codex alimentarius commission

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

WORLD HEALTH ORGANIZATION

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ALINORM 04/27/16

JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX ALIMENTARIUS COMMISSION

Twenty-Seventh Session

Geneva, Switzerland, 28 June - 2 July 2004

REPORT OF THE TENTH SESSION OF THE CODEX COMMITTEE ON MEAT HYGIENE

Auckland, New Zealand, 16 - 20 February 2004

Note: *This report includes Codex Circular Letter CL 2004/4-MH*

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CL 2004/4-MH
February 2004

TO: Codex Contact Points
Interested International Organizations

FROM: Secretary, Codex Alimentarius Commission,
Joint FAO/WHO Food Standards Programme
Viale delle Terme di Caracalla, 00100 Rome, Italy

SUBJECT: **Distribution of the Report of the Tenth Session of the Codex Committee on Meat Hygiene (ALINORM 04/27/16)**

The report of the Tenth Session of the Codex Committee on Meat Hygiene (CCMH) is attached. It will be considered by the 27th Session of the Codex Alimentarius Commission (Geneva, 28 June - 2 July 2004)

REQUEST FOR COMMENTS/INFORMATION

Draft Code of Hygienic Practice for Meat, at Step 6 of the Codex Procedure (ALINORM 04/27/16, Appendix II). See also paras. 10 through 49 of this report.

Governments and interested international organizations are invited to provide their comments on Appendix II to this report. Comments should be forwarded to Ms. Cindy Newman, Codex Committee on Meat Hygiene, New Zealand Food Safety Authority, P.O. Box 2835 Wellington, New Zealand Fax +64 4 463 2583 - E-mail: cindy.newman@nzfsa.govt.nz with a copy to the Secretary, Codex Alimentarius Commission, Viale delle Terme di Caracalla, 00100 Rome, Italy (fax +39 06 57054593; e-mail codex@fao.org) for **not later than 30 September 2004.**

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SUMMARY AND CONCLUSIONS

The Tenth Session of the Codex Committee on Meat Hygiene reached the following conclusions:

The Committee agreed:

- to incorporate the Hygiene Provisions for Processed Meat in the draft Code of Hygienic Practice for Meat for discussion in Agenda Item 3 (para. 106);
- to attach the two proposed draft Annexes on Risk-Based Evaluation of Organolepetic Post-Mortem Examination Procedures for Meat and on Microbiological Verification of Process Control of Meat Hygiene to the draft Code of Hygienic Practice for Meat as Annex I and II respectively (paras 66 and 77);
- to circulate the entire draft Code of Hygienic Practice for Meat for comments and further finalization at its next meeting (ALINORM 04/27/16, para. 49 and Appendix II).

MATTERS OF INTEREST TO THE COMMISSION:

The Committee took note of the request of the Codex Alimentarius Commission concerning the development of specific guidelines on risk analysis, and concluded that the texts developed or being developed by the Codex Committee on General Principles and other horizontal Codex Committees provided adequate guidance to its work (para. 5).

The Committee agreed to inform the Commission of the decision to discontinue the development of the Annexes on Risk-Based Evaluation of Organolepetic Post-Mortem Examination Procedures for Meat and on Microbiological Verification of Process Control of Meat Hygiene (paras 66 and 77).

LIST OF ABBREVIATIONS USED IN THIS REPORT

ALOP	Appropriate Level of Health Protection
BSE	Bovine Spongiform Encephalopathy
CAC/RCP	Codex Alimentarius Commission / Recommended Code of Practice
CAC/GL	Codex Alimentarius Commission / Guidelines
CCFH	Codex Committee on Food Hygiene
CCMH	Codex Committee on Meat Hygiene
CL	Circular Letter
CRD	Conference Room Document
FAO	Food and Agriculture Organization of the United Nations
FSO	Food Safety Objectives
GHP	Good Hygienic Practices
HACCP	Hazard Analysis and Critical Control Point
JECFA	Joint FAO/WHO Expert Committee on Food Additives
JEMRA	Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment
OIE	Office International des Epizooties / International Office of Epizootics
QA	Quality Assurance (systems)
RTE	Ready to Eat
SSOP	Sanitation Standard Operating Procedures
WHO	World Health Organization

REPORT OF THE 10TH SESSION OF THE CODEX COMMITTEE ON MEAT HYGIENE

OPENING OF THE SESSION

1. The Hon Annette King, Minister for Food Safety, opened the Tenth Session of the Codex Committee on Meat Hygiene, which was held from 16-20 February 2004 in Auckland, New Zealand at the kind invitation of the Government of New Zealand. The Session was chaired by Dr Andrew McKenzie, Executive Director, New Zealand Food Safety Authority. The Session was attended by 120 participants from 36 Member countries and 1 Member organization[1] and 5 international organizations. A complete List of Participants is attached as Appendix I.

ADOPTION OF THE AGENDA (Agenda Item 1)[2]

2. The Committee agreed to reverse the order of Agenda Item 3 "Draft Code of Hygienic Practice for Meat" and Agenda Item 6 "Discussion Paper on Hygiene Provisions for Processed Meat". It further agreed that Agenda Item 3 would be discussed on the basis of a document (CRD 7) that would merge the draft Code of Hygienic Practice for Meat (ALINORM 03/16A, Appendix III) and the hygiene provisions for processed meat, as discussed during the session. With the above changes the Committee adopted the Provisional Agenda as its Agenda for the Session.

MATTERS REFERRED TO THE COMMITTEE BY THE CODEX ALIMENTARIUS COMMISSION AND OTHER CODEX COMMITTEES (Agenda Item 2)[3]

3. The Committee noted matters arising from the 26th Session of the Codex Alimentarius Commission (Rome, 30 June – 7 July 2003) regarding the Amendments to the Procedural Manual, the Joint FAO/WHO Evaluation of the Codex Alimentarius and Other FAO and WHO Work on Food Standards and the FAO/WHO Trust Fund for Participation of Developing Countries in Codex Standards Setting Procedure.

4. In particular, the Committee commented and/or made decisions on the following matters:

Risk Analysis

5. The Committee took note of the request of the Codex Alimentarius Commission that "*relevant Codex committees develop or complete specific guidelines on risk analysis in their respective areas, for inclusion in the Procedural Manual, as recommended in the Action Plan adopted by the 22nd Session of the Commission (Geneva, June 1997)*"[4]. In this regard, the Committee concluded that the texts developed or being developed by the Codex Committee on General Principles and other horizontal Codex Committees provided adequate guidance to its work.

Decisions of the Codex Alimentarius Commission concerning the work of the Committee

6. The Committee was informed that the 26th Session of the Codex Alimentarius Commission adopted the revised terms of reference of the Committee as proposed and agreed that its name should read "Codex Committee on Meat Hygiene". The Commission adopted the draft *General Principles of Meat Hygiene* at Step 8 and the proposed draft *Code of Hygienic Practice for Meat* at Step 5 as proposed.

Report of the Activities on Risk Assessment of Microbiological Hazards in Food (JEMRA)

7. The Committee noted the report prepared by FAO/WHO on the activities of risk assessment of microbiological hazards in food, which was relevant to its work. It also noted discussion papers on Risk management strategies for *Salmonella* spp. and *Campylobacter* spp. in poultry and on Risk Profile for Enterohaemorragic *E. coli* including the identification of commodities of concern, including sprouts, ground beef and pork prepared for the 36th Session of the Codex Committee on Food Hygiene (Washington, D.C., United States of America, 29 March – 4 April 2004).

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1 CRD 1 (EC Annotated Agenda for the 10th Session of the Codex Committee on Meat Hygiene).
2 CX/MH 04/10/1.
3 CX/MH 04/10/2; CRD 2 (updating on JEMRA activities).
4 ALINORM 03/41, para. 147.

Collaboration between the Codex Alimentarius Commission and the Office International of Epizootics (OIE)

8. The Committee was informed on the status of collaboration between the Codex Alimentarius Commission and the OIE and the discussion at the 53rd Session of the Executive Committee of the Codex Alimentarius Commission (Geneva, Switzerland, 4-6 February 2004).

9. The Representative of the OIE informed the Committee about recent activities of the OIE Working Group on Animal Production Food Safety, in particular as it related to the development of documents addressing the duality of objectives during ante- and post-mortem inspection. The intent of the OIE was to have in relevant Chapters of the Terrestrial Animal Health Code reference to the work of the Codex Alimentarius on meat hygiene and other food safety areas. During its July 2003 meeting, the Working Group reviewed and modified a draft document entitled "Role and functionality of Veterinary Services in food safety throughout the food chain" that was circulated to all OIE Member Countries for comment and for discussion at the OIE General Session in May 2004. A second document on Good Farming Practices in the Food Safety Continuum, as well as a third one on the Role of Veterinary Services During Ante- and Post-mortem Inspection were also under preparation and will be discussed by the Working Group during its upcoming meeting in early April 2004.

DRAFT CODE OF HYGIENIC PRACTICE FOR MEAT (Agenda Item 3)[5]

10. The 26th Session of the Codex Alimentarius Commission adopted the proposed draft *Code of Hygienic Practice for Meat* at Step 5 as proposed by the 9th Session of the Codex Committee on Meat and Poultry Hygiene.[6]

11. As agreed during the adoption of the agenda (see para. 2), the Committee discussed this item on the basis of a document prepared by the Secretariat (CRD 7), which merged the provisions for processed meat as discussed during Agenda Item 6 (see paras 78-116) into the draft Code of Hygienic Practice for Meat. In addition to editorial amendments, it agreed to the following changes:

General Comments

12. The Committee recognized the value of integrating all provisions on meat hygiene into a consolidated text.

13. The Committee noted that the emphasis of the Code was on a risk-based approach and since it was developed internationally, it could not reflect all national legislations. The Code did not deal with specific diseases as the risks that existed in one region or countries in the world did not necessarily exist in another, the hazards were not necessarily homogeneous internationally and there were different animal husbandry practices around the world.

14. The Committee noted the recommendation of the Observer from the OIE that the Code should specifically address the duality of objectives that slaughterhouses activities deliver in the field of biosecurity in terms of public and animal health, including zoonoses. It agreed to insert some references in the Code to the work of the OIE in utilising ante- and post-mortem inspection in the production of meat to reduce hazards of public and animal health significance.

15. The Delegation of the European Community stated that they reserved their position concerning the role of veterinary inspector, the definitions of ante- and post-mortem inspection and the requirements in some other sections of the draft Code, as the EC legislation concerning these issues was in the process of being finalised. It was also suggested to restructure the draft Code into three parts to address: i) generic requirements applicable to all establishments, and specific requirements for ii) fresh meat and iii) processed meat (see CRD 6). This proposal was not further developed by the Committee.

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5 ALINORM 03/16A, Appendix III; Comments submitted by Australia, Switzerland, European Community and OIE (CX/MH 04/10/3), India (CRD 4), and the Philippines (CRD 5); Revised draft Code of Hygienic Practice for Meat (CRD 7); European Community's suggestions on Agenda item 3 (CRD 8); Report of *ad hoc* Working Group on definitions (CRD 9); US suggestions on definitions (CRD 10).

6 ALINORM 03/41, para. 134 and Appendix VI

Specific Comments

SECTION 1 – INTRODUCTION

16. A new paragraph 2 bis was introduced to refer to the duality of public and animal health objectives of meat hygiene activities in the slaughterhouse, in particular in relation to ante- and post-mortem inspection, and to acknowledge the importance of this duality when specifying and carrying out meat hygiene activities.

17. In paragraph 4, the Committee added a reference to the work of JEMRA, JECFA and FAO/WHO Expert Consultations as contributing to risk management recommendations. Paragraph 4 bis was deleted as already covered in other parts of Section 2.

SECTION 2 – SCOPE AND USE OF THIS CODE

18. Paragraph 5 was amended to include all types of meat covered by the Code, such as raw meat, manufactured meat, etc. The Committee added a new paragraph 8 bis to refer to linkages to relevant texts contained in the OIE Terrestrial Animal Health Code.

SECTION 3 – DEFINITIONS

19. The Committee agreed that in the revision of this section, it should focus its consideration on:

a. New definitions that were added due to the widening the scope of the draft Code to include processed meat (e.g. meat preparations);

b. Definitions under development in the Codex Committee on Food Hygiene (e.g. FSOs, performance criteria);

c. Definitions of ante- and post mortem examination;

d. Definitions related to competent authority, competent persons, official inspectors, etc.

a) New definitions

20. The Committee agreed to change “processed meat” to “manufactured meat” to avoid confusion with the general terms “process” and “product”. It generally agreed to the proposal of an *ad hoc* working group, which met during the session, presented in CRD 9 on the following terms: i) raw meat i.e fresh meat, minced meat, mechanically separated meat; ii) manufactured meat; and, iii) meat preparations.

21. The Committee amended the proposed definitions in CRD 9 of “manufactured meat” by adding “raw” and specifying that when cut, the cut surface of the product had no longer the characteristic of fresh meat; and of “Raw meat” by adding the footnote “this does not preclude interventions for the purpose of pathogen reduction”.

22. The Committee deleted the footnote in the definition of “meat”. The Committee agreed to use the term “Ready-to-Eat Products” and replaced “meat and meat preparations” with “products” in the definition.

b) Definitions under development in the Codex Committee on Food Hygiene

23. The Committee noted that at its 9th Session it was already decided at to use these definitions in the draft Code on an interim basis, pending their finalization by CCFH. In noting that the work in CCFH had been further protracted, the Committee decided to leave these definitions unchanged.

c) Definitions of ante- and post mortem examination

24. While discussing the definitions of ante- and post-mortem examination, the Committee noted that at its last Session it was generally accepted to use the term “examination” as it encompassed activities that were much broader than inspection *per se* and provided more flexibility to governments in assigning responsibility for this function. However, some delegations expressed their concern in this regard.

25. The Committee noted that the written comments addressed two main elements: i) the use of the word “examination” versus “inspection”; and, ii) the inclusion of animal health objectives. It was agreed to revert to the term “inspection” in the definitions and throughout the Code with the understanding that the term was accepted in its common usage and was not regarded as a function to be undertaken only by a person employed by the Competent Authority. It was also noted that the use of the term “inspection”, better contributed to consumer’s confidence in food safety.

26. The Committee agreed that ante- and post-mortem inspection were fundamental for public health, animal health as well as for other purposes such as animal welfare, animal identification, etc. and that it was necessary to indicate a link between these activities in the Code. To this effect, it added to the two definitions a footnote to indicate that procedures other than these solely for public health, might also be conducted, in particular for the purpose of animal health.

d) Definitions related to competent authority, competent persons, official inspectors, etc.

27. The Committee noted that the Code attempted to accommodate the flexibility of different regulatory systems worldwide. It recognized that accountability for meat hygiene always rested with the Competent Authority of national governments, but that flexibility should be allowed on how the service was delivered, e.g. either by the Competent Authority itself or by an officially recognized competent body operating under the supervision and control of the Competent Authority. It was also noted that the competent person was not necessarily the person with overarching and final responsibility for ante- and post-mortem judgements and that the activities of a range of competent persons could contribute to such judgement.

28. With this understanding the Committee accepted the above definitions as proposed.

29. In addition, it added a footnote to the definition of Competent Authority to clarify that it provided official assurances in international trade of meat and to refer to the requirements for certification for public health and fair trade purposes as developed by the Codex Alimentarius Commission, and for certification for animal health, zoonoses and fair trade purposes as developed by OIE.

30. The Committee expanded the definition of Veterinary inspector to specify that the veterinary inspector carried out official meat hygiene activities as specified by the Competent Authority. However, in recognizing the need for further discussion, the Committee put this definition in square brackets for finalization at its next meeting.

SECTION 5.2- HYGIENE OF SLAUGHTER ANIMALS

31. In the first bullet of paragraph 19, the nature of suitable interventions for cleaning of the external surfaces of the animal was clarified by providing examples of washing or shearing and for consistency with principles in Section 6.1.

SECTION 5.6.2 -TRANSPORT OF KILLED WILD GAME

32. Paragraph 33 was amended to allow for more flexibility.

SECTION 6.3 - ANTE-MORTEM EXAMINATION

33. Paragraph 40 was amended to clarify that procedures and/or tests for ante-mortem examination should also take into account signs of disease in live animals.

SECTION 6.3.1 - DESIGN OF ANTE-MORTEM EXAMINATION SYSTEMS

34. The Committee added paragraph 43 bis to complement information contained in the Introduction on the duality of objectives of ante-mortem inspection and to stress that ante-mortem inspection procedures be science-based and tailored to the relevant risks.

SECTION 8.2 - DESIGN AND CONSTRUCTION OF LAIRAGES

35. The Committee amended the second last bullet in the first box in order to be less prescriptive.

SECTION 8.4 - DESIGN AND CONSTRUCTION OF AREAS WHERE BODIES OF ANIMALS ARE DRESSED OR MEAT MAY BE PRESENT

36. The Committee noting that in small businesses it was not always possible to have separate rooms for skin-on dressing of pigs or other animals, amended the bullet point to allow also for the use of separate areas for these operations.

SECTION 8.5 - DESIGN AND CONSTRUCTION OF EQUIPMENT WHERE BODIES OF ANIMALS ARE DRESSED OR MEAT MAY BE PRESENT

37. The Committee added a sentence at the end of paragraph 70 to highlight that the layout and equipment of establishments be design to prevent cross-contamination between products of different status and products at various production stages.

SECTION 8.9 - TRANSPORT VEHICLES

38. Section on “Transport vehicles” was renamed to “Means of transport” in order to facilitate translation into other languages.

39. The text of the second bullet in the box was amended to clarify that provisions related to unprotected meat, not contacting the floor.

SECTION 9 - PROCESS CONTROL

40. The Committee noted that actions required as a result of non-compliance with performance criteria should be not only corrective but also “preventative”, therefore amended the second sentence of paragraph 93 to this effect.

41. The Committee amended paragraph 99 by adding “wherever practicable” to allow for more flexibility.

SECTION 9.2.5 - QUALITY ASSURANCE (QA) SYSTEMS

42. The Committee did not expand this Section. One delegation noted that the Section provided very little guidance on how QA systems could contribute to meat safety and suitability outcomes.

SECTION 9.5.1 - DESIGN OF POST-MORTEM EXAMINATION SYSTEMS

43. The Committee:

- added paragraph 121 bis to be consistent with provisions in Section 6.3.1;
- divided paragraph 137 into two and deleted paragraph 137 bis, as redundant;
- amended footnote 44 in order to be consistent with earlier decisions (see para 97);
- amended paragraph 138 bis to emphasize that the operator of the establishment was responsible not only for the establishment but also for the implementation of procedures for determining and validating shelf life of manufactured meat and meat preparations.

SECTION 9.9 - RECALL SYSTEMS

44. The Committee had an extensive debate on recall procedures. Some delegations pointed out that there was not clear distribution of functions and responsibilities between the establishment and the Competent Authority(s) in relation to product tracing, withdrawal, recall, and/or seizure procedures (the latter being an action available to the Competent Authority) and suggested that clearer explanations were needed for these terms. It was suggested that as the Section did not contain specific provisions for recall of meat, references to other Codex texts might be sufficient in this regard. The Committee noted that although recall procedures were briefly covered by the General Principles of Food Hygiene, there was a need to clarify the various terms and the different responsibilities and interrelations of the Competent Authority(s) and the establishment in this regard.

45. The Committee agreed to clarify that establishments should have systems for tracing and withdrawal of products as well as for recall of products that had passed beyond the immediate jurisdiction of the establishment.

46. The Observer of CLITRAVI proposed to amend the first sentence of paragraph 141 to include retailers, however the Committee did not retain this suggestion as such provisions were of difficult application for some developing countries.

47. The Committee agreed that the Competent Authority had the responsibility to verify that establishments take necessary steps to ensure that all affected products are included in a recall, and added additional language in paragraph 141 bis to this effect.

48. The Committee agreed that there was need for further discussion and work on this Section.

STATUS OF THE DRAFT CODE OF HYGIENIC PRACTICE FOR MEAT

49. The Committee noted that considerable progress was made on the revision of the draft Code of Hygienic Practice for Meat, which now encompassed also provisions for processed meat. However some issues, especially on the fundamental definition of Veterinary Inspector and on Recall System required further consideration. It therefore agreed to return the draft Code to Step 6 for comments and further consideration at its next session (see Appendix II). The Committee also agreed that Annexes on Risk Based Evaluation of Organoleptic Post-Mortem Inspection Procedures for Meat and on Microbiological Verification of Process for Control of Meat Hygiene would constitute an integral part of the draft Code and attached them to Appendix II (see paras 66 and 77).

PROPOSED DRAFT ANNEX ON RISK-BASED POST-MORTEM EXAMINATION PROCEDURES FOR MEAT (Agenda Item 4)[7]

50. The 9th Session of the Committee decided to append the proposed draft Annex on Risk-Based Post-Mortem Examination Procedures for Meat to its report for comments at Step 3. The Committee agreed that a drafting group, under the direction of New Zealand, would prepare a revised version of the Annex for circulation, additional comments and further consideration at its next meeting[8] .

51. The Committee considered document CX/MH 04/10/4 and agreed that comments of general nature including those related to definitions, would be taken into account during the discussion of Agenda Item 3 (see paras 10-48). It reviewed the document section by section and, in addition to editorial amendments, agreed to the following changes:

TITLE

52. The title was amended to "Annex on Risk-Based Evaluation of Organoleptic Post-Mortem Examination Procedures for Meat" to better reflect that the scope of the Annex was intended to provide risk-based guidance on the evaluation of organoleptic procedures. Consequential changes were made throughout the text in this regard.

SECTION 1 - INTRODUCTION

Paragraph 2

53. The Committee agreed to refer to "many long-standing post-mortem examination procedures" in order to avoid possible misinterpretation of the term "traditional".

Paragraph 3

54. The sentence was amended and the reference "not developed methodologies" was deleted for clarity. A new paragraph 3 bis was added to better explain the scope of the Annex.

SECTION 2 - OBJECTIVES OF RISK-BASED POST-MORTEM EXAMINATION PROCEDURES FOR MEAT

Paragraph 4

55. The Committee added after the third bullet "positive predictive value" as an example of comparison of effectiveness of different examination procedures; it clarified the fifth bullet to refer to a "production-to-consumption" approach to meat hygiene.

SECTION 3.2 - RISK ASSESSMENT

Paragraph 7

56. In the last sentence, the wording "In the latter case" was changed to "In any case" to reflect that risk management decision applied to both quantitative and qualitative risk assessments.

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7 CX/MH 04/10/4; Comments submitted by Argentina, Egypt, Thailand, European Community (CX/MH 04/10/4, Add. 1), India (CRD 4), the Philippines (CRD 5), and European Community (CRD 6).

8 ALINORM 03/16A, para. 90 and Appendix IV.

SECTION 4 - GENERAL PRINCIPLES FOR DEVELOPMENT OF RISK-BASED POST-MORTEM EXAMINATION PROCEDURES

57. Two bullet points were added to (ii) to specify that risk-based post-mortem procedures should take into account disease prevalence and all relevant information from primary production and ante-mortem examination of the animals.

58. The second bullet of (iv) was broadened to include the detection of visible contamination.

59. The Committee deleted the reference to regulatory guidelines and standards in (viii) so as to avoid contradiction.

60. An additional (ix) was added to refer to possible utilisation of alternative examination procedures.

61. The Committee was of the view that it was not necessary to insert language on the need for risk communication with all interested parties during development and prior to implementation of new or alternative inspection procedures in the Annex as proposed by the Observer from IACFO, as risk communication aspects were already covered in the general provisions of the Code. The Observer of IACFO expressed her concern regarding this decision that the Code lacked of sufficient risk communication elements to ensure transparency.

SECTION 5.1 - IDENTIFICATION OF THE MEAT HYGIENE ISSUES

Paragraph 8

62. The Committee clarified the sentence to explain that abnormalities or visible contamination were the target of the examination procedure. It agreed to delete the terms “grossly detectable” and “gross” and to refer to abnormalities only throughout the text. In the second sentence it added a reference to “new technologies” for consistency with the scope of the Annex.

SECTION 5.2 - FIELD TRIALS

Paragraph 11

63. In recognizing that the use of target tissues acting as “indicators” was not always possible, the Committee amended the second sentence to make it less prescriptive.

SECTION 5.4 - RISK MANAGEMENT DECISIONS

Paragraph 21

64. The Committee clarified the sentence to recognize the responsibility of the Competent Authority to determine the frequency and extent of risk-based post-mortem examination procedures.

Paragraph 22

65. The Committee added a sentence with regard to incentives for improving the system.

STATUS OF THE PROPOSED DRAFT ANNEX ON RISK-BASED POST-MORTEM EXAMINATION PROCEDURES FOR MEAT

66. The Committee agreed to attach the renamed Annex on Risk-Based Evaluation of Organolepetic Post-Mortem Examination Procedures for Meat to the draft Code of Hygienic Practice for Meat (see para. 49). It agreed to inform the Commission of the decision to discontinue the development of the Annex as a separate document.

PROPOSED DRAFT ANNEX ON MICROBIOLOGICAL VERIFICATION OF PROCESS CONTROL OF MEAT HYGIENE (Agenda Item 5)[9]

67. The 9th Session of the Committee decided to append the proposed draft Annex on Microbiological Verification of Process Control of Meat Hygiene to its report for comments at Step 3. The Committee agreed that a drafting group, under the direction of New Zealand, would prepare a revised version of the Annex for circulation, additional comments and further consideration at its next meeting[10].

68. The Committee considered document CX/MH 04/10/5 and agreed that comments of general nature including those related to definitions would be taken into account during the discussion of Agenda Item 3 (see paras 10-48). It reviewed the document section by section and, in addition to editorial amendments, agreed to the following changes:

SECTION 2 – VERIFICATION OF PROCESS CONTROL BY MICROBIOLOGICAL TESTING

69. The Committee amended the first bullet of paragraph 5 by adding "and efficacy" between "adequacy" and "of establishment process control" as suggested by Egypt in its written comments.

70. The Committee deleted the reference to "export" in the last bullet of paragraph 5 in order to be less restrictive.

SECTION 4.1 – SPECIFICATIONS

71. The Committee noted that sampling plan should include specifications of time and day of sampling, and amended paragraph 6 to this effect.

72. The Committee agreed to add a sentence to paragraph 8 to recognize that microbiological verification should be conducted with sufficient frequency to ensure the effectiveness of process criteria.

73. The Committee agreed that paragraph 9 should be rewritten to read: "In the case of indicator microoorganisms *e.g.* generic *Escherichia coli*, Enterobacteriaceae and total viable counts (aerobic plate counts), the presence and/or concentration of these indicator organisms should reflect states or conditions that indicate process control, or lack of process control. In the case of specific hazards (*e.g. Salmonella* spp. on carcasses, *Listeria monocytogenes* in ready-to-eat meat), the prevalence will generally be reflective of hazards arising pre-slaughter (*e.g. Salmonella* present on hides of incoming animals) and at specific steps during product processing". The Committee also agreed to add a footnote regarding the ongoing work in the CCFH and JEMRA with respect to foodborne pathogens.

74. The Committee added an additional sentence to paragraph 10 with regard to the number of units comprising the sample or testing against alternative indicator microorganisms.

SECTION 4.2 FREQUENCY OF VERIFICATION

75. The Committee amended paragraphs 12 and 13 to clarify conditions for determining the frequency of sampling and microbiological testing for slaughter and dressing establishments.

SECTION 4.4 REGULATORY APPLICATION

76. The Committee noted that programs to verify the results of on-farm control might be driven by industry therefore deleted the reference to "regulatory" in paragraphs 18 and 19 in order allow more flexibility. It further clarified that responses in relation to process control in the case of *Salmonella* spp. in fattening pigs and broilers in some intensive production systems should be "at the establishment level".

STATUS OF THE PROPOSED DRAFT ANNEX ON MICROBIOLOGICAL VERIFICATION OF PROCESS CONTROL OF MEAT HYGIENE

77. The Committee agreed to attach the proposed draft Annex on Microbiological Verification of Process Control of Meat Hygiene to the draft Code of Hygienic Practice for Meat as Annex II (see para. 49). It agreed to inform the Commission of the decision to discontinue the development of the Annex as a separate document.

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9 CX/MH 04/10/5; Comments submitted by Argentina, Egypt, United States, European Community (CX/MH 04/10/5, Add. 1), India (CRD 4), European Community (CRD 6).

10 ALINORM 03/16A, para. 102 and Appendix V.

DISCUSSION PAPER ON HYGIENE PROVISIONS FOR PROCESSED MEAT (Agenda Item 6)[11]

78. The 9th session of the Committee agreed that a drafting group, under the direction of New Zealand, would prepare a revised version of Provisions Related to Processed Meat (CX/MPH 03/7) for circulation, additional comments and further consideration at its next Session.[12]

79. The Committee agreed to consider CX/MH 04/10/6 prior to the draft Code of Hygienic Practice for Meat (ALINORM 03/16A, Appendix III) and to incorporate the revised provisions for processed meat in the draft Code of Hygienic Practice for Meat for consideration under Agenda Item 3 (see para 2). The Committee also agreed that comments of general nature would be taken into account during the discussion on Agenda Item 3 (see paras 10-48).

80. The Committee reviewed document CX/MH 04/10/6 section by section and agreed to the following changes.

SECTION 3 - DEFINITIONS

81. The Committee amended the definitions of :

- "Meat product" by clarifying that the product no longer had the characteristics of raw meat "when cut";
- "Raw meat" by deleting the wording "in any way" and substituting the wording "modified atmosphere packaging or vacuum packaging" with "protective packaging" in order to have a more general definition. It inserted an additional wording at the end of the sentence to clarify that the product retains its natural characteristics;
- "Processed meat" to read: "meat that has been treated in some physical or chemical way (including that for the purposes of preservation) that is in addition to chilling/freezing or packaging" in order to allow more flexibility and to make it consistent with the definition of " Raw meat";
- "Ready-to-eat" to read: "processed meat and meat preparations that are intended to be consumed without any further biocidal steps" as meat products were already included in processed meat definition. Consequential changes were made throughout the text.

SECTION 8 - ESTABLISHMENTS: DESIGN, FACILITIES AND EQUIPMENT

Paragraph 66 bis 2

82. The Committee deleted the reference to construction material for clarity.

SECTION 9.1

New principle x bis

83. The Committee reworded the first sentence as follows: "Where appropriate, microbiological testing, for verification purposes, should be included in processed meat HACCP plans" and amended the last sentence by including vulnerable sub-populations.

New paragraph 91 bis

84. The Committee amended the paragraph to reflect that the responsibility of the Competent Authority was to issue guidelines on process and performance criteria to be met and that HACCP plans should be specifically developed by establishment operators to reflect their actual operations. It also included reference to other interested stakeholder organizations to recognize the possible contribution of other groups, including academia in developing guidance for HACCP plans.

85. The Committee amended the fourth bullet to refer to "cooked ham" and inserted a last bullet point to refer a category encompassing specific ethnic processes.

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11 CX/MH 04/10/6; Comments submitted by Argentina, Canada, Thailand, United States, European Community (CX/MH 04/10/6, Add. 1), India (CRD 4) and the European Community (CRD 6).

12 ALINORM 03/16A, para. 106.

New paragraph 91 bis 2

86. In addition to editorial changes, the reference to thermal death of vegetative pathogens was deleted from the first sentence for clarity.

New paragraph 95

87. The Committee amended the second sentence to reflect that the primary responsibility to produce safe food lay with industry and the frequency of microbiological verification testing should be appropriate to the circumstances. It added an additional sentence to clarify that: "The Competent Authority may also implement testing to verify that appropriate control is maintained by industry". The Committee also amended the last sentence to clarify that the HACCP plans implemented by the establishment should document not only corrective but also "preventive" measures to be taken in the event of positive tests for pathogens or toxins.

Paragraph 102

88. The Committee clarified the wording of the last sentence to refer only to "role of the Competent Authority(s)".

SECTION 9.7 HYGIENE REQUIREMENTS FOR PROCESS CONTROL AFTER POST-MORTEM EXAMINATION

Paragraph 137

89. The Committee amended the first sentence of this paragraph by deleting the reference to "processing" of meat; it took out the sentence containing reference to rooms reserved for processing as it was already covered in the general provisions of the Code.

New paragraph 137 bis

90. The Committee agreed that new paragraph should read: "Processed meat and meat preparations should only be handled in rooms or areas that are solely used for the relevant process and are clearly identified as such. The packaging and storage of raw meat should not take place in these rooms or areas".

New paragraph 137 bis 2 (new second box)

91. The Committee noted that all parts of animals approved by the Competent Authority should be safe, therefore deleted the footnote regarding the reference to examination for Trichinella.

New paragraph 137 bis 3 (new third box)

92. The Committee deleted the last bullet as the provisions were too restrictive.

New paragraph 137 bis 5 (new fifth box)

93. The Committee amended the last part of the first bullet to stress the importance to avoid possible cross-contamination.

94. It amended the second bullet by adding "and practicable" to acknowledge the problem of small business and developing countries in implementing good hygienic practice and HACCP.

95. As nutrition provisions of final product were outside of the scope of the Code, the Committee deleted the last part of the third bullet.

96. The Committee amended the fifth bullet to recognize the responsibility of the establishment to specify the appropriate storage temperatures and manner of achieving them and to demonstrate to the Competent Authority that these were sufficient to minimize growth of target microorganisms.

97. The Committee amended the seventh bullet for clarification purposes and the eleventh bullet to generally refer to all animal species affected by Trichinella.

98. In the twelfth bullet, the Committee deleted the reference to contamination with *L. monocytogenes* during slicing or peeling steps as too restrictive, and clarified that use of SSOPs and GHPs were subject to routine micriobiological verification.

99. The thirteenth bullet was deleted as already covered in the general provisions of the Code.

New paragraph 138 bis

100. The Committee clarified the paragraph to read: "The establishment operator should establish a procedure to determine and validate the shelf life of processed meat and meat preparations".

New paragraph 138 bis 2

101. The Committee amended the first sentence to clarify what should be done when RTE products do not meet microbiological performance criteria, process criteria or microbiological criteria and deleted the third sentence containing the reference to the Competent Authority, as superfluous.

The last sentence was clarified to refer to pathogens that could pose a public health risk.

New paragraph 138 bis 3

102. The Committee clarified that the instruction for storage of processed meat and meat preparations should be clearly presented on the packaging and decided to move the amended text after paragraph 155.

Paragraph 141 bis

103. The Committee amended the last part of the paragraph to emphasize that all available microbiological data should be used when making risk-based decisions.

SECTION 13 – PRODUCT INFORMATION AND CONSUMER AWARENESS

Paragraph 155 bis

104. The Committee amended this paragraph to clarify that processed meat and meat preparation labelling should also incorporate instructions on refrigeration and storage.

APPENDICES AND ADDITIONAL PROVISIONS TO THE DRAFT CODE OF HYGIENIC PRACTICE

105. The Committee deleted the wording of paragraph 13 as superfluous.

106. The Committee agreed to incorporate the provisions for processed meat in the draft Code of Hygienic Practice for Meat for discussion in Agenda Item 3 (paras 10-49).

OTHER BUSINESS AND FUTURE WORK (Agenda Item 7)

107. The Committee noted that there were no matters to be discussed under this Agenda Item.

DATE AND PLACE OF NEXT SESSION (Agenda Item 8)

108. The Committee noted that its 11th Session was tentatively scheduled to be held from 14-18 February 2005 in New Zealand, subject to further discussions between the Codex and New Zealand Secretariats.

SUMMARY STATUS OF WORK

Subject Matter	**Step**	**Action by:**	**Document Reference (ALINORM 04/27/16)**
Draft Code of Hygienic Practice for Meat	6	Comments 11th CCMPH	Paras 10-49 Appendix II
Proposed Draft Annex on Risk-Based Post-Mortem Examination Procedures for Meat	Discontinued	27th CAC	Paras 50-66
Proposed Draft Annex on Microbiological Verification of Process Control of Meat Hygiene	Discontinued	27th CAC	Paras 67-77
Discussion Paper on Hygiene Provisions for Processed Meat	-		Paras 78-106

Appendix I

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DRAFT CODE OF HYGIENIC PRACTICE FOR MEAT

(at Step 6)

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DRAFT CODE OF HYGIENIC PRACTICE FOR MEAT

(at Step 6)

1. INTRODUCTION

1. Meat has traditionally been viewed as a vehicle for a significant proportion of human food-borne disease. Although the spectrum of meat-borne diseases of public health importance has changed with changing production and processing systems, continuation of the problem has been well illustrated in recent years by human surveillance studies of specific meat-borne pathogens such as *Escherichia coli* O157:H7, *Salmonella* spp., *Campylobacter* spp. and *Yersinia enterocolitica*. In addition to existing biological, chemical and physical hazards, new hazards are also appearing e.g., the agent of bovine spongiform encephalopathy (BSE). Furthermore consumers have expectations about suitability issues which are not necessarily of human health significance.

2. A contemporary risk-based approach to meat hygiene requires that hygiene measures should be applied at those points in the food chain where they will be of greatest value in reducing food-borne risks to consumers. This should be reflected in application of specific measures based on science and risk assessment, with a greater emphasis on prevention and control of contamination during all aspects of production of meat and it's further processing. Application of HACCP principles is an essential element. The measure of success of contemporary programmes is an objective demonstration of levels of hazard control in food that are correlated with required levels of consumer protection, rather than by concentrating on detailed and prescriptive measures that give an unknown outcome.

3. The activities of the Competent Authority having jurisdiction at the slaughterhouse (usually Veterinary Administrations[1]) very often serve animal health as well as public health objectives. This is particularly the case in relation to ante- and post-mortem inspection where the slaughterhouse is a key point in animal health surveillance, including zoonoses. Regardless of jurisdictional arrangements, it is important that this duality of functions is recognized and relevant public health and animal health activities are integrated.

4. A number of national governments are implementing systems that redefine the respective roles of industry and government in delivering meat hygiene activities. Irrespective of the delivery systems the competent authority is responsible for defining the role of personnel involved in meat hygiene activities where appropriate, and verifying that all regulatory requirements are met.

5. The principles of food safety risk management[2] should be incorporated wherever appropriate in the design and implementation of meat hygiene programmes. Specifically, work conducted by JEMRA, JECFA and FAO/WHO Expert Consultations and resulting risk management recommendations should be considered. Further, newly-recognised meat-borne risks to human health may require measures additional to those usually applied in meat hygiene, e.g., the potential for zoonotic transmission of central nervous system disorders of slaughtered livestock means that additional animal health surveillance programmes may need to be undertaken.

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1 OIE is currently working on a standard addressing 'ante- and post-mortem activities in the production of meat to reduce hazards of public and animal health significance', to provide additional guidance in this area.

2 Proposed Draft Working Principles for Risk Analysis (CX/GP 02/3); Proposed Draft Working Principles for Microbiological Risk Management (CX/FH 01/7 and ALINORM 03/13 paras. 99-128)

2. SCOPE AND USE OF THIS CODE

6. The scope of this code covers hygiene provisions for raw meat, meat preparations and manufactured meat from the time of live animal production up to the point of retail sale. It further develops 'The Recommended International Code of Practice: General Principles of Food Hygiene' [3] in respect of these products. Where appropriate, the Annex to that code (Hazard Analysis and Critical Control Point System and Guidelines for its Application) and the Principles for the Establishment and Application of Microbiological Criteria for Foods[4] are further developed and applied in the specific context of meat hygiene.

7. For the purposes of this code, meat is that derived from domestic ungulates, domestic solipeds, domestic birds, lagomorphs, farmed game, farmed game birds (including ratites) and wild game. This Code of Practice may also be applied to other types of animals from which meat is derived, subject to any special hygienic measures required by the competent authority. Further to general hygiene measures applying to all species of animal as described above, this code also presents specific measures that apply to different species and classes of animals, e.g. wild game killed in the field.

8. The hygiene measures that are applied to the products described in this code, should take into account any further measures and food handling practices that are likely to be applied by the consumer. It should be noted that some of the products described in this code may not be subjected to a heat or other biocidal process before consumption.

9. Meat hygiene is by nature a complex activity, and this code refers to standards, texts and other recommendations developed elsewhere in the Codex system where linkages are appropriate, e.g., Principles for Food Import and Export Inspection and Certification (CAC/GL 20 - 1995), Proposed Draft Principles and Guidelines for the Conduct of Microbiological Risk Management (CX/FH 01/7 and ALINORM 03/13 paras. 99-128), General Guidelines for Use of the Term "Halal" (CAC/GL 24-1997) and recommendations of the *Ad hoc* Intergovernmental Task Force on Animal Feeding (ALINORM 01/38 and ALINORM 01/38A).

10. Where appropriate, linkages should also be made to the standards, guidelines and recommendations contained in the OIE Terrestrial Animal Health Code that relate to zoonoses.

11. Subsets of the general principles (Section 4) are provided in subsequent sections within ‘double-line boxes’. Where guidelines are provided at the section level, those that are more prescriptive in nature are presented in ‘single-line boxes’. This is to indicate that they are recommendations based on current knowledge and practice. They should be regarded as being flexible in nature and subject to alternative provisions so long as required outcomes in terms of the safety and suitability of meat are met.

12. Traditional practices may result in departures from some of the meat hygiene recommendations presented in this code when meat is produced for local trade.

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[3] CAC/RCP 1-1969, Rev. 4-2003

[4] CAC/GL 21-1997

3. DEFINITIONS

13. For the purposes of this code, the following definitions apply. (Note that more general definitions relating to food hygiene appear in The Recommended International Code of Practice: General Principles of Food Hygiene[5]).

Abattoir Any establishment where specified animals are slaughtered and dressed for human consumption and that is approved, registered and/or listed by the competent authority for such purposes.

Animal Animals of the following types:

- Domestic ungulates;
- Domestic solipeds;
- Domestic birds i.e. poultry;
- Lagomorphs;
- Farmed game;
- Farmed game birds, including ratites;
- Wild game, i.e. wild land mammals and birds which are hunted (including those living in enclosed territory under conditions of freedom similar to those of wild game);
- Animals as otherwise specified by the competent authority.

Ante-mortem inspection[6] Any procedure or test conducted by a competent person on live animals for the purpose of judgement of safety and suitability and disposition

Carcass The body of an animal after dressing.

Chemical residues Residues of veterinary drugs and pesticides as described in the Definitions for the Purpose of the Codex Alimentarius[7].

Competent authority[8] The official authority charged by the government with the control of meat hygiene, including setting and enforcing regulatory meat hygiene requirements.

Competent body A body officially recognised and overseen by the competent authority to undertake specified meat hygiene activities.

Competent person A person who has the training, knowledge, skills and ability to perform an assigned task, and who is subject to requirements specified by the competent authority.

Condemned Examined and judged by a competent person, or otherwise determined by the competent authority, as being unsafe or unsuitable for human consumption and requiring appropriate disposal.

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5 Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969, Rev.4-2003)

6 These and other procedures and tests stipulated by the Competent Authority, may also be conducted, in particular for the purposes of animal health

7 Procedural Manual of the Codex Alimentarius Commission

8 The Competent Authority provides official assurances in international trade of meat. Requirements for certification for public health and fair trade purposes have been developed by the Codex Committee on Food and Import and Export Inspection and Certification Systems (ref. CAC/GL 26-1997). Requirements for certification for animal health (including zoonoses) purposes are contained in the OIE Terrestrial Animal Health Code (ref. Section 1.2 Obligations and ethics in international trade). Both should be read in parallel where veterinary certification is required.

Contaminant	Any biological or chemical agent, foreign matter, or other substance not intentionally added to food that may compromise food safety or suitability.[9]
Disease or defect	Any abnormality affecting safety and/or suitability.
Dressing	The progressive separation of the body of an animal into a carcass and other edible and inedible parts.
Establishment	A building or area used for performing meat hygiene activities that is approved, registered and/or listed by the competent authority for such purposes.
Establishment operator	The person in control of an establishment who is responsible for ensuring that the regulatory meat hygiene requirements are met.
Equivalence	The capability of different meat hygiene systems to meet the same food safety and/or suitability objectives.
Food safety objective (FSO)	The maximum frequency and/or concentration of a hazard in a food at the time of consumption that provides the appropriate level of protection (ALOP)[10].
Fresh Meat	Meat that apart from refrigeration has not been treated for the purpose of preservation other than through protective packaging and which retains its natural characteristics.
Game depot	A building in which killed wild game is temporarily held prior to transfer to an establishment, and which is approved, registered and/or listed by the competent authority for this purpose. *(Note that for the purposes of this code, a game depot is a particular type of establishment).*
Good Hygienic Practice (GHP)	All practices regarding the conditions and measures necessary to ensure the safety and suitability of food at all stages of the food chain.[11]
Hazard	A biological, chemical or physical agent in, or condition of, food with the potential to cause an adverse health effect.[12]
Hunter	A person involved in the killing and/or bleeding, partial evisceration and partial field dressing of killed wild game.
Inedible	Examined and judged by a competent person, or otherwise determined by the competent authority to be unsuitable for human consumption.
Manufactured Meat	Products resulting from the processing of raw meat or from the further processing of such processed products, so that when cut, the cut surface shows that the product no longer has the characteristics of fresh meat.
Meat	All parts of an animal that are intended for, or have been judged as safe and suitable for, human consumption.
Meat hygiene	All conditions and measures necessary to ensure the safety and suitability of meat at all stages of the food chain.
Meat preparation	Raw meat which has had foodstuffs, seasonings or additives added to it.

9 Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969, Rev 4-2003)

10 This is an interim definition for the purpose of this Code that is subject to change depending on the final outcome from CCFH

11 WHO Teachers Handbook, 1999

12 Definitions for the Purpose of the Codex Alimentarius. Procedural Manual, 13th edition

Mechanically separated meat (MSM)	Product obtained by removing meat from flesh-bearing bones after boning or from poultry carcasses, using mechanical means that result in the loss or modification of the muscle fibre structure.
Minced meat	Boneless meat which has been reduced into fragments.
Official inspector	A competent person who is appointed, accredited or otherwise recognised by the competent authority to perform official meat hygiene activities on behalf of, or under the supervision of the competent authority.
Organoleptic inspection	Using the senses of sight, touch, taste and smell for identification of diseases and defects.
Performance criteria	The required outcome of one or more control measures at a step or a combination of steps that contribute to assuring the safety of a food.[13]
Primary production	All those steps in the food chain constituting animal production and transport of animals to the abattoir, or hunting and transporting wild game to a game depot.
Process control	All conditions and measures applied during the production process that are necessary to achieve safety and suitability of meat.[14]
Process criteria	The process control parameters (e.g. time, temperature, dose …) at a specified step that can be applied to achieve performance criteria[15].
Post-mortem inspection[16]	Any procedure or test conducted by a competent person on all relevant parts of slaughtered/killed animals for the purpose of judgement of safety and suitability and disposition.
Quality assurance (QA)	All the planned and systematic activities implemented within the quality system and demonstrated as needed, to provide adequate confidence that an entity will fulfil requirements for quality.[17]
Quality assurance (QA) system	The organisational structure, procedures, processes and resources needed to implement quality assurance.
Raw meat	Fresh meat, minced meat or mechanically separated meat [18].
Ready-to-Eat (RTE) products	Products that are intended to be consumed without any further biocidal steps.
Risk-based	Containing performance and/or process criteria developed according to risk analysis principles.

13 This is an interim definition for the purpose of this Code that is subject to change depending on the final outcome from CCFH

14 The "process" includes ante- and post-mortem inspection.

15 This is an interim definition for the purpose of this Code that is subject to change depending on the final outcome from CCFH

16 These and other procedures and tests stipulated by the Competent Authority, may also be conducted, in particular for the purposes of animal health

17 ISO 8402

18 This does not preclude interventions for the purpose of pathogen reduction.

Safe for human consumption	Safe for human consumption according to the following criteria: • has been produced by applying all food safety requirements appropriate to its intended end-use; • meets risk-based performance and process criteria for specified hazards; and • does not contain hazards at levels that are harmful to human health.
Sanitation standard operating procedures (SSOPs)	A documented system for assuring that personnel, facilities, equipment and utensils are clean and where necessary, sanitised to specified levels prior to and during operations.
Suitable for human consumption	Suitable for human consumption according to the following criteria: • has been produced under hygienic conditions as outlined in this code; • is appropriate to its intended use[19]; and • meets outcome-based parameters for specified diseases or defects as established by the competent authority.
Verification (Operator)	The continual review of process control systems, including corrective and preventative actions to ensure that regulatory and/or specified requirements are met**.**
Verification	Activities performed by the competent authority and/or competent body to determine compliance with regulatory requirements.
[Veterinary Inspector	An official inspector who is professionally qualified as a veterinarian and carries out officially meat hygiene activities as specified by the competent authority[20].]

4. GENERAL PRINCIPLES OF MEAT HYGIENE

Insert CAC/GL 50 (2003) adopted by the 26th Session of the Codex Alimentarius Commission (July 2003).

5. PRIMARY PRODUCTION

14. Primary production is a significant source of hazards associated with meat. A number of hazards are present in animal populations intended for slaughter and their control during primary production, often presents considerable challenges, e.g., *E. coli* O157:H7, *Salmonella* spp. *Campylobacter* spp and various chemical and physical hazards. A risk-based approach to meat hygiene includes consideration of risk management options that may have a significant impact on risk reduction when applied at the level of primary production.[21]

15. Provision of relevant information on animals intended for slaughter facilitates application of risk-based meat hygiene programmes, and allows inspection procedures to be tailor-made to the spectrum and prevalence of diseases and defects in the particular animal population. This may be particularly important in situations where the presence of zoonotic agents is not detectable by organoleptic or laboratory tests and routine precautionary measures need to be taken.

16. Voluntary or officially recognised QA systems implemented at primary production should be appropriately taken into account during verification of regulatory requirements.

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19 See for example the General Guidelines for Use of the Term "Halal" (CAC/GL 24-1997)

20 These may include animal health objectives.

21 Working Principles for Risk Analysis for Application in the Framework of the Codex Alimentarius, Procedural Manual, 13th edition

17. The principles and guidelines presented in this section are supplemental to the objectives and guidelines in Section III of the Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 4-2003).

5.1 PRINCIPLES OF MEAT HYGIENE APPLYING TO PRIMARY PRODUCTION

i. Primary production should be managed in a way that reduces the likelihood of introduction of hazards and appropriately contributes to meat being safe and suitable for human consumption.

ii. Whenever possible and practicable, systems should be established by the primary production sector and the competent authority, to collect, collate and make available, information on hazards and conditions that may be present in animal populations and that may affect the safety and suitability of meat.

iii. Primary production should include official or officially-recognised programmes for the control and monitoring of zoonotic agents in animal populations and the environment as appropriate to the circumstances, and notifiable zoonotic diseases should be reported as required.

iv. Good hygienic practice (GHP) at the level of primary production should involve for example the health and hygiene of animals, records of treatments, feedingstuffs and relevant environmental factors, and should include application of HACCP principles to the greatest extent practicable.

v. Animal identification practices should allow trace-back to the place of origin to the extent practicable, to allow regulatory investigation where necessary.

5.2 HYGIENE OF SLAUGHTER ANIMALS

18. Both primary producers and the competent authority should work together to implement risk-based meat hygiene programmes at the level of primary production that document the general health status of slaughter animals, and implement practices that maintain or improve that status, e.g., zoonoses control programmes. QA programmes at the level of primary production should be encouraged and may include application of HACCP principles as appropriate to the circumstances. Such programmes should be taken into account by the competent authority in the overall design and implementation of risk-based meat hygiene programmes.

So as to facilitate the application of risk-based meat hygiene programmes:

- Primary producers should record relevant information to the extent possible on the health status of animals as it relates to the production of meat that is safe and suitable for human consumption. This information should be made available to the abattoir as appropriate to the circumstances.
- Systems should be in place for return from the abattoir to the primary producer, of information on the safety and suitability of slaughter animals and meat, in order to improve the hygiene on the farm and, where producer-led QA-programmes are applied, to be incorporated into these programmes to improve their effectiveness.
- The competent authority should systematically analyse monitoring and surveillance information from primary production so that meat hygiene requirements may be modified if necessary.

19. The competent authority should administer an official programme for control of specified zoonotic agents, chemical hazards and contaminants. This should be co-ordinated to the greatest extent possible with other competent authorities that may have responsibilities in public and animal health.

Official or officially-recognised programmes for specified zoonotic agents should include measures to:

- control and eradicate their presence in animal populations, or subsets of populations, e.g., particular poultry flocks;
- prevent the introduction of new zoonotic agents;

- provide monitoring systems that establish baseline data and guide a risk-based approach to control of such hazards in meat; and
- control movement of animals between primary production units, and to abattoirs, where populations are under quarantine restrictions.

Official or officially-recognised programmes for chemical hazards and contaminants should include measures to:

- control the registration and use of veterinary drugs and pesticides so that residues do not occur in meat at unsafe[22] levels that make the product unsafe for human consumption, and
- provide monitoring and surveillance systems that establish baseline data and guide a risk-based approach to control of such hazards in meat.

20. Animal identification systems, to the extent practicable, should be in place at primary production level so that the origin of meat can be traced back from the abattoir or establishment to the place of production of the animals.

21. Animals should not be loaded for transport to the abattoir when:

- the degree of contamination of the external surfaces of the animal is likely to compromise hygienic slaughter and dressing, and suitable interventions such as washing or shearing are not available,
- information is available to suggest that animals may compromise the production of meat that is safe and suitable for human consumption, e.g., presence of specific disease conditions or recent administration of veterinary drugs. In some situations, transport may proceed if the animals have been specifically identified (e.g. as "suspects") and are to be slaughtered under special supervision; or
- animal stress issues may exist or arise that are likely to have an adverse impact on the safety and suitability of meat.

5.3 HYGIENE OF KILLED WILD GAME

22. Only limited knowledge can be gained on the health status of populations of wild game hunted for meat; however, the competent authority should consider all sources when gathering such information. In this respect, hunters should be encouraged to provide relevant information, e.g., geographical origin of wild game, and any clinical symptoms of disease observed in wild animal populations.

23. Wild game should be harvested in a manner so that:

- killing methods are consistent with the production of meat that is safe and suitable for human consumption; and
- their geographical origin is not subject to relevant official prohibitions on harvest, e.g., in the case of concurrent chemical pest control programmes or animal health quarantine.

24. Hunters are particularly important in providing information on killed animals. They should be aware of their responsibilities in terms of supplying to the establishment, all relevant information that may impact on the safety and suitability of killed wild game meat, e.g., symptoms of disease immediately before killing, grossly-apparent diseases and defects detected during partial field dressing and/or evisceration. The competent authority should require that hunters or other people involved in harvesting of wild game undergo basic training in meat hygiene appropriate to field procurement, e.g., recognition of diseases and defects, application of GHP in partial field dressing and transport to a game depot.

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[22] Guidelines for the Establishment of a Regulatory Programme for Control of Veterinary Drug Residues in Foods (CAC/GL 16-1993) (under revision)

25. As wild game are killed in the field, appropriate hygienic practices immediately following death are essential to minimise contamination of edible parts. GHP should be applied to the extent practicable during bleeding, partial dressing, e.g., removal of the head, and/or partial evisceration (where allowed by the competent authority).[23]

Bleeding and partial dressing of killed wild game in the field should include:

- bleeding and partial evisceration as soon as possible after killing (unless exempted by the competent authority for a particular species of wild game);
- partial skinning and/or partial dressing in a manner that minimises the level of contamination of edible parts to the lowest level practicable;
- removal only of those parts of the animal that are not necessary for post-mortem inspection and judgement; and
- retention of the lungs, liver, heart and kidneys as a minimum if partial evisceration is carried out, either by natural attachment to the carcass or identified and packaged as an attachment to the carcass, unless a hunter, who is a competent person, has carried out an inspection and has not detected or suspected abnormalities.[24]

26. Game depots should not be simultaneously used for a purpose other than receiving and holding killed wild game, unless the competent authority specifies other uses and conditions.

27. Delivery of killed wild game to a game depot or an establishment should be within time limits established by the competent authority considering harvesting, environmental conditions and desired food safety outcomes. The body and other animal parts should not be frozen before dressing and post-mortem inspection in an establishment, unless unavoidable due to ambient temperatures.

5.4 HYGIENE OF FEEDINGSTUFFS[25]

28. Feeding of animals during primary production should be subject to good animal feeding practice in the procurement, handling, storage, processing and distribution of animal feedingstuffs, and in forage crop production and pasture feeding. Records should be maintained at the manufacturing level, on the origin of feedingstuffs and/or their ingredients to facilitate verification.

29. There is a need for collaboration between all parties involved in feed production, feed manufacturing and use so as to establish any linkage between identified hazards and the level of risk to consumers that may result from transmission through the food chain[26].

Animals should not be fed feedingstuffs that:

- are recognised as likely to introduce zoonotic agents (including TSEs) to the slaughter population; or
- contain chemical substances, (e.g., veterinary drugs, pesticides) or contaminants that could result in residues in meat at levels that make the product unsafe for human consumption.

30. The competent authority should implement appropriate legislation and controls governing the feeding of animal protein to animals where there is a likelihood of transmission of zoonotic agents, and this may include a ban on such feeding when justified by risk management. Any processed feedingstuff should be subject to appropriate microbiological and other criteria, e.g., negative for *Salmonella* spp. according to a specified sampling plan, and maximum limits for mycotoxins.

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23 Partial evisceration usually only involves removal of the gastrointestinal tract, and this aides cooling

24 In the case of small killed wild game, the competent authority may allow full evisceration

25 This section is subject to alignment with the Code of Practice on Good Animal Feeding (under development). See ALINORM 03/38A, Appendix II

26 OIE International Animal Health Code (chapters on zoonotic diseases); OIE Guidelines on antimicrobial resistance.

5.5 HYGIENE OF THE ENVIRONMENT

31. Primary production of animals should not be undertaken in areas where the presence of hazards in the environment could lead to an unacceptable level of such hazards in meat.

The competent authority should design and administer monitoring and surveillance programmes appropriate to the circumstances, that address :

- hazards arising from animals and plants that may compromise the production of meat that is safe and suitable for human consumption;
- environmental contaminants that may result in levels in meat that make the product unsafe for human consumption; and
- ensuring that water and other potential carriers, e.g., fertilizer, are not significant vehicles for transmission of hazards.

Facilities and procedures should be in place to ensure that:

- housing and feeding platforms where used, and other areas where zoonotic agents and other hazards may accumulate, can be effectively cleaned, and are maintained in a sanitary condition (refer to Section 10);
- systems for active processing and/or disposal of dead animals and waste should not constitute a possible source of food-borne hazards to human and animal health; and
- chemical hazards required for technological reasons are stored in a manner so that they do not contaminate the environment or feedingstuffs.

5.6 TRANSPORT

5.6.1 Transport of slaughter animals

32. Transport of slaughter animals should be carried out in a manner that does not have an adverse impact on the safety and suitability of meat[27].

Slaughter animals require transport facilities to the abattoir that ensure that:

- soiling and cross-contamination with faecal material is minimised;
- new hazards are not introduced during transport;
- animal identification as to the place of origin is maintained; and
- consideration is given to avoiding undue stress.

Transport vehicles should be designed and maintained so that:

- animals can be loaded, unloaded and transported easily and with minimal risk of injury;
- animals of different species, and animals of the same species likely to cause injury to one another, are physically separated during transport;
- use of floor gratings, crates or similar devices limits soiling and cross-contamination with faecal material;

[27] OIE International Animal Health Code (chapter on transport); Report of the OIE Working Group on Animal Welfare, October 2002.

- where the vehicle has more than one deck, animals are protected from cross-contamination as appropriate ;
- ventilation is adequate; and
- cleaning and sanitising is readily achieved (refer to Section 10).

33. Transport vehicles, and crates where used should be cleaned and if necessary sanitised as soon as practicable after animals have been unloaded at the establishment.

5.6.2 Transport of killed wild game

34. Following killing and dressing in the field, the body and other parts should be transported to an establishment, including a game depot, without delay and in a manner that minimises contamination of edible parts. Vehicles used for this purpose should be consistent with good hygienic practice and any specific regulatory requirements.

35. Unless deemed unnecessary due to low environmental ambient temperatures, the temperature of the body should be actively reduced as quickly as possible after partial field dressing and transport.

6. PRESENTATION OF ANIMALS FOR SLAUGHTER

36. Only healthy, clean and appropriately identified animals should be presented for slaughter.

37. Ante-mortem inspection is an important pre-slaughter activity, and all relevant information on animals presented for slaughter should be utilised in meat hygiene systems.

6.1 PRINCIPLES OF MEAT HYGIENE APPLYING TO ANIMALS PRESENTED FOR SLAUGHTER

i. Animals presented for slaughter should be sufficiently clean so that they do not compromise hygienic slaughter and dressing.

ii. The conditions of holding of animals presented for slaughter should minimise cross-contamination with food-borne pathogens and facilitate efficient slaughter and dressing.

iii. Slaughter animals should be subjected to ante-mortem inspection, with the competent authority determining the procedures and tests to be used, how inspection is to be implemented, and the necessary training, knowledge, skills and ability of personnel involved.

iv. Ante-mortem inspection should be science- and risk-based as appropriate to the circumstances, and should take into account all relevant information from the level of primary production.

v. Relevant information from primary production where available and results of ante-mortem inspection should be utilised in process control.

vi. Relevant information from ante-mortem inspection should be analysed and returned to the primary producer as appropriate.

6.2 CONDITIONS OF LAIRAGE

38. Holding of animals presented for slaughter has an important effect on many aspects of slaughter, dressing and the production of meat that is safe and suitable for human consumption. The cleanliness of animals has a major influence on the level of microbiological cross-contamination of the carcass and other edible parts during slaughter and dressing. A range of measures appropriate to the animal species may be applied to ensure that only animals that are sufficiently clean are slaughtered and to assist in reducing microbiological cross-contamination.

39. QA systems implemented by the establishment operator should enhance achievement of appropriate conditions of lairage on an on-going basis.

The establishment operator should ensure conditions of lairage that include:

- facilities are operated in a way that soiling and cross-contamination of animals with food-borne pathogens are minimised to the greatest extent practicable;
- holding of animals so that their physiological condition is not compromised and ante-mortem inspection can be effectively carried out, e.g., animals should be adequately rested and not overcrowded and protected from weather where necessary;
- separation of different classes and types of slaughter animals as appropriate, e.g., sorting of animals by age so as to facilitate the efficiency of routine dressing, separation of animals with special dressing requirements, and separation of "suspects" that have been identified as having the potential to transfer specific food-borne pathogens to other animals (refer to 6.3);
- systems to ensure that only animals that are sufficiently clean are slaughtered;
- systems to ensure that feed has been appropriately withdrawn before slaughter;
- maintenance of identification of animals (either individually, or as lots, e.g., poultry) until the time of slaughter and dressing; and
- conveying of relevant information on individual animals or lots of animals to facilitate ante- and post-mortem inspection.

40. The competent authority or the competent body should take into account QA systems properly implemented by the establishment operator, in setting the frequency and intensity of verification activities necessary to determine that the conditions of lairage are in accordance with regulatory requirements.

6.3 ANTE-MORTEM INSPECTION

41. All animals presented for slaughter should be subjected to ante-mortem inspection, by a competent person whether on an individual or a lot basis. Inspection should include confirmation that the animals are properly identified, so that any special conditions pertaining to their place of primary production are considered in the ante-mortem inspection, including relevant public and animal health quarantine controls.

42. Ante-mortem inspection should support post-mortem inspection by application of a specific range of procedures and/or tests that consider the behaviour, demeanour and appearance, as well as signs of disease in the live animal.

43. Ante-mortem inspection should be preceded by screening of animals by the establishment operator upon their arrival at the abattoir. Where abnormalities in behaviour or appearance suggest that an individual animal or a consignment of animals should be segregated, this should occur and the competent person undertaking ante-mortem inspection, notified.

Animals described below should be subject to special controls, procedures or operations imposed by the competent authority (which may include denial of entry to the abattoir) when:

- animals are not sufficiently clean;
- animals have died in transit;
- a zoonotic disease posing an immediate threat to either animals or humans is present, or suspected;
- an animal health disease subject to quarantine restrictions is present, or suspected;
- animal identification requirements are not met; or
- declarations from the primary producer, if required by the competent authority (including compliance with good veterinary practice in the use of animal medicines), are absent or inadequate.

6.3.1 Design of ante-mortem inspection systems

44. Ante-mortem inspection should be included as an integral component of an overarching risk-based system for the production of meat, with systems for process control (refer to Section 9) incorporating appropriate components. Relevant information on the slaughter population, e.g., animal class, health status, geographical region of origin, should be utilised in both the design and implementation of ante-mortem inspection systems.

45. Ante-mortem inspection, including procedures and tests, should be established by the competent authority according to a science and risk-based approach. In the absence of a risk-based system, procedures will have to be based on current scientific knowledge and practice.

46. Ante-mortem procedures and tests may be integrated and implemented together so as to achieve public health and animal health objectives. In such cases all aspects of ante-mortem inspection should be science-based and be tailored to the relevant risks.

47. Where indicated by public health concerns, measures additional to routine ante-mortem inspection may be required.

Characteristics of a risk-based ante-mortem inspection programme are:

- procedures for confirmation of proper animal identification in accordance with national legislation;
- design and application of organoleptic procedures and tests that are relevant and proportional to meat-borne risks associated with clinical signs of illness and grossly-detectable abnormalities;
- tailoring of procedures to the spectrum and prevalence of diseases and defects reasonably likely to be present in the slaughter population, taking into account the type of animal, geographical origin and primary production system;
- integration with HACCP-based process control to the extent practicable, e.g., application of objective criteria for ensuring appropriate cleanliness of animals presented for slaughter;
- on-going tailoring of procedures to information received from the primary production unit, where practicable;
- use of laboratory tests for hazards that are unaddressed by organoleptic inspection when their presence is suspected, e.g., chemical residues and contaminants; and
- return of information to the primary producer so as to seek continuous improvement in the safety and suitability status of animals presented for slaughter (refer to 6.4).

6.3.2 Implementation of ante-mortem inspection

48. The competent authority should determine how ante-mortem inspection is to be implemented, including identification of the components that may be applied at primary production rather than the abattoir, e.g., in the case of intensively-raised poultry.[28] The competent authority should establish the training, knowledge, skills and ability requirements of all personnel involved, and the roles of the official inspector, including the veterinary inspector (refer to 9.2). Verification of inspection activities and judgements should be undertaken as appropriate by the competent authority or competent body. The final responsibility for verifying that all regulatory requirements are met should lie with the competent authority.

The responsibilities of the establishment operator in respect of ante-mortem inspection include:

- presentation of a certificate to the competent person undertaking ante-mortem inspection, stating that animals have passed ante-mortem inspection when this has been carried out at the primary production unit;

[28] In some cases the competent authority may allow slaughter on the farm for particular classes of animal, e.g., farmed game, and in such cases the slaughter animals should be subject to ante-mortem inspection and other hygiene controls as determined by the competent authority

- segregation of animals if, for example, they have recently given birth during transport or in lairages, or have recently aborted and/or show retained foetal membranes;
- applying identification systems for individual animals or lots of animals until the time of slaughter that document the outcome of ante-mortem inspection, and after slaughter in the case of "suspect" animals;
- presentation of animals that are sufficiently clean; and
- prompt removal of animals that have died in the lairage, e.g., from metabolic disease, stress, suffocation, with the permission of the competent person undertaking ante-mortem inspection.

49. Ante-mortem inspection at the abattoir should occur as soon, as is practicable after delivery of slaughter animals. Only animals that are judged to be sufficiently rested should proceed to slaughter, but should not be withheld from slaughter any longer than necessary. Where there is an undue delay before slaughter, e.g., more than 24 hours, ante-mortem inspection should be repeated.

Ante-mortem inspection systems required by the competent authority should include the following:

- all relevant information from the level of primary production should be taken into account on an on-going basis, e.g., declarations from the primary producers relating to the use of veterinary drugs, information from official hazard control programmes;
- animals suspected as being unsafe or unsuitable for human consumption should be identified as such and handled separately from normal animals (refer to 6.2 and 8.2);
- results of ante-mortem inspection are made available to the competent person undertaking post-mortem inspection before animals are examined at the post-mortem stations so as to augment final judgement. This is particularly important when a competent person undertaking ante-mortem inspection, judges that a suspect animal can proceed to slaughter under special hygiene conditions.;
- in more equivocal situations, the competent person undertaking ante-mortem inspection may hold the animal (or lot) in special facilities for more detailed inspection, diagnostic tests, and/or treatment;
- animals condemned as unsafe or unsuitable for human consumption should be immediately identified as such and handled in a manner that does not result in cross-contamination of other animals with food-borne hazards (refer to 8.2); and
- the reason for condemnation should be recorded, with confirmatory laboratory tests being carried out if deemed necessary. Feed back of this information to the primary producer should take place.

50. Slaughter of animals under an official or officially-recognised programme for the eradication or control of a specific zoonotic disease, e.g., salmonellosis, should only be carried out under the hygiene conditions specified by the competent authority.

6.3.3 Ante-mortem judgement categories

Ante-mortem judgement categories include:

- passed for slaughter;
- passed for slaughter subject to a second ante-mortem inspection, after an additional holding period, e.g., when animals are insufficiently rested, or are temporarily affected by a physiological or metabolic condition;
- passed for slaughter under special conditions i.e. deferred slaughter as "suspects", where the competent person undertaking ante-mortem inspection suspects that post-mortem inspection findings could result in partial or total condemnation;

- condemned for public health reasons i.e. due to: meat-borne hazards, occupational health hazards, or likelihood of unacceptable contamination of the slaughter and dressing environment following slaughter[29];
- condemned for meat suitability reasons;
- emergency slaughter, when an animal eligible for being passed under special conditions could deteriorate if there was a delay in slaughter; and
- condemned for animal health reasons, as specified in relevant national legislation, and disposed of accordingly.

6.4 INFORMATION ON ANIMALS PRESENTED FOR SLAUGHTER

51. Information provided on animals presented for slaughter may be an important determinant of optimal slaughter and dressing procedures and is a prerequisite for effective design and implementation of process control by the establishment operator. The competent authority should analyse relevant information and take it into account when setting hygiene requirements for risk-based hygiene systems throughout the entire food chain (refer to 9.2).

52. The competent authority may require monitoring of animals presented for slaughter to establish baseline information on the prevalence of hazards in the slaughter population, e.g., specified meat-borne pathogens, chemical residues greater than maximum residue limits. The competent authority should design and implement these monitoring activities according to national public health goals. Scientific analysis and dissemination of results to interested parties is the responsibility of the competent authority.

So as to facilitate science- and risk-based meat hygiene throughout the entire food chain, systems should be in place that provide:

- on-going information on animals presented for slaughter for incorporation into HACCP plans and/or QA programmes that are part of process control;
- information back to the primary producer on the safety and suitability status of animals presented for slaughter; and
- information to the competent authority that facilitates on-going review.

7. PRESENTATION OF KILLED WILD GAME FOR DRESSING

53. Killed wild game presented at an establishment have been subject to different harvesting, handling and transportation arrangements compared to live animals presented for slaughter. Killed wild game should undergo an appropriate inspection before dressing and full post-mortem inspection commences, so as to prevent undue contamination of the dressing environment and wastage of resources.

7.1 PRINCIPLES OF MEAT HYGIENE APPLYING TO INSPECTION OF KILLED WILD GAME PRESENTED FOR DRESSING

i. Inspection of killed wild game for safety and suitability prior to dressing should be risk-based to the extent practicable, and should take into account relevant information available from the field.

[29] The competent person may judge, after post-mortem inspection in special facilities, that edible parts of the animal can be salvaged for a particular purpose e.g. pet-food

7.2 INSPECTION OF KILLED WILD GAME PRESENTED FOR DRESSING

54. The inspection should determine to the extent possible whether hygienic practice for field-harvested animals has been appropriately applied, including an assessment of cleanliness sufficient for hygienic dressing. Special measures required by the competent authority to facilitate post-mortem inspection, e.g., correct identification and attachment of viscera separated from the carcass (refer to 5.3), should be confirmed at this time.

55. The inspection should take into account any information available from harvesting in the field, e.g., presence of abnormalities at the time of death, geographical location. Where practicable, the results should be returned to hunters or other people involved in harvesting of wild game so as to improve their knowledge of and contribution to meat hygiene.

56. Inspection of killed wild game for safety and suitability prior to dressing should be risk-based to the extent practicable, given that the entire animal may not be presented for dressing, e.g., the gastrointestinal tract of large killed wild game will most likely have been discarded in the field. Inspection procedures prior to dressing and post-mortem inspection, will be necessarily limited in nature. They should be focused on detecting abnormalities intrinsic to field harvesting of wild game, e.g. signs of natural death or the animal being moribund at the time of death, the effects of a misplaced or expanding bullet, decomposition, and any evidence of intoxication with poisons or environmental contaminants. Systems for the implementation of inspection procedures and judgements should be based on those used for ante-mortem inspection of other classes of animals (refer to 6.3).

57. Identity of the body of the animal along with those parts required for post-mortem inspection, should be maintained until final post-mortem judgement.

8. ESTABLISHMENTS: DESIGN, FACILITIES AND EQUIPMENT

58. The principles and guidelines presented in this section are supplemental to the objectives and guidelines in Section IV of the Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969, Rev 4 2003).

59. The competent authority should allow variations in the design and construction of game depots and establishments processing killed wild game, and their facilities, where they are by necessity impermanent, as long as meat hygiene is not compromised.

8.1 PRINCIPLES OF MEAT HYGIENE APPLYING TO ESTABLISHMENTS, FACILITIES AND EQUIPMENT

i. Establishments should be located, designed and constructed so that contamination of meat is minimised to the greatest extent practicable.

ii. Facilities and equipment should be designed, constructed and maintained so that contamination of meat is minimised to the greatest extent practicable.

iii. Establishments, facilities and equipment should be designed to allow personnel to carry out their activities in a hygienic manner.

iv. Facilities and equipment that are in direct contact with edible parts of animals and meat, should be designed and constructed so that they can be effectively cleaned and monitored for their hygiene status.

v. Suitable equipment should be available for control of temperature, humidity and other factors as appropriate to the particular processing system for meat.

vi. Water should be potable except where water of a different standard can be used without leading to contamination of meat.

60. Each establishment should have appropriate facilities and equipment for competent persons to properly carry out their meat hygiene activities.

61. Laboratory facilities necessary to support meat hygiene activities may be located in the establishment or provided at a separate location.

8.2 DESIGN AND CONSTRUCTION OF LAIRAGES

62. Lairages should be designed and constructed so that they do not lead to undue soiling of the animal, cause undue stress of the animal, or otherwise adversely impact on the safety and suitability of meat derived from animals held therein.

Lairages should be designed and constructed so that:

- animals can be held without overcrowding or injury, and are not exposed to climatic stress;[30]
- there are appropriate layout and facilities for cleaning and/or drying of animals;
- ante-mortem inspection is facilitated;
- floors are paved or slatted and allow good drainage;
- there is an adequate supply and reticulation of clean water for drinking and cleaning, and facilities are provided for feeding where necessary;
- there is a physical separation between lairages and areas of an abattoir where edible material may be present;
- "Suspect" animals can be segregated and examined in separate areas.[31] These areas should include facilities that are capable of secure holding of "suspect" animals pending slaughter under supervision, in a manner that precludes contamination of other animals; and
- there is an adjacent area with adequate facilities for cleaning and sanitation of transport vehicles and crates, unless there are facilities within close distance that are approved by the competent authority.

63. Special facilities may be required to handle condemned animals.

These facilities should be:

- constructed so that all parts, gut contents and faeces from condemned animals can be held under secure containment as appropriate to the circumstances; and
- constructed and equipped so as to facilitate effective cleaning and sanitation (refer to Section 10).

8.3 DESIGN AND CONSTRUCTION OF SLAUGHTER AREAS

64. Stunning and bleeding areas should be separated from dressing areas (either physically or by distance), so that cross-contamination of animals is minimised.

65. Areas for scalding, dehairing, defeathering, scraping and singeing (or similar operations) should also be appropriately separated from dressing areas.

66. Where slaughter is carried out the processing line should be designed so that there is constant progress of animals in a manner that does not cause cross-contamination.

67. Special facilities may be required to slaughter and dress "suspect" or injured animals.

Where these facilities exist they should be:

- easily accessed from pens containing "suspect" or injured animals;

[30] In the case of poultry and farmed game birds, facilities should be available to park transport vehicles in areas that are well ventilated, and are protected from direct sunlight, inclement weather and extremes of temperature

[31] In the case of poultry and farmed game birds, "suspect" birds are usually slaughtered on the slaughter line under special hygiene provisions

- constructed with suitable facilities for hygienic storage of parts derived from "suspect" or injured animals; and
- constructed and equipped so as to facilitate effective cleaning and sanitising (refer to Section 10).

8.4 DESIGN AND CONSTRUCTION OF AREAS WHERE BODIES OF ANIMALS ARE DRESSED OR MEAT MAY OTHERWISE BE PRESENT

68. All areas and facilities where bodies of animals are dressed or meat may be present should be designed and constructed so that they allow GHP,[32] and contamination of meat is minimised to the greatest extent practicable.

Rooms and other areas in which bodies of animals are dressed or meat may be present should be designed and constructed so that:

- cross-contamination during operations is minimised to the greatest extent practicable;
- effective cleaning, sanitation and maintenance can be carried out during and between periods of operation; (refer to Section 10);
- floors in areas where water is present slope sufficiently to grilled or otherwise protected outlets so as to ensure continual drainage;
- exterior doors do not open directly into the area;
- chutes separately conveying different parts of animals are fitted with inspection and cleaning hatches where these are necessary for sanitation;
- separate rooms or separated areas are used for skin-on dressing of pigs or other animals, when other classes of animals are being dressed at the same time;
- separate rooms are used for:
  - emptying and cleansing of alimentary tracts, and further preparation of clean alimentary tracts, unless such separation is deemed unnecessary;
  - handling of meat and inedible parts of animals after they have been so designated, unless these products are otherwise separated by time or distance;
  - storage of inedible animal parts such as hides, horns, hooves, feathers and inedible fats;
- there is adequate natural or artificial lighting for hygienic process control;
- there are appropriate facilities for the preparation and storage of edible fats;
- access and harbouring of pests are effectively restricted; and
- adequate facilities are provided for secure storage of chemicals, (e.g., cleaning materials, lubricants, branding inks) and other hazardous substances so as to prevent accidental contamination of meat.

69. Appropriately designed and insulated rooms should be available as necessary for cooling, chilling and freezing of meat.

Establishments that de-bone or otherwise cut up meat should have for this purpose:

- facilities that allow constant progress of operations or that ensure separation between different production batches;
- a room or rooms, capable of being temperature-controlled; and

[32] Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1 - 1969, Rev. 4-2003)

- separation of the boning, cutting and primary wrapping area from the packaging area, unless hygiene measures are in place to ensure that packaging does not contaminate meat.

70. Wood may be used in rooms for curing, smoking, maturing, pickling, storage and dispatch of meat preparations and manufactured meat when essential for technological reasons, as long as meat hygiene requirements are not compromised

71. Drainage and waste disposal systems should not be a source of contamination of meat, the potable water supply or the processing environment. All lines should be watertight and adequately trapped and vented, with catch basins, traps and sumps that are isolated from any area where animals are dressed or meat may be present.

72. Establishments should have an appropriate area, sufficiently protected from environmental contamination and capable of preventing adverse temperature variations, for dispatching meat.

8.5 DESIGN AND CONSTRUCTION OF EQUIPMENT WHERE BODIES OF ANIMALS ARE DRESSED OR MEAT MAY BE PRESENT

73. All equipment used in areas where bodies of animals are dressed or meat may be present should facilitate GHP. Equipment and containers in rooms and other areas where bodies of animals are dressed or meat may be present should be designed and constructed so that contamination is minimised. Meat should not be allowed to contact the floor and walls, or fixed structures not designed for such contact.

74. Where slaughter lines are operated, they should be designed so that there is constant progress of animal bodies, carcasses and other parts, in a manner that prevents cross-contamination between different parts of the slaughter line and between different slaughter lines. In establishments where meat preparations and manufactured meat are circulating, the layout and equipment should be designed to prevent cross contamination between products of different status and products at different production stages.

75. All rooms and other areas in which animals are dressed or meat may be present should be equipped with adequate facilities for washing hands, and should be equipped with adequate facilities for cleaning and sanitation of implements where required (refer to Section 10).

Facilities for cleaning and sanitation of equipment should:

- be designed to effectively clean and sanitise the particular equipment;
- be located convenient to work stations; and
- have waste water ducted to drains.

76. Equipment and implements for use with inedible or condemned parts of animals should be distinctively identified.

77. Establishments should be provided with adequate means of natural or mechanical ventilation so as to prevent excessive heat, humidity and condensation, and ensure that air is not contaminated with odours, dust or smoke.

Ventilation systems should be designed and constructed so that:

- air-borne contamination from aerosols and condensation droplets is minimised;
- ambient temperatures, humidity and odours are controlled; and
- air flow from contaminated areas, (e.g., slaughter and dressing areas) to clean areas, (e.g., chilling rooms for carcasses) is minimised.

78. Equipment used for heat treatment of manufactured meat and meat preparations should be fitted with all control devices necessary to ensure that an appropriate heat treatment is applied.

8.6 WATER SUPPLY[33]

79. Adequate facilities should be provided for monitoring and maintaining potability, storage, temperature control, distribution of water and for the disposal of waste water.

Equipment should be installed that provides:

- an adequate and easily accessible supply of hot and cold potable water at all times;
- hot potable water for effective sanitising of equipment, or an equivalent sanitation system;
- potable water at a temperature appropriate for hand-washing; and
- sanitising solution used according to manufacturers' specifications supplied as and where necessary;

80. Where non-potable water is supplied for various uses e.g., fire fighting, steam production, refrigeration, reticulation systems should be designed so that cross-contamination of the potable water supply is prevented.

8.7 TEMPERATURE CONTROL

81. In the absence of suitable temperature, humidity and other environmental controls, meat is particularly vulnerable to survival and growth of pathogens and spoilage micro-organisms.

82. Facilities and equipment should be adequate for:

- Cooling, chilling and/or freezing of meat according to written specifications;
- Storage of meat at temperatures that achieve the safety and suitability requirements; and
- Monitoring of temperature, humidity, air flow and other environmental factors so as to assure that process control regimes are achieved.

83. Where steam is generated in the cooking of meat, it should be properly vented out of the area in order to minimise the potential for condensation and not be allowed to permeate into adjoining rooms.

8.8 FACILITIES AND EQUIPMENT FOR PERSONAL HYGIENE

84. Slaughter and dressing of animals and animal parts, and further handling of meat preparations and manufactured meat presents many opportunities for cross-contamination of meat by food handlers (refer to Section 11). Appropriate personal hygiene facilities are needed to minimise cross-contamination of meat from this source.

85. Facilities and equipment should be provided, designed and located so that meat safety is not compromised. Where necessary, separate amenities should be provided e.g. for staff handling live animals, condemned products (refer Section 11).

Facilities for personal hygiene should include:

- changing rooms, showers, flush toilets, hand-washing and hand-drying facilities where necessary, and separate areas for eating; and
- protective clothing that can be effectively cleaned and minimises accumulation of contaminants.

[33] General Principles of Food Hygiene, Section 5.5 (CAC/RCP 1-1969, Rev. 4-2003)

All areas in which exposed meat may be present, should be equipped with adequate facilities for washing hands that:

- are located convenient to work stations;
- have taps that are not operable by hand;
- supply water at an appropriate temperature, and are fitted with dispensers for liquid soap or other hand cleansing agents;
- include hand drying equipment where necessary, and receptacles for discarded paper towels; and
- have waste water ducted to drains.

8.9 MEANS OF TRANSPORT

Vehicles or shipping containers in which unprotected meat is transported should:

- be designed and equipped so that the meat does not contact the floor;
- have joint and door seals that prevent entry of all sources of contamination; and
- where necessary, be equipped so that temperature control and humidity can be maintained and monitored.

9. PROCESS CONTROL

86. An extensive range of hazards are associated with meat, e.g., *Salmonella* spp. and veterinary drug residues; the processing environment, e.g., *Listeria monocytogenes* and *Clostridium perfringens;* and food handlers themselves, e.g., *Staphylococcus aureus* and hepatitis viruses. Effective process control, that includes both GHP and HACCP, is necessary to produce meat that is safe and suitable for human consumption.

87. The principles and guidelines presented in this section should satisfy the general objectives and guidelines in Section V of the Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969, Rev 4-2003). They are developed in this section in respect of hazards in meat however they are equally applicable to suitability characteristics.

88. Many aspects of slaughter and dressing procedures have the potential to result in significant contamination of meat, e.g., hide/feather removal, evisceration, carcass washing, post-mortem inspection, trimming, and further handling in the cold chain. Systems for process control should limit microbial cross-contamination in these circumstances to as low as practicably achievable, and reflect the proportional contribution of these controls in reducing meat-borne risks to human health.

89. Ready-to-eat (RTE) products may require specific microbiological testing regimes that incorporate microbiological performance criteria, process criteria and/or microbiological criteria.

9.1 PRINCIPLES OF MEAT HYGIENE APPLYING TO PROCESS CONTROL

i. Production of meat that is safe and suitable for human consumption requires that detailed attention be paid to the design, implementation, monitoring and review of process control.

ii. The establishment operator has the primary responsibility for implementing systems for process control. Where such systems are applied, the competent authority should verify that they achieve all meat hygiene requirements.

iii. Process control should limit the level of microbiological contamination to the lowest level practicable, according to a risk-based approach.

iv. HACCP should be applied wherever practicable as the system of choice for process control, and should be supported by prerequisite GHP that includes SSOPs.

v. Process control should reflect an integrated strategy for control of hazards throughout the food chain, with information available from primary production and pre-slaughter being taken into account wherever possible and practicable.

vi. All bodies of animals should be subjected to post-mortem inspection that is science- and risk-based, and is tailored to the hazards and/or defects that are reasonably likely to be present in the bodies of animals presented for inspection.[34]

vii. The competent authority should determine the procedures and tests to be used in post-mortem inspection, how that inspection is to be implemented, and the necessary training, knowledge, skills and ability required of personnel involved (including the role of veterinarians, and personnel employed by the establishment operator).

viii. Post-mortem inspection should take into account all relevant information from primary production, ante-mortem inspection, and from official or officially-recognised hazard control programmes.

ix. Post-mortem judgements should be based on: food-borne risks to human health, other human health risks, e.g., from occupational exposure or handling of meat in the home, food-borne risks to animal health as specified in relevant national legislation, and suitability characteristics.

x. Performance criteria for the outcome of process control and post-mortem inspection activities should be established by the competent authority wherever practicable, and should be subject to verification by the competent authority.

xi. Where appropriate, microbiological testing, for verification purposes, should be included in meat preparation and manufactured meat HACCP plans. Such testing should be relevant to the type of product and the likely risks to consumers, including vulnerable sub-populations.

xii. Competent bodies or competent persons may be engaged by the establishment operator to undertake prescribed process control activities[35], including ante-[36] and post-mortem inspection, as approved by the competent authority.

xiii. Handling of RTE products up until the point of sale to the consumer should ensure that there is no contact with non-RTE products, and any other exposure to potential sources of microbiological contamination is minimised to the greatest extent practicable.

xiv. Voluntary or officially recognised QA systems may be implemented by the establishment operator where they enhance meat hygiene activities, and they may be taken into account in the verification of regulatory requirements by the competent authority.

9.2 PROCESS CONTROL SYSTEMS

90. Effective process control requires design and implementation of appropriate systems. Industry has the primary responsibility for applying and supervising process control systems to ensure the safety and suitability of meat, and these should incorporate prerequisite GHP and HACCP plans as appropriate to the circumstances.

91. A documented process control system should describe the meat hygiene activities applied (including any sampling procedures), performance criteria (if set), verification activities, and corrective and preventative actions.

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34 Where risk assessment capability is not available, post-mortem inspection carried out according to current scientific knowledge and practice should be capable of achieving the level of consumer protection required

35 Prescribed process control activities may include “Officially recognised inspection systems” (CAC/GL 20 - 1995)

36 Ante-mortem inspection as covered in Section 6.3

92. Competent bodies or competent persons suitably recognised by the competent authority may be engaged by the establishment operator to undertake prescribed process control activities, including post-mortem inspection. These activities should be part of HACCP or QA systems as appropriate to the circumstances.

93. Process control systems relating to food safety should incorporate a risk-based approach. Application of HACCP principles in the design and implementation of process control systems should be according to The Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application (CAC/RCP 1-1969, Rev. 4-2003). The Guidelines for the Design, Operation, Assessment and Accreditation of Food Import and Export Inspection and Certification Systems (CAC/GL 26-1997) provide general requirements for control of operations for food as they relate to international trade.

9.2.1 Sanitation Standard Operating Procedures (SSOPs)

94. Pre-operational and operational SSOPs should minimise direct and indirect contamination of meat to the greatest extent possible and practicable. A properly implemented SSOP system should ensure that facilities and equipment are clean and sanitised prior to start of operations, and appropriate hygiene is maintained during operations. SSOP guidelines may be provided by the competent authority, which may include minimum regulatory requirements for general sanitation.

Characteristics of SSOPs are:

- development of a written SSOP programme by the establishment that describes the procedures involved and the frequency of application;
- identification of establishment personnel responsible for implementing and monitoring SSOPs;
- documentation of monitoring and any corrective and/or preventative actions taken, which is made available to the competent authority for purposes of verification;
- corrective actions that include appropriate disposition of product; and
- periodic evaluation of the effectiveness of the system by the establishment operator.

95. Microbiological verification of SSOPs can utilise a range of direct or indirect methods. Establishment operators should use statistical process control or other methods to monitor sanitation trends.

96. In the case of RTE products, microbiological verification of SSOPs for food contact and non-food contact surfaces is likely to be of higher intensity than for other types of product.

9.2.2 HACCP

97. HACCP systems for production of meat are a proactive means of process control for food safety purposes.[37] Validation of a HACCP plan for meat should ensure that it is effective in meeting performance criteria (refer 9.2.3), taking into account the degree of variability in presence of hazards that is normally associated with different lots of animals presented for processing.

98. Verification frequency may vary according to the operational aspects of process control, the historical performance of the establishment in application of the HACCP plan, and the results of verification itself. The competent authority may choose to approve HACCP plans and stipulate verification frequencies.

99. Microbiological testing for verification of HACCP systems, e.g. for verification of critical limits and statistical process control, is an important feature of HACCP.

100. Guidelines for the development of HACCP programmes to achieve pre-determined process criteria stipulated by the competent authority should be provided to establishment operators so as to guide development of process and product-specific HACCP plans. Guidelines should be developed in consultation with industry and other interested stakeholder organisations, and may be differentiated according to processing category, e.g.:

[37] Hazard Analysis and Critical Control Point (HACCP) System and Guidelines for its Application, (Annex to CAC/RCP 1-1969, Rev. 4-2003)

- Raw ground or comminuted e.g. pork sausage
- Meat with secondary inhibitors / non-shelf stable e.g. cured corned beef
- Heat treated / not fully cooked, non-shelf stable e.g. partially-cooked patties
- Fully cooked / non-shelf stable e.g. cooked ham
- Non-heat treated / shelf stable e.g. dry salami
- Heat treated / shelf stable e.g. beef jerky
- Thermally processed / commercially sterile e.g. canned meat
- Specific ethnic processes, e.g. tandoori

101. When developing HACCP plans for heat-treated meat preparations and manufactured meat, the establishment operator should fully document as appropriate to the process, all thermal process parameters, post-heat treatment handling, and additional preservation treatments appropriate to the intended process outcome e.g. pasteurisation. Process parameters for cooling of heat-treated products may incorporate as appropriate to the product, rapid cooling, slow cooling, or interrupted cooling. Previously heated products should not be packaged above a minimum temperature, e.g. 4 C, unless it can be demonstrated that cooling after packaging does not compromise product safety.

102. HACCP plans for meat preparations and manufactured meat that are cooked should include monitoring and documentation of parameters that ensure appropriate internal temperatures are reached. Internal temperatures of product should be taken as necessary to verify the adequacy of the cook.

9.2.3 Outcome-based parameters for process control

103. In a risk-based meat hygiene system, verification of process control is greatly strengthened by establishment of performance criteria for the outcome of specified activities. In most cases these will be established by the competent authority. When performance criteria are established, industry can use them to readily demonstrate adequate process control for food safety characteristics of meat.

104. The establishment should have a documented process control system for implementing corrective actions that will allow it to consistently meet performance criteria. Process review and any other corrective and preventative actions required as a result of non-compliance with performance criteria should be properly recorded. The competent authority should implement a system for collecting and analysing results from all establishments to the greatest extent possible, and periodically review process control trends in relation to national meat hygiene goals.

105. Where possible, performance criteria should objectively express the level of hazard control as derived from the application of risk analysis principles. In the absence of sufficient knowledge of risks to human health, performance criteria can initially be established from baseline surveys of current performance, and subsequently modified as appropriate to reflect public health goals. Where outcome-based parameters have been established for suitability characteristics of meat, outcomes should be practically achievable and reflect consumer expectations.

106. Organoleptic parameters may also be established e.g., “zero tolerance” for visible faecal contamination on carcasses.

Performance criteria for outcomes of process control systems act to:

- facilitate validation of process control systems;
- facilitate derivation of process parameters at various steps in the food production system;
- allow maximum flexibility and technical innovation in the way the establishment operator achieves the required level of performance;
- facilitate industry-wide consistency in performance;

- provide an objective basis for outcome-driven regulatory guidelines and standards, e.g., statistical process control requirements, prevalence of Salmonella spp.;
- improve hazard control over time so as to enhance the level of consumer protection; and
- facilitate determination of the equivalence of sanitary measures.

107. Microbiological performance criteria, process criteria and microbiological criteria for RTE products should be risk-based according to the category of product e.g. not heat treated and shelf stable, heat treated and shelf stable, fully cooked and not shelf stable. Microbiological verification tests should be undertaken by the establishment at a frequency appropriate to the circumstances. The competent authority may also implement testing to verify that appropriate control is maintained by industry. HACCP plans applied by the establishment should document corrective and preventative measures to be taken in the event of positive tests for pathogens or toxins.

108. Where performance criteria are established as regulatory requirements, explanation of the linkage to an appropriate level of consumer protection should be provided to all interested parties, e.g., guidelines for allowable levels of generic *E. coli*, standards for absence of *E. coli* O157:H7, maximum residue limits for chemicals with acute toxicity.

109. In some circumstances a performance criterion may be established as a microbiological criterion that defines the acceptability of a production lot, e.g. based on the presence/absence or number of microbes, and/or the quantity of their toxins or metabolytes according to a specified sampling plan.[38]

110. Performance criteria for outcomes of process control may be difficult to establish for some hazards of concern, and the competent authority may need to implement specific procedures and tests to achieve expected levels of consumer protection, e.g. BSE. Specific measures such as these should be implemented on the basis of risk assessment and full consideration of the effectiveness of all available risk management options[39].

111. The competent authority should, wherever practicable, recognise different risk-based meat hygiene activities within its competence, which have been demonstrated to meet at least the same risk-based meat hygiene outcomes.

9.2.4 Regulatory systems

112. The competent authority should have the legal power to set and enforce regulatory meat hygiene requirements, and has the final responsibility for verifying that all regulatory requirements are met. The competent authority should:

i. Establish regulatory systems (e.g. recall, traceback, product tracing, as appropriate, etc.) and requirements, e.g. training, knowledge, skills and ability of personnel (generally at a national level).

ii. Undertake specified meat hygiene controls that are designated activities of the competent authority, e.g., official sampling programmes, those aspects of ante and post-mortem activities specified by the competent authority, or official certification.

iii. Verify that process control systems implemented by the establishment operator meet regulatory requirements e.g. GHP, SSOPs, HACCP, as appropriate.

iv. Verify that competent bodies are carrying out functions as required.

v. Carry out enforcement actions as necessary.

The competent authority should verify compliance with:

- GHP requirements for: animals presented for slaughter (and killed wild game presented for dressing), establishments, facilities and equipment, process control, transport, and hygiene of personnel;

[38] Principles for the Establishment and Application of Microbiological Criteria for Foods (CAC/GL 21-1997)

[39] Bovine spongiform encephalopathy. Chapter 2.3.13. International Animal Health Code - 2000. Office International des Epizooties

- SSOPs;
- HACCP plans;
- all regulatory requirements relating to ante- and post-mortem inspection;
- performance and process parameters that are regulatory requirements, e.g., microbiological statistical process control requirements, standards for *Salmonella* spp.
- chemical residue and contaminant levels that are below maximum limits as described in relevant legislation and national sampling plans;
- official or "officially-recognised" zoonoses control programmes, e.g., microbiological tests for *E. coli* O157:H7; and
- additional risk management measures as specified by the competent authority.

113. Verification activities may include assessment of processing activities carried out by establishment personnel, documentary checks, organoleptic inspection of edible parts and meat, taking of samples for laboratory tests and testing for pathogens, indicator organisms, residues, etc. Approval/registration/listing of an establishment may facilitate the ability of the competent authority to verify that it is operating in compliance with regulatory requirements.

114. The competent authority should conduct appropriate supervision of (operator) verification activities, and the nature and intensity of that supervision should be risk-based. The official inspector (including the veterinary inspector) verifies compliance with the regulatory requirements and may use additional documentary checks, procedures and tests in this role. Rules governing the presence of the official inspector during ante- and post-mortem inspection, and during processing, cutting, and storage of meat, should be determined by the competent authority in relation to deployment of other competent persons, and in relation to potential risks to human health associated with the classes of animals and meat involved. The role of the competent authority(s) during distribution and retail sale of products should be of an extent that is proportional to likely generation of risks to consumers during these activities.

115. A national meat hygiene programme should be subject to verification by the competent authority.

Where the establishment operator does not comply with regulatory requirements, the competent authority should carry out enforcement actions that may include:

- slowing of production while the operator regains process control;
- stopping production, and withdrawing certification for meat deemed to be unsafe or unsuitable for its intended use;
- withdrawing official supervision, or accreditation of competent persons;
- ordering specified treatment, recall or destruction of meat as necessary; and
- withdrawing or suspending all or part of the approval/registration/listing of the establishment if process control systems are invalid or repeatedly non-compliant.

9.2.5 Quality assurance (QA) systems

116. Whenever there are verifiable QA systems in place in the industry, the competent authority should take them into account.[40]

[40] Guidelines for the Design, Operation, Assessment and Accreditation of Food Import and Export Inspection and Certification Systems - Section 4 "Quality Assurance" (CAC/GL 26-1997)

9.3 GENERAL HYGIENE REQUIREMENTS FOR PROCESS CONTROL

117. Process control should meet the general hygiene requirements of the Recommended International Code of Practice: General Principles of Food Hygiene.[41]

General hygiene requirements for process control should include for example:

- water for cleaning and sanitising of a standard that is appropriate for the specific purpose, and used in a manner that does not directly or indirectly contaminate meat;
- cleaning of facilities and equipment that involves disassembly where necessary, removal of all debris, rinsing of parts, application of an approved cleaner, repeat rinsing, reassembly, and further sanitisation and rinsing as appropriate;
- handling and storage of containers and equipment in a way that minimises the potential for contamination of meat;
- assembly of containers or cartons in rooms or areas where meat may be present in such a manner that there is minimal possibility of contamination; and
- controlled access of personnel to processing areas.

118. The competent authority and industry should utilise appropriately accredited or otherwise recognised laboratories when verifying process control and carrying out other meat hygiene activities. Testing of samples should utilise validated analytical methods.[42]

Laboratory testing may be required for:

- verification of process control;
- application of performance or microbiological criteria;
- residue monitoring;
- diagnosis of disease conditions affecting individual animals; and
- monitoring of zoonoses.

9.4 HYGIENE REQUIREMENTS FOR SLAUGHTER AND DRESSING

119. Only live animals intended for slaughter should be brought into an abattoir, with the exception of animals that have undergone emergency slaughter outside the slaughterhouse and have appropriate veterinary documentation.

120. No animal other than an animal intended for slaughter should enter an abattoir, with the exception of animals used for stock handling.

121. An animal should only be slaughtered or dressed in an abattoir if a competent person is available to undertake ante- and post-mortem inspection. In cases of emergency slaughter where a competent person is not available, special provisions established by the competent authority will apply to ensure that the meat is safe and suitable for human consumption.

122. All animals brought to the slaughter floor should be slaughtered without delay, and stunning, sticking and bleeding of animals should not proceed at a rate faster than that at which bodies of animals can be accepted for dressing.

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41 Note that general requirements for control of incoming materials, use of water, packaging, documentation and records, and recall procedures are described in the recommended international code of practice: general principles of food hygiene (CAC/RCP 1 - 1969, Rev. 4-2003)

42 Guidelines for the assessment of the competence of testing laboratories involved in the Import and Export Control of Food (CAC/GL 27-1997)

During initial dressing operations, and with due consideration to minimising contamination:

- slaughtered animals that are scalded, flamed or similarly treated should be scoured of all bristles, hair, scurf, feathers, cuticles and dirt;
- the trachea and oesophagus should remain intact during bleeding, except in the case of ritual slaughter;
- bleeding should be as complete as possible; if blood is intended for food, it should be collected and handled in a hygienic manner;
- exposure of the tongue should be done in such a way that the tonsils are not cut;
- skinning of the head may not be required for some classes of animals e.g. goats, calves, sheep, provided that heads are handled in such a way as to avoid undue contamination of meat;
- before the removal from the head of any parts intended for human consumption, the head should be clean and, except in the case of scalded and dehaired carcasses, skinned to an extent sufficient to facilitate inspection and the hygienic removal of specified parts;
- lactating or obviously-diseased udders should be removed from carcasses at the earliest opportunity;
- removal of udders should be done in such as way that the contents do not contaminate the carcass;
- gas skinning or dehiding (pumping of air or gas between the skin or hide and the underlying tissue to facilitate skinning) should only be permitted if it can be achieved with minimal contamination and meets required microbiological and organoleptic performance criteria; and
- hides/fleeces should not be washed, de-fleshed or left to accumulate in any part of an abattoir or establishment that is used for slaughter or dressing.

123. Poultry and farmed game birds, following de-feathering, can only be effectively cleaned of dust, feathers and other contaminants by the application of potable water. Washing of the carcasses of these animals at multiple steps in the dressing process, and as soon as possible after each contaminating step, reduces the adherence of bacteria to the skin which can minimise overall carcass contamination. (Washing after evisceration and post-mortem is also necessary for technological reasons, as this is the only method available to routinely clean carcasses before entry to the chilling process). Washing may be carried out by several methods e.g., spraying, immersion washing.

124. Farmed ratites may have an excessive amount of dust and dirt trapped in their feathers, and this has the potential for significant contamination of the dressing area unless there is adequate separation by distance, physical barrier, or other means, e.g., positive ventilation.

125. Once the removal of the hide/fleece has commenced, or dehairing has occurred, animal bodies should be separated from each other to avoid contact, and this should be maintained until each carcass has been examined and judged by a competent person undertaking post-mortem inspection. (Note: While full separation of carcasses is more difficult in the case of poultry and farmed game birds, such contact should be minimised).

During dressing, and with due consideration to minimising contamination:

- where bodies of animals are skinned, this process should be completed before evisceration;
- water in scalding tanks should be managed so that it is not excessively contaminated;
- evisceration should be carried out without delay;
- discharge or spillage of any material from the oesophagus, crop, stomach, intestines, cloaca or rectum, or from the gall bladder, urinary bladder, uterus or udder, should be prevented;
- intestines should not be severed from the stomach during evisceration and no other opening should be made into an intestine, unless the intestines are first effectively tied to prevent spillage, except in the case of poultry and game birds;

- stomachs and intestines and all inedible material derived from the slaughtering and/or dressing of bodies of animals should be removed as soon as possible from the dressing area, and processed in a manner that does not cause cross-contamination of meat;
- methods used to remove visible and microbial contamination should be demonstrated to be effective and meet other requirements as specified by the competent authority; and
- faecal and other material should be trimmed or otherwise removed from carcasses in a manner that does not result in further contamination, and which achieves appropriate performance criteria for process control.

126. Animal bodies and carcasses should not come into contact with surfaces or equipment unless practically unavoidable. Where use of equipment involves contact by design, e.g., in the case of automatic eviscerating machines, the hygiene of the equipment should be appropriately maintained and monitored.

127. Where a competent person undertaking post-mortem inspection, considers that the manner in which animals are being slaughtered or dressed, or meat is further handled, will adversely affect the safety and suitability of meat, that competent person should enforce a reduction in the rate of production or the suspension of operations or other appropriate measures, as deemed necessary (refer to 9.2.4).

128. Establishment operators should meet the requirements of the competent authority in terms of presentation of edible parts of bodies of animals for post-mortem inspection. Parts of slaughtered animals that have been removed before post-mortem inspection is performed should remain identifiable, as belonging to a single carcass (or a group of carcasses) when required for post-mortem judgement.

129. Facilities and equipment for slaughtering and/or dressing may be used for other purposes, e.g. for animal health emergency slaughter, provided appropriate cleaning and sanitation requirements are met.

130. The competent authority should encourage development and adoption of innovative technologies and procedures at the establishment level, that reduce cross-contamination and enhance food safety, e.g., enclosing the terminal rectal intestine in a bag and tying off.

9.5 POST-MORTEM INSPECTION

131. All carcasses and other relevant parts should be subjected to post-mortem inspection, which preferably should be part of an overarching, risk-based system for the production of meat.

132. Post-mortem inspection of carcasses and other relevant parts should utilise information from primary production and ante-mortem inspection, together with the findings from organoleptic inspection of the head, carcass and viscera, to make a judgement on the safety and suitability of parts intended for human consumption. Where the results of organoleptic inspection are insufficient to accurately judge carcasses and other relevant parts as safe or suitable for human consumption, the parts should be set aside and followed up with confirmatory inspection procedures and/or tests.

9.5.1 Design of post-mortem inspection systems

133. Post-mortem inspection procedures and tests should be established by the competent authority according to a science- and risk-based approach. The competent authority has responsibility for establishing judgement criteria and verifying the post-mortem inspection system. In the absence of a risk-based system, procedures will have to be based on current scientific knowledge and practice.

134. Post-mortem procedures and tests may be integrated and implemented together so as to achieve public health and animal health objectives. In such cases, all aspects of post-mortem inspection should be science-based and be tailored to the relevant risks.

135. Relevant information on the animal population, e.g., animal type, health status, geographical region of origin, should be utilised in both the design and implementation of post-mortem inspection systems.

136. Where indicated by public health concerns, routine screening of carcasses and other relevant parts by methods other than organoleptic inspection may be required for suspected hazards, e.g., testing for *Trichinella* spp.

Characteristics of a risk-based post-mortem inspection programme are:

- design and application of organoleptic procedures and tests that are relevant and proportional to meat-borne risks associated with grossly-detectable abnormalities;
- tailoring of procedures to the spectrum and prevalence of diseases and defects reasonably likely to be present in the particular slaughter population, taking into account the type (age), geographical origin and primary production system of the slaughter animals, e.g., multiple incisions of relevant muscles in all pigs from geographical regions where *Taenia solium* is present;
- procedures that minimise cross-contamination through handling to the greatest extent practicable, and may include procedures that are limited to visual observation of carcasses and other relevant parts in the first instance if justified by risk assessment;
- inspection of non-edible parts of animals where they may play an indicator role in the judgement of edible parts;
- modification of traditional procedures where scientific investigation has shown them to be ineffective, or, of themselves, hazardous to food, e.g., routine incision of lymph nodes of young animals to detect granulomatous abnormalities;
- application of more intensive organoleptic procedures on a routine basis when a disease or condition capable of general distribution is found in a single part of a carcass and other relevant parts, e.g., cysts of *Taenia saginata* in cattle, xanthosis;
- application of additional risk-based inspection procedures on a routine basis when live animals are positive to a diagnostic test, e.g., tuberculin test in cattle, mallein test in horses;
- use of laboratory tests for hazards that are unaddressed by organoleptic inspection, e.g., *Trichinella* spp., chemical residues and contaminants;
- application of performance criteria for outcomes of organoleptic inspection that reflect a risk-based approach;
- integration with HACCP plans for other process control activities, e.g., establishment of “zero faecal tolerance” criteria for faecal contamination of carcasses;
- on-going tailoring of procedures to take into consideration information received from the primary producer on a lot-by-lot basis; and
- return of information to the primary producer so as to seek continuous improvement in the safety and suitability status of animals presented for slaughter (refer to 6.4).

9.5.2 Implementation of post-mortem inspection

137. Post-mortem inspection should occur as soon as is practicable after slaughter of animals, or delivery of killed wild game animals. Inspection should take into account all relevant information from the level of primary production and ante-mortem inspection, e.g. information from official or officially-recognised hazard control programmes, information on animals slaughtered as “suspects”.

138. The competent authority should determine: how post-mortem inspection is to be implemented, the training, knowledge, skills and ability required of personnel involved (including the role of the official inspector, the veterinary inspector, and any personnel not employed by the competent authority), and the frequency and intensity of verification activities (refer to 9.2.4). The final responsibility for verifying that all post-mortem inspection and judgement requirements are met should lie with the competent authority.

139. Carcasses and other relevant parts condemned by the competent person undertaking post-mortem inspection, as unsafe or unsuitable for human consumption should be identified as appropriate and handled in a manner that does not result in cross-contamination of meat from other carcasses and relevant parts. The reason for condemnation should be recorded, and confirmatory laboratory tests may be taken if deemed necessary.

The responsibilities of the establishment operator in respect of post-mortem inspection include:

- maintenance of the identity of a carcass and other relevant parts (including blood as appropriate) until inspection is complete;
- skinning and dressing of heads to the extent necessary to facilitate inspection, e.g., partial skinning to allow access to sub-maxillary lymph nodes, detaching of the base of the tongue to allow access to the retropharyngeal lymph nodes;
- skinning of heads to the extent necessary to allow hygienic removal of edible parts, when this is a processing option;
- presentation of a carcass and other relevant parts for inspection according to the requirements of the competent authority;
- a prohibition on establishment personnel intentionally removing or modifying any evidence of a disease or defect, or animal identification mark, prior to post mortem inspection;
- prompt removal of foetuses from the evisceration area, for rendering or other processes as allowed by the competent authority, e.g., collection of foetal blood;
- retention in the inspection area of all carcasses and other relevant parts required for inspection, until inspection and judgement has been completed;
- provision of facilities for identifying and retaining all carcasses and other relevant parts that require more detailed inspection and/or diagnostic tests before a judgement on safety and suitability can be made, in a manner that prevents cross-contamination of meat from other carcasses and other relevant parts;
- condemnation of parts of the carcass trimmed from the region of the sticking wound;
- routine condemnation of the liver and/or kidneys from older animals where the competent authority has determined that there may be accumulation of heavy metals to an unacceptable level;
- use of health marks (as specified by the competent authority) that communicate the outcome of post-mortem inspection; and
- co-operation with competent persons undertaking post-mortem inspection, in all other ways necessary to facilitate effective post-mortem inspection, e.g., access to processing records, and easy access to all carcasses and other relevant parts.

Post-mortem inspection systems, should include:

- procedures and tests that are risk-based to the extent possible and practicable (refer to 9.5.1);
- confirmation of proper stunning and bleeding;
- availability of inspection as soon as is practicable after completion of dressing;
- visual inspection of the carcass and other relevant parts, including inedible parts, as determined by the competent authority;
- palpation and/or incision of the carcass and other relevant parts, including inedible parts, as determined by the competent authority according to a risk-based approach;

- additional palpation and/or incisions, as necessary to reach a judgement for an individual carcass and other relevant parts, and under appropriate hygiene control
- more detailed inspection of edible parts intended for human consumption compared with inspection of those parts for indicator purposes alone, as appropriate to the circumstances;
- systematic, multiple incisions of lymph nodes where incision is necessary;
- other organoleptic inspection procedures, e.g., smell, touch;
- where necessary, laboratory diagnostic and other tests carried out by the competent authority or by the establishment operator under instruction;
- performance criteria for the outcomes of organoleptic inspection;
- regulatory authority to slow or halt processing so as to allow adequate post-mortem inspection at all times;
- removal of specified parts if required by the competent authority, e.g., "specified risk materials" for BSE; and
- proper use and secure storage of equipment for health marking.

140. The competent authority and industry should record and disseminate the results of post-mortem inspection as appropriate. Notifiable human or animal health diseases and cases of non-complying residues or contaminants should be reported to national competent authorities as well as to the owner of the animal(s). Analysis of the results of post-mortem inspection over time is the responsibility of the competent authority, and the results of such analyses should be made available to all interested parties.

9.6 POST-MORTEM JUDGEMENT

141. Post-mortem judgement of edible parts as safe and suitable for human consumption should primarily be based on food-borne risks to human health. Other risks to human health, e.g., from occupational exposure or from handling of meat in the home, also are an important consideration. Judgements in relation to suitability characteristics of meat should reflect consumer acceptability requirements appropriate to intended end-use. [43]

142. Although outside the mandate of Codex, post-mortem inspection programmes may be utilised to identify and judge carcasses and other relevant parts according to risks to animal health, as specified in relevant national legislation.

Judgement of edible parts as safe and suitable should take into account information from the following sources:

- information from primary production (refer to Section 6);
- observations made of animals in the lairage;
- ante-mortem inspection; and
- post-mortem inspection, including diagnostic tests, where required.

143. Judgements should be based on science and risks to human health to the greatest extent possible, with guidelines being provided by the competent authority. Judgements should only be made by competent persons. When edible parts with any abnormality are always judged to be unsafe and unsuitable for human consumption and appropriately disposed of, the level of training, knowledge, skills and ability required for judgement may be less than in situations where edible parts demonstrating an abnormality may not necessarily be removed from the food supply.

[43] The competent authority may take into account varying needs of different consumer populations so that suitability judgements do not distort the economics of the food supply

144. Where the initial results of post-mortem inspection are insufficient to accurately judge edible parts as safe or suitable for human consumption, a provisional judgement should be followed up with more detailed inspection procedures and/or tests. Pending the outcome of more detailed inspection and/or diagnostic tests, all parts of the animal that are required for further investigation should be held under the control of the competent person undertaking these activities.

Judgement categories for edible parts include:

- safe and suitable for human consumption;
- safe and suitable for human consumption, subject to application of a prescribed process, e.g., cooking, freezing;[44;]
- held on suspicion of being unsafe or unsuitable, pending the outcome of further procedures and/or tests.
- unsafe for human consumption i.e. due to meat-borne hazards or occupational health/meat handling hazards, but able to be used for some other purpose, e.g., pet-food, animal feedingstuffs, industrial non-food use, providing there are adequate hygiene controls to prevent any transmission of hazards, or illegal re-entry to the human food chain;
- unsafe for human consumption i.e. due to meat-borne hazards or occupational health/meat handling hazards, and requiring condemnation and destruction;
- unsuitable for human consumption, but able to be used for some other purpose, e.g., pet-food, animal feedingstuffs, industrial non-food use, providing there are adequate controls to prevent illegal re-entry to the human food chain;
- unsuitable for human consumption, and requiring condemnation and destruction; and
- unsafe for animal health reasons as specified in national legislation, and disposed of accordingly.[45]

145. When edible parts are judged to be safe and suitable for human consumption subject to application of a prescribed process, the specifications for that process should be verified by the competent authority as sufficient to eliminate/reduce or adequately remove the hazard or condition of concern, e.g., specifications for retorting, high temperature rendering and freezing.

9.7 HYGIENE REQUIREMENTS FOR PROCESS CONTROL AFTER POST-MORTEM INSPECTION

146. Operations following post-mortem inspection include all procedures until the point of retail sales, e.g. chilling of carcasses, de-boning and cutting, further preparing, processing, packaging, freezing, storing, and distribution to the point of retail sale. Particular attention needs to paid to temperature control, with temperatures of freshly slaughtered and dressed carcasses and other edible parts being reduced as rapidly as possible to a temperature that minimise the growth of micro-organisms or the formation of toxins that could constitute a risk to human health. It is also important that the cold chain is not interrupted except to the minimal extent necessary for practical operations, e.g., handling during transportation.

147. In the case of poultry and farmed game birds, viscera or parts of viscera, apart from kidneys, should be entirely removed as soon as possible, unless otherwise permitted by the competent authority.

Meat passed as safe and suitable for human consumption should be:

- removed without delay from the dressing area;
- handled, stored and transported in a manner that will protect it from contamination and deterioration;

[44] The competent personr can instruct that following post-mortem inspection, edible parts held under suitable inventory control can be designated as safe and suitable when subjected to a particular process e.g. freezing, cooking, canning

[45] In some circumstances, edible parts may be judged as suitable for human consumption but subject to restricted distribution because the animals were sourced from geographical areas under quarantine for animal health reasons

- held under conditions that reduce its temperature and/or water activity as quickly as possible, unless cut up or de-boned pre-rigor; and
- held at temperatures that achieve safety and suitability objectives.

In the case of poultry or farmed game birds undergoing immersion chilling:

- the immersion chilling process should meet hygiene criteria as specified by the competent authority;
- the reduction in carcass temperature should be as rapid as possible;
- carcasses emerging from the process should have a lesser microbiological count for indicator organisms and pathogens than those entering the process; and
- sanitation requirements should include complete emptying, cleaning and sanitation of tanks as appropriate.

148. An official health mark applied to meat, wrapping or packaging, should provide recognition that the product has been produced in accordance with regulatory requirements, and should assist with trace-back to the establishment of origin if required. When used as part of an official meat hygiene programme, the health mark should include the approval/registration/listing number of the establishment, be applied in such a way that it cannot be re-used, and be legible. Other marks may denote conformance with commercial specifications, or unacceptability for human consumption, e.g., distinctive brands for pet-food.

149. Official health marks may be applied directly to the product, wrapping or packaging, or be printed on a label affixed to the product, wrapping or packaging. In circumstances of bulk transport to another establishment for further handling, processing or wrapping, health marks may be applied to the external surface of the container or packaging.

Where carcasses, parts of carcasses or other meat is placed in a holding room:

- all requirements for hygienic control of operations must be adhered to e.g., chiller loading rates, stock rotation, specifications for temperature and relative humidity;
- carcasses and parts of carcasses, whether hung or placed in racks or trays, should be held in a manner permitting adequate circulation of air;
- the potential for cross-contamination via dripping of fluids should be prevented; and
- water dripping from overhead facilities and condensation should be controlled to the extent practicable, to prevent contamination of meat and food contact surfaces.

150. Rooms and equipment for cutting, mincing, mechanical separation, meat preparation and the manufacturing of meat should be designed such that activities can be carried out separately, or in such a manner that does not led to cross contamination.

151. Fresh meat intended for cutting or de-boning should be brought into work rooms progressively as needed, and should not accumulate on work tables. If fresh meat is cut or de-boned prior to reaching temperatures that are appropriate for storage and transport, it should be immediately reduced in temperature to prescribed levels.

When fresh meat is cut or de-boned pre-rigor:

- it should be transported directly from the dressing area to the cutting up or de-boning room;
- the cutting up or de-boning room should be temperature-controlled and directly linked to the dressing areas, unless the competent authority approves alternative procedures that provide an equivalent level of hygiene; and

- cutting up, de-boning and packing should be done without delay and should meet all requirements for hygienic process control.

When raw meat is minced:

- it should be obtained only from parts of animals as approved by the competent authority e.g. striated muscle and adherent fatty tissues[46]
- it should not contain bone fragments or skin
- any grossly abnormal tissues and / or post-dressing contamination should be removed before mincing
- the competent authority may specify compositional criteria

When raw meat is mechanically separated, the competent authority should:

- restrict the type of animal parts that can be used e.g. non-use of skulls
- set compositional standards for maximum calcium content
- require specific labelling of the final product

When raw meat is minced, mechanically separated or used in meat preparations:

- the competent authority can specify maximum time/temperature schedules for process control at each step of production e.g. maximum times and temperatures from chilling or freezing of raw material to the time of preparation, maximum temperatures during production, maximum times before chilling or freezing
- unless used directly as an ingredient for meat preparations and manufactured meat, it should be immediately wrapped and/or packaged, followed by immediate refrigeration
- the competent authority may specify microbiological performance criteria, process criteria or microbiological criteria for raw materials and final product
- establishments should have in-line magnets or other means of detecting contamination with metal fragments as appropriate
- it should not be refrozen after thawing.

When meat preparations or manufactured meat are handled:

- the process flow of raw meat awaiting processing and during processing should ensure uniform turnover of accumulated product and avoid possible cross-contamination, e.g. between raw materials and ready-to-eat products
- supply and addition of non-meat ingredients should be subject to good hygienic practice and HACCP as appropriate and practicable, and may involve decontamination treatments e.g. for herbs and spices

[46] Striated muscles from affected animal species should have undergone an examination from Trichinella as specified by the competent authority

- products that include non-meat protein products (as defined or standardised by Codex) should be appropriately labelled[47]
- process control for non-commercially sterile products should prevent pathogen growth and toxin production during all processing activities e.g. during fermentation, partial heat treatment, drying, maturing and curing. Process criteria may include for example, correct pH after fermentation, correct time/temperature schedules after heating or smoking, correct moisture / protein ratio after drying, correct formulation and application of nitrite as a cure ingredient
- if heat and/or other processing treatments are not sufficient to ensure the stability of the product, the product should be cooled to an appropriate storage temperature and in a manner that ensures product safety is not compromised as a result of germination and subsequent growth of pathogenic sporeformers
- product formulations e.g. distribution of antibacterial ingredients throughout cooked sausage emulsions, addition of cultures, adjustment of pH, should achieve required levels of pathogen control
- microbiological contamination of raw meat used to produce fermented products should be as low as possible, and similarly, mechanically separated meat should only be used if appropriate time / temperature schedules to achieve product safety requirements of the competent authority are used
- processing of shelf-stable products in hermetically sealed rigid containers should be according to Codex guidelines[48]
- cooked products should achieve time / internal temperatures that are validated as achieving specified microbiological performance criteria
- pasteurisation values or other heat processes should be validated for all heat treated chilled products in hermetically sealed containers so as to ensure that product safety is maintained to the end of shelf life, taking into account all preservation factors that may be present
- unless the absence of trichinellae can be assured by testing or other means, process treatments for products containing striated muscle from affected animal species, either alone or in combination, should be sufficient to destroy trichinella
- contamination with *L. monocytogenes* of heat treated / non-shelf stable and non-heat treated / shelf stable products should be prevented by use of SSOPs and GHPs that are subject to routine microbiological verification
- dried products should be protected from environmental contamination and from reabsorption of moisture
- processes for products containing minced, comminuted or mechanically separated meat should have in-line magnets or other means of detecting contamination with metal fragments.

Where meat is packaged or wrapped:

- packaging material should be suitable for use, stored and used in a hygienic manner; and
- cases or cartons should have a suitable inner liner or other means of protecting the meat, except that the liner or other protection may not be required if pieces of meat, such as cuts, are individually wrapped before packing.

Where meat is placed in a room for freezing:

[47] Codex General Standard for the Labelling of Prepackaged Food (CODEX STAN 1-1985, Rev. 1-1991)

[48] Recommended International Code of Hygienic Practice for Low-Acid Canned Foods CAC/RCP 23-1979 (Rev. 1-1989)

- meat that is not in cartons should be hung or placed on racks or trays in a manner that allows adequate circulation of air;
- meat that is not in cartons should be held in a manner whereby the potential for cross-contamination via dripping of liquids is prevented;
- cartons containing meat should be stacked so as to permit adequate circulation of air; and
- meat held on trays should be placed so as to avoid contact with the base of an upper tray.

Where meat is held in a freezer room or storage facility:

- the temperature of the meat should have been reduced to an acceptable level before placement;
- exposed meat must be stored in such a way that the hygiene cannot be compromised by the presence of packaged meat or packaging material;
- meat, whether in carcass form or in cartons, should not be stacked directly on the floor and should be positioned so that there is adequate air circulation;
- the freezer store should be operated and maintained under conditions appropriate to maintaining the safety and suitability of meat;
- temperatures should be continuously recorded and monitored; and
- adequate inventory control should be maintained.

152. Where raw meat is thawed for further processing, hygiene controls should be such that thawing will not result in growth of micro-organisms or the formation of toxins to the extent that they may constitute a risk to human health. Hygiene controls should include adequate drainage of liquid run-off.

153. The establishment operator should establish and implement a procedure for determining and validating the shelf life of manufactured meat and meat preparations.

154. In some circumstances RTE products that do not meet microbiological performance criteria, process criteria, or microbiological criteria, may be re-processed, condemned or treated as inedible. Where appropriate, follow-up sampling should verify that re-processed RTE products comply with regulatory microbiological requirements. When RTE products have been contaminated subsequent to cooking and/or other preservation treatment with pathogens such that they could pose a risk to public health, the products should be reworked or condemned without compromise.

155. Where establishments are approved, registered and/or listed for different animal species, all operations must be controlled in terms of space or time so that there is no possibility of accidental mixing of meat from different slaughter species, and no mis-identification at the time of packaging.

9.8 HYGIENE REQUIREMENTS FOR PARTS OF ANIMALS DEEMED UNSAFE OR UNSUITABLE FOR HUMAN CONSUMPTION

156. Special hygiene measures should be applied to operations involving parts of animals deemed unsafe or unsuitable for human consumption. These measures should prevent cross-contamination to other edible parts and meat, and prevent any possibility of substitution.

Parts of animals deemed unsafe or unsuitable for human consumption should be:

- placed without delay into specifically identified chutes, containers, trolleys, or other handling facilities;
- identified by means as appropriate to the type and end use of the tissue;

- in the case of condemned material, handled in rooms reserved for that purpose and conveyed in a secure manner to a place of disposal (e.g. rendering station).

9.9 RECALL SYSTEMS

157. Establishments should have adequate systems that enable the tracing, withdrawal, and/or recall of product from the food chain. The competent authority should require verification that the systems are adequate. In the case of a recall, communication with consumers and interested parties should be considered, and undertaken where appropriate.

158. Where a recall, or seizure of meat by the competent authority is necessary, the amount of product involved may be more than that from a single production or sampled lot. In such cases the competent authority should verify to the extent practicable, that the establishment has taken all steps necessary to ensure all affected product or potentially affected product is included in the recall. In the case of microbiological hazards in meat preparations and manufactured meat, the decision should be risk based and will depend on a number of factors, including the pathogen involved, the type of processing and packaging, and all the microbiological data available.

159. Recalled product may be used for purposes other than human consumption, where appropriate, or re-processed in a manner that ensures safety and suitability.

Recall systems designed by the establishment operator should:

- utilise the approval/registration/listing number of the establishment as a means to identify meat to it's final destination;
- incorporate management systems and procedures that facilitate rapid and complete recall of implicated lots e.g. distribution records, lot coding;
- keep records that facilitate trace-back to the place of origin of the animals, to the extent practicable; and
- keep records that facilitate investigation of any processing inputs that may be implicated as a source of hazards.

10. ESTABLISHMENTS: MAINTENANCE AND SANITATION

160. The principles and guidelines presented in this section are supplemental to the objectives and guidelines in Section VI of the Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969, Rev 4-2003).

10.1 PRINCIPLES OF MEAT HYGIENE APPLYING TO MAINTENANCE AND SANITATION OF ESTABLISHMENTS, FACILITIES AND EQUIPMENT

i. Establishments, facilities and equipment should be maintained and sanitised in such a manner that contamination of meat is minimised to the greatest extent practicable.

ii. Documented programmes for effective and appropriate maintenance and sanitation should be in place (refer to 9.2.1).

iii. Monitoring of the effectiveness of maintenance and sanitation should be included as a basic component of meat hygiene programmes (refer to 9.2.1).

iv. Special sanitation requirements should be applied to the slaughter and dressing of animals that are condemned or designated as "suspects".

10.2 MAINTENANCE AND SANITATION

161. Establishments, facilities and equipment should be kept in an appropriate state of repair and condition to facilitate all sanitation procedures and prevent contamination of meat, e.g., from metal shards, flaking plaster and chemical contaminants.

162. SSOPs should specify the scope of the cleaning programme, cleaning specifications, persons responsible, and monitoring and record keeping requirements.

Cleaning procedures and programmes should:

- be specified in SSOPs as appropriate to the circumstances;
- provide for removal and storage of waste;
- ensure that there is no consequential contamination of meat with detergents or sanitising agents, unless allowable under conditions of use; and
- be monitored for their effectiveness, e.g., organoleptic checks and microbiological sampling of meat contact surfaces, and be redesigned if and when necessary.

163. Particular cleaning programmes are required for equipment used in the slaughter and dressing of carcasses e.g., knives, saws, machine cutters, evisceration machines and flushing nozzles.

Such equipment should be:

- clean and sanitised before each new period of work;
- cleaned, and sanitised, by immersion in hot water or alternative methods, with appropriate frequency during and/or between periods of work;
- immediately cleaned and sanitised when coming into contact with abnormal or diseased tissue that may harbour food-borne pathogens; and
- stored in designated areas in such a manner that it will not become contaminated.

164. Containers and equipment should not pass from an “inedible” area to an “edible” area before being cleaned and sanitised.

165. Pest control programmes are an essential part of maintenance and sanitation and should follow GHP as described in the Recommended International Code of Practice: General Principles of Food Hygiene.[49]

In particular:

- the programme should be properly documented and verified by the establishment operator;
- treatment of areas, rooms, facilities and equipment, with an approved pesticide should be carried out according to the conditions of use; and
- pesticides and other pest control chemicals should be kept in secure storage, with access being limited to authorised persons.

[49] Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1 - 1969, Rev. 4-2003)

11. PERSONAL HYGIENE

166. Slaughter and dressing of animals, and handling and inspection of meat, presents many opportunities for cross-contamination. Personal hygiene practices should prevent undue general contamination, and prevent cross-contamination with human pathogens that may cause food-borne disease. The guidelines presented in this section are supplemental to the objectives and guidelines in Section VII of the Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969, Rev 4-2003).

167. Persons moving from rooms or areas containing raw meat to rooms or areas used for meat preparations and manufactured meat (especially when these products are cooked) should thoroughly wash, change and/or sanitise their protective clothing as appropriate, and otherwise limit the possibility of cross-contamination to the lowest level practicable.

11.1 PERSONAL CLEANLINESS

168. Persons who come into direct or indirect contact with edible parts of animals or meat in the course of their work should maintain appropriate personal cleanliness and behaviour, and should not be clinically affected by communicable agents likely to be transmitted by meat.

Persons who come into direct or indirect contact with edible parts of animals or meat should:

- maintain an appropriate standard of personal cleanliness;
- wear protective clothing appropriate to the circumstances, and ensure that non-disposable protective clothing is cleaned before and during work;
- if wearing gloves during the slaughter and dressing of animals and the handling of meat, ensure that they are of an approved type for the particular activity, e.g., chain-mail stainless steel, synthetic fabric, latex, and they are used according to specifications, e.g., washing of hands before use, changing or sanitising gloves when contaminated;
- immediately wash and sanitise hands and protective clothing when there has been contact with abnormal animal parts that are likely to harbour food-borne pathogens;
- cover cuts and wounds with waterproof dressings; and
- store protective clothing and personal effects in amenities that are separate from areas where meat may be present.

11.2 PERSONAL HEALTH STATUS

169. The establishment should maintain relevant personal health records of personnel.

Persons who come into direct or indirect contact with edible parts of animals or meat in the course of their work should:

- where necessary, have a medical examination prior to and during employment;
- not work while clinically affected by, or suspected to be carrying, communicable agents likely to be transmitted through meat; and
- be aware of and comply with reporting requirements to the establishment operator in respect of communicable agent.

12. TRANSPORTATION

170. The guidelines presented in this section are supplemental to the objectives and guidelines in Section VIII of the Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969, Rev 3-1997, Amended 1999).

171. Due to the potential for growth of pathogenic and spoilage micro-organisms under conditions of inadequate temperature control, meat should be transported at temperatures that achieve safety and suitability objectives. Equipment for continuous monitoring and recording of temperatures should accompany transport vehicles and bulk containers wherever appropriate. Additionally, the conditions of transport should provide adequate protection from exogenous contamination and damage, and should minimise growth of pathogenic and spoilage micro-organisms.

172. If meat is inadvertently exposed to adverse temperature conditions or sources of contamination that may affect safety and suitability, an inspection should be carried out by a competent person before further transport or distribution is allowed.

13. PRODUCT INFORMATION AND CONSUMER AWARENESS

173. Appropriate product information and adequate knowledge of food hygiene is necessary to prevent mishandling at later stages in the food chain. Pre-packaged foods should be labelled with clear instructions to enable the next person in the food chain to handle, display, store and use the product safely. Principles and guidelines for product information and consumer awareness in the context of safety and suitability of meat are described in general terms in Section IX of the Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969, Rev 4-2003).

174. The conditions of storage of meat preparations and manufactured meat should be clearly presented on the packaging.

175. Meat preparations and manufactured meat should, where appropriate, be specifically labelled so as to provide safe handling, refrigeration and storage instructions for consumers. Foods containing meat that have not received an adequate biocidal treatment for pathogens (e.g. containing raw meat, partially cooked meat, or products with secondary inhibitors) should be labelled with handling, refrigeration, storage, cooking and preparation statements that have been validated as sufficiently biocidal.

14. TRAINING

176. Adequate training of competent personnel is of fundamental importance in the production of meat that is safe and suitable for human consumption. The principles and guidelines presented in this section are supplemental to the objectives and guidelines in Section X of the Recommended International Code of Practice: General Principles of Food Hygiene (CAC/RCP 1-1969, Rev 4-2003).

14.1 PRINCIPLES OF TRAINING IN MEAT HYGIENE

Persons engaged in meat hygiene activities should be trained, and/or instructed to a required level of training, knowledge, skills, and ability. Training specified or recognised by the competent authority, should be:

i. appropriate to the activities and operations;

ii. proportional to the potential of the particular meat hygiene activity to impact on food-borne risks to human health;

iii. properly documented, including records of training programme delivery;

iv. verified as appropriate; and

v. subject to recognition by the competent authority where delivered by third parties.

14.2 TRAINING PROGRAMMES

Training programmes should:

- provide personnel with the training, knowledge, skills and ability to carry out specified meat hygiene tasks, e.g., post-mortem inspection, verification of statistical process control, HACCP;
- provide practical training to the extent required;
- where necessary, arrange for formal testing of personnel;
- ensure that personnel involved in supervisory roles have appropriate skills;
- recognise and build on professional qualifications; and
- provide for the continuing education of competent persons.

Annex I

RISK-BASED[1] EVALUATION OF ORGANOLEPTIC POST-MORTEM INSPECTION PROCEDURES FOR MEAT

1. INTRODUCTION

1. Post-mortem meat inspection procedures are a set of food hygiene measures that are unique to the production of meat. Such procedures are regarded as a component of overall process control, which is defined as "all conditions and measures applied during the production process that are necessary to achieve safety and suitability of meat"[2].

2. The General Principles of Food Hygiene state that "in deciding whether a (food control) requirement is necessary or appropriate, an assessment of the risk should be made, preferably within the framework of the HACCP approach" [3]. Many long-standing post-mortem meat inspection procedures are often complex, labour-intensive, undifferentiated for different classes of slaughtered livestock, and poorly evaluated in terms of their relative contribution to reducing food-borne risks to public health. For these reasons, competent authorities in a number of countries are carrying out investigations into the scientific basis of current procedures[4].

3. The principles and guidelines presented in this Annex could be adapted to evaluation of organoleptic post-mortem inspection procedures for determining the suitability of meat.

4. This Annex generally applies to the evaluation of routine on-line organoleptic inspection procedures. The performance of other inspection technologies, e.g. tissue imaging, relative to organoleptic procedures, may also be considered.

2. OBJECTIVES OF RISK-BASED POST-MORTEM INSPECTION PROCEDURES FOR MEAT

5. A risk-based approach to post-mortem inspection for meat can achieve the following objectives:

- Determination of the level of consumer protection provided by specified post-mortem inspection procedures;
- Relative measurement of the contribution of post-mortem inspection to the overall level of control of hazards in meat (and risks to consumers), thereby allowing risk managers to allocate meat hygiene resources proportionate to their greatest benefit in preventing meat-borne risks;
- Comparison of the effectiveness of different inspection procedures applied for the same purpose and in the same context, e.g. positive predictive value;
- Provision of information that allows appropriate evaluation of different risk management options e.g. regionalisation of inspection programmes, feasibility and comparative costs of different post-mortem inspection procedures, potential for cross-contamination;
- Full integration of post-mortem inspection procedures into a "production-to-consumption" approach to meat hygiene.

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1 The term "risk-based" can be applied to a food safety measure, a group of measures, a food safety programme or a food safety system. For the purposes of the CCMH, "risk-based" is defined as "containing performance criteria and/or process criteria developed according to risk analysis principles"

2 Draft Code of Hygienic Practice for Fresh Meat (ALINORM 03/16A, Appendix III)

3 General Principles of Food Hygiene CAC/RCP 1-1969, Rev. 4-2003

4 Competent authorities have different approaches to defining the respective roles of industry and competent authority personnel in delivering meat hygiene activities, and this issue is not covered in this Annex

3. RISK ANALYSIS

3.1. RISK MANAGEMENT FRAMEWORK

6. Development and implementation of risk-based post-mortem inspection procedures should utilise a risk management framework[5]. The four components are: preliminary risk management activities, evaluation of risk management options, implementation, and monitoring and review. All components require effective risk communication among risk assessors, risk managers and other interested parties as necessary. Utilisation of a risk management framework is the subject of on-going work within the Codex system, and is described in a number of Codex documents[6].

3.2. RISK ASSESSMENT

7. If required, a risk assessment is commissioned during preliminary risk management activities. A risk assessment consists of four steps: hazard identification, hazard characterisation, exposure assessment, and risk characterisation. The output of this process should be qualitatively integrated with all other factors relating to post-mortem meat inspection to make risk management decisions on appropriate procedures for control of hazards.

8. In the ideal situation, risk estimates will be quantified in terms of risks to human health, and risk management decisions on an appropriate level of protection (ALOP) will dictate the nature and intensity of the post-mortem inspection procedures to be applied. However, risk assessment of microbiological hazards in meat is currently limited by a lack of quantitative risk assessment models. Nevertheless, appropriate assembly of scientific information and qualitative risk characterisation as to the probable impacts on human health can provide an objective basis for decision-making. In any case, risk management decisions will revolve around the acceptability of the likely human health impact of differences in hazard levels brought about by different inspection procedures.

4. GENERAL PRINCIPLES FOR DEVELOPMENT OF RISK-BASED POST-MORTEM MEAT INSPECTION PROCEDURES

i. Risk-based post-mortem inspection procedures should be derived from the application of risk analysis principles.

ii. Development of risk-based post-mortem inspection procedures should:

- Involve application of a risk management framework to the greatest extent appropriate and practicable;
- Include quantitative risk assessment where appropriate and practicable;
- Take into account all relevant information available from the food chain;
- Take into account disease prevalence;
- Take into account all relevant information from primary production and ante-mortem inspection of the animals.

iii. Inspection procedures should be evaluated for application within a specific context e.g. species and class of slaughtered animal, defined geographical region, defined animal husbandry system.

iv. Where different inspection procedures that have the same purpose and context are being evaluated:

- An objective basis for comparison of the level of control of hazards associated with these procedures, should be established;
- The efficacy of each inspection procedure in detecting abnormalities and visible contamination affecting the safety of meat should be taken into account;

[5] Working Principles for Risk Analysis for Application in the Framework of the Codex Alimentarius. Codex Procedural Manual, 13th Edition

[6] Risk Analysis Policies of the Codex Alimentarius Commission. Twenty-fourth Session of the CAC. ALINORM 01/9. FAO 2001

- Other risk management factors should be taken into account as appropriate e.g. potential for inadvertent cross-contamination, feasibility, and practicality.

v. Where needed, representative and sufficiently large field trials should be undertaken to determine the performance attributes of specified inspection procedures e.g. sensitivity, specificity, and non-detection rates for abnormalities.

vi. Where appropriate, laboratory investigations should be designed to detect the range of hazards of possible public health importance that have been described in hazard identification.

vii. Routine application of post-mortem inspection procedures should not inadvertently increase cross-contamination with microbiological hazards.

viii. Irrespective of inspection delivery systems, the competent authority should be responsible for defining the role of personnel involved in post-mortem inspection procedures, and verifying that any performance criteria.are met.

ix. Alternative inspection procedures (e.g. serology) may be utilised to complement post-mortem inspection, which might be reduced to visual inspection.

5. GUIDELINES FOR THE DEVELOPMENT OF RISK-BASED POST-MORTEM INSPECTION PROCEDURES

5.1. IDENTIFICATION OF THE MEAT HYGIENE ISSUES

9. A hazard identification process should be undertaken to determine the likely range of hazards of public health significance that may be present in the abnormalities or visible contamination that are the target of the inspection procedure(s) being evaluated. Following this, field trials should be undertaken to determine the performance attributes of specified inspection procedures or new technologies relative to the hazards that may be present.

5.2. FIELD TRIALS

10. Once the likely range of hazards has been established, field trials may be an appropriate means to establish the prevalence of these hazards in the animal population, the potential exposure of consumers to these hazards and the potential impact of different inspection procedures on this exposure. Field trials should be carried out under competent authority supervision and employing competent personnel. The number of animals examined by the inspection procedures under evaluation should give a statistically valid estimate of the detection rate of abnormalities achieved by specific post-mortem inspection procedures.

11. Sampling plans should be representative of the slaughter population, and cater for known biological variation in respect of the type and prevalence of abnormalities e.g. influence of animal age, geographical region, farming type and season. Different trial designs may be employed, depending on the prevalence of abnormalities in the slaughter population, and the logistics of detailed inspection.

12. Where different post-mortem inspection procedures are being compared: all procedures should be applied to the same animals, each inspection station should be designed to provide independent results, and the trial should include enough samples so as to allow definite conclusions as to the consequences of changing inspection procedures. The possibility of target tissues acting as “indicators” for detection of abnormalities in other tissues and/or disposition of other tissues may be included in the design of field trials. Detailed recording of trial results is necessary, including appropriate pathological descriptions of all abnormalities detected.

13. Laboratory investigations e.g. microbiological examination and histology, should be designed to identify the range of hazards of possible public health importance that have been identified in the hazard identification process. A representative number and range of samples should be taken from abnormalities, so as to confirm the outcome of the hazard identification process and provide as much information as possible on the prevalence (and concentration) of hazards in target tissue. Trial design should include representative surveying of the prevalence (and concentration) of hazards in target tissues that are organoleptically normal, so as to provide a comparison with the prevalence (and concentration) of hazards in those tissues that are organoleptically abnormal.

5.3 PERFORMANCE ATTRIBUTES

14. An understanding of the level of consumer protection that is achieved by particular inspection procedures requires knowledge of the level of control of hazards that is attained in meat. These would be reflected in microbiological performance criteria and/or process criteria[7] where these have been defined. Performance attributes[8] for post-mortem inspection procedures should achieve these microbiological performance criteria and/or process criteria.

15. The performance attributes of the inspection procedures e.g. visual inspection, palpation, and/or incision, should be determined within appropriate statistical limits established by the competent authority. The intended end-use of the target tissues has an important influence on the development of risk-based post-mortem inspection procedures.

16. The sensitivity of a post-mortem inspection procedure is the probability of correctly identifying abnormalities that are likely to contain public health hazards. An inspection procedure with a high sensitivity will result in a low non-detection rate for abnormalities containing hazards i.e. few false negatives.

17. The specificity of an inspection procedure is the probability of correctly identifying abnormalities that do not contain public health hazards. An inspection procedure with a high specificity will result in a low detection rate for abnormalities that do not contain hazards i.e. few false positives.

18. The true prevalence of abnormalities affecting the tissues subject to post-mortem inspection ("gold standard") should be determined as part of the above process.

5.4 RISK MANAGEMENT DECISIONS

19. Risk management decisions on the acceptability or otherwise of specified post-mortem inspection procedures will generally be based on the worst case of non-detection of abnormalities included in an appropriate statistical confidence interval. Decisions should take into account the comparative public health risks associated with:

- The prevalence (and concentration) of hazards in target tissues that are organoleptically abnormal;
- The prevalence (and concentration) of hazards in target tissues that are organoleptically normal;
- The overall prevalence (and concentration) of hazards being transmitted by all pathways throughout the production of meat.

20. In the general case, new or alternative inspection procedures should provide a level of consumer protection that is at least equivalent to that provided by existing procedures, unless there are strong mitigating factors that may influence a different risk management choice e.g. unacceptable introduction of new hazards, undue risks from occupational exposure.

21. Required regulatory outcomes for post-mortem inspection may include performance attributes expressed as limits on non-detection rates for particular abnormalities. Those performance attributes may be derived quantitatively from risk assessment models, or qualitatively from baseline surveys of current performance.

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7 Microbiological performance criteria and process criteria are as defined by CCFH on "Proposed Draft Principles and Guidelines for the Conduct of Microbiological Risk Management"

8 A working definition of performance attribute is: a quantitative parameter derived from estimates of sensitivity and/or specificity of a meat inspection procedure.

22. Where detailed information on the health status of slaughtered animals is available from primary production, risk-based post-mortem inspection procedures may be modified on a lot-by-lot basis, with the competent authority having responsibility for determining the frequency and extent of the procedures.

23. The competent authority should regularly analyse results of post-mortem inspection at both the establishment and national level, and provide appropriate feedback to establishments and other interested parties on the performance of risk-based post-mortem inspection procedures. The competent authority could consider an incentive for improving the system, e.g. recognition of performance, decreased farm inspection frequency, additional change of inspection procedures, etc.

24. The competent authority may change presentation requirements and the sequence of inspection procedures as a result of scientific evaluation of different post-mortem inspection procedures, and allow introduction of new inspection tools e.g. mirrors. Alternative technologies for detecting abnormalities e.g. tissue imaging, should be acceptable to the competent authority if validated as being as effective as current procedures.

Annex II

VERIFICATION OF PROCESS CONTROL OF MEAT HYGIENE BY MICROBIOLOGICAL TESTING

1. INTRODUCTION

1. Microbiological testing at specific points in the food chain is an important tool for verifying a risk-based approach to food safety. Specification of food safety microbiological outcomes establishes appropriate levels of consumer protection, while providing maximum flexibility to industry in terms of the detailed process control systems that are employed.

2. The General Principles of Food Hygiene[1] state that "in deciding whether a (food control) requirement is necessary or appropriate, an assessment of the risk should be made, preferably within the framework of the HACCP approach", and any microbiological specifications "should be based on sound scientific principles and state, where appropriate, procedures, analytical methods and action limits"[2]. Process control is defined as "all conditions and measures applied during the production process that are necessary to achieve safety and suitability of meat"[3].

3. Where possible, microbiological performance criteria should be established for verification by microbiological testing.

4. As described in this Annex, microbiological performance criteria[4] are different to microbiological criteria. The latter are used for judging the acceptability of a product or food lot[5]. Although not included in the scope of this Annex, microbiological testing of meat may also be used to assess suitability.

2. VERIFICATION OF PROCESS CONTROL BY MICROBIOLOGICAL TESTING

5. A preventative, HACCP-based approach should be regarded as the most effective means of ensuring microbiological process control. Once process control has been validated, verification by microbiological testing is necessary to assure that required food safety outcomes are being met on an on-going basis. Verification by microbiological testing for process control purposes should be implemented where meaningful in terms of consumer protection.

6. Verification of process control of meat by microbiological testing provides a tool for:

- Assessing the adequacy and efficacy of establishment process control in relation to faecal and other contamination;
- Assuring the level of control of specified hazards of public health importance;
- Facilitating development of process criteria at a specified step or combination of steps that achieve microbiological performance criteria;
- Identifying the need for review and redesign of HACCP plans;
- Objective comparison of the outcome of different process control systems in different situations;
- Provision of assurances by competent authorities.

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1 Recommended International Code of Practice General Principles of Food Hygiene (CAC/RCP 1-1969, Rev. 4-2003)

2 Specifications for microbiological testing in relation to the outcome of SSOPs are not regarded as microbiological performance criteria for process control

3 Draft Code of Hygienic Practice for Meat (ALINORM 03/16A, Appendix III)

4 Microbiological performance criteria are as defined by CCFH on "Proposed Draft Principles and Guidelines for the Conduct of Microbiological Risk Management"

5 Principles for the Establishment and Application of Microbiological Criteria for Foods. (CAC/GL 21-1997)

3. PRINCIPLES FOR THE ESTABLISHMENT OF MICROBIOLOGICAL PERFORMANCE CRITERIA

x. Establishment of microbiological performance criteria should take into account all information available throughout the food chain, including the health status of live animals relative to public health.

xi. Microbiological performance criteria should be: hazard-, product- and process-specific, reasonably achievable, and applied only at those points in the food chain specified. When validating compliance with the criteria, account should be taken of the likelihood of uneven distribution of micro-organisms in the sampled unit and the inherent variability of the analytical procedure.

xii. Microbiological performance criteria should be based on scientific analysis and advice, and, where sufficient data is available, developed from risk analysis. Where a food safety objective based on the required level of consumer protection has been established, the relationship between the FSO and microbiological performance criteria should be specified.

xiii. The stringency of microbiological performance criteria should be proportional to human health risk.

xiv. In the absence of sufficient knowledge of risks to human health, microbiological performance criteria should initially be established from baseline surveys of current industry performance, and subsequently be modified as appropriate to reflect public health goals. Sampling plans for baseline surveys should be representative of the slaughter population, and cater for known biological variation in respect of hazards in the raw material supply e.g. influence of geographical region, farming type and season.

xv. Microbiological performance criteria should be based on micro-organisms that are indices of the presence of hazards to human health, or the pathogen itself, in the food specified.

xvi. Establishment of microbiological performance criteria should be the responsibility of competent authorities, in consultation with relevant interested parties, and may consist of guidelines or regulatory standards.

xvii. The competent authority should verify compliance with microbiological performance criteria where they are specified in regulation e.g., microbiological statistical process control requirements, standards for *Salmonella* spp.

4. IMPLEMENTATION OF A PROGRAMME FOR VERIFICATION OF PROCESS CONTROL BY MICROBIOLOGICAL TESTING

4.1 SPECIFICATIONS

7. A standardised random sampling plan should be developed, including specification of the process step, product, size and type of sample, time and date of sampling, collection methods and transport. Sampling and testing at multiple steps in the food chain may provide greater information on process control and allows for a more targeted response to non-compliance by the establishment and the competent authority

8. Sampling of tissue may be destructive e.g. by excision, or non-destructive e.g. by swabbing or sponging. No method will recover all the flora present on the surface. As non-destructive sampling will recover only a proportion of those recovered by the destructive method, microbiological performance criteria specified in this manner should be established in relation to the type of sampling used.

9. For practical reasons, microbiological performance criteria are unlikely to be verified on an on-going basis as part of a HACCP plan. However, microbiological verification should be conducted with sufficient frequency to ensure effectiveness of the process criteria. In most situations, process criteria that are validated as achieving compliance with microbiological performance criteria at a particular step in the food chain will be used. These criteria should be measurable in real time, will most likely constitute critical limits at critical control points in HACCP plans, and may be subject to microbiological verification as appropriate.

10. In the case of indicator micro-organisms e.g. generic *Escherichia coli*, Enterobacteriaciae and total viable counts (aerobic plate counts), the presence and / or concentration of these indicator organisms should reflect states or conditions that indicate process control or lack of process control. In the case of specific hazards[6] (e.g. *Salmonella* spp. on carcasses, *Listeria monocytogenes* in ready-to-eat products), the prevalence will generally be reflective of hazards arising pre-slaughter (e.g. *Salmonella* present on hides of incoming animals) and at specific steps during product processing.

11. The competent authority should provide flexibility in regulation so that the most effective verification systems can be established at the establishment level e.g. provision for alternative carcass sampling sites if an establishment can identify that they are equally as effective in assessing carcass contamination than those specified. Similarly, flexibility should be provided by the competent authority with regard to the number of units comprising the sample or testing against alternative indicator micro-organisms as long as the procedure can provide equivalent guarantees.

12. Alternative approaches to microbiological testing that are properly validated should be established where they offer practical advantages.

4.2. FREQUENCY OF VERIFICATION

13. There is no single method for determining the frequency of sampling. For slaughter and dressing establishments frequency of sampling may be fixed in relation to the particular process or may be based on throughput of animals. In addition to ensuring randomness, variables to be taken into account at the establishment level include: source of raw materials, type and nature of the meat process, and volume of production.

14. Sampling frequency should be increased or decreased according to performance. Once results show that the HACCP-based procedures are providing a consistent level of acceptable performance, subsequent microbiological testing must be sufficient to ensure that process control is maintained.

4.3. LABORATORY ANALYSIS

15. Methods for detection and enumeration should be practical, accurate, reproducible, sensitive and selective. Only methods for which the reliability and reproducibility has been validated should be used. Inter-laboratory testing should be a feature of a microbiological verification programme. In cases of dispute, recognised reference methods should be used.

16. To allow meaningful analysis and to permit objective comparison of different control systems, methods for the computation of results should be specified, including handling of pooled/individual results, calculation of mean results (e.g. log means) from groups of samples from the same carcass or different carcasses.

4.4. REGULATORY APPLICATION

17. Regulatory microbiological performance criteria for microbiological testing may be specified in several ways. For indicator organisms, two or three class attribute sampling plans that specify cut-offs for numbers of micro-organisms (m and M) may be useful, in other situations variable sampling plans may be useful. Two class plans should be applied for pathogen criteria. Where microbiological performance criteria are set according to current industry performance, percentile values may be used e.g. 80^{th} percentile for m and 98^{th} percentile for M. A variety of statistical approaches can be used e.g. “moving windows”.

18. Effective systems should be in place for distribution and sharing of information from the establishment to all interested parties, as appropriate, so as to maintain and improve process control of meat.

19. The competent authority should regularly analyse results at both the establishment and national level, and provide appropriate feedback to establishments and other interested parties.

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6 Ongoing work in CCFH and JEMRA with respect to foodborne pathogens should also be taken into account.

20. Additional to verification of process control, the results of microbiological testing may be used to establish on-farm controls e.g. intensive measures to reduce the prevalence of *Salmonella* spp. in fattening pigs.

21. In situations of non-compliance with microbiological performance criteria, actions should be specified. Regulatory and/or establishment responses should be proportional to test results as well as the public health impact of specific pathogens. Where detailed information on the status in relation to public health, of animals destined for slaughter, is available from primary production, e.g. in the case of *Salmonella* spp. in fattening pigs and broiler chickens in some intensive production systems, responses in relation to process control at the establishment level, may include consideration of pre-slaughter levels of hazards.

22. The competent authority should consider microbiological results in conjunction with public health and other relevant information when taking regulatory action. Regulatory intervention and/or sanctions may be necessary when validated controls are not being properly implemented.

23. In cases of repeated non-compliance, the competent authority in addition to other actions, should require the establishment operator to review and revise the HACCP plan and may specify an increased sampling frequency to verify that the required level of process control is restored.