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JOINT FAO/WHO FOOD STANDARDS PROGRAMME
CODEX ALIMENTARIUS COMMISSION
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REPORT OF THE EIGHTH SESSION
OF THE
CODEX COMMITTEE ON FOOD HYGIENE

Washington D.C.
14-13 June, 1971

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14 to 18 June 1971

Introduction

1. The Eighth Session of the Codex Committee on Food Hygiene was held at the Pan American Health Organization/WHO Building, in Washington, D.C., from 14 to 18 June 1971. The participants were welcomed on behalf of the Government of the U.S. by Mr. L. R. Shelton, Chairman of the Committee and Mr. G. Grange, Vice Chairman of the Codex Alimentarius Commission.
2. Participants and observers from 22 countries attended the session. The list of participants is contained in Appendix I to this Report.

Adoption of Agenda

3. The Committee adopted the proposed agenda unanimously in the order of items to be discussed. The delegation of Poland had some reservations regarding Item 7 of the Agenda dealing with various Codes of Hygienic Practice for Fish and Fishery Products, as it had not had time to study the working papers which arrived late due to postal difficulties.

Use of the Spanish Language

4. The Chairman informed the Committee that for the benefit of Spanish speaking delegates simultaneous interpretation into Spanish, in addition to English and French, would be provided for the two days of the session during which the proposed draft codes of hygienic practice for fish and fishery products were to be discussed. Furthermore, the relative working documents had been translated into Spanish. The Chairman agreed with the desirability that at future sessions of the Committee similar facilities in Spanish should be provided; however, it should be recognized that this session should not be construed as setting a precedent in this respect for future sessions.

Matters arising from the Report of the Sixteenth Session of the Executive Committee of the Codex Alimentarius Commission relevant to the Work of the Committee.

5. The Committee took note of the contents of a Secretariat oral report covering matters dealt with by the Executive Committee at its Sixteenth Session which were relevant to the work of the Committee. The report covered the following matters:
 - (a) Elaboration of proposed Draft Code of Hygienic Practice for Frozen, Pre-Cooked and Semi-Cooked Foods (See paras. 6, 7 and 8 of this Report)
 - (b) Process Definition in the Draft Code of Hygienic Practice for Quick Frozen Fruits, Vegetables and their Juices (See paras. 36-38 of this Report)

Proposed Draft Code of Hygienic Practice for Frozen, Pre-Cooked and Semi-Cooked Foods

6. The Committee took note of the guidance offered by the Executive Committee-which had been specifically requested -relative to the development of the Proposed Draft Code of Hygienic Practice for Frozen, Pre-Cooked and Semi-Cooked Foods (See document ALINORM 71/13, paras. 16 and 17 and ALINORM 71/3, para. 38).

7. Some delegations considered that if meat and meat products, fish and fishery products and possibly other commodities as well were removed from the Code under discussion because these foods would be covered otherwise, only specialty items would remain and these would not warrant a specific code of hygienic practice. A number of delegations were of the opinion, however, that overlapping could be minimized and thought that there was a need for the Code. It was further emphasized that the Code would be very useful for products containing mixtures of meat or fish with other foods.

8. It was agreed that the Canadian delegation, assisted by the Netherlands, would draft a new Scope Section of the Code. This draft would take account of the terms of reference of existing Codex Committees and of the proposed Committee on Meat Hygiene and other codes of hygienic practice and commodity standards. The proposal for the Scope Section would be sent to the Chairman of the Codex Committee on Food Hygiene and the Secretariat in Rome before 1 December 1971 and would subsequently be circulated to governments.

REVIEW OF RELEVANT MATTERS DISCUSSED BY OTHER CODEX COMMITTEES

Survey of Certain Provisions in the Hygiene Sections of Various Standards

9. The Committee noted the historical development of certain hygiene provisions in various commodity standards as presented in a working paper by the Secretariat (document no. CX/FH 71/9).

10. The Committee recognized and appreciated the reasoning behind the Secretariat's request "that due allowance being made for any difference in phraseology which might be necessary because of the different products being considered, it seemed desirable that the phraseology in the draft standards should be as uniform as possible." With this aim in mind the Committee reviewed in great detail references to microorganisms and their toxins included in various commodity standards, which, with minor variations read as follows:

"The product shall not contain any substances originating from microorganisms in amounts which are toxic" or

- (i) - "1. Microorganisms capable of development under normal conditions of storage shall not be present.
- (ii) - The product shall not contain any substances originating from microorganisms in amounts which are toxic."

11. In the discussions the crucial points proved to be the absence of qualifying statements regarding sampling, examination procedures and interpretation of results. The Committee after considering a number of proposals ultimately decided to recommend the following phraseology, relative to microbiological hazards and toxins:

"When tested by appropriate methods of sampling and examination, the product:

- (a) Should be free from microorganisms capable of development under normal conditions of storage; and
- (b) Should not contain any substances originating from micro-organisms in amounts which may be toxic."

It was recognized, however, that there may be need to refer specifically to pathogenic microorganisms in standards of some non-sterile products.

12. The Committee was well aware of the fact that until such time as internationally standardized methods for sampling and methods of analyses are generally agreed upon, the hygiene provisions on the microbiological condition of the product would remain different from country to country. For the time being, however, there appeared to be no alternative solution.

Codex Committee on Processed Fruits and Vegetables

13. It was observed that at the 8th Session (June 1971) of the above named Committee, the provisions related to microorganisms in the hygiene sections of the various standards- reviewed during the session- had been amended. This had been done to arrive at a uniform text as far as feasible, so that it was in line with the latest terminology agreed upon by the Joint ECE/Codex Group of Experts on Fruit Juices and the Codex Committee on Cocoa Products and Chocolate. The Commodity Committee considered the phraseology adopted suitable for all the standards for processed fruits and vegetables including those being submitted to the next Session (July 1971) of the Commission at Step 8.

14. The Committee on Food Hygiene, while appreciative of the uniformity in wording already achieved, decided to amend the provision dealing with microbiological criteria so that it would read like the approved text developed during the discussions recorded in paras. 9, 10 and 11 of this Report.

15. The hygiene sections in the standards for the processed fruits listed at the end of this paragraph thus read as follows:

"1. It is recommended that the product covered by the provisions of this standard be prepared in accordance with the Recommended International Code of Hygienic Practice for Canned Fruit and Vegetable Products (Ref. No. CAC/RCP 2-1969). (Recommended International Code of Hygienic Practice for Dehydrated Fruits and Vegetables including Edible Fungi **(in the case of Raisins) (Ref. No. CAC/RCP))**).

"2. To the extent possible in good manufacturing practice the product shall be free from (stones and other **(in the case of Raisins)) objectionable matter**.

"3. When tested by appropriate methods of sampling and examination, the product:

a. shall be free from microorganisms capable of development under normal conditions of storage; and

b. shall not contain any substances originating from micro-organisms in amounts which may be toxic."

Draft Standard for Canned Strawberries*	(Step 8) ALINORM 71/20 App.II
Draft Standard for Canned Plums	(Step 8) ALINORM 71/20 App.III
Draft Standard for Canned Raspberries	(Step 8) ALINORM 71/20 App.IV
Draft Standard for Canned Fruit Cocktail	(Step 8) ALINORM 71/20 App.VI
Draft Standard for Canned Pears	(Step 8) ALINORM 72/20 App.III
Draft Standard for Canned Mandarin Oranges	(Step 6) ALINORM 72/20 App.II
Draft Standard for Raisins	(Step 6) ALINORM 72/20 App.VI

16. The hygiene section in the standards for the processed vegetables (with the exception of tomato concentrate) listed at the end of this paragraph read as those for the canned fruits (para.15 of this Report) with an additional provision:

"4 The product shall have received a processing treatment sufficient to destroy all spores of Clostridium botulinum.

(Tomato Concentrate only):

"4. The diluted product (at approximately 8% natural tomato soluble solids) shall not contain mould filaments in a quantity indicative of unsuitable raw materials or unsanitary processing lines. A guide in determining compliance with these requirements would be a mould count, as determined by the Howard Method, not in excess of 50% positive fields, based on the diluted product (at approximately 8% natural tomato soluble solids)."

Draft Standard for Canned Mushrooms	(Step 8) ALINORM 71/20 App.VII
Draft Standard for Canned Asparagus	(Step 8) ALINORM 71/20 App.VIII
Draft Standard for Canned Green Peas	(Step 8) ALINORM 71/20 App.V
Draft Standard for Canned Green Peas	(Step 8) ALINORM 71/20 App.IV

Codex Committee on Cocoa Products and Chocolate

17. The Committee considered the hygiene provisions in the five standards presently being elaborated by the Committee mentioned above (doc. ALINORM 71/20, App. II-VI).

18. Some delegations drew attention to the need for specific provisions in the standards for cocoa products and chocolate relating to the absence of pathogenic microorganisms. Other delegations considered that there was no need for such a requirement nor for reference to the absence of microorganisms capable of development under normal conditions of storage.

19. The Committee decided that the hygiene requirements in these standards should relate only to freedom from toxic substances originating from microorganisms but agreed that information should be assembled on the possible incidence of pathogenic microorganisms in cocoa products and chocolate ready for consumption. The delegation of Switzerland agreed to collate this information.

20. The following provision was endorsed:

"When tested by appropriate methods of sampling and examination, the product shall not contain any substances originating from microorganisms in amounts which may be toxic."

(*) Note by the Secretariat: The CAC, at its 8th Session (July 1971) agreed to adopt the Standard at Step 8 of the Procedure of Codex Standards as a Recommended Standard.

Codex Committee on Food Additives

21. The Committee observed that endorsement was sought on the hygiene provisions in the Proposed Draft General Standard (Code of Practice) for Commercial Enzyme Preparations for Food Processing (doc. ALINORM 71/12, App. III). It was understood that depending on whether the draft under elaboration would develop into a

standard or code of practice, the Committee on Food Additives would phrase the hygiene provisions in an imperative or in an advisory form. The Committee discussed the provisions prepared by the Food Additives Committee at some length and endorsed the introductory paragraph and the provision contained in sub-section 6.1.

22. The Committee decided to amend the provision contained in sub-section 6.2 so that the text would read like the general text for hygiene provisions related to microbiological activity as recorded in para. 11 of this Report. The principal hazard being the possibility of rapid development of microorganisms present in the enzyme preparation when diluted for use. The Committee agreed on the following text:

"6.2 When tested by appropriate methods of sampling and examination, the enzyme preparation:

- (a) shall be free from pathogenic microorganisms;
- (b) shall not contain any substances originating from micro-organisms in amounts which may be toxic."

23. The delegation of Italy proposed to specify that the product should also be free from antibiotics. The Committee was of the opinion, however, that in view of the broad range of unspecified antibiotics which might

be present and with the existing technical limitations with regard to methods of detection, it was not practical to include this clause and perhaps not even a question of hygiene. Furthermore the issue was also covered in the Section on Essential Composition and Quality Factors.

24. The Committee was uncertain in interpreting the provision "6.3 - Enzyme preparations shall not contribute more microorganisms to the finished food product than the accepted level for that product." It was assumed to mean that the accumulative microbiological count of the enzyme preparation and the raw material should not exceed the limit set for the end product, however, no bacteriological specifications for products covered by Codex standards have been developed. Moreover, the addition of an enzyme preparation -even if it were sterile- often changed the stability of the product and this in itself could greatly promote the growth of microorganisms present in the basic materials.

The Committee decided to refer the particular specification back to the Committee on Food Additives with the request to clarify the intent of the specification.

Joint ECE/Codex Alimentarius Group of Experts on Standardization of Fruit Juices

25. The Committee was informed that at the Eighth Session (1971) of the above named Group of Experts, this body for practical reasons had not thought it desirable to include in the Standards for Fruit Juices a provision recommending that the product should be free from excessive mould, as there could be significant variations in opinion as to what constituted excessive mould. Furthermore, the Group of Experts were of the opinion that by reference in the hygiene provisions of the Standards to various relevant Codes of Hygienic Practice certain safeguards were provided (doc. ALINORM 71/14, paras. 37 and 52 (d)).

26. The Committee noted that the Group of Experts had adopted in the light of earlier discussions by the Food Hygiene Committee a provision regarding the possible use of the Howard Method for the mould count in tomato juice (doc. ALINORM 71/14A, para. 44).

27. The Committee was of the general consensus that the wording it had defined for the microbiological part of the hygiene provisions earlier during the meeting should be used for fruit juices too.

28. The hygiene sections in the standards for fruit juices listed below thus read as follows:

1. It is recommended that the products covered by the provisions of this standard be prepared in accordance with the Recommended International Code of Hygienic Practice for Canned Fruit and Vegetable Products (Ref. No. CAC/RCP 2-1969) and the Recommended International Code of Hygienic Practice for Quick Frozen Fruits, Vegetables and their Juices (Ref. No. CAC/RCP)
2. When tested by appropriate methods of sampling and examination, the product:
 - a. shall be free from microorganisms capable of development under normal conditions of storage; and
 - b. shall not contain any substances originating from microorganisms in amounts which may be toxic.
3. The product shall not contain mould filaments in a quantity indicative of unsuitable raw materials or unsanitary processing lines. A guide for determining compliance with these requirements would be a mould count, as determined by the Howard Method, not in excess of 30 percent positive fields.

Draft Standard for Apricot, Peach and pear Nectars Preserved Exclusively by Physical Means* (**)	(Step 8) ALINORM 71/14 App. II
Draft Standard for Orange Juice Preserved Exclusively by Physical Means* (**)	(Step 8) ALINORM 71/14 App. III
Draft Standard for Grapefruit Juice Preserved Exclusively by Physical Means* (**)	(Step 8) ALINORM 71/14 App. IV
Draft Standard for Lemon Juice Preserved Exclusively by Physical Means* (**)	(Step 8) ALINORM 71/14 App. V
Draft Standard for Apple Juice Preserved Exclusively by Physical Means* (**)	(Step 8) ALINORM 71/14A App. II
Draft Standard for Grape Juice Preserved Exclusively by Physical Means*	(Step 6) ALINORM 71/14A App. III
Draft Standard for Tomato Juice Preserved Exclusively by Physical Means* (**)	(Step 8) ALINORM 71/14A App. IV

* For the purpose of this Standard and at this time preservation by physical means does not include ionizing radiation.

** See footnote on page 4.

Codex Committee on Processed Meat Products

29. The Committee was informed about the progress made relative to the elaboration and the harmonization of Codex codes of hygienic practice for fresh meat and for processed meat products. It noted that the establishment of a separate Codex Committee on Meat Hygiene had been proposed, at the Fifth Session (1970) of the Codex Committee on Meat

and that the Sixteenth Session (February 1971) of the Executive Committee had favorably discussed this proposal, which now will be put forward to the Eighth Session of the Commission (July 1971). Under these circumstances the Committee agreed to postpone the consideration of the hygienic provisions as contained in the various standards for processed meat products at present under elaboration by the Commodity Committee and await the decision of the Commission regarding the establishment of a Codex Committee on Meat Hygiene.

30. It was considered that the terms of reference of the new committee might affect the work of the Committee on Food Hygiene concerning the endorsement of hygiene provisions in standards for processed meat products. It could be expected that the Code for processed meat products would be brought in line with the Code of Hygienic Practice of Fresh Meat and certain sections of the Code of Hygienic Practice for Processed Meat Products might subsequently be retained as mandatory provisions in one or more processed meat product standards.

31. The Committee recommended in the interest of guidance for the Codex Committee on Meat Hygiene (to be established), that the new Committee consider utilization of the newly endorsed phraseology relative to the microbiological part of the hygiene provisions in standards (see paras. 9, 10 and 11 of this Report).

Codex Committee on Fish and Fishery Products

32. The Committee discussed the hygiene provisions of some Standards presently being elaborated by the above named Committee.

33. There was general agreement that the Standards dealing with frozen fillets of various species of fish were adequately served with the hygiene provision as it stood (see para. 35 sub. 1). It was thought premature to make reference to the Code of Hygienic Practice for Handling Fresh and Frozen Fish under elaboration by this Committee.

34. Regarding the Standard on Canned Tuna and Bonito the Committee was of the opinion that because of the nature of the terminally sterilized product and the inherent potential hazard of botulism, more detailed provisions were required.

35. The Committee agreed on the following text for the hygiene section of the Proposed Draft Standard for Canned Tuna and Bonito in Water or Oil whereby not only the newly worded microbiological provisions were included, but also the end-product specification (see sub. 4 below) related to the canned product in the Proposed Draft Code of Hygienic Practice for Canned Fish.

1. It is recommended that the product covered by the provisions of this standard be prepared in accordance with the Recommended International Code of Practice - General Principles of Food Hygiene: (CAC/RCP 1-1969).
2. To the extent possible in good manufacturing practice the product shall be free from objectionable matter.
3. When tested by appropriate methods of sampling and examination, the product:
 - a. shall be free from microorganisms capable of development under normal conditions of storage; and
 - b. shall not contain any substances originating from micro-organisms in amounts which may be toxic.

4. Products with an equilibrium pH above 4.5 shall have received a processing treatment sufficient to destroy all spores of Clostridium botulinum, unless growth of surviving spores is permanently prevented by product characteristics other than pH.

Draft Standard for Frozen Fillets of Cod and Haddock* (**)	(Step 8) ALINORM 71/18 App. II
Draft Standard for Frozen Fillets of Ocean Perch* (**)	(Step 8) ALINORM 71/18 App. III
Draft Standard for Frozen Fillets of Plaice and Similar Species of Flat Fish*	(Step 6) ALINORM 71/18 App. IV
Proposed Draft Standard for Canned Tuna and Bonito in Water or Oil	(Step 5) ALINORM 71/18 App. V

Joint ECE/Codex Alimentarius Group of Experts on the Standardization of Quick Frozen Foods

36. The Committee had during its Seventh Session referred to the above named Group of Experts for endorsement a definition to cover quick frozen fruits, vegetables and their juices for the purpose of a (Step 8) Code of Hygienic Practice (doc. ALINORM 71/25, paras. 11 and 12). The Group of Experts considered the proposal but came to the conclusion that a uniform definition was to be preferred, whether for the purpose of a standard of a particular quick frozen food or for a code of hygienic practice covering the commodity group and, therefore, did not endorse the proposal made by the Food Hygiene Committee.

37. The Committee noted that matter pertaining to the definition would be discussed by the Commission. The delegation of Australia- author of the definition under consideration - briefly restated the arguments, foremost, that definitions are written to clarify, limit, or extend the meaning of terms, when such terms are used, and not to establish substantive requirements. Inclusion of substantive requirements in the scope permits a product which does not comply to escape the provisions of the code. Substantive provisions should be handled elsewhere in the code. (The particular requirements were related to sustaining the quality of the product.) The Committee put itself on record as reiterating its request to the Commission.

38. In considering the hygiene provisions in various standards for quick frozen products (listed at the bottom of this paragraph) the Committee decided to endorse the text as given in the Standards:

* These Standards will only contain provision 1.

** See footnote on page 4.

It is recommended that the product covered by the provisions of this standard be prepared in accordance with the Recommended International Code of Hygienic Practice for Quick Frozen Fruits, Vegetables and their Juices (Ref. No. CAC/RCP).

Draft Standard for Quick Frozen Strawberries (**)	(Step 8) ALINORM 71/25 App. II
Proposed Draft Standard for Quick Frozen Peaches	(Step 5) ALINORM 71/25 App. IV
Proposed Draft Standard for Quick Frozen Bilberries	(Step 5) ALINORM 71/25 App. V

Codex Committee on Foods for Special Dietary Uses

39. The Committee had at an earlier session received a notice of intent from the above named Committee regarding a Code of Hygienic Practice for Foods for Infants and Children. It was noted that the Committee on Dietetic Foods wished to defer the request for work by the Food Hygiene Committee on the proposed Code until a later date when a basic paper "Bacteriological Requirements and Microbiological Methods of Analyses for Baby and Infant Foods" would reach a more advanced stage of elaboration.

DRAFT CODE OF HYGIENIC PRACTICE FOR TREE NUTS - Considered at Step 7

40. The Committee considered the Draft Code of Hygienic Practice for Tree Nuts as contained in document ALINORM 70/13, Appendix III in the light of government comments received thereon. The Code, as revised by the Committee, is contained in Appendix II of this Report. The main points emerging from the Committee's deliberations were the following.

41. At the seventh session of the Committee (1970) the Scope of the Code was briefly discussed in the light of a directive from the Commission to determine whether coconuts were or were not covered by the Code. The Committee decided that coconuts were excluded, and governments were requested to inform the Committee of any other tropical tree nuts they wished to exclude from the Code. In the absence of any such comments the Committee agreed to the Scope as it stood.

42. On the basis of an amendment proposed by the delegation of the United Kingdom, sub-section IV.D.7(b)(i) "Optimum storage conditions for tree nuts" was extended to also cover storage of tree nuts at ambient temperatures in countries with a temperate climate. The provision now reads:

IV.D.7(b) Optimum storage conditions

- (i) For optimum conditions store at approximately 1°C (34°F) with a relative humidity from 60% to 70%. In temperate countries, nuts in shell and kernels may be stored in sound, dry warehouses at ambient temperatures.
- (ii) (remains unchanged)

43. Regarding Section V "End-Product Specification" the delegation of France queried whether parasites, etc. were covered by the wording as appearing in provision V.A: the products should be free from objectionable matter". Whereas in English there seemed to be no problem, the translation in French "substances inadmissibles" was considered defective in this respect and the following words were proposed "matieres inadmissibles".

(**) See footnote on page 4.

44. In dealing with provision V.B. relative to microorganisms and toxic substances originating from microorganisms the Committee agreed to amend it in the same way as was decided for the various Standards discussed earlier during the meeting. The provision now reads as follows:

- "B. When tested by appropriate methods of sampling and examination, the product:
- a. should be free from pathogenic micro-organisms; and
 - b. should not contain any substances originating from micro-organisms in amounts which may be toxic."

Advancement of Code for Tree Nuts to Step 8

45. The Committee agreed to advance the Draft Code of Hygienic Practice to Step 8 of the procedure for the elaboration of codes of practice, for consideration by the Commission at its ninth Session.

PROPOSED DRAFT CODE OF HYGIENIC PRACTICE FOR EGG PRODUCTS - Considered at Step 4

46. The Committee considered the Proposed Draft Code of Hygienic Practice for Egg Products as contained in document ALINORM 71/13, Appendix V in the light of government comments received thereon. The complete Code is contained in Appendix III of this Report at the present session of the Committee revisions were made in Section IV.D and onwards. The other Sections of the Code were revised at the seventh meeting of the Committee (see also document ALINORM 71/13, paras. 12, 13 and 14).

47. The Committee discussed at some length sub-section IV.D (2) Inspection and Sorting. Some delegations were of the opinion that the paragraph dealing with the handling of cracked eggs with shell membranes intact

dealt with the matter in too great detail and did not reflect actual practice in some countries and was therefore redundant. The Committee decided, however, to retain the paragraph since cracked eggs should be handled and examined carefully. The question was posed whether there should be a time limit set to cover the period between handling and breaking, but for various reasons this was not considered necessary.

48. In discussing the provision on the removal of shell fragments, blood spots and meat spots in sub-section IV.D.3(a) Breaking - individually, it was emphasized that hygienic practices should be observed for the removal of unwanted matter from individually broken eggs. The reworded text reads as follows:

"Hygienic Practices should be observed for the removal of shell fragments, and where customarily removed, for blood spots and meat spots."

49. In response to a proposal supported by some delegations to delete the provision contained in sub-section IV.D.3(b), the delegation of Australia briefly described a method for the bulk crushing of eggs. As this technique was unknown in most other countries some doubt existed about the necessity for coverage in the Code. However, after a lengthy discussion the provision was retained. The heading was amended from breaking -collectively" to "breaking by crushing" to accentuate clearly the method of operation. The delegation of the United States took exception to the method of bulk crushing as in its opinion the procedure did not allow for the elimination of unfit eggs.

50. The Committee considered the temperature requirements in sub-section IV.D.(3)(d)- Chilling. It was agreed that the temperature limit should be raised to 5°C (41°F) for liquid products which were to be held for more than 8 hours before further processing. It was further agreed that albumin should be treated in the same manner as other liquid products, i.e. chilled to a temperature not exceeding 7°C (45°F). The Committee realized that the margin between the temperature limits set for products to be processed within 8 hours after breaking or to be stored for a longer period had been reduced to such an extent as to make it desirable to consider whether there was a valid technical reason for maintaining this difference. Governments are requested to comment specifically on this issue.

51. Sub-sections IV.D.(3)(e) and IV.D. (3) (h) (ii) were amended to allow for the production of crystalline albumen by pan drying without prior pasteurization of the liquid

albumen; such a product should subsequently, however, be subjected to a heat treatment process to eliminate Salmonella.

52. The provision for the cooling after pasteurization of liquid egg yolk was reworded eliminating reference to the interim temperature of 10°C and reads as follows: "Liquid egg yolk should be cooled immediately after pasteurization as rapidly as possible to a temperature not exceeding 5°C (41°F)."

53. The Statement relative to Section V End Products-Specifications was modified to read as follows:

"The alpha-amylase test has been found to be valuable as an indication of the attainment of specific time/temperature relationships and may be used as an index of this attainment.

To test for the effectiveness of other time/temperature combinations, or other means of pasteurization or the possibility of post pasteurization contamination, appropriate methods of sampling and microbiological examination should be utilized to ensure the absence of salmonellae and other pathogens from the product."

Advancement of Code of Hygienic Practice for Egg Products

54. The Committee agreed to advance the Draft Code of Hygienic Practice to Step 5 of the procedure for the elaboration of codes of practice, for consideration by the Commission at its ninth Session.

Microbiological Examination of Low Acid, Heat Processed, Shelf Stable Foods in Cans, Glass and Retortable Pouches

55. Brief consideration was given to the above paper prepared by the United States and Canada. Detailed consideration was deferred, however, until the next session of the Committee to allow further examination of the paper by member delegations and particularly to solicit advice from experts in the field of food microbiology. These comments should be forwarded to the author country no later than 1 December 1971.

PROPOSED DRAFT CODES OF HYGIENIC PRACTICE FOR FISH AND FISHERY PRODUCTS

56. The Committee considered four proposed draft codes of hygienic practice for fish and fishery products at Step 2 of the Procedure:

Author Countries

- | | |
|-------------------------------------|--|
| (i) Molluscan Shellfish | United States and Italy |
| (ii) Handling Fresh and Frozen Fish | United Kingdom and Australia |
| (iii) Canned Fish | United States |
| (iv) Smoked and Semi-Preserved Fish | <u>United States and The Netherlands</u> |

57. Some delegations of Spanish speaking countries present at the Session expressed their appreciation of the simultaneous interpretation into Spanish of the Committee's deliberations on the above named codes.
(See also para. 4 of this Report.)

58. The delegation of Canada expressed concern about the duplication of effort involved in producing separate Codes of technological and hygienic practice. The FAO-Fisheries Department is currently involved in elaborating a number of codes of technological practice covering a variety of fish and fishery products. Technological codes for fresh fish and frozen fish have already been completed. It was explained that these codes are initially drafted by a small group of selected experts (Ad-Hoc Consultation) circulated for comments to fishery technologists and institutes around the world and finally redrafted by an expert group before referred to the Codex Committee on Fish and Fishery Products. In the opinion of the Canadian delegation food hygiene experts should be asked to take part in this work. Provisions for both technology and hygiene are interrelated and should be integrated into the documents covering specific fields for maximum usefulness in particular to fish handlers and processors.

59. The FAO Fisheries Department representative briefly introduced the two existing technological Codes, pointing out the hygiene provisions in these two codes. He indicated that FAO was aware that the codes were incomplete so far as hygiene provisions were concerned but that there would be no problem in adding any additional hygienic provisions which the Committee might wish to propose. On the basis of these statements the Committee discussed various possibilities on how to avoid duplication of work between the Ad-Hoc Consultation and the Food Hygiene Committee.

60. The Committee noted that its terms of reference clearly included responsibility for the development of hygiene codes for fish as well as for other products and therefore decided to continue with the elaboration of the various codes included in the agenda. The Committee agreed, however, that the FAO codes should be taken into account in its work.

61. The discussion of the various Codes of Hygienic Practice centered on general points. In particular, harmonization in the wording of provisions of the same nature in different codes was considered essential, and the points of demarcation for the various codes were set out. The delegation which presented oral comments on specific sections of the codes agreed to provide the author countries also with specific written comments and alternative wording for a revised text. These comments should reach the author countries not later than 1 December 1971. It was agreed that the four Codes should be retained at Step 2 of the Procedure. It was further agreed that certain of the provisions in the drafts were so specific that it would be impractical or even impossible to comply. The author countries agreed to make the necessary amendments.

Proposed Draft Code of Hygienic Practice for Molluscan Shellfish at Step 2

62. The Committee had before it the above named Code for discussion at Step 2. It was suggested to extend the list of species in the definition on shellfish with abalone. Regarding the end-product specifications the Committee agreed to use the same wording for the microbiological provisions as agreed on earlier during the meeting (see para. 11 of this Report). In discussing current laboratory procedures and standards the delegates agreed to provide information on laboratory procedures and standards as they are in use in their respective countries. It was further suggested that this section be extended so as also to cover laboratory procedures for processed shellfish and delegates were requested to provide relevant information.

Proposed Draft Code of Hygienic Practice for Handling Fresh and Frozen Fish at Step 2

63. The Committee discussed above named Code for Discussion at Step 2. The author countries explained it had been deemed advisable to produce one document

rather than to elaborate two codes, namely "Handling Fresh and Frozen Fish at Sea and on Shore" and "Fresh and Frozen Processed Fishery Products." The discussion focused on the scope of the code and the detailed specifications contained in Section IV A, Plant Construction and Layout. Suggestions were made by some delegates for inclusion in the Scope! Squid, Tunicates, Octopus, and shell-less Molluscs not covered by the Molluscan Code. Concerning the detailed specifications relating to construction the author countries indicated that this had been done to assist developing countries in planning the layout of fishery plants. Some delegates questioned such detailed specificity; however, after some discussion it was agreed to continue in this manner for this preliminary document. It was determined that certain sections of this document could be incorporated in other fishery codes due to their similarity.

Proposed Draft Code of Hygienic Practice for Canned Fish at Step 2

64. The Committee discussed the above mentioned Code at Step 2 of the Procedure. The Committee recognized the desirability of drafting similar phraseology in both the draft code for Handling Fresh and Frozen Fish and this code relative to Section IV dealing with Plant Facilities and Operating Procedures. Since the author countries of the Fresh and Frozen Fish document were instructed to re-draft their document with the benefit of specific written comments by member delegations, the Committee deferred detailed comment on Section IV.A(I) through IV.D.3. In the Section V End-Product Specifications the Committee agreed to amend the draft by inserting the microbiological provisions developed earlier during the Session (see para. 11 of this Report) and to retain the specific provision regarding Clostridium botulinum.

Proposed Draft Code of Hygienic Practice for Smoked and Semi-Preserved Fish at Step 2

65. The Committee discussed the above mentioned Code at Step 2 of the Procedure. The Committee decided that due to the broad diversity of semi-preserved fishery products, the scope of the document should be limited to smoked fish with consideration being given to additional codes for semi-preserved products at a later date. The Committee readily recognized the differences in the types and kinds of smoked fish products produced throughout the world. Further discussion revealed that the document as drafted centered primarily on only a small number of specialty items. Therefore, the author countries were requested to re-draft a document of a more general nature, in the light of the delegations' comments.

SUMMARY STATUS OF WORK

(prepared by Codex Alimentarius Commission-Secretariat)

1. CODES AND PAPERS UNDER CONSIDERATION BY THE COMMITTEE

Code/Paper	Status (Step)			to be dealt with by	Document ALINORM-App.	Working papers for next session
	8th Session (1971)		previous session			
	advanced	retained				
Tree Nuts	8			C'ssion 9th	72/13-II	
Egg Products	5			" 9th	72/13-III	
Mollusc. Shellf.		2		F.H.Cttee 9th		CX/FH 72/2°
Handling Fresh & Frozen Fish		2		" " 9th		CX/FH 72/3°
Canned Fish		2		" " 9th		CX/FH 72/4°
Smoked Fish		2		" " 9th		CX/FH 72/5°
Semi-pres. Fish		-		F.H. Cttee Future		
Micro-biol. Exam. of Low Acid, etc. Foods	info-paper			F.H.Cttee 9th		distributed by USA May, 1970
Frozen Precooked Foods		2		" " 9th	-	
Desicc. Coconut			8	C'ssion 8th*	71/13-II	
Dehydr. Fruits & Vegs. Including Edible Fungi			8	" 8th*	71/13-III	
OF Fruits. Vegs. & their Juices			8	" 8th**	71/13-IV	
Poultry & Poultry Parts			5	" 8th***	71/13-VI	

o) not yet distributed

*) adopted at Step 8 by CAC 8th Session, July 1971

***) retained at Step 8 by CAC 8th Session, July 1971

****) advanced to Step 6 by CAC 8th Session, July 1971 to be dealt with by F.H. Committee, 9th Session

2. MATTERS OF SPECIFIC INTEREST TO OTHER COMMITTEES

<u>Codex Committee</u>	<u>Paragraphs</u>
- Processed Fruits and Vegetables	9, 10, 11, 12, 13, 14, 15, 16
- Cocoa Products and Chocolate	9, 10, 11, 12, 17, 18, 19, 20
- Food Additives	9, 10, 11, 12, 21, 22, 23, 24
- Joint ECE/Codex Alimentarius Group of Experts on Standardization of Fruit Juices	9, 10, 11, 12, 25, 26, 27, 28
- Processed Meat Products	9, 10, 11, 12, 29, 30, 31
- Fish and Fishery Products	9, 10, 11, 12, 32, 33, 34, 35
- Joint ECE/Codex Alimentarius Group of Experts on Standardization of Quick Frozen Foods	9, 10, 11, 12, 36, 37, 36
- Foods for Special Dietary Uses	9, 10, 11, 12, 39
- Meat Hygiene	9, 10, 11, 31

3. WORK UNDERTAKEN BY VARIOUS COUNTRIES

Proposed Draft Code of Hygienic Practice for Frozen, Pre-Cooked and Semi-Cooked Foods

Canada assisted by Netherlands to draft new Scope Section. Deadline: 1 December 1971 (See para 8 of this Report)

4. REQUEST FOR SPECIAL COMMENTS TO BE SENT TO AUTHOR COUNTRIES

Microbiological Examination of Low Acid, Heat Processed, Shelf Stable Foods in Cans, Glass and Retortable Pouches

Specific comments regarding the above-named paper are requested before 1 December 1971; to be sent to:

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Food and Drug Directorate
Department of National Health and Welfare
Ottawa
Canada

(See para 55 of this Report)

Proposed Draft Codes of Hygienic Practice for Fish and Fishery Products

Specific comments and alternative wording for a revised text are requested on the following Codes of Hygienic Practice which were distributed prior to June 1971. Deadline for comments: 1 December 1971; to be sent to the author countries.

-Molluscan Shellfish	U.S.A.	Head of Delegation	
-Handling Fresh and Frozen Fish	U.K.	" " "	See
-Canned Fish	U.S.A.	" " "	App. I
-Smoked Fish	U.S.A.	" " "	

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JOINT FAO/WHO CODEX ALIMENTARIUS COMMISSION
CODEX COMMITTEE ON FOOD HYGIENE

Proposed Draft Code of Hygienic Practice for Egg Products
(advanced to Step 5)

To be read in conjunction with the General Principles of Food Hygiene. Side-lined portions 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

This Code of Practice is designed to:

- A. Prevent deterioration in the quality of eggs in shell intended for processing into egg products.
- B. Prescribe a code of hygienic practice for the production for human consumption of whole egg, egg albumen, egg yolk, and other products consisting wholly or mainly of one or more of the constituents of egg.
- C. Prescribe a code of hygienic practice relating to premises, plant, equipment, and personnel used or engaged in the production of these products.

Unless specifically stated otherwise, the word "egg" in this code relates to domesticated chickens' eggs intended for processing as above.

SECTION II - DEFINITIONS

(To be developed if necessary)

SECTION III - RAW MATERIAL REQUIREMENTS

- A. Environmental Sanitation in Production Areas
 - (1) As in the General Principles of Food Hygiene.
 - (2) Animal, plant pest and disease control. Where control measures are undertaken, treatment with chemical, biological or physical agents should be done only in accordance with the recommendations of the appropriate official agency, by or under the direct supervision of personnel with a thorough understanding of the hazards involved, including the possibilities of toxic residues being retained by the product.
- B. Sanitary Harvesting and Production of Raw Materials
 - (1) As in the General Principles of Food Hygiene.
 - (2) Sanitary techniques. To prevent deterioration in the quality of eggs intended for processing in accordance with this Code of Practice, it is essential that steps be taken to prevent:
 - a. Contamination of the shell with dirt, bedding materials or any other extraneous matter.
 - b. Exposures to unfavorable temperatures.

c. Rough handling.

Eggs should be collected at least twice a day or more frequently if necessitated by the climatic conditions and should be handled as little as possible.

Dirty eggs should preferably be dry cleaned either with simple hand equipment or with a dry cleaning machine. Where this is not practicable, dirty eggs should preferably not be washed on the farm. If however they are washed on the farm the eggs should be washed in water containing a detergent/sterilant approved by the official agency having jurisdiction and at an approved temperature.

- (3) Removal of obviously unfit materials. Unfit eggs should be segregated during collection to the fullest extent practicable, and should be disposed of in a manner such as will prevent contamination of other eggs or water supplies.
- (4) Protection of product from contamination. As in the General Principles of Food Hygiene but omitting last sentence and with the addition of the following:

Eggs should be stored in a cool room to which they should be taken immediately after collection. They should not be stacked or packed into boxes until they are cool, and the room should be kept free from strong smelling substances and odors. Eggs should be stored at such a temperature and relative humidity as will minimize deterioration having regard to local climatic conditions.

Thin-shelled or hair-cracked eggs should be carefully handled and packed in a separate container to prevent breakage before delivery to the breaking plant.

C. Transportation

- (1) Facilities. As in the General Principles of Food Hygiene with the addition of the following:

Eggs should be collected from the producers premises and delivered to the processing plant as soon as possible, and be maintained at such a temperature as will minimize deterioration having regard to local climatic conditions.
- (2) As in the General Principles of Food Hygiene but omitting last sentence.

SECTION IV - PLANT, FACILITIES, AND OPERATING REQUIREMENTS

A. Plant Construction and Layout

- (1) Location, size, and sanitary design. As in the General Principles of Food Hygiene with the addition of the following:

The construction and layout of the processing premises should be such as to secure a regulated flow in the process from the arrival of the eggs at the premises to the finished product, and should provide for correct temperature storage at all stages of the process.

- (2) Sanitary facilities and controls.

(a) Separation of processes. As in the General Principles of Food Hygiene with the addition of the following: Separate rooms should be provided for unpacking the eggs and storing the finished product. Breaking, pasteurizing, and filling should be so separated as to protect against cross contamination but where appropriate may be carried out in recognized areas of the same rooms.

(b), (c), and (d) As in the General Principles of Food Hygiene.

- (e) Plumbing and waste disposal. As in the General Principles of Food Hygiene with the addition of the following:

Drainage systems which include sumps or solid matter traps should be designed so as to allow them to be emptied. When located within the plant, sumps and solid matter traps should be emptied and thoroughly cleaned and disinfected at the close of every working day.

- (f) Lighting and ventilation. As in the General Principles of Food Hygiene with the addition of the following:

The illumination in any part of a workroom should be not less than 325 lux units (30 foot candles), and at points requiring close examination of the product they should be illuminated at an intensity of not less than 540 lux units (50 foot candles). Reflector filaments should be designed to allow easy dismantling, cleaning, and reassembling.

Ventilation should be planned to allow for adequate circulation or changes of air and to ensure that the direction of air flow is never from a dirty area to a clean one.

(g) and (h) As in the General Principles of Food Hygiene.

B. Equipment and Utensils

- (1) As in the General Principles of Food Hygiene.

- (2) Sanitary design, construction, and installation. As in the General Principles of Food Hygiene with the addition of the following:

Wooden equipment should not be used in the breaking, pasteurizing, or filling rooms.

All pumps, pipes, vessels, and contact surfaces should be of stainless steel or other approved material.

Containers for shell eggs moving into the breaking room and breaking tables should be of stainless steel, aluminum, or of plastic materials. Plastic materials used for this purpose should be free from cracks and scratches and should be capable of withstanding the regular cleaning and disinfection process.

- (3) As in the General Principles of Food Hygiene.

C. Hygienic Operating Requirements

- (1) Sanitary maintenance of plant, facilities, and premises. As in the General Principles of Food Hygiene with the addition of the following:

Whenever the process is stopped for approximately 30 minutes or more all hand breaking equipment and easily removable parts of breaking machines should be cleaned and disinfected. At the same time the surfaces of breaking tables should be cleaned, liberally hosed with clean water, and wiped dry with clean single use disposable cloth or tissues.

All equipment should be thoroughly cleaned and disinfected at all major breaks in work periods. Disinfection should always be carried out before commencement of the day's work. Steam condensate should not be allowed to remain in any equipment. Where "in-place" cleaning is carried out, pasteurizing equipment should be dismantled and cleaned at the end of each day's production and other equipment should be dismantled and cleaned when manual inspection indicates defective "in-place" cleaning.

The final stage of cleaning should be a thorough rinse with clean, hot water.

After disinfection plant and equipment should be handled as little as possible. Waste materials (including empty shells and reject eggs) should be stored in such a manner as not to cause a nuisance from offensive odors, flies, or other vermin. They should be removed from the premises at least once daily. Immediately after emptying, the receptacles should be thoroughly washed out with hot water and detergent, and the paved area used for storage of waste receptacles should be thoroughly cleaned and disinfected.

JOINT FAO/WHO CODEX ALIMENTARIUS COMMISSION
CODEX COMMITTEE ON FOOD HYGIENE

Draft - Code of Hygienic Practice for Tree Nuts

(Advanced to Step 8)

To be read in conjunction with the General Principles of Food Hygiene. Side-lined portions 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

This code of practice had been specifically designed for almonds (Prunus amygdalus) and walnuts (Juglans spp.) but is generally applicable to all tree nuts, including filberts (hazel nuts) (Corylus spp.), pecans (Carya illinoensis), brazils (Bertholletia excelsa), cashews (Anacardium occidentale), chestnuts (Castanea spp.), macadamia nuts (Macadamia spp.), etc.

In considering hygienic practices for tree nuts, two basic products are recognized--the inshell nut and the nut meats with specific and often different sanitation problems.

Further consideration has been given to the fact that a tree nut grower may deliver his product to the packer either in the shell or as nut meats.

The code of practice has been designed to set the basic hygienic requirements for orchards, farm processing (shelling and hulling), and/or commercial shelling or inshell operations.

It covers all tree nuts and tree nut products, including the blanched, diced, ground, and similar products, but does not include products where tree nuts are a minor ingredient.

SECTION II - DEFINITIONS

Blows. "Blows" are inshell nuts which are unusually lightweight due to extensive damage from physiological, fungous, insect, or other causes and which can be removed, for example, mechanically by air flow.

SECTION III - RAW MATERIAL REQUIREMENTS

A. Environmental Sanitation in Growing and Food Production Areas.

- (1) Sanitary disposal of human and animal wastes. Adequate precaution 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 hygienic hazard, and extreme care should be taken to protect the products from contamination with these wastes.

- (2) and (3) As in the General Principles of Food Hygiene. Sanitary Harvesting and Food Production.

B. Sanitary Harvesting and Food Production.

- (1) Harvesting. Tree nut harvesting procedures generally include shaking the trees and picking the nuts off the ground. Where nuts are picked off the ground, the orchard preferably should not be used for grazing or holding cattle or other animals. If the land has been so used, the orchard should be worked immediately prior to harvesting (disced, rototilled, or soil turned in some manner) to lessen the hazard of faecal contamination of tree nuts. Where the exclusion of animals and subsequent working of the land are impracticable, other steps should be taken to protect the nuts during harvesting; for example, the spreading of protective sheets below the trees.
- (2) Equipment and product containers. As in the General Principles of Food Hygiene.
- (3) Sanitary techniques. Harvesting and production operations, methods, and procedures should be clean and sanitary. This includes the hulling and drying of nuts that are generally considered part of the harvest or farm operation. Hulling and drying equipment should be so constructed that it can be easily cleaned and maintained. When water is used in this process, it must be potable water.
- (4) Removal of obviously unfit materials. Unfit nuts should be segregated during harvesting and production to the fullest extent practicable and should be disposed of in an appropriate manner. Following hulling it is recommended that all nuts be subjected to a defect separation and quality inspection before they are utilized for further processing into human food. Nuts should not be used for such processing unless they are free from obvious faecal contamination, infestations, decomposition and other defects, such as broken shells, imbedded dirt, blows, etc., to an extent which would render them unfit for human consumption.
- (5) Protection of nuts from contamination. Suitable precautions should be taken to prevent the nuts from being contaminated by domestic animals, insects, mites and other arthropods, vermin, birds, chemical or microbiological contaminants, or other objectionable substances during handling and storage. The nature of the nut and the methods of harvesting will indicate the type and degree of protection required. 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 have become infested with insects or other arthropods during or after harvesting, as a preventive measure suitable treatment such as fumigation should be applied. Nuts held for processing should be stored in closed containers, buildings, or under suitable type of covering that protects them from domestic animals, insects, mites and other arthropods, vermin, birds, chemical or microbiological contaminants, debris, and dust. Fumigation methods and chemicals used should be approved by legal authorities having jurisdiction. High humidities which are conducive to proliferation of mold and elaboration of mycotoxins should be avoided.

C. Transportation.

(1) and (2) As in the General Principles of Food Hygiene except the final sentence of (2) dealing with ice.

SECTION IV - PLANT FACILITIES AND OPERATING REQUIREMENTS

A. Plant Construction and Layout

(1) Location, size, and sanitary design. As in the General Principles of Food Hygiene.

(2) Sanitary facilities and controls.

(a), (b), (d), (e), (f), (g), and (h) As in the General Principles of Food Hygiene.

B. Equipment and Utensils.

(1), (2), and (3) as in the General Principles of Food Hygiene.

C. Hygienic Operating Requirements.

(1), (2), (3), (4), (5), (6) As in the General Principles of Food Hygiene (with the deletion of the introductory paragraph).

D. Operating Practices and Production Requirements.

(1) Raw material handling.

(a) Acceptance criteria. The raw material should not be accepted by the plant if known to contain decomposed, toxic, or extraneous substances which will not be removed to acceptable levels by normal plant procedures of sorting or preparation. Particular care should be taken to avoid contaminating either inshell nuts or nut meats with either animal or human fecal material, and if it is suspected that nuts have been so contaminated, they should be rejected for human consumption. Special precautions must be taken to reject nuts showing signs of mold growth because of the danger of their containing mycotoxins.

(b) and (c) As in the General Principles of Food Hygiene.

(2), (3), (4), and (5) As in the General Principles of Food Hygiene.

(6) Preservation of finished product. The finished product of shelled nuts or nut meats shall be of such a moisture content that they can be held under normal conditions without significant deterioration by decay, mold, or enzymatic changes. Finished products may be (a) treated with chemical preservatives at levels approved by the Codex Committee on Food Additives as referenced in the Commodity Standard; and (b) heat processed and/or packed in hermetically sealed container, so the product will remain safe and will not spoil under normal conditions.

(7) Storage and transport of finished product. The finished product should be stored and transported under such conditions as will preclude the development of pathogenic or toxigenic microorganisms; and protect against deterioration of the product or of the container.

- (a) All finished products should be stored in clean, dry buildings, protected from insects, mites and other arthropods, vermin, birds, chemical or microbiological contaminants, debris and dust.
- (b) Optimum storage conditions:
 - (i) For optimum storage conditions store at approximately 1°C (34 F) with a relative humidity from 60% to 70%. In temperate countries, nuts in shell and kernels may be stored in sound, dry warehouses at ambient temperatures.
 - (ii) Where nut products are stored under conditions in which they may become infested by insects and/or mites, appropriate methods of protection should be used regularly. Nut products should be stored in such a manner that they can be fumigated in situ or that they can be removed elsewhere for fumigation in special facilities (e.g., fumigation chambers, steel barges, etc.). Cold storage can be used, either to prevent infestation in localities where insects are likely to be present in ordinary storage or to prevent insects damaging the nut products.

E. Sanitary Control Procedures

As in the General Principles of Food Hygiene.

F. 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 its own or access to laboratory control of the sanitary quality of the nut products processed. The amount and type of such control will vary with the different nut products as well as the needs of management. Such control should reject all nuts that are unfit for human consumption. Analytical procedures used should follow recognized or standard methods in order that the results may be readily interpreted.

SECTION V - END-PRODUCTS SPECIFICATIONS

Appropriate methods should be used for sampling, analysis and determination to meet the following specifications:

- A. To the extent possible in good manufacturing practice, the products should be free from objectionable matter.
- B. When tested by appropriate methods of sampling and examination, the products:
 - (a) should be free from pathogenic microorganisms; and
 - (b) should not contain any substances originating from microorganisms in amounts which may be toxic.
- C. 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.

(2), (3), (4), (5), and (6) As in the General Principles of Food Hygiene.

- (7) Disposal of waste materials. Waste materials, including empty shells and reject eggs, should be removed regularly and frequently from processing rooms either in suitable containers or by means of conveyer belts or water troughs. Containers and any equipment used for such purposes as consolidating shells should be thoroughly cleaned and disinfected before return to the processing rooms, and the paved area used for the storage of waste receptacles should be cleaned and disinfected. Waste materials should be stored in such a manner as not to cause a nuisance from offensive odors, flies, or other vermin. They should be removed from the premises daily.

D. Operating Practices and Production Requirements

- (1) Raw material handling. On receipt at the plant, shell eggs should be stored in their cases in a cool clean room and processed as soon as possible. Cases should be stored in such a way as to permit cleaning underneath.

Eggs should be unpacked in a room completely separated from the processing rooms.

Egg cases and fittings should not be taken into the breaking room.
- (2) Inspection and sorting. Dirty eggs should be cleaned before breaking out.

Cracked eggs with shell membranes intact should be segregated in shallow containers constructed of suitable materials and should be carefully examined by experienced breakers before processing.

Cracked eggs with shell membranes broken should be dealt with as waste material, but if the breakage has occurred within the plant during candling or handling they should be segregated in a suitable receptacle used for this purpose only. Such eggs should be processed without delay.

Eggs should be candled before being passed into the breaking room. Where breaking by crushing is used special care is necessary during candling to eliminate defective eggs.

To avoid cross contamination, eggs other than chicken eggs should be segregated and handled and processed separately at the end of the day's processing of chicken eggs. All equipment should be thoroughly cleaned and sterilized before the processing of chicken eggs is resumed.
- (3) Preparation and processing.
 - (a) Breaking - individually. Eggs should be broken either by hand or machine into cups or trays and each egg should be inspected for odor and appearance.

Machines and containers should be of stainless steel or other suitable material and should be so constructed as to permit the ready elimination from the liquid egg supply of all egg contents that are unfit for further processing.

Egg substance having an abnormal odor or appearance should be rejected and removed, together with any contaminated breaking equipment. Such equipment should be thoroughly cleaned and disinfected before being used again. After handling rejected egg, the breaker should immediately wash his hands with odorless soap/detergent in hot water.

The separation of egg yolk from egg white should, where appropriate, be carried out by an approved separating device of sanitary design and construction.

Hygienic practices should be observed for the removal of shell fragments and, where customarily removed, for blood spots and meat spots.

- (b) Breaking by crushing. Bulk crushing machines used for breaking out eggs for the preparation of whole egg product should be of a suitable type and be so constructed and operated as to permit the ready elimination from the liquid egg supply of egg contents that are unfit for further processing.

Eggs which are to be broken out in bulk crushing machines should be candled within 24 hours of processing, provided that where the eggs are held under controlled temperature conditions so as to retard spoilage and the growth of microorganisms, they may be held for a period not exceeding 72 hours without recandling.

The eggs should be conveyed on rollers of stainless steel or other suitable material through a hot water bath at an approved and controlled temperature, rinsed under hot water sprays and afterwards air dried before being ejected on to a conveyor belt, constructed of suitable material, in the crushing section.

The eggs should be crushed to remove their contents, after which all shell fragments should be removed on the conveyor belt. At the end of each day's work the machines should be cleaned, scrubbed with a suitable sterilant, rinsed and wiped dry with a single-service cloth or tissue.

- (c) Straining and collection. The liquid egg should be strained either by suitable strainers, centrifuges or other suitable equipment. If strainers are used a supply of clean sterilized stainless steel, monel, or other suitable strainers should be available to enable frequent changes to be made. A clean, sterilized stainless steel or other suitable container should be used to collect liquid egg when strainers are being changed. This liquid egg should be added immediately to the receiving tank.
- (d) Chilling. After straining, liquid products which are to be held for more than 8 hours before further processing should be chilled rapidly to a temperature not exceeding 5°C (41°F). Liquid products which are to be held for less than 8 hours before further processing should be chilled to a temperature not exceeding 7°C (45°F) or in the case of liquid egg yolk 10°C (50°F). The liquid

product should preferably be pasteurized as part of a continuing process, but where this is not practicable, it may be held in suitably insulated storage tanks at a temperature not exceeding 5°C (41°F) for a period not exceeding 24 hours.

- (e) Pasteurization. All egg products, with the exception allowed for under IVD3.(h)(ii) should be pasteurized by an approved method acceptable to the official agency having jurisdiction.

The raw liquid whole egg should be pasteurized by being retained at a temperature not lower than 64 C (148°F) for at least 2% minutes. Other approved processes of heating to a temperature sufficiently high and for a time sufficiently long to ensure the destruction of Salmonella organisms, or other treatment which will give the same results, may be employed.

The pasteurization of liquid albumen and liquid egg yolk may require different time/temperature combinations. On completion of pasteurization, liquid products, other than egg yolk, should be immediately cooled to a temperature not exceeding 5°C (41°F).

Liquid egg yolk should be cooled immediately after pasteurization as rapidly as possible to a temperature not exceeding 5°C. (41°F).

The pasteurizing apparatus should include such devices as may be necessary to ensure a constant rate of flow of liquid egg, thermostatic control of the heating of the liquid egg, and the automatic diversion of flow of any liquid egg not sufficiently heated.

A continuous recording should be made of each pasteurization run, and charts showing pasteurization temperatures should be dated and kept available for inspection.

- (f) Storage. Pasteurized liquid egg may be held in sterilized, insulated, chilled and covered tanks fitted with a low speed agitation and a thermometer, or in sterilized oh urns, provided that the temperature of the egg does not exceed 5° C (41° F) during the holding period.

- (g) Packing and freezing.

- (i) Empty containers should be stored in a clean dry place and kept free from dust, vermin, insects and any foreign matter. They should be inspected immediately before use to ensure they are in a clean and satisfactory condition. Prior to filling, containers should, where applicable, be sterilized by steam or hot air, but if steam is used, they should be well drained before filling.

Open top cans with polythene liners, and corrugated or fibreboard containers using polythene and heat sealing mediums may also be used.

Only containers ready for immediate use should be kept in the filling room.

- (ii) The filling of containers should be a continuous process. The filled containers should be immediately sealed and taken to the freezing chambers without undue delay. Care should be taken during filling to avoid spillage and any excess egg should be removed with a single service cloth or tissue.
 - (iii) Containers should be stacked in the freezing chambers so as to permit free circulation of air around the containers.
 - (iv) The rate of freezing should be sufficient to prevent deterioration of the product and be completed within 24 hours of filling. After freezing, the product should be stored at a temperature not exceeding -18°C (0°F).
- (h) Drying.
- (i) The de-sugaring process should , where applicable, be carried out prior to pasteurization by an approved method acceptable to the official agency having jurisdiction.
 - (ii) Liquid albumen processed to form crystalline albumen, i.e. pan drying, may not have been pasteurized beforehand and thus should subsequently be subjected to a heat treatment process to eliminate salmonellae.
 - (iii) Drying should be carried out by an approved process. The drying plant used for the product should, where applicable, include a cyclone separation system in preference to the bag type separation,
 - (iv) The product should be continuously removed from the drying chamber, cooled, and packed as soon as possible into suitable containers. If the product was not de-sugared, it should be stored at a temperature not exceeding 10°C (50°F).
- (j) Transportation of liquid egg products in bulk.
- (i) Tanks or containers used for transporting liquid egg products should be constructed of stainless steel or other suitable material, be designed to facilitate cleaning, and should be adequately drained. They should be refrigerated or sufficiently insulated to maintain the egg product at a temperature of not more than 5°C (41°F), and should preferably not be used for any other purpose.
 - (ii) Pipes and connections used for the filling and discharge of the liquid egg products should be of suitable design and materials and should be sterilized before use.
 - (iii) During transit the temperature of the liquid egg product should not rise above 5°C (41°F).
 - (iv) Liquid egg products should not be discharged from a road tanker or mobile container into a vessel containing liquid egg product from a previous delivery.

- (v) Tankers, mobile containers and bulk storage tanks should be sterilized before being filled, and after emptying should be cleaned as soon as practicable. Delivery of liquid egg products from the compartment of a tanker should be to one point only. Pipes and connections should be sterilized before use and cleaned as soon as practicable after use.
- (vi) Bulk storage tanks should be refrigerated or suitably insulated to maintain the egg product at a temperature not exceeding 50C (41 °F), and, for long term storage, should be fitted with a slow speed agitator.
- (k) Defrosting of frozen egg products.
 - (i) When frozen egg products are being defrosted, they should be brought to their liquid state as quickly as possible, but with as little increase of the temperature of the product above 0°C (32°F) as possible.
 - (ii) Defrosted egg products should be used immediately.

E. Sanitation Control Programme

As in the General Principles of Food Hygiene.

F. Laboratory Control Procedures.

As in the General Principles of Food Hygiene.

SECTION V - END-PRODUCT SPECIFICATIONS

As in the General Principles of Food Hygiene with the addition of the following:

The alpha amylase test has been found to be valuable as an indication of the attainment of specific time/temperature relationships and may be used as an index of this attainment.

To test for the effectiveness of other time/temperature combinations or other means of pasteurization or the possibility of post-pasteurization contamination, appropriate methods of sampling and microbiological examination should be utilized to ensure the absence of salmonellae and other pathogens from the product.

THE ALPHA AMYLASE TEST

The alpha amylase test in relation to the heat treatment of whole egg is analogous to the phosphatase test which is used for testing the efficiency of the pasteurization of milk. It depends on the fact that heat destroys the alpha amylase activity in whole egg in proportion to the degree of heat treatment given.

The temperature and holding time for the pasteurization of bulked liquid egg is not less than 64 °C (148°F) for two and a half minutes, a time and temperature combination which is lethal to Salmonella organisms.

When untreated whole egg is mixed with a starch solution the alpha amylase present degrades the starch so that the normal blue violet colouration which occurs when iodine and starch are mixed does not develop. The intensity of the blue violet colour varies inversely with the amount of alpha amylase present. The alpha amylase test is therefore a test of the degree of heat treatment given to the whole egg mixture when it is pasteurized, and provides evidence that a satisfactory time/temperature combination has, or has not, been reached.

This annex is designed to help those who may be required to carry out the test on liquid whole egg.

THE TEST

1. The Examination of the Sample.

The sample of liquid egg should be tested as soon as possible after receipt at the testing laboratory, but it must be allowed to come to room temperature immediately before the test.

If the sample of liquid egg has to be stored before testing it should be kept below 40°F (approximately 4.5°C) and later brought to room temperature before carrying out the test.

Any samples which show signs of decay, or evidence of deterioration, should not be tested.

A sample which contains any sugar, citric acid, or salt of citric acid, or any substance which contains sugar, citric acid or any such salt, should not be sent for testing as these substances interfere with the reaction.

2. Precautions.

The following precautions must be taken:

- (a) distilled or de-ionized water must be used in the preparation of reagents or in the dilution of reactants;
- (b) contamination of liquid egg or reagents with saliva must be avoided;
- (c) all glassware must be clean and dry before use;
- (d) a fresh pipette must be used for each sample of liquid egg;
- (e) pipettes must not be contaminated with saliva;
- (f) in the event of a sample failing to pass the test, any glassware which has come into contact with the liquid egg must be thoroughly sterilized and cleaned as laid down in Section 5.

3. Reagents to be used.

- (a) Starch Solution. Different starches give a slight variation in performance which may affect both the shade and intensity of the colour that is produced. This variation does not in any way affect the basis of the test. The starch solution should be prepared as follows:

Weigh an amount of analytical reagent quality soluble starch equivalent to 0.70 g. of dry starch. The moisture content of the starch should be determined by drying a sample at 100°C or 212°F for 16 hours, (or at 160°C or 320°F for one hour) .

Mix this quantity of starch to a thin cream with cold water. Transfer the whole quantity of this cream to about 50 ml of boiling water, boil for one minute and cool by immersion in cold water. Add three drops of toluene and dilute with water to 100 ml in a volumetric flask.

This solution must not be used if more than a fortnight old.

- (b) Solution of iodine; approximately milli-normal, as specified in the "British Pharmacopoeia", 1963, Appendix IIA.

This solution must be freshly prepared before use, but may be made by dilution from a stronger solution with appropriate adjustment of potassium iodide concentration.

A stock solution can be made from 12.7 g of iodine dissolved in a solution of 25 g of potassium iodine in 30 ml water, and made up to one litre with water to give an approximately N/10 solution.

- (c) Solution of trichloroacetic acid: 15 percent weight in volume aqueous solution of trichloroacetic acid of analytical reagent quality.

4. Apparatus.

The following may be used:

- (a) Graduated pipettes Grade B bulb 2 ml , 5 ml , and 10 ml , or Grade B bulb 2 ml and Grade A 10 ml straight-sided.
- (b) Grade B volumetric flasks of 100 ml and 1,000 ml capacity.
- (c) A 50 ml measuring cylinder.
- (d) Filter funnels of 3-4 in. diameter.
- (e) Whatman No. 12 fluted filter papers of 12.5 cm diameter or equivalent.
- (f) Wide neck conical flasks of 100 ml capacity and/or universal containers.
- (g) Test tubes approximately 7" x 1".
- (h) Burettes and automatic syringes may be used for measuring iodine, trichloroacetic acid, and distilled water.
- (i) A water bath capable of maintaining at a temperature of 44°C + 0.5°C (111.2°F ± 0.9° F).

5. Cleaning and Care of Apparatus.

- (a) After use all glassware should be rinsed in water and adhering egg washed off, if necessary with N/10 sodium hydroxide. The glassware

must then be washed with chromic or dilute hydrochloric acid, followed by a thorough rinsing with water and distilled water.

- (b) Apparatus used for samples which have failed the test should be sterilized in a bactericidal solution of hypochlorite or carbolic acid before cleaning.
- (c) New glassware should be cleaned by soaking in chromic or dilute hydrochloric acid solution and then rinsed in warm water, rinsed in distilled water, and finally dried.
- (d) Glassware used for the test shall not be used for any other purpose and must be kept apart from all other apparatus in the laboratory.

6. Method of Carrying out the Test.

Weigh out 15.0 g of the sample of liquid egg into a 100 ml conical flask or universal container, or a 7" x 1" boiling tube can be used if stoppered.

Add 2.0 ml of the starch solution and mix thoroughly.

If the egg is at all viscous, it may be difficult to ensure that the egg and starch are properly mixed. As this is essential the egg and starch should be mixed as well as possible before, during, and after incubation.

Place the mixture in the water bath for 30 minutes at $44^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$. Remove from the water bath, shake, and with the minimum of delay add 5 ml of this mixture to 5 ml of trichloroacetic acid solution contained in a 100 ml conical flask. Shake and mix thoroughly again. Add 15 ml water and shake and mix again.

Remove the suspended matter by filtration or centrifugation. Add 10 ml of the clear filtrate (after rejecting the first runnings), or the supernatant liquor, as the case may be, to 2 ml of the solution of iodine.

7. Interpretation.

A standard Lovibond Comparator Disc 4/26 containing seven reference colour standards, and designed for use with a Special Purposes Comparator and 25 mm cells may be used for determining the colour.

There are many intershades between blue and violet and those on the standard disc indicate the likely range.

The sample shall be deemed to have passed the alpha amylase test if the filtrate, or liquor in the solution of iodine immediately turns a blue violet colour. For this purpose colours which are more blue-violet than No. 3 on the Standard Lovibond Comparator Disc 4/26, or of a comparable spectrophotometric standard, shall be taken as satisfactory. With 1 cm cells using a wave length of 585 m μ the comparable spectrophotometric standard, compared against water, has an optical density of 0.15.