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JOINT FAO/WHO CODEX ALIMENTARIUS COMMISSION  
Fifth Session, Rome, 19 February - 1 March 1967

REPORT OF THE FOURTH SESSION  
OF THE  
CODEX COMMITTEE ON FOOD HYGIENE

Washington, D.C.  
12-16 June 1967

JOINT FAO/WHO FOOD STANDARDS PROGRAM

CODEX ALIMENTARIUS COMMISSION

COMMITTEE ON FOOD HYGIENE

Report of the Fourth Session, 12-16 June 1967, Washington, D. C., United States of America.

1. The Fourth Session of the Codex Committee on Food Hygiene was held from 12-16 June 1967, at the Pan American Health Organization/WHO Building in Washington, D. C, by the Government of the United States of America, under the chairmanship of Mr. L. R. Shelton (U.S.A.). The List of Participants is contained in Appendix I (omitted). The Agenda as proposed was adopted with a slight rearrangement of the order of items of business.

Matters referred to Codex Committee on Food Hygiene by the Fourth Session of the Codex Alimentarius Commission, and by the Tenth Session of Executive Committee of the Commission.

2. The Chairman of the Codex Alimentarius Commission, Professor Dols, introduced the discussions on this topic and pointed out the request of the Commission in paragraph 74 of the report of the Fourth Session that the advisory and mandatory portion of the Codes of Hygienic Practices should be clearly distinguished. It was also pointed out that the Executive Committee in paragraph 13 of the report of its Tenth Session had agreed "on the importance of non-mandatory Codes of Hygienic Practices to complement the standards. It was noted, however, that the Statutes of the Commission did not appear to provide for the elaboration of Codes of Hygienic Practice. The Executive Committee agreed that Codes of Hygienic Practices should be regarded as being in the nature of advice to Governments, formulated by an international body of experts, as to procedures which might be followed for the handling, preparation, packaging, and distribution of foods and which would materially contribute to the purposes of the Codex Alimentarius Commission. Such Codes of Hygienic Practices might not, however, be submitted to Governments for formal acceptance, although it might be preferable that they be published in relation to the Codex Alimentarius and distributed to Governments through the Codex Procedure. The Executive Committee asked the (Codex) Secretariat to draw up a paper on the subject for the next session of the Committee." The meeting was also informed that the Executive Committee in discussing the format had adopted the following statement (see paragraph 17 of the Report of the Tenth Session of the Executive Committee), subject to any comments by the Codex Committee on General Principles and finally, by the Commission, in which it was indicated that this was to be used by the Codex Commodity Committee as a guide in presenting their standards and that there would be a section in each standard relating to hygiene.

"Reference should be made to any hygiene standard applying to the food and any specific mandatory hygiene provisions considered necessary should be included in this section. They should be prepared in accordance with paragraph 13(d) of the Guidelines for Codex Committees. Reference may be made to applicable Codes of Hygienic Practices as an annex to, but not as a part of the standard. The following statement(s) may also appear:

The following provisions in respect of the food hygiene of this product are subject to endorsement (have been endorsed) by the Codex Committee on Food Hygiene."

After some discussion the meeting agreed to concern itself mainly with the substance and technical aspects in the Codes of Hygienic Practices and in particular to devote attention to determining which portions of each Code of Hygienic Practice are advisory and which portions are mandatory.

In view of the consideration to be given to the problem of Codes of Hygienic Practices in the Codex Committee on General Principles in October 1967, and the consequent decision to be made by the Commission on this matter, the national delegates to this committee were requested to make sure that their country's delegate to the Codex Committee on General Principles and the Codex Alimentarius Commission should be fully informed of the importance which this Committee attaches to the Codes of Hygienic Practice.

3. Concerning the Commission's request to indicate, clearly which were the advisory parts and which were the mandatory parts of the standards, it was the opinion of the Committee that all the provisions of these documents are of great importance and are essential to the hygienic production of food. The Committee was, however, in some doubt about the meaning of the term "mandatory" as used by the Commission and proceeded on the basis that the expression means those provisions or standards which are subject to the full procedure for the elaboration and formal acceptance for Codex Standards.

The Committee called attention to its definition of Food Hygiene (Paragraph 5) and wished to emphasize that the rules and methods of hygienic performance constitute a continuous process, and that each element is important to each other and to the whole. It recognized, moreover, that the application of these rules and methods cannot be verified in all cases at a later point of time and that in some respects it depends essentially on supervision, which at official levels (local, national, or international) may not always be possible. For these reasons, the Committee took the view that the hygiene rules should not follow the formal acceptance procedures of the Codex Alimentarius and in this sense would not be "mandatory." The Committee strongly recommended, however, that national Governments should endorse the principles as expressed in the General Principles of Food Hygiene and in the Codes of Hygienic Practice and develop legislation designed to encompass the objectives set forth in them.

4. The Committee referred to the Codex Committee on General Principles for interpretation of the statement in the General Principles of the Codex Alimentarius (paragraph 3(1)) that "Codex (commodity) standards should incorporate by reference the applicable hygiene provisions." The General Principles Committee should consider all implications of this statement and in particular whether referencing makes a provision "mandatory." If this is interpreted in a sense which does not permit the accomplishment of the purposes of the Food Hygiene Committee as indicated at various places in this report, this Committee recommends to the General Principles Committee and the Commission that changes should be made in this statement to make it clearer and less restrictive.

5. The Commission at its Fourth Session decided that the Codex Committee on Food Hygiene should be requested to define 'food hygiene', "for the purposes of the General Principles of the Codex Alimentarius in its widest sense and irrespective of whether the Committee would be concerned with all aspects of the definition in its work."

"The Commission recommended that any definitions required for use in Standards by Codex Committee should be prepared by the Committee concerned. The Codex Committee on General Principles would be responsible for reconciling any differences among conflicting definitions of the same term."

After discussion of the draft presented by the working party, the Committee agreed on the following definition:

"Food hygiene comprises conditions and measures necessary for the production, processing and distribution of foods designed to ensure a safe, sound, wholesome final product fit for human consumption."

The Committee noted that the definition should be understood to include the concept of cultural and aesthetic acceptability.

6. The Codex Committee on Food Hygiene wished to make known to the Commission its concern over the possible duplication of its work in the field of food hygiene by the Joint WHO/FAO Expert Committee on Food Hygiene (Food Microbiology). It was explained by the representative of WHO that this Expert Committee, mentioned above, would initially be concerned with the problem of the prevention of the transmission of pathogens by food and will develop technical tests and norms which will be advisory recommendations. It would then be for the Codex Committee on Food Hygiene, at which governments are represented, to consider whether or not these recommendations could be used in Codex Standards as substantive requirements or be dealt with in some other way. The Committee decided to ask the Codex Alimentarius Commission for a clear separation and definition of the interrelated work of the two committees, as has been done in the case of the committees dealing with food additives and pesticide residues. It was realized that this point was dealt with in part by the new terms of reference for the Codex Committee on Food Hygiene and these were accepted by the Committee without revision, as follows:

- (a) to draft basic provisions on food hygiene applicable to all food;
- (b) (i) to consider, amend if necessary, and endorse provisions on hygiene prepared by Codex Commodity Committees and contained in Codex commodity standards,  
or  
(ii) to draft provisions on hygiene in respect of a particular food coming within the terms of reference of a Codex Commodity Committee at the request of that Committee;
- (c) to draft, where necessary, provisions on hygiene in respect to any food not assigned to any Codex Commodity Committee;
- (d) to consider specific hygiene problems assigned to it by the Commission.

7. The Committee discussed ways and means for assisting developing countries in their food hygiene problems. The Committee believes that the General Principles of Food Hygiene will afford guidance in this connection, although it is realized that problems in developing countries may be concerned largely with raw materials for which the scope of activity of the Codex Alimentarius is limited according to the General Principles of Codex Alimentarius. Where questions arise it is suggested that they be addressed to the FAO/WHO Secretariat who in turn would solicit advice from competent technical authorities, and where appropriate, refer such questions for further guidance to the Codex Committee on Food Hygiene.

8. With reference to food hygiene problems involving particular technical problems (e.g. food microbiology), and practices applicable to developing countries, the Committee noted with satisfaction the program and activities of FAO and WHO aimed at meeting such problems by educational efforts. Specifically, the Committee endorsed such activities as the meeting of the Joint FAO/WHO Expert Committee on Food Hygiene (Food Microbiology) scheduled for October 1967, to consider technical problems in food microbiology and special problems of developing countries, and the Joint FAO/WHO Inter-regional Seminar on Food Borne Diseases and Food Hygiene Practices, to be held in New Delhi (October 1967) where technical representatives of developing countries will discuss particular questions with experts in this field. In the latter connection, training courses in food hygiene designed especially for developing countries would serve a most useful purpose for improving local food hygiene practices. This would in turn assist the developing countries in meeting specific requirements and in using hygiene practices which would enable them to participate to a greater extent in Codex activities.

9. In accordance with the request in paragraph 57 of the Report of the Fourth Session of the Codex Alimentarius Commission, the Committee accepted again the task of developing a Code of Hygienic Practice for Poultry Meat, and intends to consider at its next meeting a redraft of the material by the United Kingdom delegate on this topic presented at earlier meetings, bearing in mind the work of the Joint FAO/WHO Expert Committee on Meat Hygiene.

#### Consideration of the General Principles of Food Hygiene.

10. The revised version of the General Principles of Food Hygiene is given in Appendix II. The Committee did not designate a step in the procedure for the Elaboration of Standards for this document in view of the open question of the position of it in the Codex Alimentarius.

11. In the discussion of general points on the General Principles for Food Hygiene, the Committee considered the written comments of Austria that food hygiene standards should be developed on a regional basis. As this is a procedural matter, it was referred to the Commission. However, the Committee did emphasize that the Codes of Hygienic Practices were of an advisory nature and was of the opinion that it was only to develop world-wide Codes of Hygienic Practices.

12. The Committee, in answer to the objections raised in the Fourth Session of the Commission (paragraph 74) on the "Introduction" to the General Principles of Food Hygiene stressed that this was intended only as an introductory preface to indicate the purposes of the General Principles and did not form part of the document on General Principles. In future, the document will appear without this introduction. The Committee drew attention to the fact that the General Principles of Food Hygiene are intended to provide a basis for establishing Codes of Hygienic Practice which will insure uniformity of practices in handling individual commodities. In addition, in the case of the development of specific Codes of Hygienic Practice where no amplification is required, basic provisions from the General Principles may be incorporated into Codes of Hygienic Practices for that commodity verbatim. Furthermore, where no specific Code of Hygienic Practice is required for a product, the provisions of the General Principles of Food Hygiene will constitute the Code of Hygienic Practice for that product.

13. The Committee agreed after the consideration of the General Principles of Food Hygiene that the document was in its final form and should be submitted to all

commodity committees as the basis for their development of Codes of Hygienic Practice for the products for which they are elaborating standards.

14. Discussions were held by the Committee to increase the effectiveness of its work with reference to its responsibilities to the Codex Commission and the Codex Commodity groups. In addition to the recommendations made in paragraph 12 and 13 concerning the General Principles of Food Hygiene it was recommended that Codex Commodity groups carefully consider the General Principles in relation to their particular commodity product. Since food handling and processing procedures vary with each commodity, and this information is most readily available to particular Commodity groups, these groups should include clearly the following information in their referral to the Food Hygiene Committee of questions pertaining to food hygiene problems:

- (a) Their concurrence with, and applicability of particular recommendations of relevant sections of the General Principles of Food Hygiene.
- (b) Where practices with reference to a particular commodity are at variance with the General Principles, or are inapplicable, a clear statement should be made as to the reasons for this, and the specific procedures used.
- (c) information relevant to the End Product Specifications (Section V of General Principles).

On the basis of such information the Food Hygiene Committee would review the procedures and advise the Commodity Groups what further data are needed in order to arrive at a judgment with respect to food hygiene requirements.

#### Code of Hygienic Practice for Canned Fruit and Vegetable Products.

15. Appendix CF of Document CL-1966-24 which had been sent to Governments for comment at Step 6 of the Commission's procedure for the Elaboration of Standards was revised by the Committee in the light of specific comments from Governments. This Code was given priority in the work of the Committee since it had been requested by the Codex Committee on Processed Fruits and Vegetables. The revised text of the Code of Hygienic Practice is contained in Appendix III to this report. The Sidelined or underlined portions represented the points at which the document differs from the General Principles of Food Hygiene. This Code was referred to the Codex Committee on Processed Fruits and Vegetables for their use. It will also be referred to the Joint ECE/Codex Group of Experts on Fruit Juices for their use in connection with standards for canned fruit juices. The Committee did not designate a step in the procedure for the elaboration of standards for the reason stated in paragraph 10.

#### Draft Code of Hygienic Practices for Dried Fruits.

16. The Code of Hygienic Practice for Dried Fruits was given priority in the work of the Committee, since this Code will be needed by the Codex Committee on Processed Fruits and Vegetables. The revised text of the Code of Hygienic Practice for Dried Fruits is contained in Appendix IV of this report, and, as in the previous case, the sidelined or underlined portions represent the points at which the document differs from the General Principles of Food Hygiene. The Committee did not designate a step in the procedure for the elaboration of standards for the reason stated in paragraph 10. Governments will be asked to comment for the first time on these points of differences and the document is also submitted for use by the Codex Committee on Processed Fruits and Vegetables in its standards for dried fruits.

### Draft Code of Hygienic Practices for Quick (Deep) Frozen Fruits and Vegetable Products.

17. The Code of Hygienic Practice for these products was presented in a document, SP 10/55, November 1966, a first draft prepared by Switzerland, and was examined next in the order of priority since it is a response to a direct request to this Committee from the Joint ECE/Codex Group of Experts on the Standardization of Quick (Deep) Frozen Foods (see paragraph 8 in the report of the Third Session of the Codex Committee on Food Hygiene). The Code of Hygienic Practice for these products appears in Appendix V. The provisions relative to transport, storage, distribution, refreezing, and labelling appear in this standard as in the General Standard for Quick (Deep) Frozen Foods being elaborated by the Joint ECE/Codex Group of Experts on the Standardization of Quick (Deep) Frozen Foods. The Committee requested consideration by the Joint FAO/WHO Expert Committee on Food Hygiene (Food Microbiology) of the problem of indicating the exact significance of the statement "the products should be free from any pathogen infectious to man and from any toxic substance originating from microorganisms" in general terms and with particular reference to the problem presented by quick frozen products composed of raw (uncooked) fruits and vegetables. The use of a phrase in the end product hygienic specifications such as "the products should not contain microorganisms of a kind or in numbers indicative of insanitation or of potentially hazardous contamination" has not been inserted in any Codes of Hygienic Practice since the Committee has been advised that the Expert Committee will be considering this at some future date with a lower priority. The Committee agreed to send the Code of Hygienic Practice to the Frozen Foods Group and to Governments for a first round of comments on the sidelined and underlined portions which did not appear in the General Principles of Food Hygiene. The Committee draws the attention of the Frozen Foods Committee to the fact that there is also available for consideration a draft Code of Hygienic Practice for Precooked Frozen Foods. The attention of the Joint ECE/Codex Group of Experts on Fruit Juices and on Frozen Foods is also drawn to a draft Code of Hygienic Practice for frozen fruit juices. The Committee is deferring consideration of these documents pending receipt of a specific request from these Codex Commodity Committees.

### Requests to the Codex Committee on Food Hygiene From Codex Commodity Committees.

18. The attention of this Committee was drawn to the request of the Codex Committee on Fish and Fishery Products for guidance as to sanitary requirements on frozen fillets of cod and haddock, which included a number of figures for microbial counts. The Committee felt that it was premature to deal with such figures and asked the Codex Committee on Fish and Fishery Products for the further information which is needed to make sure that these figures represent reasonable limits for good manufacturing practice. It was also pointed out that caution would be needed in the interpretation of such results because of variations in analytical methods used and lack of uniform sampling procedures. The Committee concurred that the matter should be referred to the FAO/WHO Expert Committee on Food Hygiene (Food Microbiology). The Codex Committee on Food Hygiene would consider the advice of the Expert Committee, and then make recommendations on this topic to the Codex Committee on Fish and Fishery Products. The Expert Committee was asked to consider giving highest priority to the development of standardized methodology including sampling procedures for determining freedom from pathogens and toxic substances originating from microorganisms. The method for the examination of canned products for sterility was

considered and the Committee noted that there was at present no suitable generally recognized referee method including the necessary statistical sampling procedure for this test. Such a method is in process of development by the Association of Official Analytical Chemists.

With respect to the development of Codes of Hygienic Practice for various fish and fishery products and codes covering various facets of the fish industry, the Committee requested the Codex Committee on Fish and Fishery Products to indicate clearly the relationship between the various groups developing these Codes and, in particular, drew the attention of the latter committee to the fact that this Committee has for consideration draft Codes of Hygienic Practices for Molluscan Shell Fish and for Sanitation and Disinfection of Fish Processing Plants. The drafting of Codes of Hygienic Practices is referred to the Codex Committee on Fish and Fishery Products.

19. Concerning the reference from the Joint ECE/Codex Group of Experts on the Standardization of Fruit Juices, this Committee agreed that the Code of Hygienic Practices for Canned Fruit and Vegetable Products would apply to canned fruit juices, and drew the attention of the Fruit Juice Group to the requirements of the following paragraphs in the above-mentioned Code of Hygienic Practices, namely Paragraph IV, D (4) dealing with preparation and processing and Paragraph IV, D (6) dealing with preservation of the finished product, and in particular (6)(a) dealing with heat processing. It was suggested that these paragraphs might substitute for portions of their own standards. The Committee also noted that, since the Fruit Juice Group agreed to adopt the above-mentioned Code of Hygienic Practices, this would include the phraseology concerning pathogens given in Section V, B, namely that, "The products should be free from any pathogen infectious to man and from any toxic substance originating from microorganisms."

On the matter of mold counts, it was concluded that the methods should be the latest Association of Official Analytical Chemists methods, which is generally recognized as a referee method. It was noted that for some products technical developments have resulted in situations where it is necessary to wait on further scientific data before indicating specific values.

20. The Committee examined the paper, Codex/Fats and Oils/31 (Amended), submitted to it by the Codex Committee on Fats and Oils relative to the hygienic aspects of fats, oils and margarine and agreed with the Codex Committee on Fats and Oils that there is little general evidence to suggest that any special difficulties arise in the production of fats, oils and margarines which are not common to all foods and which will not, therefore, be covered by the General Principles of Food Hygiene. It also agreed that this being so, there was no need to prescribe special requirements relating to pathogenic organisms, although the Joint FAO/WHO Expert Committee on Food Hygiene (Food Microbiology) should consider the special methods needed for the examination of products of high fat content for pathogenic organisms.

The Committee agreed that tests should be laid down to ensure that crude oils and virgin oils are free from aflatoxins. The Committee noted that in the final stage of the discharge of lard from tankers, the tanks were scraped manually and the product was inevitably contaminated although it was eventually refined before use. The Committee strongly recommended that such "puddled" lard not be used for human consumption.

The Committee also agreed that all ingredients in margarine should meet the requirements of the General Principles of Food Hygiene or the appropriate Code of

Hygienic Practice for the commodity, and that any milk used in the production of margarine should be pasteurized.

21. The Committee agreed with the Codex Committee on Cocoa Products and Chocolate that the General Principles of Food Hygiene should apply to cocoa and chocolate themselves. Other ingredients, such as milk and egg products, will have to be considered under hygiene requirements for these products themselves. There would have to be a shared responsibility with other commodity committees if there are particular hygienic requirements for the cocoa ingredient of certain mixed products, such as chocolate milk. The Committee also pointed out that frequently yeast and mold counts are used in industry for certain cocoa products and requested the Codex Committee on Cocoa Products and Chocolate to consider whether they wish to develop end product hygienic specifications relating to these factors.

22. The attention of the Committee was drawn to the request of the Codex Committee on Sugars, but since suitably amended copies of the Secretariat paper on the hygienic aspects of sugars examined by that Committee at its 1966 meeting were not available, this Committee could reach no decision.

As in the case of microbial counts for fish products (see Paragraph 18), the Committee felt that it was premature to deal with such criteria in lactose and referred this question to the Joint FAO/WHO Expert Committee on Food Hygiene (Food Microbiology) in the same general context.

#### Draft Code of Hygienic Practice for Desiccated Coconut.

23. The draft Code of Hygienic Practice for this product was examined by the Committee next in the order of priority since it deals with a product of interest to some developing countries. The revised text of this draft Code is contained in Appendix VI to this report. The Committee draws to the attention of the Codex Committee on Food Labelling the provisions of this Code of Hygienic Practice with respect to marking the containers with the identification of the factory at which the product was manufactured, and also requested the Labelling Committee to take up the general problem of code-marking as an important part of food hygiene control measures. The Committee asked the Expert Committee on Food Hygiene (Food Microbiology) to take into account, as in the case of similar provisions in the frozen food and fish standards, the end product specification "product not to contain bacteria of the Salmonella group in a 50 gram sample." The Code of Hygienic Practice is to be sent to Governments for comment on the portions specific to this product, that is the sidelined portions in the document which differ from the General Principles of Food Hygiene. The document was drawn to the particular attention of Governments which are producers of desiccated coconut.

#### Code of Hygienic Practices for Egg Products.

24. The Committee examined the end product specifications in this document in a preliminary fashion. It was agreed that bacteriological tests are of great importance for this commodity and the use of the Enterobacteriaceae test should be referred to the Joint FAO/WHO Expert Committee on Food Hygiene (Food Microbiology). In addition, in this context the use of the alpha amylase test as a measure of pasteurization in relation to the bacteriology of egg products was also referred to this Expert Committee.

#### Other Business, Future Work, Date and Place of the Next Meeting.

25. The Committee had no other business on hand, but noted that it had not had time to consider the documents concerning Dehydrated Fruits and Vegetables, including

Edible Fungi and the documents on Tree Nuts. The documents on Frozen Pre-cooked Foods and Frozen Fruit Juices are to be the subject of a request from the pertinent commodity committee. The documents on Molluscan Shell Fish and Sanitation and Disinfection of Fish Processing Plants were referred to the Codex Committee on Fish and Fishery Products. The document on eggs will be considered at the next meeting of the Committee, as well as, a document on poultry. The Committee considered that the date and place of the next meeting is a responsibility of the Codex Alimentarius Commission.

JOINT FAO/WHO CODEX ALIMENTARIUS COMMISSION

CODEX COMMITTEE ON FOOD HYGIENE

General Principles of Food Hygiene

SECTION I - SCOPE

This document is intended to provide a basis for establishing Codes of Hygienic Practice which will insure uniformity in the hygienic handling of individual commodities.

The scope of each commodity Code of Hygienic Practice for a commodity or group of commodities should carefully delineate the product(s) involved and the operations to be covered. Raw materials intended for extraction or other destructive refining purposes need only be covered to the extent required adequately to safeguard the hygienic quality of the end product.

SECTION II - DEFINITIONS

Definitions should enumerate and define those terms unique to the products included, their production and distribution. The number of definitions used should be no more than needed to assure uniform interpretation of requirements. Where possible, consistency between Codes of Hygienic Practice should be maintained\*

SECTION III - RAW MATERIAL REQUIREMENTS

A. Environmental Sanitation in Growing and Raw Food Material Production Areas

- (1) Sanitary disposal of human and animal wastes. Adequate precautions should be taken to insure 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 products from contamination with these wastes, particularly those products that may be consumed without heat treatment.
- (2) Sanitary quality of irrigation water. Water used for irrigation should not constitute a public health hazard to the consumer through the product.
- (3) 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 possibility of toxic residues being retained by the crop.

B. Sanitary Harvesting and Production of Raw Food Materials

- (1) Equipment and product containers. Equipment and product containers should not constitute a hazard to health. Containers which are reused should be of such material and construction as will facilitate thorough cleaning, and should be so cleaned and maintained as not to constitute a source of contamination to the product.
- (2) Sanitary techniques. Harvesting and production operations, methods and procedures should be clean and sanitary.

- (3) Removal of obviously unfit materials. Unfit products should be segregated during harvesting and production to the fullest extent practicable and should be disposed of in such a place and in such a manner that they cannot result in contamination of the food and water supplies or other crops.
- (4) Protection of product from contamination. Suitable precautions should be taken to protect the raw product from being contaminated by animals, insects, vermin, birds, chemical or microbiological contaminants or other objectionable substances during handling and storage. The nature of the product and the methods of harvesting will indicate the type and degree of protection required.

C. Transportation

- (1) Facilities. Conveyances for transporting the harvested crop or raw product from the production area, 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 should be so cleaned and maintained as not to constitute a source of contamination to the product.
- (2) Handling procedures. All handling procedures should be such as will prevent the product from being contaminated. Extreme care should be taken in transporting perishable products to prevent spoilage or deterioration. 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 sanitary quality as required in Section IV - A - (2c).

SECTION IV - PLANT FACILITIES AND OPERATING REQUIREMENTS

A Plant Construction and Layout

- (1) Location, size and sanitary design. The building and surrounding area should be such as can be kept reasonably free of objectionable odours, smoke, dust, or other contamination; should be of sufficient size for the purpose intended without crowding of equipment or personnel; should be of sound construction and kept in good repair; should be of such construction as to protect against the entrance and harboring of insects or birds or vermin; and should be so designed as to permit easy and adequate cleaning.
- (2) Sanitary facilities and controls.
  - (a) Separation of processes. Areas where raw materials are received or stored should be so separated from areas in which final product preparation or packaging is conducted as to preclude contamination of the finished product. Areas and compartments used for storage, manufacture or handling of edible products should be separate and distinct from those used for inedible materials. The food handling area should be completely separated from any part of the premises used as living quarters.
  - (b) Water supply. An ample supply of cold water should be available and an adequate supply of hot water where necessary. The water

supply should be of potable quality. Standards of potability shall not be less than those contained in the "International Standards for Drinking Water", World Health Organization, 1963.

- (c) Ice should be made from water of potable quality and should be manufactured, handled, stored and used, so as to protect it from contamination.
- (d) Auxiliary water supply. Where non-potable water is used - for such purposes as fire control - it must be carried in completely separate lines, identified preferably by colour and with no cross-connection or backsiphonage with the lines carrying potable water.
- (e) Plumbing and waste disposal. All plumbing and waste disposal lines (including sewer systems) must be large enough to carry peak loads. All lines must be watertight and have adequate traps and vents. Disposal of waste should be effected in such a manner as not to permit contamination of potable water supplies. The plumbing and the manner of waste disposal should be approved by the official agency having jurisdiction.
- (f) Lighting and ventilation. Premises should be well lit and ventilated. Special attention should be given to the venting of areas and equipment producing excessive heat, steam, obnoxious fumes or vapours, or contaminating aerosols. Good ventilation is important to prevent both condensation (which may drip into the product) and mold growth in overhead structures - which growth may fall into the food. Light bulbs and fixtures suspended over food in any step of preparation should be of the safety type or otherwise protected to prevent food contamination in the case of breakage.
- (g) Toilet-rooms and facilities. Adequate and convenient toilets should be provided and toilet areas should be equipped with self-closing doors. Toilet rooms should be well lit and ventilated and should not open directly into a food handling area. They should be kept in a sanitary condition at all times. There should be associated hand-washing facilities within the toilet area and notices should be posted requiring personnel to wash their hands after using the toilet.
- (h) Hand-washing facilities. Adequate and convenient facilities for employees to wash and dry their hands should be provided wherever the process demands. They should be in full view of the processing floor. Single-use towels are recommended, where practicable, but otherwise the method of drying should be approved by the official agency having jurisdiction. The facilities should be kept in a sanitary condition at all times.

## B. Equipment and Utensils

- (1) Materials. All food contact surfaces should be smooth; free from pits, crevices and loose scale; non-toxic; unaffected by food products; and capable of withstanding repeated exposure to normal cleaning; and non-absorbent unless the nature of a particular and otherwise acceptable process renders the use of a surface, such as wood, necessary.

- (2) Sanitary design, construction and installation. Equipment and utensils should be so designed and constructed as will prevent hygienic hazards and permit easy and thorough cleaning. Stationary equipment should be installed in such a manner as will permit easy and thorough cleaning.
- (3) Equipment and utensils used for inedible or contaminating materials should be so identified and should not be used for handling edible products.

C. Hygienic Operating Requirements

While additional and more specific requirements may be established for certain products, the following should apply as minimal in all food production, handling, storage and distribution:

- (1) Sanitary maintenance of plant, facilities, and premises. The building, equipment, utensils and all other physical facilities of the plant should be kept in good repair and should be kept clean and maintained in an orderly, sanitary condition. Waste materials should be frequently removed from the working area during plant operation and adequate waste receptacles should be provided. Detergents and disinfectants employed should be appropriate to the purpose and should be so used as to present no hazard to public health.
- (2) Vermin control. Effective measures should be taken to protect against the entrance into the premises and the harbourage on the premises of insects, rodents, birds or other vermin.
- (3) Exclusion of domestic animals. Dogs, cats and other domestic animals, should be excluded from areas where food is processed or stored.
- (4) Personnel health. Plant management should advise personnel that any person afflicted with infected wounds, sores, or any illness, notably diarrhoea, should immediately report to management. Management should take care to ensure that no person, while known to be affected with a disease capable of being transmitted through food, or known to be a carrier of such disease microorganisms, or while afflicted with infected wounds, sores, or any illness, is permitted to work in any area of a food plant in a capacity in which there is a likelihood of such person contaminating food or food-contact surfaces with pathogenic organisms.
- (5) Toxic substances. All rodenticides, fumigants, insecticides or other toxic substances should be stored in separate locked rooms or cabinets and handled only by properly trained personnel. They should be used only by or under the direct supervision of personnel with a thorough understanding of the hazards involved, including the possibility of contamination of the product.
- (6) Personnel hygiene and food handling practices.
  - (a) All persons working in a food plant should maintain a high degree of personal cleanliness while on duty. Clothing including suitable headgear should be appropriate to the duties being performed and should be kept clean.
  - (b) Hands should be washed as often as necessary to conform to hygienic operating practices.

- (c) Spitting, eating and the use of tobacco or chewing gum should be prohibited in food handling areas.
- (d) All necessary precautions should be taken to prevent the contamination of the food product or ingredients with any foreign substance.
- (e) Minor cuts and abrasions on the hands should be appropriately treated and covered with a suitable waterproof dressing. Adequate first-aid facilities should be provided to meet these contingencies so that there is no contamination of the food.
- (f) Gloves used in food handling should be maintained in a sound, clean and sanitary condition; gloves should be made of an impermeable material except where their usage would be inappropriate or incompatible with the work involved.

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.
  - (b) Storage. Raw materials stored on the plant premises should be maintained under conditions that will protect against contamination and infestation and minimize deterioration.
  - (c) Water used for conveying raw materials, including sea water for the conveyance of fish and other marine products into the plant should be from such a source or suitably treated as not to constitute a public health hazard and should be used only by permission of the official agency having jurisdiction.
- (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. Such operations should be carried out in a clean and sanitary manner. Only clean, sound materials should be used in further processing.
- (3) Washing or other preparation. Raw materials should be washed as needed to remove soil or other contamination. Water used for such purposes should not be recirculated unless suitably treated to maintain it in a condition as will not constitute a public health hazard. Water used for washing, rinsing or conveying final food products should be of potable quality.
- (4) Preparation and processing. Preparatory operations leading to the finished product and the packaging operations should be so timed as to permit expeditious handling of consecutive units in production under conditions which would prevent contamination, deterioration, spoilage, or the development of infectious or toxigenic microorganisms.

- (5) Packaging of finished product.
  - (a) Materials. Packaging materials should be stored in a clean and sanitary manner and should not transmit to the product objectionable substances beyond limits acceptable to the official agency having jurisdiction and should provide appropriate protection from contamination.
  - (b) Techniques. Packaging should be done under conditions that preclude the introduction of contamination into the product.
- (6) Preservation of finished product. Methods of preservation and necessary controls should be such as to protect against contamination, infestation, or development of a public health hazard and against deterioration within limits of good commercial practice.
- (7) Storage and transport of finished product. The finished product should be stored and transported under such conditions as will preclude the contamination with, or development of pathogenic or toxigenic microorganisms or infestation and protect against deterioration of the product or of the container.

E. Sanitation Control Programme

It is desirable that each plant in its own interest designate a single individual, whose duties are preferably divorced from production, to be held responsible for the cleanliness of the plant. His staff should be a permanent part of the organization and should be well trained in the use of special cleaning tools, methods of disassembling equipment for cleaning, and in the significance of contamination and the hazards involved. Critical areas, equipment and materials should be designated for specific attention as part of a permanent sanitation schedule.

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 access to laboratory control of the sanitary quality 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 foods 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 PRODUCT SPECIFICATIONS

Microbiological, chemical, physical or extraneous materials specifications may be required depending upon the nature of the food. Such specifications should include sampling procedures, analytical methodology, etc., as required for the particular product.

JOINT FAO/WHO CODEX ALIMENTARIUS COMMISSION  
CODEX COMMITTEE ON FOOD HYGIENE  
Code of Hygienic Practice for Canned  
Fruit and Vegetable Products

To be read in conjunction with the General Principles of Food Hygiene (Appendix II GP, attached). Underlined parts in the text and 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 Hygienic Practice applies to fruit and vegetable products which are packed in hermetically sealed containers and which are processed by heat either before or after being filled into the containers.

SECTION II - DEFINITIONS

- A. Hermetically sealed means air-tight.
- B. Container means any hermetic enclosure for food including, but not limited to, metal, glass or laminated plastics.
- C. Heat processed means processed by heat to an extent which results in a product that is safe and will not spoil under normally expected temperatures of non-refrigerated storage and transportation.

SECTION III - RAW MATERIAL REQUIREMENTS

- A. Environmental Sanitation in Growing and Food Production Areas
  - (1) Sanitary disposal of human and animal wastes. Adequate precautions should be taken to insure 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 all food products from contamination with these wastes.
  - (2) and (3) - as in the General Principles of Food Hygiene.
- B. Sanitary Harvesting and Food Production
  - (1) (2), (3) and (4) - as in the General Principles of Food Hygiene.
- C. Transportation
  - (1) and (2) - as in the General Principles of Food Hygiene.

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) - as in the General Principles of Food Hygiene.
  - (b) An ample supply of hot and cold water should be available. The water supply should be of potable quality. Standards of potability shall not be less than those contained in the "International Standards for Drinking Water" World Health Organization, 1963.
  - (c) and (d) - as in the General Principles of Food Hygiene.
  - (d) Plumbing and waste disposal. All plumbing and waste disposal lines (including sewer systems) must be large enough to carry peak loads. All lines must be watertight and have adequate traps and vents. Disposal of waste should be effected in such a manner as not to permit contamination of potable water supplies. The plumbing and the manner of waste disposal should be approved by the official agency having jurisdiction.

Removal of solid or semi-solid wastes from the product preparation and canning areas should be on a continuous or near continuous basis using water and/or appropriate equipment so that these areas are kept clean and there is not danger of contaminating the product. Also they should be disposed of in a way that they cannot be used for human food. Waste materials should be disposed of in a place and in such a manner that they cannot contaminate food and water supplies and cannot offer harbourages or breeding places for rodents, insects or other vermin.

(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), and (6a-6f) - as in the General Principles of Food Hygiene.

D. Operating Practices and Production Requirements

(1) Raw material handling.

- (a) and (b) - as in the General Principles of Food Hygiene.
- (b) Water used for conveying raw material into the plant should be from a source or suitably treated as not to constitute a public health hazard and should be used only by permission of the official agency having jurisdiction.

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

(6) Preservation of finished product.

- (a) Heat processing. Products packaged in hermetically sealed containers should be so processed by heat as to result in a product that is safe and will not spoil under normally expected temperatures of non-refrigerated storage and transportation.

Processing conditions for specific formulations of canned foods should be based on the recommendations of technical specialists competent in canning technology. Such processing should be supervised in the cannery by technically competent personnel and be subject to check by the official agency having jurisdiction. Processing records adequate to identify the processing history should be kept and made available for inspection.

- (b) Cooling of processed containers. Where processed containers are cooled in water, the water should be of potable quality or suitably treated so as not to constitute a public health hazard. If cooling water is recirculated it should be effectively disinfected by chlorine or otherwise before use or each reuse.
- (c) Decrating and handling of processed containers. After processing and cooling, containers should be handled in such a manner as to avoid contamination of the product. Rough handling of processed cans, especially while they are still wet, should be avoided. Belts, runways and other processed can-conveying equipment should be maintained in good hygienic condition.
- (d) Inspection of processed containers. Containers should be inspected before labeling and casing and defective containers withdrawn.

(7) - as in the General Principles of Food Hygiene.

E. Sanitation Control Program - 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 access to laboratory control of the sanitary quality of 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 foods that are unfit for human consumption. Analytical procedures used should follow recognized or standard methods in order that the results may be readily interpreted. For certain products it may also be desirable to check the process by incubation of samples.

#### SECTION V - END PRODUCT SPECIFICATIONS

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

- A. To the extent possible in good manufacturing practice the products should be free from objectionable matter.
- B. The products should be free from any pathogen infectious to man and from any toxic substance originating from microorganisms. (This requirement is subject to review after information is received from the WHO Expert Committee on Food Hygiene.)
- C. The products should comply with the requirements set forth by the Codex Committees on Pesticide Residues and Food Additives as referenced in the commodity standards.

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

JOINT FAO/WHO CODEX ALIMENTARIUS COMMISSION CODEX

COMMITTEE ON FOOD HYGIENE

Draft Hygienic Code of Practice for Dried Fruits

To be read in conjunction with the General Principles of Food Hygiene. Underlined parts in the text and 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 applies to all fruits that have been dried by natural or artificial means or a combination of both. The fruit is dried to the extent that the greater part of the moisture has been removed, and in addition the fruit may be subjected to a safe and appropriate treatment in preparation and packing, to permit marketing in normal trade channels. Fruits covered by this code include apples, apricots, peaches, pears, nectarines, prunes, figs, dates, and vine fruits such as raisins and currants. Fruits other than vine fruits, prior to drying, if desired, and applicable for the particular fruit, may be cored, or pitted, sliced, diced quartered, halved, or otherwise subdivided. This code does not apply to fruits commonly known as "dehydrated fruits" with a moisture content not exceeding 5%.

SECTION II - DEFINITIONS

None considered necessary for this code of practice.

SECTION III - RAW MATERIAL REQUIREMENTS

A. Environmental Sanitation in Growing and Production Areas

- (1) Sanitary disposal of human and animal wastes; Adequate precaution should be taken to insure 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) - as in the General Principles of Food Hygiene.
- (3) Animal, plant pest and disease control; Growing areas should be kept free from rotten or decomposing fruit that is attractive to insects, rodents and birds. 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 possibility of toxic residues being retained by the crop.

B. Sanitary Harvesting and Food Production

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

- (3) Removal of obviously unfit materials; Unfit products should be segregated during harvesting and production to the fullest extent practicable and should be disposed of in an appropriate manner. The harvested fruit should be examined by competent persons to ensure that it is fit for further processing into food.
- (4) Protection of product from contamination; Suitable precautions should be taken to prevent the raw product from being contaminated by animals, insects, vermin, birds, chemical or microbiological contaminants or other objectionable substances during handling and storage. The nature of the product and the methods of harvesting will indicate the type and degree of protection required. The raw or dried fruit should be moved to suitable storage, or to the processing, area for immediate processing, as soon as possible after harvesting or drying. Where products are likely to have become infested with insects during or after harvesting or drying, suitable treatment such as fumigation should be applied to eliminate the insects unless they can be killed by subsequent processing which will be carried out before significant insect infestation occurs. Fruit held for processing should be stored in closed containers, buildings or under suitable type of covering that protects it from rodents, insects, birds, debris and dust.
- (5) Prying yard: Where fruit is dried by the sun in drying yards, such yards should be recognized as food processing yards whether drying is carried out on a grower's property or as a commercial operation. Such yards should as far as possible comply with such of the provisions of Section IV of this code as are applicable, and in particular with the following requirements;
- (a) Location. Drying yards should in all cases be located a sufficient distance from cattle feed lots, settling ponds and/or other waste collection areas to prevent contamination from these sources. They should also be so located that they have proper and adequate drainage.
- (b) Construction. The drying yard should be so surfaced that it will permit maintenance of clean yard surfaces and prevent contamination of drying fruit. The drying yard should be fenced, where necessary, to keep out animals as far as practicable, and the area around the drying yard should be kept clean, free from weeds and other debris that can blow into the yard.
- Cutting sheds in which fruit is pitted, cut or otherwise prepared and spread on trays for drying should preferably be closed buildings with screened windows that do not permit access by rodents, insects, or birds. Where cutting is done in open sheds, adequate precautions should be taken to protect against insect, rodent and bird contamination or harborage\* The sheds should be adequately lit and ventilated and adequate, clean toilet and hand-washing facilities should be provided.
- Both fresh fruit for processing and the dried fruit should be stored in areas where it is protected from rodent, insect and bird deprivations and storage time should be kept to a minimum consistent with good manufacturing practice.

There should be an adequate supply of clean potable water for hand washing, equipment cleaning and raw product washing. Standards of potability shall not be less than those contained in the "International Standards for Drinking Water" World Health Organization, 1963.

- (c) Hygienic operating, requirements; Drying trays, cutting equipment and storage bins should be kept clean and free from fruit residue and foreign substances that may cause contamination of the product.

C. Transportation

(1) and (2) - as in General Principles of Food Hygiene.

SECTION IV - PLANT FACILITIES AND OPERATING REQUIREMENTS

A. Plant Construction and Layout

(1) Location, size and sanitary design; The building and surrounding area should be such as can be kept reasonably free of objectionable odors, smoke, dust, or other contamination; should be of sufficient size for the purpose intended without crowding of equipment or personnel; should be of sound construction and kept in good repair; should be of such construction as to protect against the entrance or harboring of insects or birds or vermin; and should be so designed as to permit easy and adequate cleaning. In areas experiencing high concentrations of pollutants, equipment should be utilized to remove pollutants from the air blown across or through the product.

(2) Sanitary facilities and controls.

(a), (b), (c), (d), (e), (f), (g), and (h) - as in General Principles of Food Hygiene.

B. Equipment and Utensils

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

(4) Equipment used for drying should be so constructed and operated that the product cannot be adversely affected by the drying medium.

C. Hygienic Operating Requirements

(1), (2), (3), (4), (5), and (6a-6f) - as in General Principles of Food Hygiene.

D. Operating Practices and production Requirements

(1) Raw material handling.

(a) and (b) - as in General Principles of Food Hygiene.

(c) Water used for conveying raw materials into the plant should be from such a source or suitably treated as not to constitute a public health hazard and should be used only by permission of the official agency having jurisdiction.

(2), (3), (4), and (5) - as in General Principles of Food Hygiene.

(6) Preservation of finished product: Methods of preservation or treatment of the finished product should be such as to result in protection against

contamination, deterioration, or development of a public health hazard. The finished product should be of such moisture content that it can be held in the localities of origin and distribution under any normally foreseeable conditions for those localities without significant deterioration by decay, mould, enzymatic change a or other causes. In addition to applicable drying, the finished product may be treated with chemical preservatives at levels approved by the Codex Committee on Food Additives. heat processed and/or packed in hermetically sealed containers so that the product will remain safe and will not spoil under normal non-refrigerated storage conditions.

- (7) Storage and transport of finished products: The finished products should be stored and transported under such conditions as will preclude the contamination with or development of pathogenic or toxigenic microorganisms and protect against rodent and insect infestation and deterioration of the product or of the container.
- (a) The product should be stored under suitable conditions of time, temperature, humidity, and atmosphere, to prevent significant deterioration.
- (b) Where dried fruits are stored under conditions in which they are likely to become infested by insects and mites, appropriate methods of protection should be used regularly. Dried fruits should be stored in such a manner that they can be fumigated in situ or so stored 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 fruit.

E. Sanitation Control Program - as in 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 fruits processed. The amount and type of such control will vary with the fruit as well as the needs of management. Such control should reject all fruits 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 PRODUCT SPECIFICATIONS

Appropriate methods should be used for sampling, and determinations in the following specifications:

- A. To the extent possible in good manufacturing practice the products should be free from objectionable matter.
- B. The products should be free from any pathogen infectious to man and from any toxic substance originating from microorganisms. (This requirement is subject to review after information is received from the WHO Expert Committee on Food Hygiene.)
- C. The product should comply with the requirements set forth by the Codex Committees on Pesticide Residues and Food Additives as referenced in the commodity standards.

JOINT FAO/WHO CODEX ALIMENTARIUS COMMISSION

CODEX COMMITTEE ON FOOD HYGIENE

Draft Code of Hygienic Practice for Deep Frozen

Fruit and Vegetable Products

SECTION I - SCOPE

This Code of practice applies to blanched or unblanched fruit and vegetable products packed in suitable containers and which have been deep frozen either before or after packing.

SECTION II - DEFINITIONS

- A. A suitable container should be so constructed as to protect the product from contamination; be suitable for the type of product and may be of cardboard, plastic, metal or other appropriate material, lined or coated as need be.
- B. Deep frozen fruit and vegetable products are those as defined by the Joint ECE/Codex Alimentarius Committee on deep frozen foods.

SECTION III - RAW MATERIAL REQUIREMENTS

- A. Environmental Sanitation in Growing and Raw Food Production Areas  
(1), (2), and (3) - as in General Principles of Food Hygiene.
- B. Sanitary Harvesting and Food Production  
(1), (2), (3), and (4) - as in General Principles of Food Hygiene.
- C. Transportation  
(1) and (2) - as in General Principles of Food Hygiene.

SECTION IV - PLANT FACILITIES AND OPERATING REQUIREMENTS

- A. Plant Construction and Layout
  - (1) Location, size and sanitary design - as in General Principles of Food Hygiene.
  - (2) Sanitary facilities and controls.
    - (a) - as in General Principles of Food Hygiene.
    - (b) Water supply. An ample supply of hot and cold water should be available. The water supply should be of potable quality. Standards of potability shall not be less than those contained in the "International Standards for Drinking Water" World Health Organization, 1963.
    - (c) and (d) - as in General Principles of Food Hygiene.
    - (e) Plumbing and waste disposal. All plumbing and waste disposal lines (including sewer systems) must be large enough to carry peak loads. All lines must be watertight and have adequate traps and vents. Disposal of waste should be effected in such a manner

as not to permit contamination of potable water supplies. The plumbing and the manner of waste disposal should be approved by the official agency having jurisdiction.

Removal of solid or semi-solid wastes from the product preparation and canning areas should be on a continuous or near continuous basis using water and/or appropriate equipment so that these areas are kept clean and there is not danger of contaminating the product. Also they should be disposed of in a way that they cannot be used for human food. Waste materials should be disposed of in a place and in such a manner that they cannot contaminate food and water supplies and cannot offer harbourages or breeding places for rodents, insects or other vermin.

(f), (g) and (h) - as in General Principles of Food Hygiene.

B. Equipment and Utensils

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

C. Hygienic Operating Requirements

(1), (2), (3), (4), (5), and (6a-6f) - as in General Principles of Food Hygiene.

D. Operating Practices and Production Requirements

(1) Raw material handling.

(a) and (b) - as in General Principles of Food Hygiene.

(c) Water used for conveying raw material into the plant should be from a source or suitably treated as not to constitute a public health hazard and should be used only by permission of the official agency having jurisdiction.

(2), (3), (4), (5a-5b) - as in General Principles of Food Hygiene.

(6) Preservation of finished product. In order to avoid microbial proliferation, fruit and vegetable products for deep freezing should be cooled as quickly as possible, and kept at as low temperature as possible related to the holding time before deep freezing. The product should be frozen as soon as possible thereafter to prevent deterioration. The initial drop in temperature in the freezing process must take place as quickly as possible.

(7) Storage, transportation and distribution. The provisions relating to storage, transportation, distribution and refreezing should be those being elaborated by the Joint Codex/ECE group of experts on quick-frozen foods in their General Standard for Quick-Frozen Foods.

(8) Information on label. According to recommendations of the Codex Committee on labeling, the packages of deep frozen foods must bear clear indications as to the way to keep them from the time they are bought at the retailer and that of their use.

E. Sanitation Control Program - as in General Principles of Food Hygiene.

F. Laboratory Control Methods - as in General Principles of Food Hygiene.

## SECTION V - END PRODUCT SPECIFICATIONS

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

- A. To the extent possible in good manufacturing practice the products should be free from objectionable matter.
- B. The products should be free from any pathogen infectious to man and from any toxic substance originating from microorganisms. (This requirement is subject to review after information is received from the WHO Expert Committee on Food Hygiene.)
- C. The products should comply with the requirements set forth by the Codex Committees on Pesticide Residues and Food Additives as referenced in the commodity standards.

JOINT FAO/WHO CODEX ALIMENTARIUS COMMISSION

CODEX COMMITTEE ON FOOD HYGIENE

Draft Code of Hygienic Practice for Desiccated Coconut

To be read in conjunction with the General Principles of Food Hygiene. Underlined parts in the text and 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

The following code of hygienic practice applies to desiccated coconut, the dried product prepared for human consumption without requiring further processing which is obtained by shredding or otherwise comminuting the kernel of coconuts, the fruit of the palm, Cocos nucifera.

SECTION II - DEFINITIONS

- A. Coconuts - coconuts consist of an outer skin (green or brown when harvested) enclosing a thick fibrous coating or husk; inside the husk is a woody shell which encloses the kernel and is separated from it by a brown skin. The kernel consists of an outer solid white layer enclosing an aqueous liquid known as coconut milk.
- B. Coconut meat - white solid outer layer of the kernel.
- C. Husking - the removal of the husk.
- D. Hatcheting - the removal of the shell.
- E. Paring - the removal of the brown skin round the kernel.

SECTION III - RAW MATERIAL REQUIREMENTS

- A. Environmental Sanitation in Growing and Food Production Areas  
(1) and (2) - as (1) and (3) of the General Principles of Food Hygiene [(2) of GP is omitted].
- B. Sanitary Harvesting and Food Production  
Harvesting and production operations and procedures should be in accord with clean and sanitary methods.  
Coconuts are enclosed within a thick fibrous coating or husk, which has a green or brown skin when harvested« During ripening and dehushing after harvesting, contamination of the nuts may occur and clean and sanitary methods should be observed on the plantation and during dehushing. Following dehushing, special precautions should be taken to ensure that contamination does not occur.
- C. Transportation
  - (1) Facilities. Conveyances for transporting the harvested crop which may have the husk removed on the farm, should be adequate for the purpose and should be of such material and construction as will permit thorough

cleaning, and should be so cleaned and maintained as not to constitute a source of contamination to the nuts.

- (2) Handling procedures. All handling procedures should be such as will prevent the product from being contaminated. Extreme care should be taken in transporting perishable products to prevent spoilage or deterioration.

#### SECTION IV - PLANT FACILITIES AND OPERATING REQUIREMENTS

##### A Plant Construction and Layout

- (1) Location, size and sanitary design. The buildings and surrounding area should be such as can be kept reasonably free of objectionable odours, smoke, dust or other contamination; should be of sufficient size for the purpose intended without crowding of equipment or personnel; should be of sound construction and kept in good repair; should be of such construction as to protect against the entrance and harbouring of insects, birds or vermin; and should be so designed as to permit easy and adequate cleaning. Special precautions should be taken in the shredding, desiccating and packing sections to protect against the entry of birds, insects and vermin and for this purpose all openings should be covered with perforated metal gauze or other suitable protective covering. Separate and adequate space should be provided for the storage of nuts awaiting manufacture, shell awaiting disposal, rejected nuts, firewood etc. Floors should be constructed of material which is not capable of supporting microbial growth, and should be hard surfaced. They should be designed and so drained as to facilitate effective cleaning.
  - (2) Sanitary facilities and controls.
    - (a) Separation of processes. The husk, if it is not removed in the growing area, should be removed in a place separate from the factory. De-husked nuts should be received into the factory buildings, and the processes of hatcheting, paring and washing of the coconut meat should be carried out in a separate section from the subsequent processes. There should be no direct access from the hatcheting, paring and washing sections to the other sections.

The sections should be so arranged that the coconut passes from the hatcheting, paring and washing sections through to the packing room without retracing its path or passing through an area used for ancillary activities. Precautions should be taken to prevent contamination of shredding, desiccating and packing sections of the factory with dust.

Separate rooms or compartments should be provided for the storage of inedible materials, such as fuel and lubricants. The food handling area should be completely separated from any part of the premises used as living quarters.
    - (b) Water supply. An ample supply of cold water should be available and an adequate supply of hot water where necessary. The water supply should be of potable quality. "Standards of potability shall be not less than those contained in the "International Standards

for Drinking Water" World Health Organization, 1963. No husk pit for the retting of husks should be located within 300 feet of any well from which water is drawn for use in the factory.

(c), (d), (e), (f), and (g) - as in the General Principles of Food Hygiene.

(h) Washing facilities. Adequate and convenient facilities for employees to wash and dry their hands should be provided wherever the process demands. They should be in full view of the processing floor. Single-use towels are recommended, where practicable, but otherwise the method of drying should be approved by the official agency having jurisdiction. In addition, where applicable, foot baths containing a suitable bactericidal solution should be provided at all appropriate entrances to the factory. The facilities should be kept in a sanitary condition at all times.

#### B. Equipment and Utensils

(1) Materials. All food contact surfaces should be smooth; free from pits, crevices and loose scale; non-toxic; unaffected by the coconut; and capable of withstanding repeated exposure to normal cleaning, and non-absorbent unless the nature of a particular and otherwise acceptable process renders the use of a surface such as wood necessary.

(2) - as in General Principles of Food Hygiene.

(3) Equipment and utensils used for inedible or contaminating materials should be so identified and should be used only for handling such products. Suitable containers should be provided for the collection of coconut shell and parings and for rejected kernels.

Coconut parings roust not under any circumstances be dried in the desiccators used for coconut.

#### C. Hygienic Operating Requirements

(1) Sanitary maintenance of plant, facilities and premises. The building, equipment, utensils and all other physical facilities of the plant should be kept in good repair and should be kept clean and maintained in an orderly sanitary condition. All equipment in the shredding, desiccating and packing sections coming into direct contact with the coconut should be cleaned, washed and disinfected after each period of work and at least twice daily by means approved by the official agency. Detergents and disinfectants employed should be appropriate to the purpose and should be so used as to present no hazard to public health.

(2) Vermin control. Effective measures should be taken to protect against the entrance into the plant, and especially into the shredding section, desiccating section and packing and storage sections, and the harbourage on the premises of insects, rodents, birds or other vermin.

(3) Exclusion of domestic animals. Dogs, cats, and other domestic animals, should be excluded from areas where coconut or coconut products are processed or stored.

(4) (5) and (6) - as in the General Principles of Food Hygiene.

D. Operating Practices and Production Requirements

- (1) Raw material handling
  - (a) - as in General Principles of Food Hygiene.
  - (b) Storage. Coconuts stored on the plant premises should be maintained under conditions that will protect against contamination and infestation, and minimize deterioration.
- (2) Inspection and sorting. At the paring and washing stage, all kernels should be inspected and any unfit or germinated kernels rejected. Such operations should be carried out in a clean and sanitary manner. Only clean, sound coconut meat should be permitted for further processing.
- (3) Washing. Water used for washing the kernels should be clean and of potable quality. It should be so frequently changed that the possibility of contamination is kept to a minimum and the water should not be recirculated unless suitably treated to maintain it in a condition as will not constitute a public health hazard.
- (4) After washing and before shredding, the coconut meat should be subjected to an effective pasteurisation process, such as immersion in an adequate quantity of boiling water for a period of not less than 1-1/2 minutes.
- (5) After pasteurisation, the coconut meat should not be manually handled in any way, but mechanical devices, or containers and scoops or rakes or other implements constructed of impervious materials should be used to prevent contamination. Such implements should be cleaned, washed and disinfected after each period of work and at least twice daily, by means approved by the official agency and suitable racks or other places provided for their placing when not in use such that they do not become contaminated.
- (6) Shredded coconut should be dried in a current of clean hot air free from chemical contamination until the moisture content reaches a safe level for storage. After drying, coconut should be cooled before packaging.
- (7) Preparation and processing. - as in Section IV - D - 4 of General Principles of Food Hygiene.
- (8) Packaging of finished product.
  - (a) Materials. Packaging materials should be stored in a clean and sanitary manner, should not transmit to the product objectionable substances beyond limits acceptable to the official agency having jurisdiction and should provide appropriate protection from contamination. The packaging material should be approved by the official agency and for example may comprise multi-wall paper sacks with appropriate fat and moisture resistant layers or aluminum lined cases.
  - (b) Techniques. Packaging should be done in a separate clean room. Precautions such as the use of magnets or metal detectors should be taken to eliminate any metallic contamination. Packaging should be done under conditions that preclude the introduction of

contamination into the product, and mechanical rams or vibrators should be used so as to eliminate manual handling of the desiccated coconut.

- (9) All containers should be marked with the factory at which the desiccated coconut has been manufactured.
- (10) Storage and transport. The finished product should be stored and transported under such conditions as will preclude the contamination with or development of pathogenic or toxigenic microorganisms or infestation and protect against deterioration of the product or of the container.
- (11) If desiccated coconut is not packed at the factory into the containers in which it will be shipped, it should be transported to the packing rooms in hygienic containers which are disinfected before filling at the factory. The same hygienic precautions should be taken in these packing rooms as are appropriate to the packing section at the factory.

E. Sanitation Control Program - as in General Principles of Food Hygiene.

F. Laboratory Control Procedures

Regular and frequent samples of desiccated coconut should be taken from the packing section and examined for

- (1) moisture content
- (2) bacterial content
- (3) fat content and free fatty acids
- (4) contamination with any foreign matter.

#### SECTION V - END PRODUCT SPECIFICATIONS

Desiccated Coconut should be the clean, sound, wholesome product of the kernel of sound mature coconuts and should

- A. not contain bacteria of the Salmonella group in 50 gram samples (This requirement is subject to revision after information is received from the WHO Expert Committee on Food Hygiene.)
- B. be such that the acidity of the oil extracted by the solvent process shall not exceed 0.3% of free fatty acids calculated as lauric acid
- C. be free from contamination with any foreign matter.