

ECONOMIC COMMISSION FOR EUROPE
COMMITTEE ON AGRICULTURAL PROBLEMS

JOINT FAO/WHO FOOD
STANDARDS PROGRAMME

Working Party on Standardization of Perishable
Products

CODEX ALIMENTARIUS COMMISSION
Fourteenth Session 1981

REPORT OF THE THIRTEENTH SESSION OF THE
JOINT ECE/CODEX ALIMENTARIUS GROUP OF EXPERTS ON
STANDARDIZATION OF QUICK FROZEN FOODS

Rome, 15-19 September 1980

INTRODUCTION

1. The Joint ECE/Codex Alimentarius Group of Experts on Standardization of Quick Frozen Foods held its Thirteenth Session in Rome from 15 to 19 September 1980. Mr. T. Van Hiele (Netherlands) and Mr. T. Orlowski (Poland) acted as Chairman and Vice-Chairman respectively. The session was attended by government delegates, experts, observers and advisers from the following 21 countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Federal Republic of Germany, Ireland, Italy, Japan, Democratic People's Republic of Korea, the Netherlands, Norway, Poland, South Africa (observer), Spain, Sweden, Switzerland, the United Kingdom and the United States of America. The following international organizations were also represented: Association of Official Analytical Chemists (AOAC), European Economic Community (EEC), International Institute of Refrigeration (IIR), Nordic Committee on Food Analysis (NMKL), and Union Européenne des Industries de Transformation de la Pomme de terre (UEITP). The list of participants, including officers from the Secretariat, is set out as Appendix I to this Report.

ADDRESS BY THE CHIEF OF THE JOINT FAO/WHO FOOD STANDARDS
PROGRAMME

2. The 13th Session of the Joint ECE/Codex Alimentarius Group of Experts on the Standardization of Quick Frozen Foods was opened on behalf of the Directors-General of FAO and WHO and the Executive Secretary of the UN Economic Commission for Europe by Mr. G.O. Kermode, Chief of the Joint FAO/WHO Food Standards Programme. During the course of his remarks Mr. Kermode briefly informed the Group of Experts of the review of the general direction of the Programme's work and priorities undertaken by the Codex Alimentarius Commission at its 13th Session. The Commission had decided that all its subsidiary bodies should examine, in addition to other matters, the nutritional aspects of their work, especially when drawing up food standards which were of importance for foods in the diets of the populations of developing countries. The nutritional impact of the work of the Commission and its subsidiary bodies would be reviewed by the Commission at its next session. The Commission had expressed concern at the relatively slow response of developed countries in accepting Codex Standards and wished to emphasize to its subsidiary bodies that the question of acceptances of standards should be reviewed at each session of the body concerned. The Commission also wished to see a continued increase in the participation of developing countries at sessions of Codex Committees. In particular the Regional

Coordinating Committees were stimulating & much wider participation of developing countries and would be examining the possible economic impact of standards upon the development of their food industries and trade. Mr. Kermode reported that the Commission had adopted all the standards submitted by the Group at its last session at Step 8. He further suggested that the Group of Experts, in view of the progress of its work, might consider the possible adjournment of its activities sine die or for a specific period such as four to five years. This would be a matter for consideration when the Group examined the item of its agenda concerning future work.

TRIBUTE TO DR. ELIZABETH HUFNAGEL (FEDERAL REPUBLIC OF GERMANY)

3. Mr. Kermode informed the Group of Experts of the death of Dr. Elizabeth Hufnagel (Federal Republic of Germany). Mr. Kermode recalled her many years of association with the Codex Alimentarius Commission and its subsidiary bodies. She had represented the Federal Republic of Germany at many sessions of these bodies and would be remembered for her professional competence and the contribution that she made to the development of international food standards. The Group of Experts observed a minute's silence in memory of Dr. Hufnagel.

APPOINTMENT OF THE RAPPORTEUR

4. Dr. R.W. Weik (USA) agreed to act as rapporteur and was so appointed by the Group of Experts.

ADOPTION OF THE AGENDA

5. The Group of Experts adopted as the Agenda for the session the Provisional Agenda appearing in document CX/QFF 80/1 and included an additional Item 13 (iii) Quality Assessment of Quick Frozen Food, based on a paper provided by the delegation of the United Kingdom (CX/QFF 80/17). A proposal by the United Kingdom to amend Annex 1 "Method of Checking Product Temperature" to the Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976) by deleting Section 4.1 which referred to the use of glass-stemmed thermometers, was included under discussion on Item 11.

6. In order to expedite discussion on several items the following ad hoc Working Groups were established:

- Time, Temperature and Quality (Item 4), to meet with the ad hoc Working Group on Date Marking (Item 6)
- Methods of Analysis for Quick Frozen French Fried Potatoes (Item 7 (i) and (ii))
- Methods of Analysis for Quick Frozen Corn (Item 8 (i) and (ii))
- Draft Standard for Quick Frozen Carrots (Item 10 (iii))

STATEMENT BY THE UNITED STATES DELEGATION

7. The US delegation proposed the following statement to be discussed by the Group of Experts and stated that it should be so recorded in the Report. The statement read as follows:

"Resolution concerning the work of the Joint ECE/Codex Group of Experts on Standardization of Quick Frozen Foods at its 13th Session -

RECOGNIZING that the Group of Experts on Quick Frozen Foods is very near completing its work and

REALIZING that the Codex Alimentarius Food Standards Programme has higher priority work in other areas, and

RECOGNIZING the limited usefulness of Quick Frozen Foods standards in the developing regions of the world

BE IT RESOLVED that the membership and the secretariat of the 13th Session of the Group of Experts on Quick Frozen Foods shall, in considering and acting on the agenda items proposed, be ever mindful of the necessity of completing the work of the Group as expeditiously as possible, with a view towards adjourning sine die at the end of the 13th Session."

The Group of Experts did not discuss the above statement but felt that it should be discussed when Agenda Item 13(i) on Future Work of the Group of Experts was debated.

MATTERS OF INTEREST TO THE GROUP OF EXPERTS ARISING FROM THE REPORT OF THE THIRTEENTH SESSION OF THE CODEX ALIMENTARIUS COMMISSION AND FROM OTHER SESSIONS OF CODEX COMMODITY COMMITTEES AND UN/ECE SUBSIDIARY BODIES

8. The Group of Experts had before it the documents CX/QFF 80/2 and Add. 1 containing matters of interest to the Group arising from (i) the 13th Session of the Codex Alimentarius Commission, (ii) Reports of other Codex Committees and (iii) Reports of UN/ECE Subsidiary Bodies.

Matters of Interest Arising from the Commission

9. The Group of Experts noted that the Commission, at its 13th Session, had adopted as recommended standards the Draft Standards for Quick Frozen Broccoli, Quick Frozen Cauliflower, Quick Frozen Brussels Sprouts, Quick Frozen Green Beans, Quick Frozen Wax Beans and Quick Frozen French Fried Potatoes at Step 8 of the Procedure for the elaboration of Worldwide Codex Standards and advanced the proposed Standards for Quick Frozen Whole Kernel Corn and Quick Frozen Carrots to Step 6 of the Codex Procedure.

10. The Group was informed of the decision of the Commission that its subsidiary bodies should, as and where the need arose, consider nutritional aspects when drawing up standards for foods, especially when they were of importance in the diets of developing countries. The Group thought that this was a subject which would be of more importance in the case of some subsidiary bodies rather than others. Taking into account the topics and products being dealt with by the Group at its current session, the Group did not see a need for pursuing this subject.

11. The Group noted that the Commission sought the views of the Commodity Committees on the draft guidelines for the labelling of non-retail containers as contained in ALINORM 79/22, Appendix IV, elaborated by the Codex Committee on Food Labelling. The Group felt that it had nothing further to add at this stage to what had been stated regarding bulk containers in the Standards for Quick Frozen Foods which had already been accepted by the Commission.

Matters of Interest arising from Reports of Other Committees

12. The attention of the Group was drawn to the deep concern expressed by the Codex Committee on Food Additives at the tendency to include lists of food additives which had already been endorsed in standards still under consideration, without proper regard to the technological requirement. The Commodity Committees were reminded

that the justification for food additives should be carefully examined in all standards. The Group recalled that it had recommended certain food additives for inclusion in the Standard for French Fried Potatoes, which had been accepted by the Commission, and that the other standards, on which it was working, did not envisage the wide use of food additives.

13. The Group noted that the views of the 25th Session of the Executive committee that there should be a standing item on the Agenda of Codex sessions on progress made concerning acceptances of Codex standards, had been endorsed by the Commission. There was no discussion of the item since the Group was informed that it would be discussed in detail under Agenda Item 12 "Review of Acceptances of the Recommended International Standards for Quick Frozen Foods."

Matters of Interest arising from UN/ECE Subsidiary Bodies

14. The UN/ECE Secretariat reported to the Group of Experts on the activities of the UN/ECE Group of Experts on Standardization of Poultry Meat and the Group of Experts on Transport of Perishable Foodstuffs. It was noted that the work on standardization of poultry meat included deep (quick) frozen and frozen poultry, and some concern was expressed by delegations on the risk of overlapping programmes of work and the possibility that, in the absence of a proper link with Codex in the development of this standard, aspects of consumer protection, which the Codex apparatus was well equipped to provide, might be lacking. The Group of Experts was informed by the UN/ECE Secretariat that the draft standard for poultry meat was concerned only with the establishment of grading standards and trade descriptions and that any temperatures referred to in regard to deep (quick) frozen poultry and matters of hygiene and labelling would be in conformity with Codex recommendations. The delegation of the Netherlands drew attention to the coordinating role of the Codex Alimentarius Commission in all food standards work undertaken by international organizations, and the Group agreed, on the recommendation of the delegation of the USA supported by the delegation of Canada, to ask the Secretariat to ensure that the Codex Committee on Processed Meat and Poultry Products at its next session (11th) was informed regarding the development of the standard by UN/ECE and that the Commission should also be kept aware of all food standards work being undertaken by UN/ECE. At the proposal of the Chairman, the Group of Experts deferred discussion on the activities relating to the Agreement on the International Carriage of Perishable Food-stuffs and on the Equipment to be used for such Carriage (ATP) until Agenda Item 11, when they could be considered in relationship to the Proposed Draft Code of Practice for the Handling of Quick Frozen Foods in Transport.

REPORT OF THE TECHNICAL SUB-GROUP ON SENSORY METHODS OF QUALITY ASSESSMENT

15. In the absence of a working paper an oral report of the activities of the Technical Sub-Group was given by Prof. W.E.L. Spiess (Federal Republic of Germany). Prof. Spiess noted that the Sub-Group had been established to consider the problem which arose in carrying out time/temperature and quality trials when different methods were used to evaluate quality. A considerable amount of work had been done in an attempt to establish objective methods of quality assessment, but it was still considered that the most common and reliable procedures were sensory tests. Discriminatory tests, such as the triangle test, were considered reliable for the determination of High Quality Life (HQL), whereas the hedonic scales were used to determine Practical Shelf Life (PSL). Professor Spiess informed the Group that a study of the available literature showed that

two basic problems were yet to be resolved; the definition of HQL and PSL in terms of the methods used to determine them, and the development and use of uniform testing protocols by cooperating laboratories. It was reported that this work would continue under the auspices of IIR. The delegation of the Federal Republic of Germany submitted to the Secretariat a full copy of the report which would be published by the Federal Research Institute of Nutrition at Karlsruhe.

16. The Chairman thanked Professor Spiess and the Technical Sub-Group for their contribution to the understanding of the problems involved in determining the shelf-lives of quick frozen foods, and asked the Working Groups on Time, Temperature and Quality, and Date-Marking to take this information into consideration when discussing their own topics.

REPORT OF THE WORKING GROUP ON TIME/TEMPERATURE AND QUALITY OF QUICK FROZEN FOODS

17. The Working Group on Time/Temperature and Quality of Quick Frozen Foods met during the course of the session to discuss further information received from Australia, France, Italy and Sweden since the Group made its interim report at the last session of the Group of Experts (see CX/QFF 78/3). The Chairman of the Working Group, Mr. G.K. Boyes (United Kingdom) informed the Group of Experts that the additional information did not substantially alter the conclusions of the interim report. It was recommended that the interim report, together with the additional information, should be adopted as the final report of the Working Group, and that as a result the Working Group could now be adjourned.

18. The study undertaken by the Working Group had failed to show any connection between the time and temperature of storage in retail frozen food cabinets and the quality of the limited range of products chosen for the study. As a result the Working Group was unable to make any recommendation concerning amendments to Sections 5.6 and 6.3 of the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976). The sections concerned provided for a tolerable rise in product temperature to -12 C for a short period under certain conditions.

19. On this basis it was recommended by the delegation of the USA that the Group of Experts should advise the Commission to delete the footnotes to these two sections.

20. Several delegations pointed out that there were a number of veil-controlled laboratory studies which did show an effect of time and temperature on quality, and that exposure to temperatures of -12 C would reduce shelf-life at a greater rate than at -18°C, especially of some groups of products; fish, and especially fatty fish, were among these. Given that a considerable proportion of frozen foods were found to be at a temperature warmer than -12 C,¹ they proposed that a "lead in" time of five years should be mentioned in the footnotes, after which the warmest tolerable temperature would be -15°C Other delegations pointed out that the commercial practice reflected in the Working Group's study was adequate to provide satisfactory quality produce to the consumer, and that recommending more stringent provisions in the Code could not be justified on the basis of the data available.

¹ This information related to packages selected mainly from the top layer of retail freezer cabinets whether above or below the load line (clarification received from Mr. G.K. Boyes, Chairman of the Working Group on Time/Temperature and Quality of Quick Frozen Foods after the adoption of the Report).

21. The Group of Experts was divided in its opinion and finally decided not to amend the Code, but to draw to the attention of the Commission the present discussion and the fact that the footnotes (which specifically were linked to the Commission's thirteenth session) were now out of date. The delegations of Belgium, France, the Federal Republic of Germany, Italy, Netherlands and Switzerland expressed their disappointment at this decision and were in favour of retaining the footnote.

22. The Group of Experts asked the Joint Secretariat to publish the report of the Working Group, if possible as an appendix to the present report, as a number of the Group's recommendations were based on the Working Group's findings. The FAO/WHO Codex Secretariat pointed out the financial implications of such publication and noted that the report required no action by the Commission. It was agreed to publish the report in a suitable format on a cost-sharing basis, by which the UN/ECE would accept the responsibility of preparing and distributing the English and French versions of the report, and FAO/WHO the Spanish.

23. The Chairman thanked Mr. Boyes and the delegation of the United Kingdom for its efforts over the past several sessions of the Group of Experts, in handling a complex and controversial task. It was noted that future work in this area would most likely be undertaken by IIR, which would be in a position to make recommendations to its individual member governments and the industry at large.

CONSIDERATION OF PROBLEMS RELATING TO SAMPLING OF QUICK FROZEN FOODS

24. The Group of Experts had before it document CX/QFF 80/10 - AGRI/WP.1/GE.3A.75, an examination of the problems relating to sampling of quick frozen foods; and the addendum to this document outlining specific proposals for amendments to the existing standards which would harmonize the sampling provisions, taking into account the decisions taken at the last meeting of the Group of Experts (ALINORM 79/25, paras 70-77 and Appendix XIII), and provide for the uniform application of lot acceptance criteria. The papers had been prepared jointly by the delegation of the United Kingdom and the UN/ECE Secretariat.

25. The Group of Experts agreed to accept the proposals for amendments to the existing standards and recommended that they be sent as proposed draft amendments to Governments for study and comment, and that the further development of the amendments in their final form should be taken over by the Codex Committee on Methods of Analysis and Sampling.

26. The delegation of the United Kingdom drew particular attention to the basic questions raised in paragraph 14 of the document in regard to the interpretation of analytical requirements in the standards and how this affected the decisions to be taken when choosing an appropriate protocol for sampling. The delegation of Australia stated that in its opinion sampling for compliance on the average might be appropriate for such criteria as net weight and drained weight; compliance by individual units supplied or sampled seemed more appropriate to public health matters; and that compliance by a major proportion of sample units taken was already an accepted doctrine when the Codex Sampling Plans for Prepackaged Foods (CAC/RM 42-1969, under revision) were applied. Moreover there were legal aspects involved in deciding which system to choose. In general it seemed preferable to use a "variables" sampling plan in relation with analytical characteristics as such plans, when developed, would give equal confidence with less destruction of samples and less cost in laboratory expenses than "attributes" plans.

27. Considering that broad issues were involved with technical and legal implications which had ramifications for the Codex programme as a whole, the Group of Experts accepted the proposal of the delegation of the United Kingdom to refer the matter to the Codex Committees on Methods of Analysis and Sampling and on General Principles.

RESULTS OF QUESTIONNAIRE ON DATE MARTINS

28. The Group of Experts had before it the documents CX/QFF 80/5 as prepared by the rapporteurs, the United States and Switzerland, CX/QFF 80/5, Add. 1, which contained the late replies received from the Netherlands to the questionnaire on open date marking, and an un-numbered document which contained additional comments by the European Economic Community.

29. The Group of Experts was reminded of the resolution taken at the 12th Session of the Joint ECE/Codex Group of Experts on Standardization of Quick Frozen Foods held in Rome from 30 October to 6 November 1978, to request more information from all Codex Contact Points on the subject of open date marking of quick frozen foods. This information was considered necessary to enable the Group to reply to the Codex Committee on Food Labelling. A questionnaire was therefore developed and sent out to the different Codex Contact Points for their reaction. The answers received were analyzed and reported in the document CX/QFF 80/5 by the rapporteurs, the USA and Switzerland, along with their conclusions and recommendations.

30. The US delegation introduced document CX/QFF 80/5 and informed the Group that it consisted of two parts - Part I containing the answers received from Governments to the questionnaire, which was not controversial, and Part II containing the proposed course of action by the Group which was open for discussion. The US delegation also informed the Group that the questionnaire was not addressed to voluntary date marking.

31. The US delegation further informed the Group that in its opinion one conclusion inescapably arose from the answers received to the questionnaire, i.e. that there was no unanimity in frozen food markets which favoured any particular solution to the obviously complex problem of open date marking of quick frozen foods. It also felt that no one type of date marking of frozen foods was universally applicable.

32. The Swiss delegation, the Joint Rapporteur, informed the Group that it had nothing to add to the document which provided an overall view of the problem of open date marking of quick frozen foods. It informed the Committee that voluntary date marking of quick frozen foods was practised in Switzerland and that the manufacturers had received no complaints from consumers since the practice was introduced.

33. The observer from the European Economic Community brought the attention of the Committee to an error in the French version of the document and said that the correct translation for "minimum durability" was "durabilité minimal". The observer stated that though open date marking of quick frozen foods was important, the Community did not have a firm position on mandatory date marking at present. However, if a country wished to, introduce open date marking, the choice of "minimum durability" was preferred.

34. The delegation of Switzerland felt that open date marking of quick frozen foods had certain positive aspects and that, if a country decided to introduce voluntary date marking, the Group should recommend the choice of date of minimum durability. This was supported by the delegations of the Netherlands, France, Belgium, and the observer of the EEC.

35. The delegation of the Netherlands expressed strong feelings that the conclusions presented in the document were one-sided. It felt that open date marking conferred certain advantages in that it kept the retailer in a better position to check the turnover of his stock and informed the consumer of the way to handle the product. The delegation informed the Group that the Star System had proved of considerable assistance to the consumers in handling the product more carefully. The delegation felt that all such considerations had not been included in the document.

36. The Swedish delegation made a clarification of their submission to the questionnaire on date marking and informed the Group that "marking as per alternative "b" meant that as the product in question had a shelf life not exceeding nine months, the open date marking was voluntary".

37. The delegation of Norway informed the Group that open date marking of all foods was introduced in its country in cooperation with consumer organizations and the Ministry of Consumer Affairs. A short time after the country elaborated certain regulations for open date marking of quick frozen foods, the retailers and importers strongly expressed their opinion that it was a difficult problem to handle and hence open date marking of foods with shelf-life of over 18 months was withdrawn. The delegation objected to the inclusion of the wording "This has been an actual experience in one substantial market" which appeared in conclusion on page 23 of document CX/QFF 80/5.

38. The delegation of Japan informed the Group of the position of open date marking of quick frozen foods in its country. In Japan it is mandatory by the food sanitation law that the date of manufacture be provided on all packs of quick frozen foods. The clause had been introduced into the law for purposes of consumer protection. The delegation felt that additional information on minimum durability might prove useful.

39. The Group of Experts felt that this document CX/QFF 80/5 as a whole should not be submitted to the Labelling Committee but only the conclusions and the recommendations.

40. After a lengthy discussion the Group of Experts agreed that the following reasons should be presented to the Food Labelling Committee to justify its conclusions that no system of mandatory date marking was applicable for inclusion in a Codex standard or code of practice for quick frozen foods at present:

- (i) There is little evidence either to support or to negate the contention that there is a direct relationship between open date marking and the actual freshness of any food products when they are sold. This is especially true of quick frozen products which are non perishable but highly temperature dependent.
- (ii) Quality in quick frozen foods is multidimensional: initial raw material quality, processing and packaging used, and above all residence times at variable and various storage temperatures, must all be taken into account for establishing any shelf-life dates. Over-emphasis on one dimension product age, such as is provided by shelf-life marking in the absence of handling instructions, will not only be unhelpful to quick frozen food handlers and consumers but may actually mislead.
- (iii) Emphasis placed on product age has been found to detract from sufficient attention being paid to the most important determining factor of product quality during the distribution and handling of quick frozen foods: this is the maintenance of uniform, sufficiently cold product temperatures throughout the cold chain.

- (iv) The diversity of marketing practices, product stabilities, varying bulk storage temperatures, different design and labelling of in-home storage appliances for quick frozen foods and varying levels of consumer awareness of good handling practices for quick frozen foods in the various markets, all combine to render inappropriate any single international prescription for date marking of quick frozen foods.

41. In addition to the conclusion that no system of mandatory date marking is applicable for inclusion in Codex Standards for quick frozen foods at present and the supporting reasons, the Group of Experts made the following recommendations:

- (1) No "sell by", "minimum durability" or "use by date" should be permitted without in-home storage instructions also being communicated which shall be consistent with the design and labelling of frozen food storage compartments, conservators and food freezers commonly available in the market concerned.
- (2) This topic be subject to review within a few years as manufacturing techniques, cold storage temperatures, products and domestic storage appliances all may change.

42. The delegations of Belgium, France, Netherlands, Norway, and the observer of the BBC strongly felt that a recommendation to the effect that "If open date marking of quick frozen foods is to be introduced by any system, it should be by minimum durability" should be included in the list of recommendations. The Group of Experts did not agree with this view but agreed that this position be included in the Report.

CONSIDERATION OF METHODS OF ANALYSIS

Determination of Moisture Content of Quick Frozen French Fried Potatoes

43. The Group of Experts received a report from an ad hoc Working Group which had been set up to study the problems relating to the methods of analysis for Quick Frozen French Fried Potatoes. The Working Group had considered the three methods proposed in documents CX/QFF 80/6-AGRI/WP.1/GE.3/R.72 together with Addendum 1 and Conference Room Documents 3 and 4 which contained respectively comments received from Governments on the proposals and the results of a collaborative study which had been carried out on the proposed method III. The delegation of the United Kingdom had submitted the results of a collaborative study carried out on the method which had been proposed by it in Conference Room Document 3.

44. The Working Group noted that both methods gave approximately the same degree of reproducibility (variation between laboratories), but that the method proposed by the United Kingdom had better repeatability (variation between replicates). One of the significant results of the studies was the finding that there exists a significant sample-to-sample variation which could be attributed to the in homogeneity of the product. It was not thought practical to attempt to reduce this variation by increasing the size of the sample unit which at 500g was already very large. The Working Group recommended that the method proposed by the United Kingdom should be adopted by the Group of Experts and transmitted to the Codex Committee on Methods of Analysis and Sampling for endorsement as a Type I, or defining, method. This decision was based on the following:

- the method was simpler than the procedure described in CX/QFF 80/6, Add. 1, requiring only one drying step;

- commonly available laboratory equipment only was required, as opposed to the use of a vacuum oven in the other method;
- the repeatability was 0.3, and the reproducibility was 1.7 compared to 0.6 and 1.6 respectively, for the other procedure. These statistics were considered to be satisfactory taking into account the nature of the analytical criterion in the standard.

45. The observer from South Africa raised the possibility of using a microwave oven in the procedure in order to shorten the drying time. The Group of Experts noted that the precision characteristics of such a method were not known and the observer was informed that it would not be inappropriate to carry out trials of the method and submit the results to the Codex Committee on Methods of Analysis and Sampling. The proposed method and the results of both collaborative studies appear as Appendix II to this Report.

46. The Group of Experts also accepted the recommendation of the Working Group to amend Sections 3.2.2.1 and 8.5 so that the parameter to be measured would be referred to as "Loss in mass on drying".

Determination of the Free Fatty Acid Content in the Fat of Quick Frozen French Fried Potatoes

47. The Working Group had studied document CX/QFF 80/7 - AGRI/WP.1/GE.3/R.73, which contained three proposed methods for carrying out this determination, and Conference Room Document 5 which contained the comments of Austria, the Federal Republic of Germany and Poland.

48. The Working Group proposed and the Group of Experts agreed that a single complete method should be drawn up and subjected to collaborative testing, using as a basis the extraction procedure described in Method I, and the titration of the free fatty acids as described in Method III. It was recognized that certain sections of these methods required further work, especially in regard to the extraction technique and the protection of the extracted fat from oxidation. The delegations of the Netherlands and the USA, together with the observer from the European Union of Potato Industries agreed to undertake the development and collaborative testing of the method and to regularly inform the UN/ECE Secretariat, which acted as coordinator for this work, of their progress. It was hoped to present a final method to the Codex Committee on Methods of Analysis and Sampling at its 12th Session.

49. The Chairman thanked the Working Group for its thorough and constructive work.

Determination of Alcohol Insoluble Solids Content of Quick Frozen Corn-on-the Cob and Whole Kernel Corn

50. The Group of Experts had before it documents CX/QFF 80/8 - AGRI/WP.1/GE.3/R.74, containing a method proposed by the delegation of the United Kingdom; the addendum to this document containing comments of the Federal Republic of Germany and a Conference Room Document containing a revised method using the Soxhlet apparatus proposed by the United Kingdom. An ad hoc Working Group (Sweden, United Kingdom, USA) had been established to consider these documents.

51. The Group of Experts was informed that the method proposed in CX/QFF 80/8 was based on the method currently included in the Standard for Quick Frozen Peas and that this, in turn, was based on the AOAC procedure. The method had been

collaboratively studied within the United Kingdom using dried sweet corn kernels as the test material. The results of this study showed considerable variability between laboratories (R=5) and the method, as written, had been considered as unsatisfactory by the author country. The Soxhlet procedure which had then been proposed also showed unsatisfactory results.

52. The Working Group, with the aid of comments provided by the delegation of Australia, made a number of amendments to the original proposal with a view to improving the sample-handling and preparation which appeared to be the source of much of the variation of the test results. It recommended that the method should be retested internationally and the Group of Experts requested the delegations of the United Kingdom and the USA to arrange for such a study. The revised method appears as Appendix III to this Report.

Determination of the Sugar Content of Quick Frozen Corn-on-the-Cob and Whole Kernel Corn

53. The Group of Experts accepted the proposals of the United Kingdom which had been circulated as document CX/QFF 80/9 - AGRI/WP.1/GE.3/R.75. It noted that the Federal Republic of Germany had supported these proposals in their written comments (Addendum to the above paper).

54. The Group did, however, amend the procedure applying to Quick Frozen Corn-on-the-Cob in order to bring the sample preparation procedure into conformity with that of the method for alcohol insoluble solids. The methods appear as Section 8.6 in the respective draft standards appended to this Report (Appendices IV and V).

DRAFT STANDARD FOR QUICK FROZEN CORN-ON-THE-COB (at Step 6)

55. The Committee had available for consideration the above draft standard (ALINORM 79/25, Appendix VII) and Government comments as contained in CX/QFF 80/11 and CX/QFF 80/11, Add. 1.

Scope and Description

56. The delegation of the United States brought to the attention of the Committee that the expression of the species name which appears under Scope and Description should be similar. The Group felt that the species name as expressed under Description was correct and agreed to correct the species name appearing under Scope accordingly.

Style

57. The delegation of the United Kingdom informed the Group of the error that had crept into the expression of the length of trimmed whole corn-on-the-cob. The Group agreed to change 20 mm to read as 120 mm.

58. The delegation of Australia requested that a provision for a "colour presentation" be introduced into the standard and suggested consideration of yellow and white. The delegations of the USA and Sweden informed the Group that a section on "Colour presentation" existed in the original draft but later was dropped. The suggestion of Australia was not accepted, since the Group felt that inclusion of Colour presentation might necessitate further changes in the labelling section.

Definition of Defectives for Presentation

59. The delegation of the United Kingdom proposed, and the Group agreed with the wording suggested by the United Kingdom for sub-section 2.4.3, in order to bring in line the wording with the previous decisions. It was agreed to move sub-section 2.4.5 to appear before 2.4.3.

Definition of Visual Defects

60. The Group agreed with the new wording of sub-section 3.2.3(b) as suggested by the United Kingdom and agreed to the amendment of the definition for "serious" under sub-section 3.2.3(d) and the definition for "major" under sub-section 3.2.3(f).

61. The Group agreed to introduce the definitions of husk and silk as suggested by Sweden.

Standard sample Unit

62. The delegation of the United Kingdom suggested that an explanation of the term "Standard Sample Unit" be provided in the standard as a footnote, to avoid any ambiguity in the use of the word "Unit". The Group agreed to this.

Tolerances for Visual Defects

63. The changes suggested by the United States of America in Table 1 were agreed to by the Group.

Food Additives

64. The United States delegation felt that, since citric acid and malic acid were processing aids and were covered by the Carry-over Principle, Section 4.1 should be deleted. The Secretariat, however, brought to the attention of the Group that, while processing aids may be covered by the Carry-over Principle, they must be listed as such in the Food Additives Section of the standard and of course need not be declared on the label.

Hygiene

65. The Group agreed to make reference to the more recent International Code of Practice - General Principles of Food Hygiene adopted by the 13th Codex Alimentarius Commission (CAC/RCP 1-1969, Rev. 1).

Methods of Examination. Analysis and Sampling

66. The delegation of Australia suggested that a wording should be included to describe the types of method used and the Group agreed to use the same wording as that appearing in Standards for Quick Frozen Foods already adopted by the 13th Codex Alimentarius Commission.

Determination of Total Soluble Solids Content

67. The Group agreed to use the new text as agreed at the present session of the Joint ECE/Codex Group of Experts on Quick Frozen Foods (see paras 53 and 54).

Status of the Standard

68. The Group advanced the proposed Draft Standard for Quick Frozen Corn-on-the-Cob, as amended, to Step 8 of the Codex Procedure (see Appendix IV of this Report).

DRAFT STANDARD FOR QUICK FROZEN WHOLE KERNEL CORN (At Step 6)

69. The Group of Experts had available for consideration the above draft standard (ALINORM 79/25, Appendix IX). No government comments had been received. The delegation of Australia drew the attention of the Secretariat to a number of amendments which were editorial in nature.

70. The delegation of the United States brought to the attention of the Group the gaps still existing in the standard for tolerance levels for (i) ragged, crushed or broken kernels and (ii) loose skins. The delegation felt that it was rather difficult to provide tolerance levels for loose skins and suggested that it be mentioned under 3.2.1. A figure of 60 pieces for the tolerance level of ragged, crushed or broken kernels was accepted by the Group at the suggestion of Australia.

71. The Group agreed to use the new text for 8.6 Determination of Total Soluble Solids Content (expressed as sucrose) as agreed to at the present session (see para 54).

72. The Group noted that square brackets existed in 8.1.2, 8.2, 8.3 and 8.4 and felt that these should be removed.

73. The delegation of Australia felt that a reference should be made in 3.2.3(a) Definition of Visual Defects, to the possibilities of damage by mechanical injury. It also felt that there should be a uniformity of sample size unit in standards for all quick frozen foods and suggested that a figure of 300 g be used. The Group noted that agreement with the above suggestion of the delegation of Australia would pose difficulties since in certain countries even the size of pack was lower than 300 g, and also raising the sample size unit from the existing 250 g would need resultant modification of the table for tolerances for visual defects.

74. The delegation of France brought the attention of the Committee to some errors in translation which had crept into the French text and provided the correct texts to appear in the amended standard.

75. The observer of South Africa informed the Group that the text as it appeared under 3.2.1 excluded EVM and suggested that special mention be made for exclusion of harmful plant material. After some discussion the Group agreed to retain the original text.

Status of the Standard

76. The Group advanced the proposed Draft Standard for Quick Frozen Whole Kernel Corn, as amended, to Step 8 of the Codex Procedure (see Appendix V of this Report).

DRAFT STANDARD FOR QUICK FROZEN CARROTS (at Step 7)

77. The Group of Experts had before it the above draft standard (ALINORM 79/25, Appendix XIV) and Government comments as contained in CX/QFF 80/13 and Add. 1 there to. In view of the many written comments received on this standard, the Group decided to set up a Working Group to consider the matter. The Working Group was chaired by Mr. W.G. Aldershoff (Netherlands) and was attended by members of the following delegations: Australia, Austria, Canada, Denmark, France, Federal Republic of Germany, Japan, Netherlands, South Africa (observer), United Kingdom and the United States of America.

78. In introducing the conclusions of the Working Group, Mr. Aldershoff indicated that the standard had been considered in great detail and that the revised version was acceptable to almost all members of the Working Group.

79. The Group decided to consider the standard as revised by the Working Group. The following items represent the major points of the discussion of the various sections of the standard.

2.4.1 Types

80. The Group decided to clarify that the "long" style included both the conical and cylindrical cultivars.

2.4.2 Styles

81. Apart from minor improvements to this section, the Group agreed to: (a) change the style "whole" so that conical, cylindrical and spherical cultivars were mentioned separately; (b) delete the style "baby whole" because this style was considered as a sub-division of the style "whole"; (c) replace the style "baby carrot" with the new style "fingers" which differed from the style "finger cut" in not having a limit to cross sectional dimension and not necessarily having been cut.

82. The delegation of Australia was opposed to the deletion of the style "baby whole" for reasons stated in paragraph 83. The observer of South Africa indicated, and the Group agreed, that in the style "sliced length-wise" the carrots could not be sliced: exactly along the longitudinal axis. An appropriate amendment was made to this effect. The observer of South Africa also proposed a minimum length of not less than 10 mm and 25 mm for the "shoestring" and "julienne" styles. After consideration, the Group decided that such a precision was not necessary. The same delegation also proposed a third alternative designation, i.e. "roundels", for the "sliced" (a "ring cut") styles. The Group considered that the adoption of yet another designation would be counterproductive as regards facilitation of international trade, noting that Governments could always authorize alternative designations for food moving within their territorial jurisdiction.

2.4.5 Sizing

83. The Group made considerable changes to this section, on the recommendation of the Working Group, in order to bring it into line with current trade practices, except that it did not consider the category "very small" to be appropriate for the cylindrical and conical cultivars. It agreed to include a footnote indicating that the designation "baby" was used as an optional wording to "small" in the cylindrical and conical cultivars. The delegation of Australia was against the linking of the designation "baby" to a size category of 6-22 mm for the cylindrical cultivars, as this did not take into account trade practices in Australia which required a maximum diameter of 25 mm. It proposed that the size grading system should be amended to take this into account. The Group did not accept the Australian proposal.

3.1 Optional Ingredients

84. The Group agreed to increase the maximum limit for the aromatic herbs, spices and vegetable ingredient to 10% in sub-section 3.1.2.

3.2 Quality Factors

85. The Group adopted the recommendation of the Working Group to redraft this section, from an editorial point of view, in order to bring it into line with other standards for quick frozen foods. It also adopted other improvements and a proposal of the Working Group for the definition and classification of visual defects and tolerances for defects. It was recognized that the revised system required practical trial by the food industry in order to ensure that it would be acceptable to Governments.

4.1 Food Additives

86. Poland expressed its reservation for accepting the use of food additives in the production of Quick Frozen Carrots.

Status of the Standard

87. The Group agreed that the draft standard required another round of comments, in view of the extensive changes made to it at the present session, and decided on the following course of action, noting that it would be adjourning sine die:

- (a) The Draft Standard for Quick Frozen Carrots should be sent to Governments for comments at Step 6 especially on the system of evaluation of visual defects and other quality factors included in Tables land 2 and the style "baby whole".
- (b) Comments should be sent to the Chairman of the Group who would act as Rapporteur for this product and would prepare a revised draft standard, if necessary on the basis of comments;
- (c) The Commission should be requested to handle the draft standard at Steps 7 and 8 which, apart from issues raised in (a) above, appeared generally acceptable.

88. The Secretariat informed the Group that facilities, without interpretation, could be made available to hold a Working Group meeting on Quick Frozen Carrots during the Fourteenth Session of the Commission, should this prove necessary.

89. The Draft Standard for Quick Frozen Carrots is given in Appendix VI to this Report.

CONSIDERATION AT STEP 4 OF THE PROPOSED DRAFT CODE OF PRACTICE FOR THE HANDLING OF QUICK FROZEN FOODS DURING TRANSPORT

90. The Group of Experts had before it the proposed draft code (ALINORM 79/25, Appendix II) and comments received from Governments in documents CX/QFF 80/14 - AGRI/WP.1/GE.3/R.80 (New Zealand, Poland, Sweden, IIR, and the International Road Transport Union - IRU), and Addendum 1 (Netherlands, United Kingdom).

91. The Chairman of the Group of Experts, in response to the question of a number of delegations, explained that the document as it was written was intended to act as an explanatory addendum to the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976). It therefore should avoid repeating, as much as possible, those aspects of the Code which covered conditions in regard to transport.

92. The delegation of the USA questioned the necessity for proceeding with the proposed draft code as it did not seem to add anything of substance to the Recommended International Code. It was decided however to continue discussion of the

proposed draft code on the basis of the comments received and to consider the status of the revised document at the conclusion of the discussion (see para 115).

93. The delegation of Canada submitted to the Secretariat copies for information of a draft revision of the Canadian code of practice which was based in part on the present document.

Scope (Section 1)

94. The delegation of the United Kingdom recommended that the proposed draft code should be expanded to cover retail and local distribution as this was the area where temperature abuse of the product was most common; in general transport from warehouse cold store to warehouse cold store was usually well controlled. The delegation of Australia opposed the expansion of the proposed draft code to cover retail distribution and the Group of Experts did not adopt the United Kingdom's proposal.

Product and Quality (Section 2)

95. The Group of Experts agreed that Section 2.2 should specify that temperatures be kept as low as practicable noting that it was technically feasible to achieve "possible" temperatures far lower than those commonly in use in the trade. A number of delegations requested that an upper temperature (-18° C) be included in this section, and that temperature fluctuations should be kept to a minimum. The Group was reminded of the object of the proposed draft code (see para 91 above) and did not include any specific temperature requirements.

96. The Group of Experts accepted revised forms of paragraphs 2.3 and 2.5 as proposed by the United Kingdom in its written comments. The delegation of Australia noted that in the latter paragraph sub-national authorities had authority in this matter in its country, and the Group of Experts amended the text accordingly. A number of delegations suggested that in respect of the new paragraph 2.5 an upper limit for temperature might be set after which the food would automatically be refused. The Group of Experts decided not to change the revised paragraph as there seemed sufficient safeguard against unsafe food being accepted and noted that an automatic refusal of the food could result in unnecessary waste.

Loading, Unloading and Transportation (Section 3)

97. The Group of Experts agreed not to change paragraph 3.1 and in particular decided not to specify fixed rates of loading and unloading. It noted that the stopping of fans during these procedures was usually necessary to avoid complaints from the personnel performing the task.

98. Paragraph 3.2 of the proposed draft code was amended to recommend the use of standardized load units and mechanical auxiliary transport equipment, as these were recognized as being of some advantage in speeding up the loading and unloading procedures.

99. Paragraphs 3.4 and 3.5 were combined (new para 3.4) in order to clarify the necessity to arrange for proper ordering of the load when despatching to several destinations.

100. The Group of Experts accepted a proposal of the delegation of Canada to specify the requirements for the loading of the transport equipment in terms of the necessity of stowing the load so that there would be free circulation of refrigerated air (new para 3.6).

Product and Temperature (Section 4)

101. The Group of Experts adopted the written proposal of the United Kingdom to combine paragraphs 4.2 and 4.3 in order to emphasize the need for reduction of the chances of exposure of the load to high ambient temperatures, and the inability of transport equipment, in general, to reduce the temperatures of over-heated loads sufficiently during transport. Similarly, it adopted the United Kingdom's proposal in respect of paragraph 4.4 to delete the reference to the temperature of -18 C, noting that the temperatures recommended by the consignor may in fact be lower than this.

102. Paragraphs 4.5 and 4.6 were amended to provide for the agreement between carrier and receiver, and between carrier and shipper as to the time and procedure of unloading and loading. In doing this the Group of Experts noted the comments of the IRU that these paragraphs were in conflict with the established provisions of the Convention on the Contract for the International Carriage of Goods by Road (CMR) and recommended that the necessary actions be taken by one of the Contracting Parties to the CMR to amend that document to bring it into conformity with this proposed draft code.

103. In considering the procedure for the measurement of temperature, paragraph 4.7, the Group of Experts included a reference to paragraph 5.2 of their draft Code of Practice and agreed with the written comment of the delegation of the Netherlands that it would be appropriate to amend Section 6.2 of Annex I to the Code of Practice ("Method for Checking Product Temperature") to specify that the measurement of product temperature should be made at the centre of the largest surface at a depth of 2.5 cm from the surface.

104. The Group of Experts did not accept the written proposal of the IRU to make specific reference to a consignment note as it was recognized that a considerable amount of transport of quick frozen foods occurred in which the sender was also the carrier and the receiver. It was thought that the broader term "protocol" would include the consignment note where such a note was required by contract.

105. In considering paragraph 4.9 the Group of Experts did not accept the written comment of IRU which was supported by the delegation of the United Kingdom, believing that it was the responsibility of the carrier to refuse to accept any goods which the carrier considered not to be in proper condition.

106. Paragraph 4.10 of the proposed draft code was deleted as it simply repeated the information given in the newly adapted paragraph 2.5. It was noted that this section appeared to be in conformity with the general requirements of Article 4, paragraph 2 of the Agreement on the International Carriage of Perishable Foodstuffs and on the Equipment to be used for such Carriage (ATP).

Measuring Temperature (Section 5)

107. On the proposal of the delegation of the United Kingdom paragraphs 5.3 and 5.4 were combined to ensure that the measurement of temperatures would be carried out in such a way so as not to cause an increase in the temperature of the load.

Transport Equipment (Section 6)

108. The Group of Experts amended paragraph 6.1 so as to recommend the use of appropriate equipment and avoid any mention of responsibility. The clarification proposed by Sweden in its written comments was accepted. The Group decided not to make any reference to the ATP as it was generally appreciated that the proposed draft

code would have wider use than the ATP agreement. A similar decision was made in paragraph 6.2.

109. Paragraph 6.3 was extensively debated, and the Group of Experts finally agreed on a revised form of the paragraph which explicitly referred to the necessity of avoiding the development of condensation in the transport equipment or on the load.

110. Paragraph 6.4 was rewarded, talking into account the classification proposed by New Zealand in its written comments. Paragraph 6.5 was deleted as it was now understood to be covered by the new paragraph 3.6.

111. The Group of Experts discussed in detail the provisions of paragraph 6.6 and in particular the effect of permitting rises in temperature for short periods, either of 3 C - dependent on the original temperature; or of a rise in temperature to a maximum of -15 C. The representative of the UK informed the Group of Experts that the available scientific data showed that no significant effects on quality as measured by storage life could be detected after a rise in temperature to -15 C for short periods. Nevertheless the Group accepted, using as a basis the written comment of the United Kingdom which was supported by the delegations of Hungary, Netherlands, United States of America and the representative of IIR, a new form of this paragraph limiting temperature rises to 3 Celsius degrees for short periods.

112. The Group of Experts agreed to amend paragraph 6.7 in the light of the written comment of IRU to provide that records should be kept of the length of time during which doors are left open during loading and unloading operations. In making this change, the Group recognized that some of the conditions recommended in this code were not current practice, but expressed the wish that efforts should be made by the transport industry to bring these recommendations into effect. The French text was brought into harmony with the English text.

Facilities at Loading and Unloading Place (Section 7)

113. The Group of Experts adopted a revision of paragraph 7.1 as proposed by the delegation of Australia, which clarified the intent of this recommendation.

Inspection (section 8)

114. The Group of Experts agreed with the written comments of the United Kingdom that this section should be drawn to the attention of the ECE Group of Experts on the Transport of Perishable Foodstuffs for that Group's consideration during its discussions on revisions to the ATP. The Secretariat was requested to advise that Group that paragraphs 8.1 and 8.2 were essential to the rapid transport of quick frozen foods and should form the basis of the revised ATP. The secretariat was also requested to raise the matter of delays at frontiers as a general matter in all groups considering the facilitation of trade procedures and transport of foods.

Status of the Proposed Draft Code

115. The Group of Experts agreed to advance the proposed draft code to Step 5 of the Codex Procedure, as a proposed Annex II to CAC/RCP 8-1976, and requested that the Commission make the necessary arrangements for the further elaboration of the document in view of the adjournment *sine die* of this Group. It was proposed that the Chairman, acting in consultation with IIR, could act as rapporteur for the code. The proposed draft code appears as Appendix VII to this Report.

116. It was suggested that the proposed draft code, when finalized, should be used as the basis for further discussion on the ATP, but it was pointed out by the delegation of

the United Kingdom that the procedures for making amendments to the ATP had already been set in motion and that the Agreement was currently being considered in the responsible Group of Experts.

117. The Group of Experts strongly urged national delegations to coordinate their views on the present proposed draft code and the ATP, if possible, by arranging for delegates present at this meeting to also attend the meetings of the Group of Experts on Transport of Perishable Foodstuffs.

PROPOSED AMENDMENTS TO THE RECOMMENDED INTERNATIONAL CODE OF PRACTICE FOR THE PROCESSING AND HANDLING OF QUICK FROZEN FOODS (CAC/RCP 8-1976 with Addendum 1-1978)

118. The Group of Experts agreed that as a result of their deliberations on the proposed draft code on transport, a number of changes would have to be made in order to harmonize the two texts and to correct certain oversights in the older document. It agreed to await the final developments of the proposed draft code on transport before drawing the Commission's attention to those amendments which would then be of a purely consequential nature. On the other hand, it was recognized that the following amendments would need to be made as soon as possible in order to correct deficiencies in the present Step 9 texts:

Section 5.2 of CAC/RCP 8-1976 should be amended by the deletion of the words "due to unforeseen circumstances". This prevents misinterpretation of the section and may be considered as a clarification of the Group's original intention.

Section 5.3 of CAC/RCP 8-1976 should be amended to read as follows: "Before loading the vehicle as indicated in 5.1 and after entering the cold store the product temperature should be checked".

119. It was agreed that this amendment was of a substantial nature, but was urgently required as the existing text hindered the movement of goods at a critical time when exposure to high ambient temperatures was most common.

120. The first sentence of Section 6.2 of Addendum 1-1978 to CAC/RCP 8-1976 should be amended to read:

"The internal product temperature shall be measured at a point in the product which is 2.5 cm below the centre of the largest surface".

See paragraph 103 for a discussion of this proposal.

121. The Group of Experts did not accept a proposal of the United Kingdom to delete Section 4.2 of Addendum 1-1978 which allowed for the use of glass-stemmed thermometers. The delegation of the United Kingdom pointed out the hazards of using such thermometers and the ready availability, at low cost, of alternative and safe temperature measuring instruments. Nevertheless, the delegations of France and the Federal Republic of Germany pointed out that glass thermometers are usually shielded in metal and were more likely to be universally available.

REVIEW OF ACCEPTANCES OF THE RECOMMENDED INTERNATIONAL STANDARDS FOR QUICK FROZEN FOODS

122. The Group of Experts noted that the Codex Alimentarius Commission at its 13th Session had endorsed the views of the 25th Session of the Executive Committee that, as a specific practical measure for encouraging more acceptances of the Recommended Codex Standards in general, there should be a regular item on the

agenda of the Codex Commodity Committees, covering review of acceptances of standards elaborated by each Committee. The Group was informed of the concern expressed in the Coordinating Committee for Asia at the comparatively slow response of developed countries in accepting the Recommended Codex Standards in general and also of the view of many developing countries that they would like to use these standards for their export trade.

123. The Group was also informed that it would be a step in the right direction and fulfilling one of the objectives of the Codex Alimentarius, i.e. the facilitation of international trade if countries which were not in a position to give formal acceptance to a standard could agree to permitting entry into and circulation in the national territorial jurisdiction of products in conformity with the Recommended Codex Standards.

124. The Secretariat listed those countries which had so far given acceptances, according to the different methods of acceptance provided for of one or more of the Recommended Codex standards for Quick Frozen Foods. It was noted that so far not many developed countries had accepted any of the standards and that, in the main, the acceptances had been received from developing countries.

125. Several delegations indicated that even though their countries had not, as yet, notified acceptance of the standards, the work of the Commission as well as the Standards for Quick Frozen Foods were being studied very carefully and some positive responses could be expected soon. Other delegations, including the observer from the European Economic Community, pointed to certain legal difficulties in accepting the standards but added that, even if they might not be able to accept formally the Codex Standard for Quick Frozen Fruits and Vegetables, they hoped to be able to notify the Secretariat that products in conformity with these standards would be allowed entry and free circulation in their territories.

126. The Group noted that a number of countries were, in fact, allowing entry and free circulation of foods which were in conformity with the Recommended Codex Standards and had set up bodies to accelerate consideration of acceptance of the Codex Standards.

127. The Group of Experts agreed that delegates to the current session should, as far as possible, encourage more positive action at the national level in regard to acceptances of the Standards for Quick Frozen Fruits and Vegetables.

OTHER BUSINESS

Future Work of Group of Experts

128. The Group of Experts noted that it had completed its current work and agreed to adjourn sine die. The Group also noted that the standards it had developed related only to fruits and vegetables that were grown in temperate climates and felt that, if called upon, it could embark in the future on the development of standards for quick frozen tropical fruits and vegetables which might be of interest to many of the developing countries. The Secretariat indicated that the Codex Commodity Committees had been invited to express their views concerning possible future work for the Group of Experts and added that this matter would be brought to their attention further. In addition the Group might have also to revise the standards already developed and adopted by the Commission.

Date and Place of Next Session

129. It was noted that any future session of the Group of Experts, which had now adjourned sine die, would normally be held either in Rome or Geneva.

Quality Assessment of Quick Frozen Foods

130. The delegation of the United Kingdom introduced document CX/QFF 80/17 - AGRI/WP.I/GE.3/R.82 which had been prepared in order to highlight some of the difficulties in interpreting the sections on definitions and tolerances in standards for quick frozen foods. The delegation suggested that the points raised in the paper should be taken into consideration when the standards for quick frozen foods were reviewed in the future. The delegation of the United States of America, noting the importance of the questions raised in the paper, undertook to prepare a paper reflecting its experience in this area.

131. The UN/ECE Secretariat pointed out the value of the paper for the other Groups of Experts operating under the aegis of the Working Party on Standardization of Perishable Produce and offered to ask the UN/ECE Groups of Experts to consider the ramifications of the United Kingdom's paper. The delegation of the USA offered to liaise with the UN/ECE Secretariat on the results of these reviews.

ELECTION OF CHAIRMAN AND VICE-CHAIRMAN

132. The Group of Experts unanimously re-elected Mr. T. van Hiele (Netherlands) as Chairman and Mr. M. Orłowski (Poland) as Vice-chairman, both to serve from the end of the Thirteenth to the end of the next Session of the Committee.

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DETERMINATION OF THE MOISTURE CONTENT OF QUICK FROZEN FRENCH
 FRIED POTATOES

RESULTS OF A COLLABORATIVE STUDY I

INTRODUCTION

The Recommended International Standard for Quick Frozen French Fried Potatoes specifies maximum moisture contents of 76% m/m in shoestring, medium and thick cut styles and 78% m/m in extra large and other styles (see ALINORM 79/25, Appendix VIII). A method for the determination of moisture content was prepared by a working group and subjected to an inter-laboratory collaborative study; details of the method have been given in the document CX/QFF 80/6 - Add. 1 - AGRI/WP.1/GE.3/R.72/Add. 1.

Through the courtesy of the delegation of the United States of America test samples were prepared from a single lot of 3/8 inch (approx. 1 cm) quick frozen French fried potatoes. A total of 30 such samples were prepared; each was allocated a number from 01 to 30, and three samples were dispatched to each of ten laboratories on a random basis (using a random numbers table). Participating laboratories were requested to carry out the method as described, at least in duplicate. In order to minimize variations due to moisture migration over time, all laboratories were requested to perform the analyses during the same stated week (thus allowing for delays in inter-continental shipment of the samples).

TABULATIONS

Five laboratories* have forwarded results to the Secretariat. The following compilation, analysis and interpretation of these results is provided:

* USDA - Chicago; IBVL - Wageningen (NL); Lamb-Weston, Oregon; Ore-Ida Foods Inc., Oregon; and Unilever Research, Bedford (U.K.).

Table 1

Individual results, means and standard deviations

<u>Laborator</u>	<u>Sample code</u>	<u>Results of individual replicate analyses</u>			<u>Mean</u>	<u>Std.dev.</u>
<u>y</u>						
A	04	70.622	70.683		70.6525	0.0431
	07	70.632	70.590		70.6110	0.0297
	13	70.997	70.875		70.9360	0.0863
B	03	71.82	71.62	71.85	71.7633	0.1250
	10	70.92	71.11	70.07	70.7000	0.5538
	15	71.60	71.27	71.37	71.4133	0.1692
C	08	71.09	71.80	71.55	71.4800	0.3601
	18	71.21	70.78	70.76	70.9167	0.2542
	19	71.36	71.30	71.36	71.3225	0.0450
H	02	72.3	72.3	72.3	72.3000	0.0000
	06	71.7	71.7	71.6	71.6670	0.0577
	23	71.1	71.0	71.1	71.0667	0.0577
I	11	71.45	71.50	71.48	71.4767	0.0252
	20	72.28	72.32	72.30	72.3000	0.0200
	22	71.77	71.80	71.79	71.7869	0.0153

Table 2
Analysis of Variance

<u>Source</u>	<u>Source of freedom</u>	<u>Sum of Squares</u>	<u>Main Squares</u>	<u>Estimated Variance of mean</u> ^a
Total	42	12.399104	0.2952176	
All analysis	14	11.276376	0.8054554	0.28158
Laboratories	4	5.556478	1.3891195	0.13875
Samples	10	5.719898	0.5719898	0.14283
Replicates	28	1.122728	0.0400974	

^a The estimated variance of the means was obtained by the application of an appropriate correction factor, in place of simply dividing by the number of replicates. This procedure was necessary due to the unequal number of observations in each coll. The correction factor was obtained from the formula

ESTIMATED PRECISION DATA

The repeatability of the test method, r , may be found directly from the "Replicates" mean square (S_r^2)

$$r = 2.83 \sqrt{S_r^2} = 0.57$$

The difference between two single results found on identical test material by one analyst using the same apparatus with a short-term-interval will exceed the repeatability on average not more than once in 20 cases in the normal and correct operation of the method.

The reproducibility is usually determined from the sum of the variance between laboratories and the variance of the replicates:

$$R = 2.83 \sqrt{S_L^2 + S_r^2} = 2.83 \sqrt{0.13875 + 0.0400974} = 1.20$$

The difference between two single and independent results found by two operators working in different laboratories on identical test material will exceed the reproducibility on average not more than once in 20 cases in the normal and correct operation of the method.

The figure given above for R is patently incorrect, as the Analysis of Variance (Table 2) shows a greater contribution to the overall variance due to differences between samples than to differences between laboratories. Note the careful use of the words "identical test material" in the explanatory phrase accompanying the calculation of R .

If the variation due to the samples is included in the determination of reproducibility (as is the usual case when uniformity of test material is assumed), then R becomes:

$$R = 2.83 \sqrt{S_L^2 + S_r^2 + S_S^2} = 1.61$$

Under the conditions of the collaborative experiment this would be the reproducibility of the test method.

$$k = \frac{\sum n_i \cdot df}{(\sum n_i)^2 - \sum n_i^2}$$

where n_i is the number of replicates contributing to i th entry in the "All analysis" sum of squares.

DETERMINATION OF MOISTURE IN QUICK FROZEN FRENCH FRIED POTATOES

RESULTS OF COLLABORATIVE STUDY II

INTRODUCTION

Various methods (3) for the determination of moisture in quick frozen French Fried Potatoes have been circulated to members of the Joint ECE/Codex Alimentarius Group of Experts on the Standardization of Quick Frozen Foods. The United Kingdom considered these to be unnecessarily complicated and has submitted a simple weighing at $103 \pm 2^\circ\text{C}$ for 16 hours (i.e., to constant weight) procedure to the Secretariat for the Group of Experts' consideration.

This method is reproduced as Annex I to the Appendix.

It has been subjected to an internal United Kingdom collaborative trial.

2. COLLABORATIVE TRIAL

2.1 Organization

Fourteen analysts agreed to take part in the trial. 2 commercial samples of frozen French Fried Potatoes were obtained and sent to the analysts (Samples A and B). They were asked to carry out duplicate analyses on each using the prescribed method.

2.2 Results and Analysis

The results of the trial are shown in the Table. The repeatability and reproducibility were calculated using the procedures described in ISO/DIS 5725:1977. These values are also shown in the Table.

MOISTURE IN FRENCH FRIED POTATOES

RESULTS OF COLLABORATIVE TRIAL WITH OVEN DRYING AT 103°C, 16 HOURS PROCEDURE

<u>LABORATORY</u>	<u>SAMPLE</u>			
	<u>A</u>		<u>B</u>	
	(1)	(2)	(1)	(2)
1	75.49	75.46	72.41	72.35
2	74.44	74.40	72.15	72.6
3	74.41	74.54	73.03	73.04
4	74.67	74.79	71.66	71.55
5	75.64	75.65	72.87	72.92
6	74.72	74.53	72.44	72.47
7	75.07	75.13	70.92	71.07
8	75.66	75.44	72.34	72.21
9	75.24	75.14	72.15	72.13
10	73.66	75.69	71.95	71.99
11	74.68	74.17	72.79	72.64
12	75.02	74.96	72.84	72.72
13	N.R. ⁽³⁾	N.R. ⁽³⁾	N.R. ⁽³⁾	N.R. ⁽³⁾
14	74.07	74.02	72.68	72.55
Mean (x)	74.8		72.31	
Repeatability (r)	0.35		0.19	
Reproducibility (R)	1.71		1.59	

¹ Analysts requested to report results to two decimal places.

² Only laboratory 3 reported a problem namely difficulty in drying "constant" mass by the stipulated method.

³ Results not received in time for inclusion.

DETERMINATION OF MOISTURE IN FRENCH FRIED POTATOES

1. SCOPE AND FIELD OF APPLICATION

The method determines the loss of mass on drying of French fried potatoes.

2. DEFINITION

Moisture content: the loss of mass on drying as determined by the method specified.

3. PRINCIPLE

The residual mass of a test portion is determined after drying at atmospheric pressure in an oven at $103 \pm 2^\circ\text{C}$. The loss of mass is calculated as a percentage by mass of the sample.

4. APPARATUS

- 4.1 Analytical balance, accurate to 0.1 mg.
- 4.2 Dishes, preferably of nickel, aluminium, stainless steel or glass. The dishes must have lids which fit very well but which can readily be removed. Suitable dimensions are: diameter 60 to 80 mm and depth about 25 mm.
- 4.3 Atmospheric-pressure drying oven, well ventilated, thermostatically controlled with temperature regulation (at $103\text{ C} \pm 2\text{ C}$). The temperature should be uniform throughout the oven.
- 4.4 Desiccator, containing freshly activated silica gel with a water content indicator or an equivalent desiccant. Blender.

5. PROCEDURE

- 5.1 Take a 500 g representative sample of the French fried potatoes and homogenize in the blender (4.5) to a smooth consistency.
- 5.2 Uncover the dish (4.2) and place it and its lid in the oven (4.3) and heat for about one hour.
- 5.3 Place the lid on the dish and transfer the covered dish to the desiccator (4.4). Allow it to cool to room temperature and accurately weigh to the nearest 0.1 mg (M).
- 5.4 Introduce approximately 10 g of the sample into the dish, cover the dish with the lid and accurately weigh to the nearest 0.1 mg the covered dish as quickly as possible (M_1).
- 5.5 Uncover the dish and put it with its lid in the oven for about 16 hours.
- 5.6 Replace the lid, transfer the covered dish to the desiccator, allow it to cool to room temperature and accurately weigh to the nearest 0.1 mg as quickly as possible.
- 5.7 Uncover the dish and heat it and its lid for about 2 hours in the oven.
- 5.8 Repeat process 5.6.
- 5.9 Repeat processes 5.7 and 5.6 until the decrease in mass between the successive weighings does not exceed 0.5 mg or until the mass increases. If an increase in mass occurs use the lowest mass obtained in the calculation (6.1). Let the final mass recorded be M_2 g.

6. EXPRESSION OF RESULTS

6.1 Formula and Method of Calculation

Calculate the loss of mass on drying of the sample, expressed as a percentage by mass, by the formula:

$$\frac{M_1 - M_2}{M_1 - M_0} \times 100$$

Where:

M_0 = mass, in g of the dish and its lid after process 5.3;

M_1 = mass, in g of the dish, its lid and sample after process 5.4;

M_2 = mass, in g of the dish, its lid and final sample after process 5.5.

Report the result to 1 decimal place.

6.2 Repeatability

The difference (r) in results between two determinations carried out simultaneously or in rapid succession on the same sample, by the same analyst, under the same conditions, shall not exceed 0.4 g of moisture per 100 g of product.

6.3 Reproducibility

The difference (R) in results between two determinations carried out on the same sample in different laboratories by different analysts shall not exceed 1.7 g of moisture per 100 g of product.

DETERMINATION OF THE ALCOHOL-INSOLUBLE SOLIDS CONTENT

1. SCOPE AND FIELD OF APPLICATION

The method determines the alcohol-insoluble solids content in quick frozen corn-on-the-cob and whole kernel corn.

2. DEFINITION

The alcohol-insoluble solids content: the content of alcohol-insoluble solids as determined by the method specified.

3. PRINCIPLE

The alcohol-insoluble solids in corn consist mainly of insoluble carbohydrates (starch) and protein. A weighed quantity of the sample is boiled with slightly diluted alcohol. The solids are washed with alcohol until the filtrate is clear. The alcohol-insoluble solids are dried and weighed. The percentage by mass present is used as a guide to maturity.

4. REAGENTS

4.1 Ethanol (95%) or denatured ethanol

Ethanol denatured with 5% v/v methanol.

4.2 Diluted Ethanol or Diluted Denatured Ethanol 80% v/v

Dilute 8 parts by volume of reagent under 8.5.4 to 9.5 parts by volume with H₂O.

5. APPARATUS

5.1 Analytical balance

5.2 Beaker, 600-ml

5.3 Buchner funnel

5.4 Drying dish, flat bottomed with lid

5.5 Hot plates or boiling water bath, for refluxing or boiling

5.6 Clamps or weights, to prevent agitation of package in water bath during the thawing.

5.7 Desiccator containing freshly activated dry silica gel, or an equivalent desiccant, with a water content indicator.

5.8 Drying oven, well ventilated and thermostatically controlled and adjusted to operate at 100 + 2°C.

5.9 Filter paper, Whatman No. 1 or equivalent.

5.10 Macerator or blender

5.11 Glass rods, with 'policemen' and bent so as to facilitate cleaning flask or beaker.

5.12 Water bath, with continuous flow at room temperature or regulated at room temperature for thawing.

6. PREPARATION OF TEST SAMPLE

6.1 Thaw the sample in accordance with CAC/RM 32-1970.

Remove the whole grains from the cob with a suitable instrument taking care not to damage individual grains. Spread the grains on a white tile and remove silk, husk, cob and other extraneous vegetable material. By successive coneing and quartering operations reduce the sample to a representative sub-sample of approximately 100 g in size. For whole kernel corn, take a representative 100 g test portion.

Blend the test portion to a smooth paste (if necessary add cold water in the ratio 100 g corn to 25 g water). Stir and accurately weigh, to the nearest 10 mg approximately 10 g prepared material (M_0) into a 600 ml beaker. (If water added weigh 12.5 g). Add 300 ml 80% alcohol (by volume), stir, cover beaker, and bring to boil. Simmer slowly for 30 minutes.

7. PROCEDURE

7.1 Prepare a filter paper (grade suitable for use under suction), dry at 100°C for 2 hours in a flat bottomed dish, with a tight fitting lid (the lid must not be fitted to the dish during the drying period), cool in a dessicator to ambient temperature and weigh to the nearest 1 mg (M_1). Fit the prepared filter paper to a Buchner funnel allowing the edge of the paper to extend at least 13 mm up the vertical sides of the funnel. Apply suction and transfer the contents of the beaker to the Buchner funnel. Do not allow any of the material to run over the edge of the paper. Suck dry, wash the material on the filter with 80% alcohol (by volume) until the washings are clear and colourless.

7.2 Transfer the paper and alcohol-insoluble solids to the dish used in preparation of the paper, dry in the oven to constant weight (approx. 2 hrs) at 100°C, remove the dish, cover and cool in a desiccator for approximately 1/2 hour and weigh to the nearest 1 mg (M_2). Difference between two successive weighings should not exceed 1 mg.

8. EXPRESSION OF RESULTS

8.1 Formula and method of calculation

The alcohol-insoluble solids content, expressed in g per 100 g of the sample, is given by:

$$\frac{M_2 - M_1}{M_0} \times 100$$

Where

M_0 is the initial mass, in g, of the test portion

M_1 is the mass, in g, of the dish, cover and filter paper

M_2 is the mass, in g, of the dish, cover, filter paper and alcohol-insoluble solids.

Express the result to the nearest 0.1 g.

8.2 Repeatability

The difference (r) in g per 100 g of sample between the results of two determinations carried out simultaneously or in rapid succession on the same sample by the same analyst under the same conditions shall not exceed [](*).

8.3 Reproducibility

The difference (R) in g per 100 g of sample between the results of two determinations carried out on the same sample in different laboratories by different analyst shall not exceed [](*).

(*) The values to be inserted are to be calculated from the results of a collaborative trial.

DRAFT STANDARD FOR QUICK FROZEN CORN-ON-THE-COB
(Advanced to Step 8 of the Procedure)

1. SCOPE

This standard shall apply to quick frozen Corn-on-the-Cob of the species Zea mays L. convar saccharata KOERN as defined below and offered for direct consumption without further processing, except for repacking, if required. It does not apply to the product when indicated as intended for further processing or for other industrial purposes.

2. DESCRIPTION

2.1 Product Definition

Quick frozen Corn-on-the-Cob is the product prepared from fresh, clean, sound, properly matured whole or pieces of ears conforming to the characteristics of the sweet corn variety Zea mays L. convar saccharata KOERN which are trimmed (except for the style "Whole"), separated from husk and silk, sorted and washed and sufficiently blanched to ensure stability of colour and flavour during normal marketing cycles.

2.2 Process Definition

2.2.1 Quick frozen Corn-on-the-Cob is the product subjected to a freezing process in appropriate equipment and complying with the conditions laid down hereafter. This freezing operation shall be carried out in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product temperature has reached -18°C (0°F) at the thermal centre after thermal stabilization.

2.2.2 The recognized practice of repacking quick frozen products under controlled conditions is permitted.

2.3 Handling Practice

The product shall be handled under such conditions as will maintain the quality during transportation, storage and distribution up to and including the time of final sale. It is recommended that during storage, transportation, distribution and retail, the product be handled in accordance with the provisions in the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (Ref. No. CAC/RCP 8-1976).

2.4 Presentation

2.4.1 Style

2.4.1.1

- (a) Whole - the whole, intact ear of corn to which a small part of the stalk may be attached. Minimum length not less than 120 mm.
- (b) Trimmed whole - the product obtainable from one whole ear after trimming of both ends. Minimum length not less than 120 mm.
- (c) Cut Cob - portions of the whole trimmed ear, cut transversely into pieces not shorter than 40 mm.

2.4.1.2 The diameter of the product of any style, measured perpendicularly to the axis at the maximum diameter shall be not less than 30 mm.

2.4.2 Other Styles

Any other presentation of the product shall be permitted provided that it:

- (a) Is sufficiently distinctive from other forms of presentation laid down in this standard;
- (b) Meets all other requirements of this standard;
- (c) Is adequately described on the label to avoid confusing or misleading the consumer.

2.4.3 Standard Sample Unit for Presentation

The standard sample unit shall be 4 ears for whole and trimmed whole corn and 8 pieces of ear for the cut cob.

2.4.4 Definition of "Defectives" for Presentation

Any standard sample unit from a sample taken in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL 6.5) (Ref. No. CAC/RM 42-1969) shall be regarded as defective if any individual whole ear, trimmed whole ear or cut cob fails to comply with the requirements in sections 2.4.1.1 and 2.4.1.2.

2.4.5 Lot Acceptance for Presentation Factors

A lot will be considered acceptable with respect to presentation factors when the number of defectives as defined in section 2.4.4 does not exceed the acceptance number (c) for the appropriate sample plan as specified in the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods. (AQL 6.5) (Ref. No. CAC/RM 42-1969).

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Optional Ingredients

- (a) Salt (sodium chloride)
- (b) Condiments, such as spices and herbs.

3.2 Quality Factors

3.2.1 General Requirements

Quick Frozen Corn-on-the-Cob shall be:

- free from foreign flavour and odours, taking into consideration any added optional ingredients;
- clean, free from sand and grit and other foreign material;
- free from insect contamination;

and with respect to visual defects subject to a tolerance shall be:

- of reasonably uniform white, cream to yellow (golden) colour;
- reasonably well developed;
- reasonably uniform in size;
- reasonably free from blemished or mechanically damaged areas;
- reasonably free from poorly trimmed units (except for whole style);
- reasonably free from extraneous vegetable matter (EVM).

3.2.2 Analytical Requirements

3.2.2.1 The Alcohol Insoluble Solids (A.I.S.) content of the whole kernels detached from the cob, as determined by the method specified in section 8.5 of this standard shall not exceed 30% mm.

3.2.2.2 The total soluble solids content of the juice pressed from the kernels and determined according to section 8.6 of this standard by refractometer at 20°C, uncorrected for acidity and read as °Brix on the International Sucrose Scale shall be not less than 20.

3.2.3 Definition of Visual Defects

- (a) Uniform white, cream to yellow (golden) colour means, that all kernels on one ear are of the same colour and that the different units in one standard sample unit are of the same colour.

Light variation - Some difference in colour exists, only slightly affecting the appearance.

Pronounced variation - difference in colour between the different kernels and/or ears are noticeable and affecting the appearance.

- (b) Uniform in size means that the length of the longest ear in the sample unit does not exceed the length of the shortest ear by more than 50 mm for whole and trimmed whole styles or by more than 20 mm for cut style, and that the largest diameter of the largest unit does not exceed the largest diameter of the smallest unit by more than 15 mm.

Minor - outside one of the limits (length or diameter) by maximum 5 mm = 1 defect;

Major - outside both limits by maximum 5 mm = 2 defects;

Major - outside one or both of the Limits by more than 5 mm = 4 defects.

- (c) Well developed means that the kernels shall be positioned in a symmetrical pattern in distinct lines or rows which are not seriously affected by missing or shrunken kernels. The whole style may have some shrunken or under-developed parts.

Minor - Appearance materially affected by irregular pattern of kernels = 1 defect;

Major - More than 10 percent but less than 15 percent by count of the kernels missing or shrunken = 2 defects;

Serious - 15 percent or more by count of the kernels missing or shrunken = 4 defects.

In "whole style" the length of the part of ear which is shrunken or underdeveloped shall be considered as follows:

Minor - more than 20 mm and up to 25 mm = 1 defect

Major - more than 25 mm and up to 30 mm = 2 defects

Serious - more than 30 mm = 4 defects

- (d) Blemished or mechanically damaged areas

Blemished: A unit affected by pathological or insect injury with associated discolouration which affects the kernels.

Mechanically damaged: A unit affected by cuts or by crushing of the kernels. Kernels at the ends of the units which are damaged by cutting shall not be considered as damaged by mechanical injury.

Minor - more than 5 percent but less than 10 percent by count of the kernels are slightly affected but not more than 0.5 percent by count of all kernels are seriously blemished or damaged = 1 defect

Major - 10 percent or more but less than 15 percent by count of the kernels are slightly affected but not more than 1 percent by count of all kernels are seriously blemished or damaged = 2 defects

Serious - More than 15 percent by count of the kernels are slightly affected or more than 1 percent by count of the kernels are seriously affected = 4 defects

- (e) Poorly trimmed means (i) ears or cut cobs where at the stem end a small part of stalk remains attached and also means (ii) that the top end of the ear or the cut cob is cut too high leaving under-developed kernels on the cob. For the style "whole" the top is untrimmed and a piece of the stalk of maximum 15 mm may remain attached, and not be considered a defect.

Minor - at one end of unit maximum 5 mm left = 1 defect
 Major - at one end of unit 5-10 mm left = 2 defects
 Serious - at one end of unit more than 10 mm left = 4 defects

(f) EVM (Extraneous Vegetable Material) -

Husk - means the membranous outer covering and one of the constituent parts of an ear of corn that is removed during processing

Silk - means the coarse thread-like filaments that are one of the constituent parts of an ear of corn. Such silk is found beneath the husk and in immediate contact with the corn kernels (on the cob). Corn silk is normally removed during processing. Silk to the total length twice of that of the unit in question are considered normal and not a defect.

Minor - silk to a total length of 2-6 times the length of the units = 1 defect

Minor - husks not more than 2 square cm in total surface = 1 defect

Major - silk to a total length greater than 6 times the length of the units or husks larger than 2 square cm in total surface = 2 defects

3.2.4 Standard Sample Unit¹

¹ "Standard Sample Unit": This term should not be confused with individual units of product i.e., whole ear, trimmed whole ear or cut cob.

The standard sample unit for the respective styles shall be

Whole and trimmed whole	4 ears
Cut Cob	8 pieces of ears

3.2.5 Tolerances for Visual Defects

Based on the standard sample unit defined in section 3.2.4, visual defects shall be assigned points in accordance with Table I in this section. The maximum number of defects permitted in the Total Allowable Points rating are indicated for the respective categories Minor, Major, and Serious or the Combined Total of the foregoing categories.

Table 1
ALL STYLES

Defect	Unit of Measurement	Defect Categories			Total
		Minor	Major	Serious	
(a) Colour variation (Kernel)	One ear	1			
- Light					
- Pronounced			2		
Colour variation (Ears)	Standard Sample Unit	1			
- Light					
- Pronounced			2		
(b) Difference in size outside given range (in standard sample unit)		1	2 or 4		
(c) Not well developed	Each ear	1	2	4	
(d) Blemish or damaged	Each ear	1	2	4	
(e) Poorly trimmed	Each ear	1	2	4	
(f) EVM	Standard Sample Unit	1	2		
Total Allowable Points		21	6	4	21

3.3 Definition of "defective" for Quality Factors

Any standard sample unit taken in accordance with the FAO/WHO Codex Alimentarius Sampling Plan for Prepackaged Foods AQL-6.5 (Ref. No. CAC/RM 42-1969) and which is adjusted to a standard sample unit size given in 3.2.4, shall be regarded as a "defective" for the respective characteristics as follows:

- (a) Any standard sample unit that fails to meet the general requirements given in section 3.2.1
- (b) Any standard sample unit that fails the "Total Allowable Points" in any one or more of the defect categories including the Total in Table 1, in section 3.2.5
- (c) Any standard sample unit that fails to meet the analytical requirements in section 3.2.2.

3.4 Lot Acceptance for Quality Factors

A lot will be considered acceptable when the number of "defectives" as defined in section 3.3 does not exceed the acceptance number (c) for the appropriate sample plan as specified in the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL 6.5) (Ref. No. CAC/RM 42-1969). In applying the acceptance procedure each defective (as defined in section 3.3 (a) or (b) or (c)) is treated individually for the respective characteristics.

4. FOOD ADDITIVES

4.1 Citric or malic acid, as processing aids for use in the blanching or cooling water in accordance with GMP.

4.2 Carry-Over Principle

4.2.1 "Section 3" of the "Principle relating to the Carry-Over of Additives into Foods" shall apply.

5. HYGIENE

It is recommended that the product covered by the provisions of this standard be prepared in accordance with the International Code of Practice - General Principles of Food Hygiene (Ref. No. CAC/RCP 1-1969, Revision 1) recommended by the Codex Alimentarius Commission.

6. LABELLING

In addition to sections 1, 2, 4 and 6 of the Recommended International General Standards for Labelling of Prepackaged Foods (Ref. No. CAC/RS 1-1969), the following specific provisions apply subject to endorsement by the Codex Committee on Food Labelling. [To be endorsed].

6.1 The Name of the Food

6.1.1 The name of the food as declared on the label shall include "Corn-on-the-Cob" preceded or followed by a description of the style as indicated in section 2.4. The words "quick frozen" shall also appear on the label except that the term "frozen" may be applied in countries where this term is customarily used for describing the product processed in accordance with section 2.2 of the standard.

6.1.2 If the product is produced in accordance with Section 2.4.2 the label shall contain in close proximity to the work "Corn-on-the-Cob" such additional words or phrases that will avoid misleading or confusing the consumer.

6.1.3 In addition, there shall for the styles "whole" and "trimmed whole" appear on the label, in conjunction with, or in close proximity to the name a clear indication of the number of units included in the package.

6.2 List of Ingredients

A complete list of ingredients shall be declared in descending order or proportion in accordance with section 3.2 (c) of the Recommended International General Standard for the Labelling of Prepackaged Foods (Ref. No. CAC/RS 1-1969), except that food additives present in the product in accordance with sections 4.1 and 4.2 need not be declared.

6.3 Net Contents

The minimum net contents shall be declared by count and/or by weight. If by weight, it shall be declared in either the metric system ("Système international" units) or avoirdupois or both systems of measurement as required by the country in which the food is sold.

6.4 Name and Address

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the food shall be declared.

6.5 Country of Origin

The country of origin of the product shall be declared if its omission would mislead or deceive the consumer.

6.6 Lot Identification

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

6.7 Additional Requirements

The packages shall bear clear directions for keeping from the time they are purchased from the retailer to the time of their use, as well as directions for cooking.

6.8 Bulk Packs

In the case of quick frozen Corn-on-the-Cob, in bulk, regardless of style, the information required in section 6.1 to 6.6 shall either be placed on the container or be given in accompanying documents, except that the name of the food accompanied by the words "quick frozen," (the term "frozen" may be used in accordance with section 6.1.1 of this standard), and the name and address of the manufacturer or packer shall appear on the container.

7. PACKAGING

Packaging used for quick frozen Corn-on-the-Cob, regardless of style, shall:

- (a) protect the organoleptic and quality characteristics of the product;
- (b) protect the product from microbiological and other contamination;
- (c) protect the product from dehydration and, where appropriate, leakage as far as technologically practicable; and
- (d) not pass onto the product any odour, taste, colour or other foreign characteristics through the processing (where applicable) and distribution of the product up to the time of final sale.

8. METHODS OF EXAMINATION, ANALYSIS AND SAMPLING

8.1 Sampling. The methods of examinations, analysis and sampling described hereunder are international referee methods which are to be endorsed by the Codex Committee on Methods of Analysis and Sampling.

8.1.1 Sampling for Presentation and Visual Defects: For those provisions detailed in sections 2.4 and 3.2 of this standard sampling shall be carried out in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL 6.5) (Ref. No. CAC/RM 42-1969), as amended.

8.1.2 Sampling for Net Weight: shall be carried out in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for the Determination of Net Weight (under elaboration by the Codex Committee on Methods of Analysis and Sampling).

8.1.3 Sampling for Analytical Requirements: Sampling Plans to be elaborated.

8.2 Thawing Procedure

FAO/WHO Codex Alimentarius Standard Procedure for Thawing of Quick Frozen Fruits and Vegetables (Ref. No. CAC/RM 32-1970). Endorsed.

8.3 Cooking Procedure

FAO/WHO Codex Alimentarius Standard Procedure for Cooking of Quick Frozen Fruits and Vegetables (Ref. No. CAC/RM 33-1970). Cooking time for quick frozen corn, regardless of style, may vary somewhat according to variety characteristics and degree of maturity and is in the order of 10 minutes. Endorsed.

8.4 Determination of Net Weight

FAO/WHO Codex Alimentarius Standard Procedure for Determination of Net Weight of Quick Frozen Fruits and Vegetables (Ref. No. CAC/RM 34-1970); also contained in the Recommended International Standard for Quick Frozen Peas (CAC/RS 41-1970 section 8.3.). Endorsed.

8.5 Determination of the Alcohol-Insoluble Solids (A.I.S.) (To be developed).

8.6 Determination of Total Soluble Solids Content

Thaw the sample according to 8.2 Thawing Procedure. Remove the whole grains from the cob with a suitable instrument taking care not to damage individual kernels. Proceed according to FAO/WHO Codex Alimentarius Method for the Determination of Total Soluble Solids Content (expressed as sucrose) of Quick Frozen Fruit (Ref. No. CAC/RM 43-1971). It will be necessary to place the slurry on a square of cheese cloth and squeeze out some liquid for evaluation by refractometry. [To be endorsed].

DRAFT STANDARD FOR QUICK FROZEN WHOLE KERNEL CORN

(Advanced to Step 8 of the Procedure)

1. SCOPE

This standard shall apply to quick frozen whole kernel sweet corn of the species Zea mays L. convar. saccharata Koern as defined below and offered for direct consumption without further processing, except repacking, if required. It does not apply to the product when indicated as intended for further processing or for other industrial purposes.

2. DESCRIPTION

2.1 Product Definition

Quick frozen whole kernel corn is the product prepared from fresh, clean, whole, sound, succulent kernels of sweet corn species Zea mays L. convar. saccharata Koern of either the white or yellow varieties by removing husk and silk; by sorting, trimming and washing; and by sufficiently blanching before or after removal from the cob to ensure adequate stability of colour and flavour during normal marketing cycles.

2.2 Process Definition

Quick frozen whole kernel corn is the product subjected to a freezing process in appropriate equipment and complying with the conditions laid down hereafter. This freezing operation shall be carried out in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product temperature has reached -18°C (0°F) at the thermal centre after thermal stabilization.

The recognized practice of repacking quick frozen products under controlled conditions is permitted.

2.3 Handling Practice

The product shall be handled under such conditions as will maintain the quality during transportation, storage, and distribution up to and including the time of final sale. It is recommended that during storage, transportation, distribution, and retail, the product be handled in accordance with the provisions in the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (Ref. No. CAC/RCP 8-1976).

2.4 Presentation

2.4.1 Colour

- (a) Yellow
- (b) White

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Optional Ingredients

- (a) salt (sodium chloride)
- (b) condiments, such as spices and herbs
- (c) garnishes, such as pieces of green peppers or red peppers, or mixtures of both, either of which may be sweet or hot and may be dried. Other

vegetables may be used as garnishes. A garnish may not exceed 5 per cent m/m of the finished food.

3.2 Quality Factors

3.2.1 General Requirements

Quick frozen whole kernel corn shall be:

- of similar varietal characteristics;
- of a reasonably uniform colour which may be slightly dull;
- before and after cooking, free from foreign flavour and odour, taking into consideration any added optional ingredients;
- reasonably tender;
- clean, free from sand, grit, insect contamination and other foreign material;
- reasonably free from loose skins;

and with respect to visual defects subject to tolerances shall be:

- reasonably free from ragged, crushed or broken kernels;
- reasonably free from damaged or blemished kernels;
- reasonably free from pieces of cob, husk, or silk;
- practically free from harmless extraneous vegetable material; and
- reasonably free from pulled kernels.

3.2.2 Analytical Requirements

3.2.2.1 The Alcohol Insoluble Solids (AIS) content of the whole kernels, as determined by the method specified in sub-section 8.5 of this standard shall not exceed 30% m/m.

3.2.2.2 The soluble solids content of the juice pressed from the kernels and determined according to sub-section 8.6 of this standard by refractometer at 20°C, uncorrected for acidity and expressed as degrees Brix on the International Sucrose Scales shall be not less than 20.

3.2.3 Definitions of Visual Defects

- (a) Damage or blemish means any kernel affected by insect injury or damaged by discolouration, pathological injury, mechanical injury, or by any other means to the extent that the appearance or eating quality is affected. This category of defect may be further classified as "minor", "major" or "serious" depending upon the extent to which the appearance is affected.

Minor - means damage or blemish that affects the kernel to only a slight degree.

Major - means damage or blemish that is quite noticeable and materially affects the kernel.

Serious - means damage or blemish that is very noticeable and of such nature that it would customarily be discarded under normal culinary preparation.

- (b) Cob means the very firm to hard cellulose-like material to which the kernels of corn are attached and from which the kernels are removed during processing.
- (c) Husk means the membranous outer covering and one of the constituent parts of an ear of corn that is removed during processing.
- (d) Silk means the coarse thread-like filaments that are one of the constituent parts of an ear of corn. Such silk is found beneath the husk and in immediate contact with the corn kernels. Corn silk is normally removed during processing.

(e) Harmless extraneous vegetable material means vegetable matter other than cob, husk, or silk which is harmless. Such material may include, but is not limited to, grass, weeds, leaves and portions of stalk. This category of defect may be further classified as "minor", "major" or "serious", depending upon the amount of severity of the material.

Minor - only slightly noticeable and affects the product to only a slight degree.

Major - readily noticeable and affects the product to a material degree.

Serious- very noticeable and objectionable and would customarily be discarded under normal culinary preparation.

(f) Pulled kernels means kernels of corn that have been so cut or removed from the ear of corn that portions of cob or hard tissue remain. This category of defect may be further classified as "minor" or "major", depending upon the amount of adhering cob that is present.

Minor - slight amount of cob material or hard tissue remains around the base of the kernel.

Major - moderate to noticeable amount of adhering cob material. (If there is an excessive amount of cob material adhering, apply tolerance given in Table I).

3.2.4 Standard Sample Unit

250 grammes

3.2.5 Tolerances for Visual Defects

For tolerances based on the standard sample unit indicated in Section 3.2.4, visual defects shall be assigned points in accordance with Table I in this Section. The maximum number of defects permitted in the Total Allowable Points rating indicated for the respective categories Minor, Major and Serious or the Combined Total of the foregoing categories.

TABLE I

Defects	Unit of Evaluation	Defect Categories			Total
		Minor	Major	Serious	
Damage or blemish	Each kernel				
minor	“ “	1			
major	“ “		2		
serious	“ “			4	
Harmless EVM	Each piece				
minor	“ “	1			
major	“ “		2		
serious	“ “			4	
Pulled kernels	Each kernel				
minor	“ “	1			
major	“ “		2		
Total allowable points	““	60	40	20	60

Pieces of cob - maximum tolerance

0.6 cubic centimetres

Husk - maximum tolerance

4. 4 square centimetres

Silk - maximum tolerance

160 cm

Ragged, crushed or broken kernels (60 pieces)

3.3 Definition of "Defective" for Quality Factors

Any standard sample unit taken in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL - 6.5) (Ref. No. CAC/RM 42-1969) shall be regarded as a "defective" for the respective characteristics as follows:

- (a) when it fails to meet 3.1(c)
- (b) when it fails to meet the general requirements (3.2.1); or
- (c) when it fails to meet the analytical requirements (3.2.2); or
- (d) when it exceeds the 'total allowable points' in any one or more of the defect categories, including "total" in Table I; or
- (e) when it exceeds any one or more of the tolerances for cob, husk, silk, ragged, crushed or broken kernels, given in Section 3.2.5.

3.4 Lot Acceptance for Quality Factors

A lot will be considered acceptable when the number of "defectives" as defined in para. 3.3 does not exceed the acceptance number (c) for the appropriate sample size as specified in the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL-6.5) (Ref. No. CAC/RM 42-1969). In applying the acceptance procedure each defective (as defined in paragraph 3.3, sub-paragraphs (a) to (e)) is treated individually for the respective characteristics.

4. FOOD ADDITIVES

4.1 Citric or malic acid, as processing aids for use in the blanching or cooling water in accordance with GMP.

4.2 Carry-over principle

Section 3 of the "Principle Relating to the Carry-Over of Additives into Foods" (Ref. ALINORM 76/12, App. V) shall apply.

5. HYGIENE

It is recommended that the product covered by the provisions of this standard be prepared in accordance with the International Code of Practice - General Principles of Food Hygiene (Ref. No. CAC/RCP 1-1969-Rev. 1) recommended by the Codex Alimentarius Commission.

6. LABELLING

In addition to Sections 1, 2, 4 and 6 of the "Recommended International General Standard for the Labelling of Prepackaged Foods" (Ref. No. CAC/RS 1-1969), the following provisions apply:

6.1 The Name of the Food

6.1.1 The name of the food as declared on the label shall include the designation "corn".

6.1.2 In addition, there shall appear on the label in conjunction with or in close proximity to the word "corn":

- (a) The words "whole kernel" except that the description "whole grain", "cut", "sweet", or "kernels" may be used if this is customary in the country where the product is sold.
- (b) The colour "yellow" or "white" except that the colour "golden" may be used in lieu of "yellow" if this is customary in the country where the product is sold.

6.1.3 The words "quick frozen" except that the word "frozen"¹ may be applied in countries where this term is customarily used for describing the product processed in accordance with sub-section 2.2 of this standard.

¹ "Frozen" - this term is used as an alternative to "quick frozen" in some English-speaking countries.

6.1.4 When any ingredients other than salt have been added which imparts to the food the distinctive flavour of the ingredients or appearance of the garnish, the name of the food shall be accompanied by the term "with X" or "X flavoured", as appropriate.

6.2 List of Ingredients

A complete list of ingredients shall be declared in descending order of proportion: Section 3.2(c) of the "Recommended International General Standard for the Labelling of Prepackaged Foods" (Ref. No. CAC/RS 1-1969) shall also apply, except that food additives present in the product in accordance with Section 4.2 need not be declared.

6.3 Net Contents

The net contents shall be declared by weight in either the metric system (Système international" units) or avoirdupois or both systems of measurement as required by the country in which the food is sold.

6.4 Name and Address

The name and address of the manufacturer, or packer, or distributor, or importer, or exporter, or vendor of the food shall be declared on the label.

6.5 Country of Origin

The country of origin of the product shall be declared if its omission would mislead or deceive the consumer.

6.6 Lot Identification

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

6.7 Additional Requirements

The packages shall bear clear directions for keeping from the time they are purchased from the retailer to the time of their use, as well as directions for cooking.

6.8 Bulk Packs

In the case of quick frozen whole kernel corn in bulk, the information required in 6.1 through 6.6 shall either be placed on the container or be given in accompanying documents, except that the name of the food accompanied by the words "quick frozen" (the term "frozen" may be used in accordance with subsection 6.1.3 of this standard) and the name and address of the manufacturer or packer shall appear on the container.

7. PACKAGING

Packaging used for quick frozen whole kernel corn shall:

- (a) protect the organoleptic and other quality characteristics of the product;
- (b) protect the product from micro-biological and other contamination;
- (c) protect the product from dehydration and, where appropriate, leakage as far as technologically practicable; and
- (d) not pass on to the product any odour, taste, colour or other foreign characteristics throughout the processing (where applicable) and distribution of the product up to the time of final sale.

8. METHODS OF SAMPLING, EXAMINATION, AND ANALYSIS

The methods of examination, analysis, and sampling described hereunder are international referee methods which are to be endorsed by the Codex Committee on Methods of Analysis and Sampling.

8.1 Sampling

8.1.1 Sampling for Quality Factors: For those provisions detailed in Sections 3.1(c), 3.2.1, 3.2.3, 3.2.5 of this standard, sampling shall be carried out in accordance with FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL-6.5) (Ref. No. CAC/RM 42-1969, as amended).

8.1.2 Sampling for Net Weight shall be in accordance with FAO/WHO Codex Alimentarius Sampling Plans for Determination of Net Weight (under elaboration by the Codex Committee on Methods of Analysis and Sampling).

8.1.3 Sampling for Analytical Requirements

Sampling plans to be elaborated.

8.2 Thawing Procedure

According to the FAO/WHO Codex Alimentarius Standard Procedure for Thawing of Quick Frozen Fruits and Vegetables (Ref. No. CAC/RM 32-1970).

8.3 Cooking Procedure

According to the FAO/WHO Codex Alimentarius Standard Procedure for Cooking of Quick Frozen Vegetables (Ref. No. CAC/RM 33-1970). The following figures should be considered as guidelines for the cooking time for quick frozen whole kernel corn - two to four minutes.

8.4 Determination of Net Weight

According to the FAO/WHO Codex Alimentarius Method: Net Weight Determination of Frozen Fruits and Vegetables (CAC/RM 34-1970); also contained in Recommended International Standard for Quick Frozen Peas (Section 8.3, CAC/RS 41-1970).

8.5 Determination of Alcohol-Insoluble Solids (A.I.S.)

To be elaborated.

8.6 Determination of Soluble Solids Content (Expressed as sucrose)

Thaw the sample according to 8.2 Thawing procedure. Proceed according to FAO/WHO Codex Alimentarius method for the determination of total soluble solids content (expressed as sucrose) of Quick Frozen Fruit (Ref. No. CAC/RM 43-1971). It will be necessary to place the slurry on a square of cheese-cloth and squeeze out some liquid for evaluation of refractometry [to be endorsed].

DRAFT STANDARD FOR QUICK FROZEN CARROTS
(Step 6 of the Procedure)

1. SCOPE

This standard shall apply to quick frozen carrots of the species Daucus carota L. as defined below and offered for direct consumption without further processing, except for repacking, if required. It does not apply to the product when indicated as intended for further processing or for other industrial purposes.

2. DESCRIPTION

2.1 Production Definition

Quick frozen carrots are the product prepared from fresh, clean, sound, roots of carrot varieties (cultivars) conforming with the characteristics of the species Daucus carota L. from which the leaves, green tops, peel and secondary roots have been removed and which have been washed and may or may not be blanched to ensure adequate stability of colour and flavour during normal marketing cycles.

2.2 Process Definition

Quick frozen carrots are the product subjected to a freezing process in appropriate equipment and complying with the definitions laid down hereafter. This freezing operation shall be carried out in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product has reached -18°C (0°F) at the thermal centre after thermal stabilization.

The recognized practice of repacking quick frozen products under controlled conditions is permitted.

2.3 Handling Practice

The product shall be handled under such conditions as will maintain the quality during transportation, storage and distribution up to and including the time of final sale. It is recommended that during storage, transportation, distribution and retail, the product will be handled in accordance with the provisions in the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (Ref. No. CAC/RCP 8-1976).

2.4 Presentation

2.4.1 Types only for the styles Whole:

(a) Long - any suitable variety of conical (e.g. Chantenay) or cylindrical (e.g. Amsterdam) cultivars of carrot.

(b) Round - any suitable variety which has the appearance of spherical cultivar (e.g. Paris Carrot).

2.4.2 Styles

(a) Whole

- (i) Conical and cylindrical cultivars (e.g. Chantenay and Amsterdam types) - consist of carrots which, after processing, retain the approximate conformation of a whole carrot. The largest diameter of carrots, measured at right angles to longitudinal axis shall not exceed 50 mm. The variation in diameter between the largest and smallest carrot shall not exceed 4:1.
 - (ii) Spherical cultivars (e.g. Paris type) - consist of fully mature carrots of a roundish shape of which the largest diameter in any direction shall not exceed 45 mm.
- (b) Finger: carrots which may or may not be cut transversely into sections not less than 30 mm long (apart from arising end pieces).
- (c) Halved: carrots cut longitudinally into two approximately equal halves.
- (d) Quartered: carrots cut longitudinally into four approximately equal sections.
- (e) Sliced Length-wise: carrots sliced approximately longitudinally, either smooth or corrugated into four or more pieces of approximately equal size. Not less than 20 mm long and not less than 5 mm in width measured at the maximum width.
- (f) Shoestring: carrots cut longitudinally, either smooth or corrugated, into strips. The cross section shall not exceed 5 mm (measured at the longest side of the cross section).
- (g) Julienne: carrots cut longitudinally, either smooth or corrugated, into strips. The cross section shall not exceed 10 mm.
- (h) Sliced or Ring Cut: carrots cut, either smooth or corrugated at right angles to the longitudinal axis into rings, having a maximum thickness of 10 mm and a maximum diameter of 50 mm.
- (i) Finger Cut: carrots cut into pieces not less than 30 mm long and having a maximum cross sectional dimension of not more than 23 mm.
- (j) Chunks or Pieces: carrots cut cross-wise into sections having a thickness greater than 10 mm but less than 30 mm or whole carrots which are halved and then cut cross-wise into sections or sections of carrots that may be irregular in shape and size and which are larger than ring cut or double diced.
- (k) Diced: carrots cut into cubes with edges not exceeding 12.5 mm.
- (l) Double Dice: carrots cut into uniformly shaped units having a cross section that is square and of which the longest dimension is approximately twice that of the shortest dimension - the shortest dimension not exceeding 12.5 mm.

2.4.3 Other styles

Any other presentation of the product shall be permitted provided that it:

- (a) Is sufficiently distinctive from other forms of presentation laid down in this standard.
- (b) Meets all other requirements of this standard:

(c) Is adequately described on the label to avoid confusing or misleading the consumer in accordance with section 6.1.3.

2.4.4 Tolerances for Styles

A tolerance of 10 per cent by weight of non-conforming units applies to the whole style and 20 per cent for all other styles except whole.

2.4.5 Sizing

(a) Quick frozen carrots of the styles whole and finger cut may be presented sized or unsized.

(b) If presented as size-graded the styles in 2.4.5(a), dependent on the cultivar used, shall conform to one of the three following systems of specification for the size names.

(c) The diameter shall be measured at the point of largest transverse cross-section of the unit.

Specification for cylindrical cultivars

Size designation

Diameter

Small ¹

6 - 22 mm

Medium

22 - 27 mm

Large

Greater than 27 mm

Specification for conical cultivars

Size designation

Diameter

Small ¹

10 - 30 mm

Medium

30 - 36 mm

Large

Greater than 36 mm

Specification for spherical cultivars

Size designation

Diameter

Very small

Less than 18 mm

Small

Between 18 and 22 mm

Medium

Between 22 and 27 mm

Large

Between 27 and 35 mm

Extra large

Over 35 mm

¹ Carrots meeting these size requirements may be designated "baby" within countries where this practice is permitted.

2.4.6 Tolerances for sizes

If presented size graded the product shall contain not less than 80 per cent by mass of carrots of the declared size.

2.4.7 Standard Sample Unit for Presentation and Sizing

See section 3.2.4(2) and 3.2.4(3).

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS

3.1 Optional Ingredients

3.1.1 Salt (sodium chloride), sucrose, invert sugar syrup, dextrose, glucose syrup, dried glucose syrup, fructose, and fructose syrup.

3.1.2 Aromatic herbs and spices; stock or juice of vegetables and aromatic herbs; garnishes composed of one or more vegetables (e.g. lettuce, onions; pieces of green or red peppers, or mixtures of both) up to a maximum of 10 per cent m/m of the total drained vegetable ingredient.

3.2 Quality Factors

3.2.1 General Requirements

Quick frozen carrots shall be:

- of a reasonable uniform colour, conforming to the colour characteristics of the variety;
- clean and sound;
- have a normal flavour and odour, free from foreign flavour and odour, taking into consideration added optional ingredients;
- free from objectionable tough parts;

and with respect to visual defects subject to a tolerance shall be:

- not misshapen; (this regards whole and finger carrot style only);
- reasonably free from blemishes;
- reasonably free from mechanical damage (this regards whole and finger carrot style only);
- reasonably free from green tops;
- reasonably free from extraneous vegetable materials (EVM);
- reasonably free from unpeeled areas.

3.2.2 Analytical characteristics

Mineral impurities measured on a whole product basis not more than 0.1 per cent m/m.

3.2.3 Definition of Visual Defects

<u>Defect</u>	<u>Definition</u>
Extraneous Vegetable Material (EVM)	Harmless vegetable material which does not consist of carrot roots
Misshapen	Units showing branching, twisting, growth cracks greater than 2 mm wide, or other forms of distortion (Whole, Finger and Fingercut Styles). Units (other than small pieces) not possessing the configuration of the defined style.
Major Blemishes	Black, dark brown and other intensely discoloured areas due to disease, insect damage, inadequate topping or physiological factors covering an area or aggregate area greater than that of a circle 6 mm in diameter, which detract in a major way from the appearance of the product.
Blemishes	Black, dark brown or other intensely discoloured areas due to disease, insect damage, inadequate topping or physiological factors covering an area or aggregate area greater than that of a circle 3 mm in diameter but less than 6 mm in diameter. Other types of discoloration which detract noticeably but not in a major way from the appearance of the product.
Unpeeled	Units showing noticeable unpeeled areas larger than a circle of 6 mm diameter.
Damaged	Units which are crushed or broken.
Cracked	Splits which detract materially from the appearance of the product (Whole, Finger and Fingercut Styles).
Greening	Units showing green colouration extending down the shoulder or green ring at the top (Whole, Finger and Fingercut Styles). Units showing green colouration (other styles).
Small Pieces Whole, Finger, Finger cut and Shoestring styles	Pieces less than 25 mm long
Diced, Double dice, Chunk or pieces styles	Pieces less than one-third the volume of the standard product

3.2.4 Standard Sample Unit

- | | |
|--|----------|
| (i) EVM and small pieces | 1000 g |
| (ii) Whole, Finger, Finger cut, Halved, Quartered | 80 Units |
| (iii) Diced, Double Dice, Shoestring, Julienne, Sliced or Ring Cut, Sliced Lengthwise, Chunks or Pieces Styles | 400 g |

3.2.5 Classification and Tolerances for Visual Defects

For tolerances based on the standard sample unit indicated in section 3.2.4 visual defects shall be assigned points in accordance with the appropriate Tables in this

section. The maximum number of defects permitted is the Total Allowable Points rating indicated for the respective categories minor and major or the combined Total of the foregoing categories.

TABLE I
WHOLE, FINGER, FINGER CUT, HALVED AND QUARTERED STYLES

Defect	Classification	Defect Minor	Categories Major	Total
Misshapen	Each Unit	2	2	
Major Blemishes				
Blemishes		2		
Unpeeled Areas		2		
Damaged		2		
Cracked		1		
Greening	1			
Total Allowable Points:		25	10	25
Small Pieces:		Not to exceed 15 per cent m/m		
EVM:		Not to exceed 2 Pieces or 1 g/1000 g		

TABLE 2
SLICED OR RING CUT, SLICED LENGTHWISE, JULIENNE, DICED, DOUBLE DICED, SHOESTRING AND CHUNK STYLES

Defect	Classification	Defect Minor	Categories Major	Total
Misshapen	Each 1 per cent by weight of units affected	1	2	
Major Blemishes				
Blemishes		1		
Unpeeled Areas		1		
Greening		1		
Total Allowable Points	(a) Ring cut and sliced lengthwise	26	8	26
	(b) Diced and double dice	13	4	13
	(c) Julienne and Shoestring	20	4	20
Damaged and Small Pieces:		Not exceeding 20 per cent m/m		
EVM:		Not to exceed 2 Pieces or 1 g/1000 g		

3.3 Definition of Defective for Presentation Quality Factors and Size

Any standard sample unit taken in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL - 6.5) (Ref. No. CAC/RM 42-1969) and which is adjusted to a standard sample size for applying the tolerances relating to "Visual Defects" shall be regarded as "defective" for the respective characteristics as follows:

- (a) When it fails to meet the general requirements given in section 3.2.1.
- (b) When it fails to comply with the tolerances for style in para. 2.4.4.

(c) When it exceeds the Total Allowable Points in any one of the defect categories Minor or Major; or when it exceeds the Total Allowable Points for the combined Total of the respective defect categories, in Tables 1 and 2.

(d) When the tolerances for damaged and small pieces are exceeded, or

(e) When it fails to comply with the size requirements in 2.4.6.

3.4 Lot Acceptance for Presentation Quality Factors and Size

A lot is considered acceptable with respect to Presentation Quality Factors and Size when the number of "defectives" as defined in section 3.3 does not exceed the acceptance number (c) for the appropriate sample size as specified in the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (Ref. No. CAC/RC 42-1969). In applying the acceptance procedure each "defective" (sub-sections (a) or (b) or (c) or (d) or (e)) is treated individually for the respective characteristics.

4. FOOD ADDITIVES

4.1 Processing Aids

Citric Acid

Limited by GMP

Sodium Hydroxide

Limited by GMP

4.2 Carry-Over Principle

Section 3 of the "Principles Relating to Carry-Over of Additives into Foods" (Ref. ALINORM 76/12, App. IV) shall apply.

5. HYGIENE

It is recommended that the product covered by the provisions of this standard be prepared in accordance with the International Code of Practice - General Principles of Food Hygiene (Ref. No. CAC/RCP 1-1969) recommended by the Codex Alimentarius Commission.

6. LABELLING (Subject to endorsement)

In addition to Sections 1, 2, 4 and 6 of the Recommended International General Standard for the Labelling of Prepackaged Foods (Ref. No. CAC/RS 1-1969) the following provisions apply:

6.1 The Name of the Food

6.1.1 The name of the food as declared on the label shall include the designation "carrots" The words "quick frozen" shall also appear on the label, except that the term "frozen" ¹ may be applied in countries where this term is customarily used for describing the product processed in accordance with the sub-section 2.2 of the standard.

¹ See ¹ page 54.

6.1.2 In addition, there shall appear on the label in conjunction with or in close proximity to the word "carrots":

(a) the type Long or Round as appropriate;

(b) the style as appropriate; "Whole", "Finger" ¹, "Halved", "Quartered". "Sliced Lengthwise", "Shoestring", "Julienne", "Sliced or Ring Cut", "Finger Cut" ¹, "Chunks or Pieces", "Diced", or "Double Dice".

¹ "Carrots": this term is used as an alternative to "Finger" and "Finger cut" in some countries.

6.1.3 If the product is produced in accordance with sub-section 2.4.3 the label shall contain in close proximity to the word "carrots" such additional words or phrases that will avoid misleading or confusing the consumer.

6.1.4 When any ingredient, other than salt, has been added which imparts to the food the distinctive flavour of the ingredient, the name of the food shall be accompanied by the term "with X" or "X flavoured" as appropriate.

6.1.5 Where a statement of size is made, the words "very small", "small", "medium", "large", and "extra large", as appropriate shall be indicated. Carrots meeting the size requirements for "small" may be designated "baby" within countries where this practice is permitted.

6.2 List of Ingredients

A complete list of ingredients shall be declared, in descending order of proportion. Section 3.2(c) of the "Recommended International General Standard for the Labelling of Prepackaged Foods" (Ref. No. CAC/RS 1-1969) shall also apply except that food additives present in the product in accordance with Sections 4.1 and 4.2 need not be declared.

6.3 Net Contents

The net contents shall be declared by weight in either the metric system ("Système International" units) or avoirdupois or both systems of measurement as required by the country in which the food is sold.

6.4 Name and address

The name and address of the manufacturer, packer, distributor, importer, exporter or vendor of the product shall be declared.

6.5 Country of Origin

The country of origin of the product shall be declared if its omission would mislead or deceive the consumer.

6.6 Lot Identification

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

6.7 Additional Requirements

The package shall bear clear directions for keeping from the time they are purchased from the retailer to the time of their use as well as directions for cooking.

6.8 Bulk Packs

In the case of quick frozen¹ carrots in bulk the information required in 6.1 to 6.6 shall either be placed on the container or to be given in accompanying documents, except that the name of the food accompanied by the words "quick frozen" (the term "frozen" may be used in accordance with sub-section 6.1 of this standard) and the name and address of the manufacturer or packer shall appear on the container.

¹ "Frozen": this term is used as an alternative to "quick frozen" in some English speaking countries.

7. PACKAGING

Packaging used for quick frozen carrots shall:

- (a) Protect the organoleptic and other quality characteristics of the product.
- (b) Protect the product against microbiological and other contamination.
- (c) Protect the product from dehydration, and where appropriate, leakage as far as technologically practicable.
- (d) Not pass on to the product any odour, taste, colour or other foreign characteristics, throughout the processing (where applicable) and distribution of the product up to the time of final sale.

8. METHODS OF EXAMINATION, ANALYSIS AND SAMPLING

The methods of examination, analysis and sampling described hereunder are international referee methods which are subject to endorsement by the Codex Committee on Methods of Analysis and Sampling.

8.1 Sampling

8.1.1 Sampling for Presentation, Size and Quality Factors: for these provisions detailed in Sections 2.4, 3.1 and 3.2 of this standard sampling shall be carried out in accordance with the FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL-6.5) (Ref. No. CAC/RM 42-1969), as amended.

8.1.2 Sampling for Net Weight: shall be carried out in accordance with the FAO/WHO Sampling Plans for the Determination of Net Weight (under elaboration by the Codex Committee on Methods of Analysis and Sampling).

8.1.3 Sampling for analytical requirements: Sampling Plans to be elaborated.

8.2 Thawing Procedure

According to the FAO/WHO Codex Alimentarius Standard Procedure for Thawing of Quick Frozen Fruits and Vegetables (Ref. No. CAC/RM 32-1970) [endorsed].

8.3 Cooking Procedure

According to the FAO/WHO Codex Alimentarius Standard Procedure for Cooking of Quick Frozen Fruits and Vegetables (Ref. No. CAC/RM 33-1970). The cooking time for quick frozen carrots may vary within the following range, depending on variety, maturity, style and size:

Carrots	(3-6) minutes	
Cut carrots	(2-4) minutes	[endorsed]

8.4 Test Procedure

8.4.1 Net Weight - FAO/WHO Codex Alimentarius Standard Procedure for Net Weight Determination of Quick Frozen Fruits and Vegetables (Ref. No. CAC/RM 34-1970); also contained in the Recommended International Standard for Quick Frozen Peas (Section 8 Ref. No. CAC/RM 41-1970). [endorsed].

8.4.2 Mineral Impurities - FAO/WHO Codex Alimentarius Standard Procedure for Determination of Mineral Impurities in Quick Frozen Fruits and Vegetables (Ref. No. CAC/RM 54-1974). [to be endorsed].

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APPENDIX VII

PROPOSED DRAFT INTERNATIONAL CODE OF PRACTICE FOR THE HANDLING
OF QUICK FROZEN FOODS IN TRANSPORT

(Advanced to Step 5 of the Procedure)

1. Scope

1.1 This Code is intended to provide guidelines for the loading, transport and unloading of quick frozen foods, other than for retail purposes.¹

¹ Detailed technical information may be found in the following publications of the International Institute of Refrigeration: (i) Recommendations for the Processing and Handling of Frozen Foods; (ii) Recommended Conditions for Land Transport of Perishable Foodstuffs.

1.2 This Code of Practice is intended to be applied to quick frozen foods of all types which have been subjected to the process of quick freezing as described in section 3 of the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (Ref. No. CAC/RCP 8-1976), and which are offered for sale in the quick frozen state.

1.3 This Code of Practice is based on the knowledge that a product with an acceptable quality, offered by a shipper,² will have to be delivered by a carrier at the final point of destination to the receiver in an almost unchanged qualitative condition. To achieve the transportation, the carrier provides adequate transport facilities, capable of maintaining the desired temperature from the point of shipping to the point of receiving.

² In this document the shipper, carrier and receiver are considered as identical to the responsible person who offers, respectively transports and receives the load or the person who works under his responsibility.

1.4 The provisions of this Code of Practice should be interpreted as recommendations and are intended as a guide to assist in the handling and transportation of quick frozen foods in order to maintain their quality up to the time of final sale.

1.5 This Code relates to any type of transport of quick frozen foods and, therefore, also applies to transport of quick frozen foods in containers suitable for the purpose.

2. Product and Quality

2.1 Quick frozen foods, when offered for transportation, have a quality which is determined by the quality of the raw material and by the processing before freezing, the quick freezing process itself, by the packaging and the packaging material and the storage temperature-time history and handling up to that time.

2.2 Maintenance of quality should be achieved by keeping temperature as low as practicable with as few fluctuations in temperature as practicable.

2.3 No material change in quality will result from the loading, transportation and unloading operations provided that the recommended temperature provisions have been maintained.

2.4 Maintaining temperature according to the recommendations of section 4 of this Code provides no guarantee that the quality of a product will be at the acceptable quality level (A.Q.L.).

2.5 In cases where the temperature of a product at the time of arrival is warmer than that recommended, the product should not be refused but placed in such conditions so

as to reduce the temperature to the desired level as quickly as possible. Such product will not necessarily be of bad quality although its product life may have been reduced. Further handling of affected product should be determined in consultation with the appropriate control authority.

2.6 It is recommended to have a certificate for quality of a quick frozen product made out before loading. In case of dispute on the quality at the time of arrival, this may help to clarify a possible reason for a non-acceptable quality for the receiver.

3. Loading, Unloading and Transportation

3.1 Handling of quick frozen foods during loading and unloading of the transport equipment should be done as fast as practicable. Fans in the transport equipment must be stopped during the loading process.

3.2 The use of standardized load units is strongly recommended as well as the use of mechanical auxiliary transport equipment, to minimize the time-temperature-surface exposure of cargo.

3.3 The quick frozen food should not reside longer than is unavoidable in an environment with higher temperatures.

3.4 The selection and grouping of quick frozen foods for various destinations should be done well in advance and before leaving the cold store. The order of loading should be well prepared in advance in cases where the transport equipment will not be completely unloaded at one destination.

3.5 Any handling of quick frozen foods at air temperatures higher than the product temperature will result in an increase of the product temperature and may result in condensation, and should be avoided as much as possible.

3.6 Quick frozen foods should be loaded within transport equipment so as to provide for free circulation of refrigerated air at the front, rear, top, bottom and both sides of the load, except for transport equipment of envelope construction wherein air circulates within the walls of such equipment.

4. Product and Temperature

4.1 Transportation of quick frozen foods from warehouse cold-store to warehouse cold-store may imply at least twice contact with higher environmental air temperature, once during loading, once during unloading.

4.2 To reduce the exposure of frozen food to high ambient temperatures the loading process should be as fast as practicable. Transport: equipment is generally designed to keep temperatures in a load as they are offered and not to remove heat gained by the food during loading. With some exceptions it is not possible to decrease temperature due to the restricted space for air circulation, restricted temperature differences between cooler and product and the restricted overall capacity of the equipment,

4.3 On arrival at the final destination, product temperature should be kept at the temperature recommended for the product,

4.4 Carrier and receiver should agree on the temperature of the product at the time of receiving the load at entry to the warehouse cold-store and on the time and procedure of unloading, taking into account the temperature recommended for the product and the ambient air temperature during the unloading process and the time needed for unloading.

4.5 Shipper and carrier should agree on the temperature of the product at the time of preparing the load in the warehouse cold-store for delivery to the transport equipment and on the time and procedure of loading, taking into account the temperature recommended for the product and the time needed for the loading process, the ambient air temperature during the loading process, the characteristics of the refrigerated transport equipment and the time needed for transportation.

4.6 Temperature measurement at the time of loading and unloading should preferably be done on the same packages, taking into consideration the recommendations laid down in para. 8,3 of Addendum I to CAC/RCP 8-1976, and para. 5.2 of this draft Code.

4.7 Temperatures measured should be written in a protocol accompanying the load for the benefit of the receiver, with a copy to all parties concerned, including eventual insurance organizations.

4.8 It is recommended not to ship a product with a too warm initial temperature but to decrease temperature before shipping, unless it is certain that the carrier can ensure a decrease in temperature during transportation as required.

5. Measuring Temperature

5.1 Temperature should be checked in the product according to the recommendations as presented in Addendum I to the Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976)

5.2 If agreed by the parties concerned, package surface temperature may be measured instead of product temperature, but in case of dispute only the product temperature should be valid.

5.3 Checking of temperature in the situations as mentioned in 4.3, 4.4 and 4.5 always should be done by shipper/carrier and carrier/receiver, at the same time, on the same sample, in the environmental conditions of the warehouse cold store where the product will be stored or was stored unless the temperature measuring equipment provides for recording temperatures of the load, visible outside the storage (ref. No. CAC/RCP 8-1976 para. 5.4).¹

¹ This sub-paragraph (5.3) is not in conformity with the Recommended International Code of Practice for the Processing and Handling of Quick Frozen Foods (para. 5.5). It is proposed to revise the last mentioned paragraph as follows: "During unloading the vehicle as indicated in 5.1, and after entering the cold store the product temperature should be checked".

5.4 Checking product temperatures should not delay the loading or unloading process. In case of dispute the measuring procedure should follow the directions presented in para. 5.3 above, meanwhile keeping the transport equipment closed.

6. Transport Equipment

6.1 Transport equipment should be compatible with the requirements of the quick frozen food to be transported, taking into account the conditions during loading and unloading and the ambient air temperature during transportation and the duration of the transport.

6.2 The transport equipment should be free from foreign smell or odour and in good hygienic condition.

6.3 The transport equipment should be pre-cooled at the place of loading taking into account the temperature and humidity of the environment such that the development of

condensation is not excessive. (See also para. 3.5). Before loading, the refrigerated equipment and the interior of the vehicle should be defrosted as necessary.

6.4 In the event of a refrigerating system being supplied that may have repercussions on the health of people entering the refrigerated space, warning notices and safety devices must be provided to protect the, workers.

6.5 During transportation from warehouse cold store to warehouse cold store a limited rise of 3 C in the temperature from that specified for the load may be tolerated, but the temperature should be reduced as soon as possible, either during transport or immediately after delivery, to the recommended temperature (see also para. 2.5).

6.6 The carrier should keep records of:

- the temperature in the return air flow;
- the temperature of the load at different locations in the transport equipment;
- the running conditions of the refrigerating unit;
- the length of time for which the doors are left open during loading and unloading of the goods.

6.7 Transport of quick frozen foods should be realized within the shortest time.

7. Facilities at loading and unloading place

7.1 The warehouse cold store should provide for adequate connections with a protected space for the refrigerated transport equipment, such that this equipment and the cargo transferred are subject to a minimum of heat load, and that thereby any increase in product temperature is restricted as much as possible.

7.2 Shipper, carrier, receiver and Inspection Services should contribute to accelerate the loading and unloading procedure so as to avoid any unnecessary delay.

7.3 Door(s) of the transport equipment should always be closed when the loading or unloading is interrupted for any reason.

8. Inspection

8.1 Inspection of the temperature of the product, other than by reading the recording instruments outside the vehicle, as provided for in CAC/RCP 8-1976 (para. 5.4), between the time of loading and unloading by opening the transport equipment is strongly dissuaded and should be done as recommended in 5.3 above.

8.2 It is strongly recommended that inspection by governmental authorities for other purposes be organized at the point of loading and unloading.