing including head covering and footwear, all of which articles should be cleanable unless designed to be disposed of and should be maintained in a clean condition consistent with the nature of the work in which the person is engaged. Aprons and similar items should not be washed on the floor. During periods where food is manipulated by hand, any jewellery that cannot be adequately disinfected should be removed from the hands. Personnel should not wear any insecure jewellery when engaged in food handling.

6.7 Personal Behaviour

Any behaviour which could result in contamination of food, such as eating, use of tobacco, chewing (e.g. gum, sticks, betel nuts, etc.) or unhygienic practices such as spitting, should be prohibited in food handling areas.

6.8 Gloves

Gloves, if used in the handling of food products, should be maintained in a sound, clean and sanitary condition. The wearing of gloves does not exempt the operator from having thoroughly washed hands.

6.9 Visitors

Precautions should be taken to prevent visitors to food handling areas from contaminating food. These may include the use of protective clothing. Visitors should observe the provisions recommended in paragraphs 5.9, 6.3, 6.4 and 6.7.

6.10 Supervision

Responsibility for ensuring compliance by all personnel with all requirements of paragraphs 6.1 - 6.9 inclusive should be specifically allocated to competent supervisory personnel.

SECTION VII - ESTABLISHMENT: HYGIENIC PROCESSING REQUIREMENTS

7.1 Raw Material Requirements

7.1.1 Acceptance criteria

Peanuts should not be accepted by the plant if known to contain decomposed, toxic, or extraneous substances which will not be reduced to acceptable levels by normal plant procedures, sorting or preparation. Particular care should be taken to avoid contaminating in-shell peanuts or shelled nut meats with animal or human faecal material; nuts suspected of being contaminated should be rejected for human consumption. Special precautions must be taken to reject nuts showing signs of insect damage or mould growth because of the danger of their containing mycotoxins such as aflatoxins. Aflatoxin test results should be known before allowing lots of raw peanuts to be processed. Any lot of raw peanuts with an unacceptable level of aflatoxins, which cannot be reduced to permitted levels by the available sorting equipment, should not be accepted.

Progressively more accurate decisions on accepting or rejecting may be made according to the following chart:

- (i) Excessive mould growth - no further investigation = rejection
- (ii) Mould growth - presence of mould resembling A. flavus - microscopic test not available - no further investigation = rejection
- (iii) Mould growth - presence of mould resembling A. flavus - screening test indicating that aflatoxin might be present - chemical test not available - no further investigation = rejection
- (iv) Mould growth - presence of mould resembling A. flavus - screening test indicating that aflatoxin might be present - chemical test for aflatoxin = rejection if test is positive.

7.1.2 Storage

Raw materials stored on the plant premises should be maintained under conditions that will protect against contamination and infestation and minimize deterioration. Peanuts not scheduled for immediate use should be stored under conditions that prevent infestation and mould growth. See Section 3.4.2.

The warehouse should be of sound construction, in good repair and built and equipped so that it will provide suitable storage and adequate protection for peanuts. All breaks or openings in the walls, floors, or roof shall have been repaired. Any breaks or openings around doors, windows and eaves shall have been repaired or screened. Screens should be used only in those areas of the building where moisture entry from precipitation can not occur. The building should have sufficient ventilation to prevent accumulation of moisture where it can condense and wet the peanuts. Provision should be made in existing storages or at the design stage in new storages for gas tightness to permit in situ fumigation of peanuts.

Areas with new concrete floors or walls should not be used for storage until it is absolutely certain that the new concrete is well-cured and free of excess water. For the first year it is safest to use an approved plastic cover spread over the entire new concrete floor as a moisture barrier prior to use for peanuts. However, other means of protecting the peanuts against moisture from "sweating" of concrete can be used, such as stacking of containers on pallets. The plastic can be removed when the warehouse is emptied. This system will protect against moulding of the peanuts due to sweating of new concrete.

Products which affect the storage life, quality or flavour of peanuts should not be stored in the same room or compartment as peanuts. For example, such items as fertilizer, gasoline or lubricating oils should not be stored with peanuts, and some fruits or vegetables contribute objectionable odours or flavours.

#### 7.2. Inspection and sorting

Prior to introduction into the processing line, or at a convenient point within it, raw materials should be inspected, sorted or culled as required to remove unfit materials. See 3.4.2 and 3.4.6.

Experience has shown that aflatoxin is most frequently associated with mouldy, discoloured, shrivelled, insect damaged or otherwise damaged peanuts. Mould contaminated peanuts may exhibit some of the following characteristics:

- (a) Darker skin colouring before and/or after roasting.
- (b) Darker flesh (after blanching) before and/or after roasting.
- (c) Resistance to splitting and/or blanching.

To remove mould-contaminated nuts effectively, sorting should be performed before and after blanching and roasting. Where splitting is part of the processing operation, nuts that resist splitting should be removed. The effectiveness of sorting techniques should be checked by regular aflatoxin analyses of the sorted peanut stream or of the finished product, or both. This should be done frequently enough to give assurance that the product is completely acceptable.

Rejected peanuts from the sorting procedure (pickouts) should be destroyed or segregated from edible products. If they are to be used for crushing, they should be separately bagged and tagged as unsuitable for direct human or animal consumption in their present state.

#### 7.3. Prevention of Cross-Contamination

7.3.1 Effective measures should be taken to prevent contamination of food material by direct or indirect contact with material at an earlier stage of the process.

7.3.2 Persons handling raw materials or semi-processed products capable of contaminating the end product should not come into contact with any end product unless and until they discard all protective clothing worn by them during the handling of raw materials or semi-processed products which have come into direct contact with or have been soiled by raw material or semi-processed products and have changed into clean protective clothing.

7.3.3 If there is a likelihood of contamination, hands should be washed thoroughly between handling products at different stages of processing.

7.3.4 All equipment which has been in contact with raw materials or contaminated material should be thoroughly cleaned and disinfected prior to being used for contact with end products.

#### 7.4. Use of Water

7.4.1 As a general principle only potable water as defined in the latest edition of "International Standards of Drinking Water" (WHO) should be used in food handling.

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7.4.2 Non-potable water may be used with the acceptance of the official agency having jurisdiction for steam production, refrigeration, fire control and other similar purposes not connected with food. However, non-potable water may, with specific acceptance by the official agency having jurisdiction, be used in certain food handling areas provided this does not constitute a hazard to health.

7.4.3 Water re-circulated for re-use within an establishment should be treated and maintained in a condition so that no health hazard can result from its use. The treatment process should be kept under constant surveillance. Alternatively, re-circulated water which has received no further treatment may be used in conditions where its use would not constitute a health hazard and will not contaminate either the raw material or the end product. Re-circulated water should have a separate distribution system which can be readily identified. The acceptance of the official agency having jurisdiction should be required for any treatment process and for the use of re-circulated water in any food process.

7.5 Processing

7.5.1 Processing should be supervised by technically competent personnel.

7.5.2 All steps in the production process, including packaging, should be performed without unnecessary delay and under conditions which will prevent the possibility of contamination, deterioration, or the development of pathogenic and spoilage micro-organisms.

7.5.3 Rough treatment of containers should be avoided to prevent the possibility of contamination of the processed product.

7.5.4 Methods of preservation and necessary controls should be such as to protect against contamination or development of a public health hazard and against deterioration within the limits of good commercial practice.

7.6 Packaging

7.6.1 All packaging material should be stored in a clean and sanitary manner. The material should be appropriate for the product to be packed and for the expected conditions of storage and should not transmit to the product objectionable substances beyond the limits acceptable to the official agency having jurisdiction. The packaging material should be sound and should provide appropriate protection from contamination.

7.6.2 Product containers should not have been used for any purpose which may lead to contamination of the product. Where practicable containers should be inspected immediately before use to ensure that they are in a satisfactory condition and where necessary cleaned and/or disinfected; when washed they should be well drained before filling. Only packaging material required for immediate use should be kept in the packing or filling area.

7.6.3 Packing should be done under conditions that preclude the introduction of contamination into the product.

7.6.4 Lot Identification

Each container shall be permanently marked in code or in clear to identify the producing factory and the lot. A lot is a quantity of food produced under identical conditions, all packages of which should bear a lot number that identifies the production during a particular time interval, and usually from a particular "line" or other critical processing unit.

7.6.5 Processing and Production Records

Permanent, legible and dated records of pertinent processing and production details should be kept concerning each lot. These records should be retained for a period that exceeds the shelf life of the product, but unless a specific need exists they need not be kept for more than two years. Records should also be kept of the initial distribution by lot.

7.7 Preservation of product

In-shell nuts or shelled nuts (nut meats) should be stored at a moisture level low enough so that the product can be held under normal storage conditions without development of mould or significant deterioration by oxidative or enzymatic changes. Finished roasted products may be (a) treated with antioxidants at levels approved by the Codex Committee on Food Additives as referenced in the Commodity Standard; and (b) heat processed and/or packed in gas tight containers under nitrogen or vacuum, to protect quality and retard possible mould growth.

## 7.8 Storage and transport of end-product

Peanuts should be stored and transported under such conditions as will maintain the integrity of the container and the product within it. Carriers should be clean, dry, weatherproof, free from infestation and sealed to prevent water, rodents or insects from reaching the peanuts. Peanuts should be loaded and unloaded in a manner that protects from damage or water. Refrigerated vehicles are recommended for transport when climatic conditions indicate such a need. Extreme care should be taken to prevent condensation when unloading peanuts from cold storage or from a refrigerated vehicle. In warm, humid weather, the peanuts should be allowed to reach ambient temperature before exposure to external conditions. This tempering may require 1-3 days. Peanuts that have been spilled are vulnerable to contamination and should not be used for edible products.

7.8.1 All products should be stored in clean, dry buildings, protected from insects, mites and other arthropods, rodents, birds, or other vermin, chemical or microbiological contaminants, debris and dust.

### 7.8.2 Controlled storage conditions

#### 7.8.2.1 Control of mould growth

An environment with a relative humidity between 55% and 65% should be maintained to protect quality and prevent mould growth. No peanuts should be stored closer than 0.5 metres (1½ feet) from any outside wall. An active programme should be maintained to detect and control hazards from damp pallets, damp floors and walls, overhead moisture during storage, condensation, wet unloading and loading out conditions - all conducive to moisture pick-up and mould. Growth of toxigenic moulds may be prevented by packing nut products that have been dried to a "safe water activity" or by storing at a temperature sufficiently low to prevent mould growth. Exposed nut products in storage may be maintained at or dried to a "safe moisture activity" by control of the relative humidity of the circulating air. Those who use refrigerated storage should be aware that the water activity of shelled nuts increases with increased temperature; this fact should be taken into account when changing storage temperatures.

#### 7.8.2.2 Control of infestation by insects, mites and other arthropods

Peanuts should be stored in such a manner that infestation can be controlled by such methods as anaerobic or refrigerated storage or fumigation prior to storage.

Stored peanuts should be inspected regularly and, if infested, fumigated by appropriate methods. If necessary they can be removed for fumigation. In this case the storage areas should be separately cleaned and disinfested.

## 7.9 Sampling and Laboratory Control Procedures

7.9.1 In addition to any control by the official agency having jurisdiction, it is desirable that each plant should have its own or contracted laboratory control of the hygienic quality of the nut products processed and of the pest control procedures. The amount and type of such control will vary with the different nut products as well as the needs of management. Such control should provide for rejection of all nuts that are unfit for human consumption and monitoring of the quality of the finished products.

7.9.2 Where appropriate, representative samples of the production should be taken to assess the safety and quality of the product.

7.9.3 Laboratory procedures used should preferably follow recognized or standard methods in order that the results may be readily interpreted.

## SECTION VIII - END-PRODUCT SPECIFICATIONS

8. Standard methods should be used for sampling, analysis and other determinations to meet the following specifications:

8.1 To the extent possible in good manufacturing practice the products should be free from objectionable matter and should not contain any substance in amounts which may represent a hazard to health.

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- 8.2 When tested by appropriate methods of sampling and examination, the products:
- (a) should be free from pathogenic microorganisms in amounts which may represent a hazard to health; and
  - (b) should not contain any substances originating from microorganisms, particularly mycotoxins, in amounts which exceed the tolerances or criteria established by the official agency having jurisdiction.
- 8.3 The products should comply with the provisions for food additives and contaminants laid down in Codex Commodity Standards and with maximum levels for pesticide residues recommended by the Codex Alimentarius Commission.

APPENDIX IV                    DRAFT CODE OF HYGIENIC PRACTICE FOR LOW-ACID  
AND ACIDIFIED LOW-ACID CANNED FOODS

(Returned to Step 6)

To be issued separately.

(See para 69 and footnote 1 to page 8 of this Report.)



REVISED DRAFT

CODE OF HYGIENIC PRACTICE FOR FOODS FOR INFANTS AND CHILDREN

(UP TO THREE YEARS)

(Advanced to Step 8)

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SECTION II - DEFINITIONS

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- 3.1.4 Pest and disease control
- 3.2 Harvesting and production
- 3.2.1 Techniques
- 3.2.2 Equipment and containers
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    - 4.4.1.1 Potable water
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- 5.7 Pest Control
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CODE OF HYGIENIC PRACTICE FOR FOODS FOR INFANTS AND CHILDREN  
(UP TO THREE YEARS)  
(Advanced to Step 8)

Sideline positions indicate material which is particular to this Code of Hygienic Practice and therefore does not appear in the "General Principles of Food Hygiene"

SECTION I - SCOPE

1.1 This Code of Hygienic Practice applies to all prepackaged foods produced, represented, or purported to be for the special use of infants and/or children.

It contains the minimum hygienic requirements for the handling (including production, preparation, processing, packaging, storage, transport, distribution and sale) of such food to ensure a safe, sound and wholesome product.

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SECTION II - DEFINITIONS

2. For the purposes of this Code the following expressions have the meaning stated:

Adequate

Sufficient to accomplish the intended purpose of this code.

Children

persons from the age of more than 12 months up to the age of three years.

Cleaning

the removal of soil, food residues, dirt, grease or other objectionable matter.

Contamination

the occurrence of any objectionable matter in the product.

Disinfection

The reduction without adversely affecting the food by means of hygienically satisfactory chemical agents and/or physical methods of the number of micro-organisms to a level that will not lead to harmful contamination of food.

Edible Product

product fit for human consumption.

Establishment

any building(s) or area(s) in which food is handled after harvesting and the surroundings under the control of the same management.

Food Handling

any operation in the growing and harvesting, preparation, processing, packaging, storage, transport, distribution, and sale of food.

Food Hygiene

all measures necessary to ensure the safety, soundness and wholesomeness of food at all stages from its growth, production or manufacture until its final consumption.

Hermetically sealed containers

containers which are designed and intended to protect the contents against the entry of microorganisms during and after heat processing.

Infant

a person not more than 12 months of age

Low acid food

any food , other than alcoholic beverages, where any component has a pH value greater than 4.6 after heat processing.

Packaging Material

any containers such as cans, bottles, cartons, boxes, cases, and sacks, or wrapping and covering material such as foil, film, metal, paper, waxpaper, and cloth.

Pests

any animals capable of directly or indirectly contaminating food.

Potable Water

water fit for human consumption. Standards of potability should not be lower than those contained in the latest edition of the "International Standards for Drinking Water", World Health Organization.

Protective Clothing

special garments intended to prevent the contamination of food and used as outer wear by persons in an establishment and includes head coverings and footwear.

Unfit for human consumption

an article that would normally be edible but is inedible because of disease, decomposition or any other reason.

SECTION III - HYGIENIC REQUIREMENTS IN PRODUCTION/HARVESTING AREAS

3.1 Environmental Hygiene in areas from which raw materials are derived

3.1.1 Unsuitable growing or harvesting areas

Food should not be grown or harvested when the presence of **potentially harmful substances** would lead to an unacceptable level of such substances in the food.

3.1.2 Protection from contamination by wastes

3.1.2.1 Raw food materials should be protected from contamination by human, animal, domestic, industrial and agricultural wastes which may be present at levels likely to be a hazard to health. Adequate precautions should be taken to ensure that these wastes are not used and are not disposed of in a manner which may constitute a public health hazard through the food.

3.1.2.2 Arrangements for the disposal of domestic and industrial wastes in areas from which raw materials are derived should be acceptable to the official agency having jurisdiction.

3.1.3 Irrigation control

Food should not be grown or produced in areas where the water used for irrigation might constitute a health hazard to the consumer through the food.

3.1.4 Pest and disease control

Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health, particularly those which may arise from residues in the food. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.

3.2 Harvesting and production

3.2.1 Techniques

Methods and procedures associated with harvesting and production should be hygienic, and such as not to constitute a potential health hazard or result in contamination of the product.



3.2.2 Equipment and containers

Equipment and containers used for harvesting and production should be so constructed and maintained as not to constitute a hazard to health. Containers which are re-used should be of such material and construction as will permit easy and thorough cleaning. They should be cleaned and maintained clean and where necessary, disinfected. Containers previously used for toxic materials should not subsequently be used for holding foods or food ingredients.

3.2.3 Removal of obviously unfit materials

Raw materials which are obviously unfit for human consumption should be segregated during harvesting and production. Those which cannot be made fit by further processing should be disposed of in such a place and in such a manner as to avoid contamination of the food and/or water supplies or other food materials.

3.2.4 Protection against contamination and damage

Suitable precautions should be taken to protect the raw products from being contaminated by pests or by chemical, physical or microbiological contaminants or other objectionable substances. Precautions should be taken to avoid damage.

3.3. Storage on the place of production/harvesting

Raw materials should be stored under conditions that will protect against contamination and minimize damage and deterioration.

3.4. Transportation

3.4.1 Conveyances

Conveyances for transporting the harvested crop or raw product from the production area or place of harvest or storage should be adequate for the purpose intended, and should be of such material and construction as will permit easy and thorough cleaning. They should be cleaned and maintained clean and where necessary disinfected and disinfested.

3.4.2 Handling procedures

All handling procedures should be such as will prevent raw materials from being contaminated. Care should be taken to prevent spoilage, to protect against contamination and to minimize damage. Special equipment - such as refrigeration equipment - should be used if the nature of the product or distances involved so indicate. If ice is used in contact with the product it should be of the quality required in paragraph 4.4.1.2

SECTION IV - ESTABLISHMENT: DESIGN AND FACILITIES

4.1 Location

Establishments should be located in areas which are free from objectionable odours, smoke, dust or other contaminants and are not subject to flooding.

4.2 Roadways and Areas used by wheeled traffic

Such roadways and areas serving the establishment and which are within its boundaries or in its immediate vicinity should have a hard paved surface suitable for wheeled traffic. There should be adequate drainage, and provision should be made to allow for cleaning.

4.3 Buildings and facilities

4.3.1 Construction

Buildings and facilities should be of sound construction and maintained in good repair.

4.3.2 Working space

Adequate working space should be provided to allow for satisfactory performance of all operations.

4.3.3 Design: cleaning

The design should be such as to permit easy and adequate cleaning and to facilitate proper supervision of food hygiene.

4.3.4 Design: pests

The buildings and facilities should be designed to prevent the entrance and harbouring of pests and the entry of environmental contamination such as smoke, dust etc..

4.3.5 Design: cross contamination

Buildings and facilities should be designed to provide separation between those operations which may cause cross-contamination, by partition, location or other effective means. Separate rooms or areas should be provided for unpacking, washing or peeling of raw materials, as the case may be.

4.3.6 Design: operation flow

Buildings and facilities should be designed to facilitate hygienic operations by means of a regulated flow in the process from the arrival of the raw material at the premises to the finished product, and should provide for appropriate temperature conditions for the process and the product. Where appropriate, separate rooms or areas suitably equipped for the required purpose, should be provided for cooking or sterilization of food.

Where cooling is required, the establishments should provide sufficient capacity in cooling and freezer space to handle maximum product flow.

4.3.7 In food handling areas:

- Floors where appropriate, should be of water-proof, non-absorbent, washable, non-slip and non-toxic materials, without crevices, and should be easy to clean and disinfect. Where appropriate, floors should slope sufficiently for liquids to drain to trapped outlets.
- Walls where appropriate, should be of water-proof, non-absorbent, washable and non-toxic materials and should be light coloured. Up to a height appropriate for the operation they should be smooth and without crevices, and should be easy to clean and disinfect. Where appropriate, angles between walls, between walls and floor and between walls and ceilings should be sealed and coved to facilitate cleaning.
- Ceilings should be so designed, constructed and finished as to prevent the accumulation of dirt and minimize condensation, mould development and flaking, and should be easy to clean.
- Windows and other openings should be so constructed as to avoid accumulation of dirt and those which open should be fitted with screens. Screens should be easily movable for cleaning and kept in good repair. Internal window sills, if present, should be sloped to prevent use as shelves.
- Doors should have smooth, non-absorbent surfaces, and, where appropriate, be self-closing and close fitting.

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- Stairs, lift cages and auxiliary structures

such as platforms, ladders, chutes, should be so situated and constructed as not to cause contamination to food. Chutes should be constructed with inspection and cleaning hatches.

4.3.8 Overhead structures

In food handling areas all overhead structures and fittings should be installed in such a manner as to avoid contamination directly or indirectly of food and raw materials by condensation and drip, and should not hamper cleaning operations. They should be insulated where appropriate and be so designed and finished as to prevent the accumulation of dirt and to minimize condensation, mould development and flaking. They should be easy to clean.

4.3.9 Living quarters etc.

Living quarters, toilets and areas where animals are kept should be completely separated from and not open directly on to food handling areas.

4.3.10 Access control

If the establishment is not in its own building or buildings, the layout and control of access should be to prevent unauthorized persons from entering the establishment.

4.3.11 Materials

The use of material which cannot adequately be cleaned and disinfected such as wood, should be avoided, unless their use would clearly not be a source of contamination.

4.4 Sanitary Facilities

4.4.1 Water supply

4.4.1.1 An ample supply of potable water under adequate pressure and of suitable temperature should be available with adequate facilities for its storage where necessary and distribution, and with adequate protection against contamination and pollution. The standard or potability should not be less than those contained in the latest edition of "International Standards of Drinking Water" (WHO). An adequate supply of hot potable water not less than +80°C should be available at all times during the working hours.

4.4.1.2 Ice should be made from potable water and should be manufactured, handled and stored so as to protect it from contamination.

4.4.1.3 Steam used in direct contact with food or food contact surfaces should contain no substances which may be hazardous to health or may contaminate the food.

4.4.1.4 Non-potable water should be carried in completely separate lines, identified preferably by colour and used for steam production, refrigeration, fire control and other similar purposes not connected with food with no cross-connection with or back-siphonage into the system carrying potable water. (See also 7.3.2.)

4.4.2 Effluent and waste disposal

Establishments should have an efficient effluent and waste disposal system which should at all times be maintained in good order and repair. All effluent lines (including sewer systems) should be large enough to carry peak loads and should be so constructed as to avoid contamination of potable water supplies.

4.4.3 Changing facilities and toilets

Adequate, suitable and conveniently located changing facilities and toilets should be provided in all establishments. Toilets should be so designed as to ensure hygienic removal of waste. These areas should be well lit, ventilated and, where appropriate, heated and should not open directly into food handling areas. Hand washing facilities with warm or hot and cold water and with suitable hand-cleaning preparations with suitable hygienic means of drying hands should be provided near toilets and in such a position that the employee must pass them when returning to the processing area. Where hot and cold water is available mixing taps should be provided. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided adjacent to each washing facility. Taps should be of a non-hand operable type. Notices should be posted directing personnel to wash their hands after using the toilet.

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4.4.4 Hand washing facilities in processing areas

For the use of personnel during operations adequate and conveniently located facilities for hand washing and drying should be provided wherever the process demands, especially in all areas where unpacked edible material is handled, and, where appropriate, facilities for hand disinfection. The facilities should be full view of the production area. Warm or hot and cold water and suitable hand-cleaning preparations should be provided. Where hot and cold water is available mixing taps should be provided. There should be suitable hygienic means of drying hands. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided adjacent to each washing facility. Taps of a non-hand operable type are desirable. The facilities should be furnished with waste pipes leading to drains.

4.4.5 Disinfection facilities

In all processing areas wherever the process demands, adequate facilities for cleaning and disinfection of working implements and equipment should be provided. These facilities should be of such nature as to permit proper cleaning and disinfection. They should be constructed of corrosion-resistant materials and should be easy to clean. Facilities for cleaning and disinfection of implements should be fitted with suitable means of supplying hot and cold water in sufficient quantity. The temperature of the hot water should be not less than +82 °C at all times while food is being handled in that part of the establishment.

4.4.6 Lighting

Adequate natural or artificial lighting should be provided throughout the establishment. Where appropriate the lighting should not alter colours and the intensity should not be less than:

540 lux (50 foot candles) at all inspection points  
or points requiring other-  
wise close examination

220 lux (20 foot candles) in work rooms

110 lux (10 foot candles) in other areas

Light bulbs and fixtures suspended over food materials in any stage of production should be of a safety type and protected to prevent contamination of food in case of breakage.

4.4.7 Ventilation

Adequate ventilation should be provided to prevent excessive heat, steam, condensation and dust and to remove contaminated air. The direction of the air flow should never be from a dirty area to a clean area. Ventilation openings should be provided with a screen or another protecting enclosure of non-corrodable material. Screens should be easily removable for cleaning.

In areas where dry powdered materials are handled, special provisions such as suction hoods or room partitions should be used to prevent the spreading of dust.

4.4.8 Facilities for storage of waste and inedible material

Facilities should be provided for the storage of waste and inedible material prior to removal from the establishment. These facilities should be designed to prevent access to waste or inedible material by pests and to avoid contamination of food, potable water, equipment, buildings or roadways on the premises.

4.5 Equipment and Utensils

4.5.1 Materials

All equipment and utensils used in food handling areas and which may contact food should be made of material which does not transmit toxic substances, odour or taste, is non-absorbent, is resistant to corrosion and is capable of withstanding repeated cleaning and disinfection. Surfaces should be smooth and free from pits and crevices. The use of wood and other materials which cannot be adequately cleaned and disinfected should be avoided, except when their use would clearly not be a source of contamination.

The use of different materials in such a way that contact corrosion can occur should be avoided.

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4.5.2 Sanitary design, construction and installation

4.5.2.1 All equipment and utensils should be so designed and constructed as to prevent hygienic hazards and permit easy and thorough cleaning and disinfection, and where practicable, be visible for inspection. Stationary equipment should be installed in such a manner as to permit easy access and thorough cleaning.

4.5.2.2 Containers for inedible material and waste should be leak proof, constructed of metal or other suitable impervious material which is easy to clean or disposable and able to be closed accurately.

4.5.2.3 All refrigerated spaces should be equipped with temperature measurement or recording devices.

4.5.3 Equipment identification

Equipment and utensils used for inedible materials or waste should be so identified and should not be used for edible products.

4.5.4 Tanks and vessels

All surfaces which may come in contact with food should be visible for inspection and readily accessible for manual cleaning. Bottoms of fixed vessels may be of the cone type or may be flat and inclined at an angle of 3-5° for easy drainage. In either case, a drain cock should be provided at the lowest point.

Mixing, blending and homogenizing equipment should be of a type which does not allow food to come into direct contact with seals and bearings which are often a serious source of contamination.



4.5.5 Piping

The piping system should be designed so as to permit free drainage and prevent the occurrence of blind sections in pipes, joints, valves and gauges.

Pipe runs should be kept as short as possible; right-angled joints should be avoided and pipes should slope to a drainage point with a recommended fall of at least 1 in 120.

Cocks, valves and gauges should be accessible and easily dismantled for inspection and cleaning.

4.5.6 Pumps

Pumps should be so designed as to be readily dismantled for cleaning.

Shaft seals should be of the mechanical type and accessible for inspection, and maintenance.

Bearings should be located outside the food zone and be of sealed or self-lubricating type.

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SECTION V - ESTABLISHMENT: HYGIENE REQUIREMENTS

5.1 Maintenance

The buildings, equipment, utensils and all other physical facilities of the establishment, including drains, should be maintained in good repair and in an orderly condition.

As far as practicable, rooms should be kept free from steam, vapour and surplus water.

5.2 Cleaning and disinfection

5.2.1 Cleaning and disinfection should meet the requirements of this code. For further information on these procedures see Annex I of the Code of Practice "General Principles of Food Hygiene".

5.2.2 To prevent contamination of food, all equipment and utensils should be cleaned as frequently as necessary and disinfected whenever circumstances demand.

They should also be cleaned and disinfected at the conclusion of the work shift.

5.2.3 Adequate precautions should be taken to prevent food from being contaminated during cleaning or disinfection of rooms, equipment or utensils by water and detergents or by disinfectants and their solutions. Detergents and disinfectants should be suitable for the purpose intended and should be acceptable to the official agency having jurisdiction.

Any residues of these agents should be removed by thorough rinsing with potable water from any area or equipment that comes into contact with the food before the area or equipment is again used for handling food.

5.2.4 Either immediately after cessation of work for the day or at such other times as may be appropriate, floors, including drains, auxiliary structures and walls of food handling areas should be thoroughly cleaned.

5.2.5 Changing facilities and toilets should be kept clean at all times.

5.2.6 Roadways and yards in the immediate vicinity of and serving the premises should be kept clean.

5.3 Hygiene Control Programme

A permanent cleaning and disinfection schedule should be drawn up for each establishment to ensure that all areas are appropriately cleaned and that critical areas, equipment and material are designated for special attention. A single individual who should preferably be a permanent member of the staff of the establishment and whose duties should be independent of production, should be appointed to be responsible for the cleanliness of the establishment. He should have a thorough understanding of the significance of contamination and the hazards involved. All cleaning personnel should be well-trained in cleaning techniques. Completion of each task in the cleaning and disinfection schedule should be signed and dated in an appropriate record.

5.4 By-Products

By-products should be stored in such a manner as to avoid contamination of food. They should be removed from the working areas as often as necessary and at least daily.

5.5 Storage and Disposal of Waste

Waste material should be handled in such a manner as to avoid contamination of food or potable water. Care should be taken to prevent access to waste by pests. Waste should be removed from the food handling and other working areas as often as necessary and at least daily. Immediately after disposal of the waste, receptacles used for storage and any equipment which has come into contact with the waste should be cleaned and disinfected. The waste storage area should also be cleaned and disinfected.

5.6 Exclusion of Domestic Animals

Animals that are uncontrolled or that could be a hazard to health should be excluded from establishments.

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5.7 Pest Control

- 5.7.1 There should be an effective and continuous programme for the control of pests. Establishments and surrounding areas should be regularly examined for evidence of infestation.
- 5.7.2 Should pests gain entrance to the establishment, eradication measures should be instituted. Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health resulting from the use of these agents, including those which may arise from residues retained in the product. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction.
- 5.7.3 Pesticides should only be used if other precautionary measures cannot be used effectively. Before pesticides are applied, care should be taken to safeguard all food, equipment and utensils from contamination. After application, contaminated equipment and utensils should be thoroughly cleaned to remove residues prior to being used again.

5.8 Storage of Hazardous Substances

- 5.8.1 Pesticides or other substances which may represent a hazard to health should be suitably labelled with a warning about their toxicity and use. They should be stored in locked rooms or cabinets used only for that purpose, and dispensed and handled only by authorized and properly trained personnel or by persons under strict supervision of trained personnel. Extreme care should be taken to avoid contaminating food.
- 5.8.2 Except when necessary for hygienic or processing purposes, no substance which could contaminate food should be used or stored in food handling areas.

5.9 Personal effects and clothing

Personal effects and clothing should not be deposited in food handling areas.

SECTION VI - PERSONNEL HYGIENE AND HEALTH REQUIREMENTS

6.1 Hygiene training

Managers of establishments should arrange for adequate and continuing training of every food handler in hygienic handling of food and in personal hygiene so that they understand the precautions necessary to prevent contamination of food. Instruction should include relevant parts of this Code. Attendance records should be kept.

6.2 Medical examination

Persons who come in contact with food in the course of their work should have a medical examination prior to their employment if the official agency having jurisdiction, acting on medical advice, considers that this is necessary, either because of epidemiological considerations, the nature of the food prepared in a particular establishment, or the medical history of the prospective food handler. Medical examination of a food handler should be carried out at other times when clinically or epidemiologically indicated.

6.3 Communicable diseases

The management should take care to ensure that no person, while known or suspected to be suffering from, or to be a carrier of a disease likely to be transmitted through food, or while afflicted with infected wounds, skin infections, sores or with diarrhoea, is permitted to work in any food handling area in any capacity in which there is any likelihood of such a person directly or indirectly contaminating food with pathogenic micro-organisms. Any person so affected should immediately report to the management that he is ill.

6.4 Injuries

Any person who has a cut or wound should not continue to handle food or food contact surfaces until the injury is completely protected by a waterproof covering which is firmly secured, and which is conspicuous in colour. Adequate first-aid facilities should be provided for this purpose.

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6.5 Washing of hands

Every person engaged in a food handling area should wash his hands frequently and thoroughly with a suitable hand-cleaning preparation under running warm, potable water while on duty. Hands should always be washed before commencing work, immediately after using the toilet, after handling contaminated material and whenever else necessary. After handling any material which might be capable of transmitting disease, hands should be washed and disinfected immediately. Notices requiring hand-washing should be displayed. There should be adequate supervision to ensure compliance with this requirement.

6.6 Personal cleanliness

Every person engaged in a food handling area should maintain a high degree of personal cleanliness while on duty, and should at all times while so engaged wear suitable protective clothing including head covering and footwear, all of which articles should be cleanable unless designed to be disposed of, and should be maintained in a clean condition consistent with the nature of the work in which the person is engaged. Aprons and similar items should not be washed on the floor. During periods where food is manipulated by hand any jewellery that cannot be adequately disinfected should be removed from the hands. Personnel should not wear any insecure jewellery when engaged in food-handling.

6.7 Personal Behaviour

Any behaviour which could result in contamination of food, such as eating, use of tobacco, chewing (e.g. gum, sticks, betel nuts, etc.) or unhygienic practices such as spitting, should be prohibited in food handling areas.

6.8. Gloves

Gloves, if used in the handling of food products, should be maintained in a sound, clean and sanitary condition. The wearing of gloves does not exempt the operator from having thoroughly washed hands. Gloves should be made of an impermeable material except where their usage would be inappropriate or incompatible with the work involved.

6.9 Visitors

Precautions should be taken to prevent visitors to food handling areas from contaminating food. These may include the use of protective clothing. Visitors should observe the provisions recommended in paras 5.9, 6.3, 6.4, 6.7.

6.10 Supervision

Responsibility for ensuring compliance by all personnel with all requirements of paragraphs 5.9.1 - 5.9.10 inclusive should be specifically allocated to competent supervisory personnel.

SECTION VII - HYGIENIC PROCESSING REQUIREMENTS

7.1 Raw material requirements in the establishment

Raw materials used for the production of food for infants and children should, where applicable, comply with their appropriate Codes of Hygienic Practice. If no appropriate Code of Hygienic Practice exists, the "General Principles of Food Hygiene" should apply.

7.1.1 Acceptance

No raw material or ingredient should be accepted by the establishment if known to contain parasites, microorganisms, or toxic, decomposed or extraneous substances which will not be reduced to acceptable levels by normal plant procedures of sorting and/or preparation or processing.

Raw materials used for the production of food for infants and children should not contain pesticide residues or other objectionable substances in a concentration in the final product believed to constitute a health hazard for infants and children.

Raw materials destined for the production of food for infants and children should be of high hygienic condition.

Food of animal origin should only be derived from healthy stock.

7.1.2 Inspection and sorting

Raw materials or ingredients should be inspected and sorted prior to being moved into the processing line, and where necessary, laboratory tests should be made. Only clean sound raw materials or ingredients should be used in further processing.

7.1.3 Storage of raw materials and ingredients

Raw materials and ingredients stored on the premises of the establishment should be maintained under conditions that will prevent spoilage, protect against contamination and minimize damage. Stocks of raw materials and ingredients should be properly rotated, and should be stored under cool conditions.

7.2 Prevention of cross-contamination

7.2.1 General remarks

Effective measures should be taken to prevent contamination of food material by direct or indirect contact with material at an earlier stage of the process.

7.2.2 Personal behaviour

Persons handling raw materials or semi-processed products capable of contaminating the end product should not come into contact with any end product unless and until they discard all protective clothing worn by them during the handling or raw materials or semi-processed products which have come into direct contact with or have been soiled by raw material or semi-processed products and have changed into clean protective clothing.

7.2.3 Hand washing

If there is a likelihood of contamination, hands should be washed thoroughly between handling products at different stages of processing.

7.2.4 Equipments

All equipments which has been in contact with raw materials or contaminated material should be thoroughly cleaned and disinfected prior to being used for contact with end products.

7.3 Use of water

7.3.1 General requirements

As a general principle, only potable water as defined in the latest edition of "International Standards of Drinking Water" (WHO) should be used in food handling.

7.3.2 Non-potable water

Non-potable water may be used with the acceptance of the official agency having jurisdiction for steam production, refrigeration, fire control and other similar purposes not connected to food. However non-potable water may, with special acceptance of the official agency, be used in certain food handling areas, when this does not constitute a hazard to health.



7.3.3 Re-circulated water

Water recirculated for reuse within an establishment should be treated and maintained in a condition so that no health hazard can result from its use. The treatment process should be kept under constant surveillance. Alternatively, recirculated water which has received no further treatment may be used in conditions where its use would not constitute a health hazard, and will not contaminate either the raw material or the end product. Recirculated water should have a separate distribution system which can be readily identified. The acceptance of the official agency having jurisdiction should be required for any treatment process and for the use of recirculated water in any food process.

7.4 Processing

- 7.4.1 Processing should be supervised by technically competent personnel.
- 7.4.2 All steps in the production process, including packaging, should be performed without unnecessary delay and under conditions which will prevent the possibility of contamination, deterioration, or the development of pathogenic and spoilage micro-organisms.
- 7.4.3 Rough treatment of containers should be avoided to prevent the possibility of contamination of the processed product.
- 7.4.4 Methods of preservation should be such as to protect against contamination or development of a public health hazard and against deterioration within the limits of good commercial practice.

7.5 Packaging

All food for infants and children should be packed in containers which protect the food from contamination and deterioration.

7.5.1 Packaging material

All packaging materials should be stored in a clean and sanitary manner. The material should be appropriate for the product to be packed and for the expected conditions of storage, and should not transmit to the product objectionable substances beyond the limits acceptable to the official agency having jurisdiction. The packaging material

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should be sound and should provide appropriate protection from contamination.

Vacuum packed containers sealed with quick-twist, screw-on or snap-on lids, which have an annular space between the inner edge of the lid's rim and the container itself, should have such space eliminated by lid or container design or be made inaccessible by sealing.

7.5.2 Inspection

Product containers should not have been used for any purpose which may lead to contamination of the product. Containers should be inspected immediately before use to ensure that they are in a satisfactory condition and where necessary cleaned and/or disinfected; no water, other than potable water, should be used for washing empty containers. When washed they should be well drained before filling. Only packaging material required for immediate use should be kept in the packing or filling area.

7.5.3 Precluding contamination

Packing should be done under conditions that preclude the introduction of contamination into the product.

7.5.4 Lot identification

Each container shall be permanently marked in code or in clear to identify the producing factory and the lot.

A lot is a quantity of food produced under identical conditions, all packages of which should bear a lot number that identifies the production during a particular time interval, and usually from a particular "line" or other critical processing unit.

7.5.5 Storage instructions

Instructions for proper storage and use should be given on the label.

7.6. Storage and transport of the end product

The end product should be stored and transported under such conditions as will preclude the contamination with and/or proliferation of micro-organisms and protect against deterioration of the product or damage to the container. During storage, periodic inspection of the end product should take place to ensure that only food which is fit for human consumption is despatched and that end product specifications should be complied with. The product should be despatched in the sequence of the lot numbers.

7.6.1 Thermally processed low acid canned food should be produced according to the Code of Hygienic Practice for Low Acid Canned Foods.

7.6.2 Checking for defects

Each lot should be checked after filling. Containers showing defects which may affect product quality, should be rejected.

7.6.3 Vacuum checking

In case of thermally processed vacuum packed containers, the vacuum of all containers should be checked after heat processing.

7.7

Sampling and Laboratory Control Procedures

7.7.1 Each establishment should have access to laboratory control of the products processed. Such control should reject all food that is unfit for human consumption or that does not comply with the end product specifications.

Laboratories checking for pathogenic microorganisms should be well separated from food processing areas.

7.7.2 Sampling

Representative samples of the end product should be taken to assess the safety and quality.

SECTION VIII - END PRODUCT SPECIFICATIONS

8.1 General

The food for infants and/or children should be free from foreign and other objectionable matter to the extent possible in good manufacturing practice, as well as free from toxic substances in a concentration believed to constitute a health hazard for infants and children.

8.2 Pesticide residues and food additives

The food for infants and/or children should comply with the requirements for pesticide residues and food additives laid down by the Codex Alimentarius Commission.

8.3 Microbiological specifications

The food should comply with the microbiological specifications laid down in Annex I. For the microbiological analysis, the methods contained in Annex II should be used.

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MICROBIOLOGICAL SPECIFICATIONS FOR FOODS FOR INFANTS AND CHILDREN  
(UP TO THREE YEARS)

Product	Test	Class				Limit per g	
		Case	Plan	n	c	m	M
a) Dried biscuit type product <sup>1)</sup>							
1. plain	none	-	-	-	-	-	-
2. coated	coliform	5	3	5	2	<3 <sup>2)</sup>	20
	Salmonella <sup>3)9)</sup>	11	2	10	0	0	-
b) Dried and instant products <sup>4)5)</sup>	mesophilic aerobic bacteria <sup>6)</sup>	6	3	5	2	10 <sup>3</sup>	10 <sup>4</sup>
	coliform	6	3	5	1	<3 <sup>2)</sup>	20
	Salmonella <sup>9)</sup>	12	2	60	0	0	-
c) Dried products requiring heating before consumption <sup>5)7)</sup>	mesophilic aerobic bacteria	4	3	5	3	10 <sup>4</sup>	10 <sup>5</sup>
	coliform	4	3	5	2	10	100
	Salmonella <sup>9)</sup>	10	2	5	0	0	-
d) Thermally processed products packaged in hermetically sealed containers <sup>8)</sup>	These products:						
	a) shall be free of microorganisms capable of growth in the product under normal nonrefrigerated conditions of storage and distribution; and						
	b) shall not contain any substances originating from microorganisms in amounts which may represent a hazard to health; and						
	c) if they have a pH above 4.6 shall have received a processing treatment which renders the products free of viable forms of microorganisms having public health significance.						

- 1) Dry shelf-stable products
- 2) <3 means no positive tube in the standard-3-tube MPN method
- 3) Applies only to products containing one or more Salmonella sensitive ingredients, e.g. chocolate coatings
- 4) Products intended for consumption after addition of liquid; includes dried infant formulas, instant infant cereals, etc.; microbial limits apply to dry product
- 5) Includes supplementary products, e.g. sweetening agents, starches, texturizers and similar products, singly or in combination
- 6) Not applicable to products which are produced by a microbial fermentation process
- 7) Products intended for consumption after addition of liquid and which are specified to be heated to boiling before consumption; microbial limits apply to dry product
- 8) Includes aseptically canned products and liquid infant formulas; assumes these products are manufactured in accordance with the respective Codes of Good Manufacturing Practice
- 9) For the examination of such foods for the presence of Salmonella, 25 g samples shall be used and these may be pooled.

METHODS FOR MICROBIOLOGICAL ANALYSIS FOR FOODS FOR INFANTS AND CHILDREN  
(UP TO THREE YEARS)

Mesophilic aerobic bacteria

Draft International Standard ISO/DIS 4833

Refer to ICMSF (1974) chapter 7, page 83-91 for collection and preparation of samples for analysis; in all instances 25 g shall constitute a sample unit (analytical unit); incubation of agar plates shall be at 30°C.

Coliform count

Draft International Standard ISO/DIS 4831

Collection and preparation of samples, sample unit and incubation as in viable colony count above.

Salmonellae

According to the "Report of the 13th Session of the Codex Alimentarius Committee on Food Hygiene, Rome, 10 - 13 May, 1976, Appendix VI, para 9".

Collection and preparation of samples, sample unit and incubation as in viable colony count above.

Labour and cost of testing may be reduced by testing pooled sample units (analytical units). Studies have shown<sup>1)</sup> that salmonellae may be detected with equal accuracy, and that there is no significant difference in sensitivity when testing a large sample versus multiple subsamples. Therefore, 25 g sample units may be composited to a quantity not to exceed 400 g. Analysis may then proceed as for a 25 g unit with appropriate change in equipment, media volume, etc.

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1) American Public Health Association, 1976. Compendium of Methods for the Microbiological Examination of Foods, M. L. Speck (ed), chapter 25, page 313. American Health Association, 1015 18th St., N.W. Washington D.C. 20036

DRAFT CODE OF HYGIENIC PRACTICE FOR PROCESSING OF FROGLEGS

(Returned to Step 3)

The hygiene requirements of this Code are partially based on the revised Recommended International Code of Practice - General Principles of Food Hygiene (ALINORM 78/13A, Appendix V) and the Recommended International Code of Practice for Fresh Fish (CAC/RCP 9-1976). Where inserted in this Code the subsections are indicated in the right hand margin (GP - General Principles; FF - Fresh Fish).

SECTION I - SCOPE

This code of hygienic practice applies to froglegs derived from edible frogs. It contains the minimum requirements of hygiene in the production, processing, handling, packing, storage, transportation and distribution of froglegs to ensure a healthful and wholesome supply of this product.

SECTION II - DEFINITIONS

2. For the purposes of this Code the following expressions have the meaning stated:

2.1 "Chilling" means the process of cooling to a temperature approaching that of melting ice. FF  
2.4

2.2 "Contamination" means the occurrence of any objectionable matter in the product. GP  
2.3

2.3 "Disinfection" means the reduction, without adversely affecting the food, by means of hygienically satisfactory chemical agents and/or physical methods, of the number of microorganisms to a level that will not lead to harmful contamination of food. GP  
2.4

2.4 "Establishment" means any building(s) or area(s) in which food is handled after harvesting and the surroundings under the control of the same management. GP  
2.5

2.5 "Fresh Froglegs" means the skinless hind legs of freshly killed frogs.

SECTION III - HYGIENE REQUIREMENTS IN PRODUCING/HARVESTING AREA

3.1 Environmental Hygiene in Areas from which Froglegs are Obtained

3.1.1 Protection from contamination by wastes. Frogs should be protected in so far as practicable from contamination with human, animal, domestic, industrial and agricultural wastes and adequate precautions should be taken to ensure that these wastes are not used or disposed of in a manner which may constitute a health hazard through the food. GP  
3.1.2

3.1.2 Pest and disease control. Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health, particularly those which may arise from residues in the food. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction. GP  
3.1.4

3.1.3 Harvest areas. The environment where frogs are caught or collected should be protected in so far as practicable against contamination which may constitute a health hazard to the consumer through the product.

3.2 Harvesting and Production

3.2.1 Techniques

3.2.1.1 Methods and procedures associated with harvesting and production should be hygienic and such as not to constitute a potential health hazard or result in contamination of the product. GP  
3.2.1

3.2.1.2 To prevent deterioration in the quality of froglegs, it is essential that steps should be taken to prevent the live frogs from:

- (i) injury or bruising of the flesh during catching, for example, from use of unsuitable equipment;
- (ii) contamination with dirt or any other extraneous matter;
- (iii) exposure to unfavourable temperatures;
- (iv) rough handling, such as improper stacking of containers.

3.2.1.3 Harvesting should be carried out under conditions of minimal stress, such as proper fill to avoid overloading containers.

3.2.2 Equipment and product containers. Equipment and containers used for harvesting should be so constructed and maintained as not to constitute a hazard to health. Containers which are re-used should be of such material and construction as will permit easy and thorough cleaning. They should be maintained clean and, where necessary, disinfected. Containers used for toxic materials should not subsequently be used for holding foods or food ingredients. GP 3.2.2

3.2.3 Removal of obviously unfit materials. Unfit frogs, for example those less active, that are injured or have blood clots or parasites in the flesh, should be segregated during collection to the fullest extent practicable prior to delivery to the processing plant. Similarly, on arrival, unfit frogs should be removed as soon as possible and segregated for disposal in an appropriate manner. Arrangements for removal and segregation should be approved by the official agency having jurisdiction.

3.2.4 Protection against contamination and damage. Suitable precautions should be taken to protect the frogs from being contaminated by animals, insects, vermin, birds, chemicals or microbiological contaminants or other objectionable substances during handling and storage.

3.3 Storage at the place of production/harvesting. Frogs that are stored alive should be kept alive in a sanitary environment until they are processed. Frogs that die, become weak or appear abnormal in any way should be immediately removed from the live store and discarded.

3.4 Transportation

3.4.1 Conveyances for transporting the harvested frogs from the production area or place of harvest or storage should be adequate for the purpose intended and should be of such material and construction as will permit easy and thorough cleaning. They should be maintained clean and where necessary disinfected.

3.4.2 All handling procedure should be such as will prevent raw materials from being contaminated. Care should be taken to keep the frogs alive, to protect against contamination and to minimize damage and stress. Special equipment - such as refrigeration equipment - should be used if the distances involved so indicate. If ice is used in contact with the product it should be of the quality required in paragraph 4.4.1.2

3.5 Cutting Stations. In butchering and cutting carried out at collection points or cutting centres away from the main processing plant, facilities and operating practices should comply with all applicable requirements contained in sections 4, 5, 6 and 7, particularly 7.4.1 involving slaughter, cutting and de-skinning.

SECTION IV - ESTABLISHMENT: DESIGN AND FACILITIES

4.1 Location. Establishments should be located in areas which are free from objectionable odours, smoke, dust or other contaminants and are not subject to flooding. GP 4.1

4.2 Roadways and Areas used by wheeled traffic serving the establishment which are within its boundaries or in its immediate vicinity should have a hard paved surface suitable for wheeled traffic. There should be adequate drainage and provision should be made to allow for cleaning. GP 4.2

4.3 Buildings and Facilities

4.3.1 Buildings and facilities should be of sound construction and maintained in good repair. GP 4.3.1

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- 4.3.2 Adequate working space should be provided to allow for satisfactory performance of all operations. GP 4.3.2
- 4.3.3 The design should be such as to permit easy and adequate cleaning and to facilitate proper supervision of food hygiene. GP 4.3.3
- 4.3.4 The buildings and facilities should be designed to prevent the entrance and harboring of pests and the entry of environmental contaminants such as smoke, dust, etc. GP 4.3.4
- 4.3.5 Separation of processes. Buildings and facilities should be designed to provide separation, by partition, location or other effective means, between those operations which may cause cross-contamination. GP 4.3.5
- 4.3.5.2 Any plant producing food not intended for human consumption should be entirely separate from a plant which is processing froglegs for human consumption. Processing of by-products not intended for human consumption should be conducted in separate buildings or in areas which are physically separated to prevent any possible contamination of froglegs.
- 4.3.6 Buildings and facilities should be designed to facilitate hygienic operations by means of a regulated flow in the process from the arrival of the raw material at the premises to the finished product without overcrowding of equipment and personnel, and should provide for appropriate temperature conditions for the process and the product. GP 4.3.6
- 4.3.7 In food handling areas: GP 4.3.7
- Floors, where appropriate, should be of water-proof, non-absorbent, washable non-slip and non-toxic materials, without crevices, and should be easy to clean and disinfect. Where appropriate, floors should slope sufficiently for liquids to drain to trapped outlets.
  - Walls, where appropriate, should be of water-proof, non-absorbent, washable and non-toxic materials and should be light coloured. Up to a height appropriate for the operation they should be smooth and without crevices, and should be easy to clean and disinfect. Where appropriate angles between walls and floors and between walls and ceilings should be sealed and coved to facilitate cleaning.
  - Ceilings should be so designed, constructed and finished as to prevent the accumulation of dirt and minimize condensation, mould development and flaking, and should be easy to clean.
  - Windows and other openings should be so constructed as to avoid accumulation of dirt and those which open should be fitted with screens. Screens should be easily movable for cleaning and kept in good repair. Internal window sills, if present, should be sloped to prevent use as shelves.
  - Doors should have smooth, non-absorbent surfaces and, where appropriate, be self-closing and close fitting.
  - Stairs, lift cages and auxiliary structures such as platforms, ladders, chutes, should be so situated and constructed as not to cause contamination to food. Chutes should be constructed with inspection and cleaning hatches.
- 4.3.8 In food handling areas all overhead structures and fittings should be installed in such a manner as to avoid contamination directly or indirectly of food and raw materials by condensation and drip, and should not hamper cleaning operations. They should be insulated where appropriate and be so designed and finished as to prevent the accumulation of dirt and to minimize condensation, mould development and flaking. They should be easy to clean. GP 4.3.8
- 4.3.9 Living quarters, toilets and areas where animals are kept should be completely separated from and should not open directly on to food handling areas. GP 4.3.9
- 4.3.10 Where appropriate, establishments should be so designed that access can be controlled. GP 4.3.10
- 4.3.11 The use of material which cannot be adequately cleaned and disinfected, such as wood, should be avoided unless its use would clearly not be a source of contamination. GP 4.3.11



4.3.12 Adequate facilities should be available to maintain froglegs in a chilled condition, as required.

4.3.13 Refrigeration and freezing equipment should be properly designed and constructed to accomplish rapid freezing and should be of adequate capacity.

4.3.14 Freezer and cold storage facilities should be adequate for the intended production and should be fitted with automatic temperature controlling and recording devices.

4.4 Sanitary Facilities

4.4.1 Water supply

4.4.1.1 An ample supply of potable water under adequate pressure and of suitable temperature should be available with adequate facilities for its storage, where necessary, and distribution, and with adequate protection against contamination and pollution. The standards of potability should not be less than those contained in the latest edition of "International Standards of Drinking Water" (WHO). GP 4.4.1.1

4.4.1.2 Ice should be made from potable water and should be manufactured, handled and stored so as to protect it from contamination. GP 4.4.1.2

4.4.1.3 Steam used in direct contact with food or food contact surfaces should not contain any substances which may be hazardous to health or may contaminate the food. GP 4.4.1.3

4.4.1.4 Non-potable water should be carried in completely separate lines, identifiable preferably by colour, and used for steam production, refrigeration, fire control and other similar purposes not connected with food with no cross-connection with or back-siphonage into the system carrying potable water. GP 4.4.1.4

4.4.2 Effluent and waste disposal. Establishments should have an efficient effluent and waste disposal system which should at all times be maintained in good order and repair. All effluent lines (including sewer systems) should be large enough to carry peak loads and should be so constructed as to avoid contamination of potable water supplies. GP 4.4.2

4.4.3 Changing facilities and toilets. Adequate, suitable and conveniently located changing facilities and toilets should be provided in all establishments. Toilets should be so designed as to ensure hygienic removal of waste handled. These areas should be well lit, ventilated and, where appropriate, heated and should not open directly on to food handling areas. Hand washing facilities with warm or hot and cold water, a suitable hand cleaning disinfectant, and with suitable hygienic means of drying hands, should be provided adjacent to toilets and in such a position that the employee must pass them when returning to the processing area. Where hot and cold water are available mixing taps should be provided. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided near to each washing facility. Taps of a non-hand operable type are desirable. Notices should be posted directing personnel to wash their hands after using the toilet. GP 4.4.3

4.4.4 Hand washing facilities in processing areas. Adequate and conveniently located facilities for hand washing and drying should be provided wherever the process demands. Where appropriate, facilities for hand disinfection should also be provided. Warm or hot and cold water and suitable hand-cleaning preparations should be provided. Where hot and cold water are available mixing taps should be provided. There should be suitable hygienic means of drying hands. Where paper towels are used, a sufficient number of dispensers and receptacles should be provided adjacent to each washing facility. Taps of a non-hand operable type are desirable. The facilities should be furnished with properly trapped waste pipes leading to drains. GP 4.4.4

4.4.5 Disinfection facilities. Where appropriate adequate facilities for cleaning and disinfection of working implements and equipment should be provided. These facilities should be constructed of corrosion resistant materials, capable of being easily cleaned, and should be fitted with suitable means of supplying warm and cold water in sufficient quantities. GP 4.4.5

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4.4.6 Lighting. Adequate natural or artificial lighting should be provided throughout the establishment. Where appropriate the lighting should not alter colours and the intensity should not be less than:

- |  |       |
|--|-------|
| 540 lux (50 foot candles) at all inspection points | GP    |
| 220 lux (20 foot candles) in work rooms            | 4.4.6 |
| 110 lux (10 foot candles) in other areas           |       |

Light bulbs and fixtures suspended over food materials in any stage of production should be of a safety type and protected to prevent contamination of food in case of breakage.

4.4.7 Ventilation. Adequate ventilation should be provided to prevent excessive heat, steam condensation and dust and to remove contaminated air. The direction of the air flow should never be from a dirty area to a clean area. Ventilation openings should be provided with a screen or other protecting enclosure of non-corrodible material. Screens should be easily removable for cleaning. GP 4.4.7

4.4.8 Facilities for storage and disposal of waste and inedible material. Facilities should be provided for the storage of waste and inedible material prior to removal from the establishment. These facilities should be designed to prevent access to waste or inedible material by pests and to avoid contamination of food, potable water, equipment, buildings or roadways on the premises. GP 4.4.8

4.5 Equipment and Utensils

4.5.1 Materials. All equipment and utensils used in food handling areas and which may contact food should be made of material which does not transmit toxic substances, odour or taste, is non-absorbent, is resistant to corrosion and is capable of withstanding repeated cleaning and disinfection. Surfaces should be smooth and free from pits and crevices. The use of wood and other materials which cannot be adequately cleaned and disinfected should be avoided except when their use would clearly not be a source of contamination. The use of different materials in such a way that contact corrosion can occur should be avoided. GP 4.5.1

4.5.2 Sanitary design, construction and installation

4.5.2.1 All equipment and utensils should be so designed and constructed as to prevent hygienic hazards and permit easy and thorough cleaning and disinfection and, where practicable, be visible for inspection. Stationary equipment should be installed in such a manner as to permit easy access and thorough cleaning. GP 4.5.2.1

4.5.2.2 Containers for inedible material and waste should be leak-proof, constructed of metal or other suitable impervious material which should be easy to clean or disposable and be able to be closed accurately. Such containers, used on the processing line, should be located below the level at which the froglegs are processed and in such a way that there is no splashback on the processing line.

4.5.3 Equipment identification. Equipment and utensils used for inedible materials should be so identified and should not be used for edible products. GP 4.5.3

SECTION V - ESTABLISHMENT: HYGIENIC REQUIREMENTS

5.1 Maintenance. The buildings, equipment, utensils and all other physical facilities of the establishment, including drains, should be maintained in good repair and in an orderly condition. As far as practicable, rooms should be kept free from steam, vapour and surplus water. GP 5.1

5.2 Cleaning and Disinfection

5.2.1 Cleaning and disinfection should meet the requirements of this code. For further information on cleaning and disinfection procedures see Code of Practice, General Principles of Food Hygiene, Annex I. GP 5.2.1

5.2.2 To prevent contamination of food, all equipment and utensils should be cleaned as frequently as necessary and disinfected whenever circumstances demand. Stock solution such as hypochlorite should be analyzed for available chlorine prior to use. GP 5.2.2

5.2.3 Adequate precautions should be taken to prevent food from being contaminated during cleaning or disinfection of rooms, equipment or utensils by water and detergents or by disinfectants and their solutions. Detergents and disinfectants should be suitable for the purpose intended and should be acceptable to official agency having jurisdiction. Any residues of these agents on a surface which may come in contact with food should be removed by thorough rinsing with potable water before the area or equipment is again used for handling food. GP 5.2.3

5.2.4 Either immediately after cessation of work for the day or at such other times as may be appropriate, floors, including drains, auxiliary structures and walls of food handling areas should be thoroughly cleaned. GP 5.2.4

5.2.5 Changing facilities and toilets should be kept clean at all times. GP 5.2.5

5.2.6 Roadways and yards in the immediate vicinity of and serving the premises should be kept clean. GP 5.2.6

5.3 Hygiene Control Programme. A permanent cleaning and disinfection schedule should be drawn up for each establishment to ensure that all areas are appropriately cleaned and that critical areas, equipment and material are designated for special attention. A single individual who should preferably be a permanent member of the staff of the establishment and whose duties should be independent of production, should be appointed to be responsible for the cleanliness of the establishment. He should have a thorough understanding of the significance of contamination and the hazards involved. All cleaning personnel should be well-trained in cleaning techniques. GP 5.3

5.4 By-products. By-products should be stored in such a manner as to avoid contamination of food. They should be removed from the working areas as often as necessary and at least daily. GP 5.4

5.5 Storage and Disposal of Waste. Waste material should be handled in such a manner as to avoid contamination of food or potable water. Care should be taken to prevent access to waste by pests. Waste should be removed from the food handling and other working areas as often as necessary and at least daily. Immediately after disposal of the waste, receptacles used for storage and any equipment which has come into contact with the waste should be cleaned and disinfected. The waste storage should also be cleaned and disinfected. GP 5.5

5.6 Exclusion of Domestic Animals. Animals that are uncontrolled or that could be a hazard to health should be excluded from establishments.

5.7 Pest Control

5.7.1 There should be an effective and continuous programme for the control of pests. Establishments and surrounding areas should be regularly examined for evidence of infestation. GP 5.7.1

5.7.2 Should pests gain entrance to the establishment, eradication measures should be instituted. Control measures involving treatment with chemical, physical or biological agents should only be undertaken by or under direct supervision of personnel who have a thorough understanding of the potential hazards to health resulting from the use of these agents, including those which may arise from residues retained in the product. Such measures should only be carried out in accordance with the recommendations of the official agency having jurisdiction. GP 5.7.2

5.7.3 Pesticides should only be used if other precautionary measures cannot be used effectively. Before pesticides are applied, care should be taken to safeguard all food, equipment and utensils from contamination. After application, contaminated equipment and utensils should be thoroughly cleaned to remove residues prior to being used again. GP 5.7.3

5.8 Storage of Hazardous Substances

5.8.1 Pesticides or other substances which may represent a hazard to health should be suitably labelled with a warning about their toxicity and use. They should be stored in locked rooms or cabinets used only for that purpose and dispensed and handled only by authorized and properly trained personnel or by persons under strict supervision of trained personnel. Extreme care should be taken to avoid contaminating food. GP 5.8.1

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- 5.8.2 Except when necessary for hygienic or processing purposes, no substance which could contaminate food should be used or stored in food handling areas. GP 5.8.2
- 5.9 Personal Effects and Clothing. Personal effects and clothing should not be deposited in food handling areas. GP 5.9

SECTION VI - PERSONNEL HYGIENE AND HEALTH REQUIREMENTS

- 6.1 Hygiene Training. Managers of establishments should arrange for adequate and continuing training of every food handler in hygienic handling of food and in personal hygiene so that they understand the precautions necessary to prevent contamination of food. Instruction should include relevant parts of this Code. GP 6.1
- 6.2 Medical Examination. Persons who come in contact with food in the course of their work should have a medical examination prior to their employment if the official agency having jurisdiction, acting on medical advice, considers that this is necessary, either because of epidemiological considerations, the nature of the food prepared in a particular establishment or the medical history of the prospective food handler. Medical examination of a food handler should be carried out at other times when clinically or epidemiologically indicated. GP 6.2
- 6.3 Communicable Diseases. The management should take care to ensure that no person, while known or suspected to be suffering from, or to be a carrier of a disease likely to be transmitted through food, or while afflicted with infected wounds, skin infections, sores or with diarrhoea, is permitted to work in any food handling area in any capacity in which there is any likelihood of such a person directly or indirectly contaminating food with pathogenic microorganisms. Any person so affected should immediately report to the management that he is ill. GP 6.3
- 6.4 Injuries. Any person who has a cut or wound should not continue to handle food or food contact surfaces until the injury is completely protected by a waterproof covering which is firmly secured, and which is conspicuous in colour. Adequate first-aid facilities should be provided for this purpose. GP 6.4
- 6.5 Washing of Hands. Every person engaged in a food handling area should wash his hands frequently and thoroughly with a suitable hand cleaning preparation under running warm, potable water while on duty. Hands should always be washed before commencing work, immediately after using the toilet, after handling contaminated material and whenever else necessary. After handling any material which might be capable of transmitting disease, hands should be washed and disinfected immediately. Notices requiring hand-washing should be displayed. There should be adequate supervision to ensure compliance with this requirement. GP 6.5
- 6.6 Personal Cleanliness. Every person engaged in a food handling area should maintain a high degree of personal cleanliness while on duty, and should at all times while so engaged wear suitable protective clothing including head covering and footwear, all of which articles should be cleanable unless designed to be disposed of and should be maintained in a clean condition consistent with the nature of the work in which the person is engaged. Aprons and similar items should not be washed on the floor. During periods when food is manipulated by hand any jewellery that cannot be adequately disinfected should be removed from the hands. Personnel should not wear any insecure jewellery when engaged in food handling. GP 6.6
- 6.7 Personal Behaviour. Any behaviour which could result in contamination of food, such as eating, use of tobacco, chewing (e.g. gum, sticks, betel nuts, etc.) or unhygienic practices such as spitting, should be prohibited in food handling areas. GP 6.7
- 6.8 Gloves. Gloves, if used in the handling of food products, should be maintained in a sound, clean and sanitary condition. The wearing of gloves does not exempt the operator from having thoroughly washed hands. Gloves should be made of an impermeable material except where their usage would be inappropriate or incompatible with the work involved. GP 6.8
- 6.9 Visitors. Precautions should be taken to prevent visitors in food handling areas from contaminating food. These may include the use of protective clothing. Visitors should observe the provisions recommended in paragraphs 5.9, 6.3, 6.4 and 6.7.

6.10 Supervision. Responsibility for ensuring compliance by all personnel with all requirements of paragraphs 5.9.1 - 5.9.10 inclusive should be specifically allocated to competent supervisory personnel. GP 6.10

SECTION VII - ESTABLISHMENT: HYGIENIC PROCESSING REQUIREMENTS

7.1 Raw Material Requirements

7.1.1 Unfit frogs should not be accepted.

7.1.2 No raw material or ingredient should be accepted by the establishment if known to contain parasites, microorganisms or toxic, decomposed or extraneous substances which will not be reduced to acceptable levels by normal plant procedures of sorting and/or preparation or processing. GP 7.1.1

7.1.3 Raw materials or ingredients should be inspected and sorted prior to being moved into the processing line and where necessary laboratory tests should be made. Only clean sound raw materials or ingredients should be used in further processing. GP 7.1.2

7.1.4 Raw materials and ingredients stored on the premises of the establishment should be maintained under conditions that will prevent spoilage, protect against contamination and minimize damage. Stocks of raw materials and ingredients should be properly rotated. GP 7.1.3

7.1.5 Frogs should be held under conditions of minimum stress.

7.2 Prevention of Cross-Contamination

7.2.1 Effective measures should be taken to prevent contamination of food material by direct or indirect contact with material at an earlier stage of the process. GP 7.2.1

7.2.2 Persons handling raw materials or semi-processed products capable of contaminating the end product should not come into contact with any end product unless and until they discard all protective clothing worn by them during the handling of raw materials or semi-processed products which have come into direct contact with or have been soiled by raw material or semi-processed products and have changed into clean protective clothing. GP 7.2.2

7.2.3 Each employee should be assigned his definite place and duty on the processing line to prevent intermingling or movement of employees from more contaminated to less contaminated areas.

7.2.4 Ice should be supplied along the processing line only by the employees assigned for this purpose, using clean containers and being fully aware of the danger of cross contamination. Any left-over ice should be discarded.

7.2.5 Any containers and utensils used for ice, water, chlorine, salt solutions, or other food contact material or containing froglegs should be kept off the floor. Small, elevated, readily cleanable platforms or stands may be utilized.

7.2.6 All equipment and utensils used in the processing of froglegs should be assigned exclusively for this purpose. Processing of froglegs should be carried out as a separate operation divorced entirely from other food processing operations such as for shrimp, shellfish, or other fish.

7.2.7 If there is a likelihood of contamination, hands should be washed thoroughly between handling products at different stages of processing. GP 7.2.3

7.2.8 All equipment which has been in contact with raw materials or contaminated material should be thoroughly cleaned and disinfected prior to being used for contact with end products. GP 7.2.4

7.3 Use of Water

7.3.1 As a general principle only potable water as defined in the latest edition of "International Standards of Drinking Water" (WHO) should be used in food handling.

7.3.2 Non-potable water may be used with the acceptance of the official agency having jurisdiction for steam production, refrigeration, fire control and other similar purposes not connected with food. However, non-potable water may, with specific acceptance by the official agency having jurisdiction, be used in certain food handling areas provided this does not constitute a hazard to health.

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7.3.3 Water recirculated for re-use within an establishment should be treated and maintained in a condition so that no health hazard can result from its use. The treatment process should be kept under constant surveillance. Alternatively, recirculated water which has received no further treatment may be used in conditions where its use would not constitute a health hazard and will not contaminate either GP the raw material or the end product. Recirculated water should have a separate 7.3.3 distribution system which can be readily identified. The acceptance of the official agency having jurisdiction should be required for any treatment process and for the use of recirculated water in any food process.

7.3.4 When in-plant chlorination of water is used the residual content of free chlorine should be maintained at no more than the minimum effective level for the use intended. Chlorination systems should not be relied upon to solve all FF 5.1.3.5 hygienic problems. The indiscriminate use of chlorine cannot compensate for unhygienic conditions in a processing plant.

7.4 Processing

7.4.1 Operating Practices - General Considerations

7.4.1.1 Only good quality frogs should be accepted for processing.

7.4.1.2 Sampling and inspection procedures for evaluation of frogs and/or froglegs received for processing should not result in undue delay in entry of frog stock to the processing line.

7.4.1.3 Volume of frogs and/or froglegs received for processing should be regulated and scheduled to prevent large accumulations which may result in excess holding time prior to processing.

7.4.1.4 Frogs and froglegs should be handled and processed and packaged with care, a minimum of delay, and under conditions which will prevent the possibility of contamination, deterioration or the development of pathogenic and spoilage micro-organisms.

7.4.1.5 Froglegs should at all times be processed rapidly and kept chilled during processing.

7.4.1.6 Any food additives used for dipping or spraying the froglegs should meet the requirements of the official agency having jurisdiction.

7.4.1.7 Methods of preservation and necessary controls should be such as to protect against contamination or development of a public health hazard and against deterioration within the limits of good commercial practice. GP 7.4.4

7.4.1.8 Processing should be supervised by technically competent personnel GP 7.4.1

7.4.1.9 Rough treatment of containers should be avoided to prevent possibility of contamination of the processed product. GP 7.4.3

7.4.2 Preparatory Operations

7.4.2.1 Washing or other preparation. Frogs should be washed as needed to remove any contamination. Water used for washing and rinsing should be of potable quality. Water used for such purpose should not be recirculated unless suitably treated to maintain in a condition as will not constitute a public health hazard.

7.4.2.2 Frogs obtained from polluted habitats may be subjected to washing in running clean water for at least 24 hours. For this purpose, a clean holding tank, with an outlet at the bottom or an overflow pipe, may be employed.

7.4.2.3 Live frogs, before being placed into any holding tank, should be washed (hosed down or immersed in rapidly changing water) to remove soil, faeces and slime. Only potable water should be used for this purpose.

7.4.3 Slaughter and Butchering

7.4.3.1 Slaughter should be carried out with minimal stress to the animal. For example, after cleaning the live frogs may be put into a 10% solution of common salt containing an adequate quantity (see Code of Practice, General Principles of Food Hygiene, Annex I) of chlorine, for 15 minutes. By treatment in brine solution the live frogs become paralyzed (anaesthetized) so they are relieved from pain during the cutting.

7.4.3.2 The hind legs should be cut at the abdomen close to the waist and in such a manner that the intestines are left intact. Any remaining viscera and the cloaca and surrounding skin should be removed as hygienically as possible.

#### 7.4.4 Bleeding

7.4.4.1 If bled immediately after cutting, the legs should be washed thoroughly under running chlorinated water (see Code of Practice, General Principles of Food Hygiene, Annex I) to remove blood, remnants of viscera, slime, faeces and other extraneous materials. Immersion in chilled brine is recommended for proper bleeding and prevention of clotting of blood inside. The legs may be skinned and trimmed either before or after bleeding in brine. Immediately after washing, the legs are immersed for a period of 2 minutes in chilled water (chilled by addition of crushed ice) containing an adequate quantity (see Code of Practice, General Principles of Food Hygiene, Annex I) of chlorine.

#### 7.4.5 Holding and transporting for further processing

7.4.5.1 If the froglegs are not processed immediately after bleeding it is preferable to leave the skin on.

7.4.5.2 Froglegs intended for further processing should be chilled immediately and held in this condition until the next processing stage.

7.4.5.3 Froglegs should be transported from cutting stations to freezing and packing plants as quickly as possible under chilled conditions.

7.4.5.4 Where froglegs cannot be processed on arrival, or when the final product cannot be frozen soon after butchering, adequate facilities are required to keep the froglegs cool. Chill rooms should not be used to cool the froglegs but only to maintain them chilled after they have been cooled by ice or other means. It is poor practice, therefore, to load the chill room with large quantities of fresh froglegs that were not pre-chilled effectively to the temperature of melting ice.

7.4.6 Acceptance Criteria. Only good quality froglegs should be accepted by a freezing and packing plant. Froglegs should be inspected to ensure cutting was properly carried out.

#### 7.4.7 Skinning and Trimming

7.4.7.1 Removal of skin and clipping of feet should be carried out on clean surfaces and with a minimum of delay. After this operation the legs should be carefully washed in an adequate amount of running water and bled immediately by placing them into a container of ice and chlorinated water (see Code of Practice, General Principles of Food Hygiene, Annex I) for a period of not less than 20 minutes.

7.4.7.2 After bleeding, the legs should be trimmed by removing bits of membrane, hanging pieces of flesh and a remaining portion of the cloaca in a hygienic manner. During this dressing operation, the dressed materials should be carefully examined for parasites, bruises, blood spots and other defects. This operation should be followed by washing the legs thoroughly in an adequate amount of running water and then immersing them again in a container of ice and chlorinated water (see Code of Practice, General Principles of Food Hygiene, Annex I) for 15 minutes. The legs should then be taken out and washed in four or five changes of chilled, chlorinated water (see Annex I as above).

7.4.8 Grading. The material should be given a final wash in clean water and graded in the different sizes demanded by the market. Size grading should preferably be done before freezing.

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7.5. Packaging.

7.5.1 All packaging material should be stored in a clean and sanitary manner. The material should be appropriate for the product to be packed and for the expected conditions of storage and should not transmit to the product objectionable substances beyond the limits acceptable to the official agency having jurisdiction. The packaging material should be sound and should provide appropriate protection from contamination. GP 7.5.1

7.5.2 Product containers should not have been used for any purpose which may lead to contamination of the product. Where practicable containers should be inspected immediately before use to ensure that they are in a satisfactory condition and, where necessary, cleaned and/or disinfected; when washed they should be well drained before filling. Only packaging material required for immediate use should be kept in the packing or filling area. GP 7.5.2

7.5.3 Packing should be done under conditions that preclude the introduction of contamination into the product. GP 7.5.3

7.5.4 During packaging, extreme care should be taken not to contaminate the product. The legs should either be wrapped hygienically, individually in polyethylene film or preferably inserted into small polyethylene bags. The wrapping material or the bags should be dipped into clean water containing an adequate quantity of chlorine. There is no necessity to dip the rubber bands in chlorine solution.

7.5.5 Lot identification. Each container shall be permanently marked in code or in clear to identify the producing factory and the lot. A lot is a quantity of food produced under identical conditions, all packages of which should bear a lot number that identifies the production during a particular time interval, and usually from a particular "line" or other critical processing unit. GP 7.5.4

7.5.6 Processing and production records. Permanent, legible and dated records of pertinent processing and production details should be kept concerning each lot. These records should be retained for a period that exceeds the shelf life of the product, but unless a specific need exists they need not be kept for more than two years. Records should also be kept of the initial distribution by lot.

7.6 Freezing. The legs should be frozen in the minimum possible time. Bruised, squeezed or broken legs should not be used for freezing. After freezing, the material should be transferred into cold storage, the temperature of which should not be higher than  $-18^{\circ}\text{C}$ .

7.7 Storage and Transport of the end product

7.7.1 The end product should be stored and transported under such conditions as will preclude the contamination with and/or proliferation of microorganisms and protect against deterioration of the product or damage to the container. During storage, periodic inspection of the end product should take place to ensure that only food which is fit for human consumption is despatched and that end product specifications should be complied with when they exist. The product should be despatched in the sequence of the lot numbers. GP 7.6

7.7.2 Doors should not be left open for extended periods and should be closed immediately after use.

7.7.3 No chilling room and cold storage should be loaded beyond its designed capacity.

7.7.4 Where recording thermometers are not used, temperature should be read at regular intervals and the readings recorded in a log book.

7.7.5 Frozen froglegs should be stored at a uniformly low temperature if a considerable quality loss is to be avoided. Freezer stores should be able to operate at  $-18^{\circ}\text{C}$ . Thermometers, or other temperature recording devices, should be capable of being read easily within a two-degree accuracy. More detailed requirements for the construction and operation of a freezer store are given in the "Code of Practice for Frozen Fish".



7.8 Laboratory Control Procedures. In addition to any control by the official agency having jurisdiction, it is desirable that each plant in its own interest should have access to laboratory control of the sanitary quality of the product processed. Such control should reject all products that are unfit for human consumption. Laboratory procedures used should preferably follow recognized or standard methods in order that the results may be readily interpreted. Where appropriate, representative samples of the production should be taken to assess the safety and wholesomeness of the product. Laboratories checking for pathogenic microorganisms should be well separated from food processing areas.

SECTION VIII - END PRODUCT SPECIFICATIONS

8.. Appropriate methods should be used for sampling and examination to determine the compliance with the following specifications:

8.1 Froglegs should, to the extent possible in good manufacturing practice, be free from objectionable matter and parasites.

8.2 Froglegs should be free from microorganisms in amounts harmful to man, free from parasites harmful to man and should not contain any substances originating from microorganisms in amounts which may represent a hazard to health.

8.3 Froglegs should be free from chemical pollutants in amounts which may represent a hazard to health.

8.4 Froglegs should comply with any requirements set forth by the Codex Alimentarius Commission on pesticide residues and food additives as contained in permitted lists of Codex commodity standards, or should comply with the requirements on pesticide residues and food additives of the country in which the froglegs will be sold.

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APPENDIX VII

DRAFT EUROPEAN REGIONAL STANDARD FOR NATURAL MINERAL WATERS

(At Step 8)

5. HYGIENE <sup>1/</sup>

5.1 It is recommended that the products covered by this standard should be prepared in conformity with the applicable sections of the General Principles of Food Hygiene (Ref. No. CAC/RCP 1-1969).

5.2 Microbiological requirements

5.2.1 The total revivable microorganism content of a natural mineral water at the source shall conform to its normal microbe content and give evidence of an effective protection of the source against all contamination. This revivable microorganism content shall be determined under the conditions laid down in Annex I, Section 3.

After bottling, this microorganism content shall not exceed 100 per ml at 20 to 22°C in 72 hours on agar or an agar-gelatine mixture and 20 per ml at 37°C in 24 hours on agar. This microorganism content shall be measured within the 12 hours following bottling, the water being maintained at 4°C during this 12-hour period. At the source, these values should not normally exceed 20 per ml at 20 to 22°C in 72 hours and 5 per ml at 37°C in 24 hours respectively, on the understanding that these values are to be considered as guide numbers and not as maximum permitted concentrations.

5.2.2 At source, and during its marketing, a natural mineral water shall be free from:

- (a) parasites and pathogenic microorganisms;
- (b) escherichia coli and other coliforms and faecal streptococci in any 250 ml sample examined;
- (c) sporulated sulphite-reducing anaerobes in any 50 ml sample examined;
- (d) pseudomonas aruginosa in any 250 ml sample examined.

5.2.3 Without prejudice to sections 5.2.1 and 5.2.2, the total revivable microorganism content of a natural mineral water at the marketing stage may only be that resulting from the normal increase in the bacteria content which it had at source.

5.3 The source or the point of emergence shall be protected against risks of pollution.

5.4 The installations intended for the production of natural mineral waters shall be such as to exclude any possibility of contamination. For this purpose and in particular:

- (a) the installations for collection, the pipes and the reservoirs shall be made from materials suited to the water and in such a way as to prevent the introduction of foreign substances into the water;
- (b) the equipment and its use for production, especially installations for washing and packaging, shall meet hygienic requirements;
- (c) if, during production it is found that the water is polluted, the producer shall stop all operations until the cause of pollution is eliminated;
- (d) the observance of the above provisions shall be subject to periodic checks in accordance with the requirements of the country of origin.

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<sup>1/</sup> All provisions, except Section 5.2, have been endorsed by the Codex Committee on Food Hygiene.

ANNEX I

CRITERIA FOR MICROBIOLOGICAL ANALYSES AT SOURCE

These analyses must include:

1. Proof of absence of pathogenic microorganisms.
2. The quantitative assessment of revivable microorganisms indicative of faecal contamination:
  - (a) colorimetry: negative result in at least 250 ml at 37°C and 44.5°C;
  - (b) absence of faecal streptococci in at least 250 ml;
  - (c) absence of sporulated sulphite-reducing anaerobes in 50 ml.
3. The assessment of the total number of revivable microorganisms per ml of water:
  - (a) in gelose:
    - (i) at 20°C - 22°C in 72 or 96 hours;
    - (ii) at 37°C in 24 hours;
  - (b) possibly in gelatine at 18°C - 20°C in 15 days.

With regard to Annex I the text proposed by Switzerland for consideration by the 12th Session of the Commission and by the Codex Committee on Food Hygiene was:

\*Criteria for microbiological analyses

1. Demonstration of the absence of parasites and of pathogenic microorganisms
  2. Determination of colony count indicative of faecal contamination
    - (a) absence of Escherichia coli and other coliforms in a 250-ml sample examined at 44.5°C and 37°C;
    - (b) absence of faecal streptococci in a 250-ml sample examined;
    - (c) absence of sporulated sulphite-reducing anaerobes in a 50-ml sample examined;
    - (d) absence of Pseudomonas aeruginosa in a 250-ml sample examined.
  3. Determination of colony count per ml of water in agar or agar-gelatine medium
    - (a) at 20°C - 22°C in 72 hours
    - (b) at 37°C in 24 hours.
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