



JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FOOD HYGIENE

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PROPOSED DRAFT GUIDELINES FOR CONTROL OF SPECIFIC ZONOTIC PARASITES IN MEAT: *TRICHINELLA SPIRALIS* AND *CYSTICERCUS BOVIS*

(At Step 3)

Prepared by the Physical Working Group led by European Union and New Zealand¹

Governments and interested international organizations are invited to submit comments on the attached Proposed Draft Guidelines (*see* Appendices I and II) and should do so in writing in conformity with the Uniform Procedure for the Elaboration of Codex Standards and Related Texts (*see Procedural Manual of the Codex Alimentarius Commission*) **to:** Ms Barbara McNiff, US Department of Agriculture, Food Safety and Inspection Service, US Codex Office, 1400 Independence Avenue, SW, Washington, D.C. 20250, USA, email Barbara.McNiff@fsis.usda.gov with a copy **to:** The Secretariat, Codex Alimentarius Commission, Joint WHO/FAO Food Standards Programme, FAO, Viale delle Terme di Caracalla, 00153 Rome, Italy, by email codex@fao.org **by 15 September 2012.**

Format for submitting comments: In order to facilitate the compilation of comments and prepare a more useful comments document, Members and Observers, which are not yet doing so, are requested to provide their comments in the format outlined in the Annex to this document.

BACKGROUND

1. During the 43rd Session of the Codex Committee on Food Hygiene (CCFH) (Miami, USA, 5-9 December 2011), the CCFH agreed that the proposed draft Guidelines to be returned to Step 2 for further elaboration and to expand the scope to include all *Trichinella* species.
2. The CCFH also agreed to establish an electronic working group (EWG), led by the European Union and New Zealand, to continue work on the draft Guidelines based on written comments provided at Step 3 and the recommendations of the 43rd Session (REP 12/FH, par.72). The EWG would be open to all interested parties and work in English only.

ELECTRONIC WORKING GROUP

3. During the period March – June 2012 the participants of the EWG commented on the draft Guidelines as prepared by the co-chairs following written comments provided to the 43rd Session and plenary discussion. The development of the OIE work on the revision of Chapter 8.13 "Infection with *Trichinella* spp." of the OIE *Terrestrial Animal Health Code* was also considered.
4. The discussion in the EWG took into account the delayed progress in the OIE work on the revision of Chapter 8.13 and therefore focussed its work on general aspects of post-harvest options for *Trichinella* spp. and *Taenia saginata* as agreed during the 43rd Session of the CCFH. Upcoming activities in OIE and FAO/WHO during 2012 will further inform risk-based aspects of the Guidelines and CCFH will discuss the possibility of inclusion of risk-based examples at the 44th Session in November.

¹ Working group members: Argentina, Australia, Belgium, Brazil, Canada, Colombia, Costa Rica, Croatia, EU, France, Germany, Iran, Ireland, Italy, Japan, Malaysia, The Netherlands, Norway, Poland, Spain, Sweden, Switzerland, UK, USA, Vietnam, , OIE, CLITRAVI, IFAH, WHO.

DEVELOPMENT OF THE DRAFT GUIDELINES

5. A farm to-plate approach to development of the guidelines was taken, with cross-reference to applicable OIE texts for pre-harvest aspects and diagnostic tests. Detail was provided on post-harvest control options where appropriate.
6. General editing resulted in rearrangement of some paragraphs and removal of duplicated text.
7. Consistent use of terminology and definitions resulted in a number of changes, with some suggestions remaining in square brackets for further discussion by CCFH. In the case of *T. saginata*, the naming of the parasite in meat seems to be contentious, with a call from Norway that this should be *T. saginata*, not *C. bovis*.
8. Consistency was sought as regards validation of post-mortem control options and analytical methods. Cross-reference to the *OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* was made wherever possible.
9. While there has been considerable discussion in CCFH as to the desirability of risk-based examples of control measures, no such examples are currently available. Thus reference to such examples has been removed from the draft Guidelines. This issue will be further discussed at the 44th Session of CCFH and will be informed by discussions on this topic in OIE in July 2012. CCFH may choose to allocate development of such examples to JEMRA.
10. For *T. saginata*, there is a need for scientific evidence justifying the "six weeks of age" criterion for non-inspection and further discussion is needed on the role of monitoring as it relates to wildlife, farm animals, slaughtered animals and humans.

RECOMMENDATIONS

11. The 44th Session of the CCFH is invited to:
 - Consider the revised Proposed Draft Guidelines as presented in Appendices I and II.
 - Decide on the value of the risk profiles for *T. spiralis* and *T. saginata* / *C. bovis* and their possible lodgement on the FAO/WHO website.
 - Take into account the work of OIE in revising Chapter 8.13 "Infection with *Trichinella* spp." of the *OIE Terrestrial Animal Health Code* in July 2012.
 - Take into account the outcomes of the FAO/WHO Expert Group on Parasites meeting in September 2012.
 - Consider a physical working group, in conjunction with OIE, to further a whole-of-food-chain, risk-based approach to control of *Trichinella* spp. and *T. saginata* / *C. Bovis*.
 - Consider an extension of the scope of the proposed draft Guidelines for *Trichinella* to other susceptible species intended for human consumption.

Appendix I

PROPOSED DRAFT GUIDELINES FOR CONTROL OF SPECIFIC ZONOTIC PARASITES IN MEAT: *TRICHINELLA* IN MEAT OF SUIDAE.

1. Introduction

1. Trichinellosis is a parasitic disease of major public health and economic importance in some countries. Human infection occurs from the consumption of raw or undercooked meat of many species (e.g. domestic pig, horse, game) containing infective *Trichinella* spp. larvae. Meat from Suidae is considered to be the most important source for human infection. The status of domestic pigs, with respect to risk for *Trichinella* infection, can be determined based on knowledge of management practices or by monitoring the prevalence of infection in populations using validated tests. Human health data can also be used to support the determination of risk for exposure to *Trichinella*.

2. Post-slaughter mitigations to protect consumers from exposure to *Trichinella* in Suidae should be based on risk. Traditional control measures including post-slaughter testing and/or processing of meat and meat products may not be required if a negligible level of risk is achieved by management or is documented by surveillance and other epidemiological evidence.

3. These Guidelines incorporate elements of the “risk management framework” (RMF) approach as developed by the Codex Committee on Food Hygiene for managing microbiological hazards (Principles and Guidelines for the Conduct of Microbiological Risk Management (CAC/GL/63-2007)) such as:

- Preliminary risk management activities;
- Identification and selection of risk management options;
- Implementation of control measures;
- Monitoring and review.

2. Objectives

4. The primary objective of these Guidelines is to provide guidance to governments and industry on risk-based measures to control *Trichinella* in meat of Suidae.

5. The Guidelines also provide a consistent and transparent technical basis for reviewing national or regional control measures based on epidemiological information and risk analysis. The control measures selected can and will vary between countries, and production systems. These guidelines propose a range of measures which may be considered equally preventing exposure to humans. They should be taken into account in the judgement of equivalence² by importing countries, thereby facilitating international trade.

3. Scope and use of the Guidelines

3.1. Scope

6. These Guidelines address only the control of *Trichinella* in meat from Suidae, as this is considered the most important source of infection of humans. The control of *Trichinella* in meat from other species (e.g. horses, bears, walrus etc.) may be included in a future extension of this guidance or a separate annex. The occurrence of *Trichinella* in these other species is however taken into account where considered relevant to the control of *Trichinella* in meat from Suidae.

7. These Guidelines apply to the control of all species and genotypes of *Trichinella* that may infect meat of Suidae and cause foodborne disease. The proposed Guidelines are based on Working Principles for Risk Analysis for Application in the Framework of the Codex Alimentarius³ and the Code of Hygienic Practice for Meat (CAC/RCP 58-2005) that provides generic advice on a risk-based approach to meat hygiene.

8. These Guidelines, used in conjunction with the OIE recommendations (*OIE Terrestrial Animal Health Code (Chapter 8.13 Trichinellosis)*), apply to all steps from primary production to consumption.

² Guidelines on the Judgement of Equivalence Sanitary Measures associated with Food Inspection and Certification Systems (CAC/GL 53-2003)

³ <http://www.fao.org/DOCREP/006/Y4800E/y4800e0o.htm>

3.2. Use

9. The Guidelines, used in conjunction with the OIE recommendations (*OIE Terrestrial Animal Health Code (Chapter 8.13 Trichinellosis)*), provide specific guidance for control of *Trichinella* in meat of Suidae with potential control measures being considered at each step, or group of steps, in the process flow. The Guidelines are supplementary to and should be used in conjunction with the *Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1 – 1969)*, the *Code of Hygienic Practice for Meat (CAC/RCP 58-2005)*, the *Code of Practice for the Processing and Handling of Quick Frozen Foods (CAC/RCP 8-1976)*, the *FAO/WHO/OIE Guidelines for the Surveillance, Management, Prevention and Control of Trichinellosis* and the *Recommendations on Methods for the Control of Trichinella in Domestic and Wild Animals Intended for Human Consumption* prepared by the International Commission on Trichinellosis (ICT) Standards for Control Guidelines Committee⁴.

10. The diagnostic techniques referred to in these Guidelines are those of the *OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals (Chapter 2.1.16 Trichinellosis)*.

11. Flexibility in application of these Guidelines is important. They are primarily intended for use by government risk managers and industry in the design and implementation of food control systems. The Guidelines could also be used when judging the equivalence⁵ of different food safety measures for meat of Suidae in different countries for international trade purposes.

12. These Guidelines provide a framework for post-slaughter mitigations to protect human health with regard to meat and meat products of Suidae which are at risk for infection with *Trichinella* ssp.; pre-harvest mitigations and classification of risk based on management and surveillance are described in the *OIE Terrestrial Animal Health Code (Chapter 8.13 Trichinellosis)*.

4. Definitions

Biosecurity	a prescribed set of management practices designed to prevent the introduction and spread of disease, in this case <i>Trichinella</i> . Examples of biosecurity practices for <i>Trichinella</i> include: controlled housing, controlled introduction of new animals, prevention of exposure of animals to rodents and other animals that may harbor <i>Trichinella</i> , and the prevention of access of rodents to feed and feed contamination with meat that may contain <i>Trichinella</i> .
Compartment ⁶	means an animal subpopulation contained in one or more establishments under a common bio-security management system, with a distinct health status with respect to a specific disease or specific diseases for which surveillance, control and bio-security measures have been applied for the purpose of international trade.
Controlled housing	[means a type of husbandry in which domestic pigs are housed and fed in a facility that is completely roofed and constructed in such a manner as to prevent pigs from being exposed to free-flying birds and other wildlife, and from coming in contact with the carrion of free-flying birds or other wildlife.] <i>Provisional definition pending OIE guidelines.</i>
Cross breeds	means the progeny of domestic pigs bred with non-domesticated Suidae.
Domestic pigs	means domesticated animals of the family Suidae living in a managed production system.
Feral pigs	means domesticated animals of the family Suidae no longer living in a managed production system.
Finishing pigs	means domestic pigs kept solely for meat production.

⁴ (<http://www.med.unipi.it/ict/ICT%20Recommendations%20for%20Control.English.pdf>)

⁵ Guidelines on the Judgement of Equivalence Sanitary Measures associated with Food Inspection and Certification Systems (CAC/GL 53-2003)

⁶ This definition is taken directly from OIE Terrestrial Animal Health Code www.oie.int.

- Herd**⁵ means a number of animals of one kind kept together under human control or a congregation of gregarious wild animals. A herd is usually regarded as an epidemiological unit.
- Reservoir wildlife** means wild or feral animals that are known to be the most important potential direct or indirect sources of infection for *Trichinella* to domestic swine in a region or country. Rats are of particular concern.
- Veterinary authority**⁵ means the governmental authority, including veterinarians, other professionals and para-professionals, with responsibility and competence for ensuring or supervising the implementation of animal health and welfare measures, international veterinary certification, and other standards and recommendations in these Guidelines within a defined territory.

5. Principles applied to control of *Trichinella* in meat of Suidae

13. Overarching principles for good hygienic practice for meat are presented in the *Code of Hygienic Practice for Meat* (CAC/RCP 58-2005) section 4: *General Principles of Meat Hygiene*. Three principles that have particularly been taken into account in these Guidelines are:

- i. The principles of food safety risk analysis should be incorporated wherever possible and appropriate in the design and implementation of meat hygiene programmes.
- ii. As appropriate to the circumstances, the results of monitoring and surveillance of animal and human populations should be considered with subsequent review and/or modification of meat hygiene requirements whenever necessary.
- iii. Competent authorities should recognise the equivalence of alternative hygiene measures where appropriate, and promulgate meat hygiene measures that achieve required outcomes in terms of safety and suitability and facilitate fair practices in the trading of meat.

6. Preliminary risk management activities

6.1 Identification of a food safety issue

14. Consumers are exposed to the risk of *Trichinella* infection when they consume raw or insufficiently cooked meat containing infectious larvae. Risk management activities should incorporate a “primary production-to-consumption” approach in order to identify all steps in the food-chain where mitigations are required.

15. Preliminary risk management activities appropriate to these Guidelines include:

- Development of a national, regional, or compartment risk profile taking into account the generic Codex risk profile;
- Evaluation of the epidemiological evidence supporting a risk-based approach relative to the national or regional situation and/or trade in meat of Suidae.

6.2 Risk Profile

16. Risk profiles are an important tool within “Preliminary Risk Management Activities” when applying a RMF to a food safety issue. They provide scientific information to risk managers and industry and can assist in the design of food safety control systems that are tailor-made to individual food production and processing systems.

17. A generic risk profile which takes into account the FAO/WHO/OIE Guidelines for the Surveillance, Management, Prevention and Control of *Trichinellosis* (“FAO/WHO/OIE Guidelines *Trichinella*”) will be available as an addition to the repository of risk profiles on the FAO and WHO websites

[6.3 Risk Assessment Policy and Risk Assessment]

Paragraph 6.3 will refer to the draft OIE document and any work on risk-based examples initiated by FAO/WHO JEMRA and completed in due course.

7. Identification and selection of post-slaughter control measures using a risk-based approach

7.1 Assessing risk based on farm level control measures and/or surveillance of domestic pigs

18. At primary production, the most important risk factors for infection of domestic pigs include garbage feeding (including uncooked meat), exposure to carcasses of infected pigs, reservoir wildlife, or vermin (especially rats) (FAO/WHO/OIE Guidelines *Trichinella*). Although these factors are very rarely encountered in well-controlled housing conditions, generic control measures addressing these concerns are recommended as described in the *Terrestrial Animal Health Code* draft 8.13. Infection with *Trichinella* spp., (under development) and the ICT *Recommendations on Methods for the Control of Trichinella in Domestic and Wild Animals Intended for Human Consumption*. Biosecurity measures to prevent *Trichinella* infections can only be achieved through controlled housing of domestic pigs. Further, the OIE *Terrestrial Animal Health Code* draft 8.13 describes surveillance and other epidemiological data that can be used to classify risk of *Trichinella* infection in domestic pigs.

7.2 Availability of post-slaughter control measures

19. Available post-slaughter control measures for *Trichinella* include when validated: laboratory testing, freezing, cooking and curing processes. Irradiation of meat of Suidae is also an option to destroy *Trichinella* in meat prior to consumption. These measures may be subject to the approval by the competent authority, where appropriate.

7.2.1 Testing:

20. When laboratory tests are performed on individual carcasses, those selected should be tested in accordance with the diagnostic techniques recommended in Chapter 2.1.16. of *OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* ("digestion method") and the ICT *Recommendations for Quality Assurance in Digestion Testing Programmes for Trichinella*⁷.

21. If a *Trichinella*-positive carcass is identified during post-slaughter testing, the competent authority should be notified. The competent authority can then decide which follow-up actions are necessary in line with these guidelines.

22. Other diagnostic methods for *Trichinella* may be used if endorsed in the *OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* or if validated in accordance with an internationally accepted protocol.

23. Any test that is chosen should have known performance characteristics, i.e. sensitivity and specificity if a risk-based approach to ensuring food safety is to be applied.

7.2.2 Freezing.

24. Freezing of meat should utilise cooling regimes that ensure lethality for all *Trichinella* present in different portions of meat or whole carcasses. Use of this method for inactivation of *Trichinella* that are not cold tolerant should be in accordance with validated parameters such as those described in the "*Recommendations on Methods for the Control of Trichinella in Domestic and Wild Animals Intended for Human Consumption*" prepared by the International Commission on Trichinellosis (ICT) Standards for Control Guidelines". *Trichinella* species and genotypes that are known to be cold tolerant include *Trichinella* T6, *T. britovi*, and *T. nativa*⁸.

7.2.3 Cooking or irradiation

25. Inactivation of *Trichinella* by these methods should be performed in accordance with validated methods such as those described in the "*Recommendations on Methods for the Control of Trichinella in Domestic and Wild Animals Intended for Human Consumption*" prepared by the International Commission on Trichinellosis (ICT) Standards for Control Guidelines Committee". The General Standards on Irradiated Food⁹ should also be taken into account.

7.2.4 Curing

⁷ http://www.trichinellosis.org/uploads/Part_1_final_-_QA_Recomendations_7Feb2012.pdf

⁸ "Trichinella in pork: current knowledge on the suitability of freezing as a public health measure" at <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3079>.

⁹ General Standard for Irradiated Foods (Codex Stan 106-1983)

26. Validated curing procedures can be used to inactivate *Trichinella*. It will be up to the competent authority to validate these procedures and the process controls for these procedures.

7.3. Selection of risk-based control measures

7.3.1. Risk-based approach

27. Populations of domestic pigs can be designated as being in a specific category of risk at the farm, compartment, region, or country level. See *Terrestrial Animal Health Code* draft Chapter 8.13 (under development).

7.3.2. Selection of measures

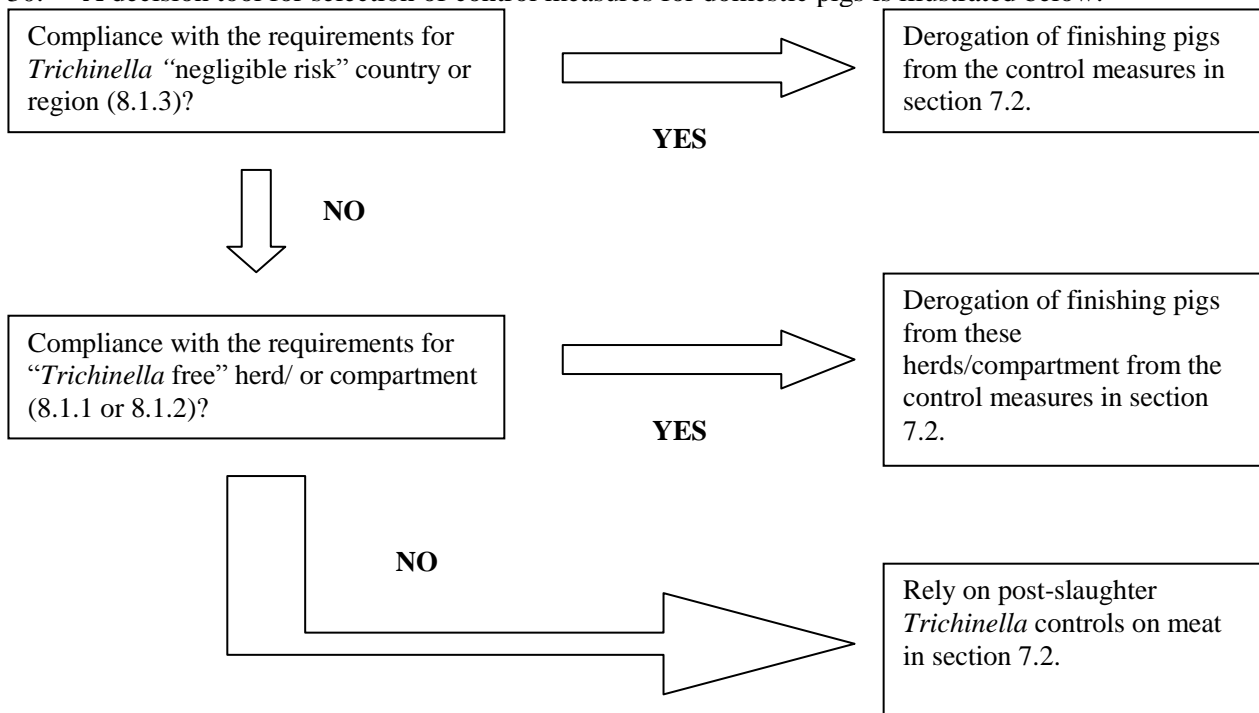
The wordings "Free herd", "free compartment" and "negligible risk region or country" may be adapted pending the outcome of the OIE guidelines.

28. In the absence of the designation of specific categories of risk in swine populations, as developed from epidemiological data e.g. designation of "free herd", "free compartment" or region or country of "negligible risk", all carcasses from domestic pigs over five weeks of age¹⁰ should be subject to at least one of the following validated control measures:

- Laboratory testing with disposal of the positive carcasses according to requirements of the Competent authority; or
- Freezing, or
- Cooking, or
- Curing method, or
- Irradiation

29. The competent authority / veterinary authority may provide derogation from controls or change the level of controls where there is appropriate verification over time of different categories of domestic pig populations as above

30. A decision tool for selection of control measures for domestic pigs is illustrated below:



31. Where derogations have been applied, the competent authority/veterinary authority will determine through a risk-based approach, what, if any, verification testing and measures will be required (See Section 9).

¹⁰ http://www.aesan.msc.es/AESAN/docs/docs/evaluacion_riesgos/comite_cientifico/TRIQUINA_LECHONES.pdf

8. Implementation of risk-based control measures

32. Testing procedures are described in Chapter 2.1.16 of the *OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* and any consequential changes to on-farm biosecurity practices described in the *Terrestrial Animal Health Code* draft Chapter 8.13 (under development).

33. Implementation of selected control measures are dependent on official recognition by the competent authority/veterinary authority of the *Trichinella* status of the herd, compartment, region of country.

8.1. Conditions for official recognition of *Trichinella* free herds

8.2. Conditions for official recognition of *Trichinella* free compartments

8.3. Conditions for official recognition of *Trichinella* “negligible risk” country or region

[Paragraphs 8.1 to 8.3 will refer to draft OIE document and be completed when this draft has progressed]

8.4 Non-domesticated Suidae, feral pigs and cross-breeds

34. All non-domesticated Suidae, including wild boars, feral pigs and cross-breeds intended for human consumption should be tested in accordance with the diagnostic techniques recommended in *OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* ("digestion method") or an appropriate alternative validated method.

Positive carcasses should be disposed of according to practices described by the competent authority

9. Monitoring and review

9.1. “*Trichinella* free” herds/compartments

9.2 *Trichinella* “negligible risk” countries or regions

[Paragraphs 9.1 and 9.2 will refer to draft OIE document and be completed when this draft has progressed]

10. Risk communication

35. Best practice in the control of *Trichinella* in the meat of Suidae should be communicated to all stakeholders in domestic pig production. Similarly, all stakeholders should be aware of the benefits of obtaining *Trichinella*-free herd or compartment status.

36. Hunters should be informed on the risk of consumption of meat from reservoir wildlife, stressing the importance of testing even if for personal consumption. Hunters should be also informed of the risk of promulgating and maintaining the sylvatic life cycle associated with the common habit of leaving animal carcasses in the field after skinning, or removing and discarding the entrails, thereby providing the opportunity for transmission to new hosts.

37. The competent authority/veterinary authority should publish ideally annually laboratory results in a form that demonstrates the epidemiological status of herds, compartments, regions or the whole country. Results of epidemiological investigations of any food-borne outbreaks should also be communicated.

38. Since each country has specific consumption habits, communication programs pertaining to trichinellosis are most effective when established by individual governments.

39. Retailers and consumers, including travelers who visit regions or countries where *Trichinella* is endemic, should be made aware of the risk of becoming infected with *Trichinella* after consumption of meat of Suidae, raw or partially treated, as appropriate for the *Trichinella* status of Suidae in the country.

Appendix II**PROPOSED DRAFT GUIDELINES FOR CONTROL OF SPECIFIC ZOOONOTIC PARASITES IN MEAT:
[TAENIA SAGINATA / CYSTICERCUS BOVIS] IN MEAT OF DOMESTIC CATTLE****1. Introduction**

1. Bovine cysticercosis refers to the infection of the striated muscle of cattle with the metacestode of *Taenia saginata*. Humans get infected (taeniosis or beef tapeworm infection) solely upon consumption of raw or undercooked beef containing live cysticerci. Taeniosis in human populations varies world-wide with a high prevalence in some countries. Very few countries are free from *T. saginata* in cattle populations. *T. saginata* is not an OIE-listed disease.

2. As governments review their meat hygiene systems, the application of non-risk based control measures for meat and meat products in trade can be disproportionate to the amount of risk reduction achieved. The public health significance of *T. saginata* is limited due to the mostly benign clinical symptoms. However, the economic importance is high for several reasons:

- Resources involved in routine meat inspection
- Downgrading and condemnation of affected carcasses
- Routine treatment to inactivate cysticerci such as freezing or cooking
- Intensified livestock controls at farm level when affected herds are identified.

3. Where the parasite is common in domestic cattle, mitigation of risks to consumers is hampered by the low sensitivity of routine post mortem meat inspection.

4. These Guidelines incorporate elements of a risk management framework (RMF) approach as developed by the Codex Committee on Food Hygiene for managing microbiological hazards (*Principles and Guidelines for the Conduct of Microbiological Risk Management* (CAC/GL/63-2007)) i.e.:

- Preliminary risk management activities
- Identification and selection of risk management options
- Implementation of control measures
- Monitoring and review.

2. Objectives

5. The primary objective of these Guidelines is to provide guidance to governments and industry on risk-based measures for the control of [*C. bovis*/*T. saginata*] in meat of domestic cattle.

6. The Guidelines also provide a consistent and transparent framework to review national or regional control measures based on epidemiological information and risk analysis. The Guidelines should be taken into account when considering the equivalence by importing countries where such measures differ from their own, thereby facilitating international trade.

3. Scope and use of the Guidelines**3.1. Scope**

7. These Guidelines, used in conjunction with *FAO/WHO/OIE Guidelines for the Surveillance, Prevention and Control of Taeniasis/Cysticercosis* address the control of cysticercosis in the meat of domestic cattle that may cause human taeniasis. They are based on the *Code of Hygienic Practice for Meat* (CAC/RCP 58-2005) that provides generic advice on a risk-based approach to meat hygiene.

8. The Guidelines, used in conjunction with the *FAO/WHO/OIE Guidelines*, apply to all steps in a “primary production-to-consumption” food chain continuum.

3.2. Use

9. The Guidelines provide specific guidance for the control of cysticercosis in meat and follow a risk-based approach for selecting of post-harvest control measures as risk management options. The Guidelines are supplementary to and should be used in conjunction with the *Recommended International Code of Practice* –

General Principles of Food Hygiene (CAC/RCP 1 – 1969), the *Code of Hygienic Practice for Meat* (CAC/RCP 58-2005) and the *FAO/WHO/OIE Guidelines*.

10. The diagnostic techniques referred to in the Guidelines are those of the *OIE Manual of Diagnostic Tests and Vaccines for Terrestrial Animals* Chapter 2.9.5 www.oie.int.

11. Flexibility in applying the Guidelines is an important consideration. They are primarily intended for use by government risk managers and industry in the design and implementation of food control systems. The Guidelines could also be used when judging the equivalence of different control measures for beef meat applied by different countries.

4. Definitions

Compartment¹¹ means an animal subpopulation contained in one or more establishments under a common biosecurity management system with a distinct health status with respect to a specific disease or specific diseases for which surveillance, control and biosecurity measures have been applied for the purpose of international trade.

Domestic cattle mean all domesticated cattle species including *Bubalus* and *Bison* species.

Herd means a number of animals of one kind kept together under human control [and with supervision] [or a congregation of gregarious wild animals]. A herd is usually regarded as an epidemiological unit.

5. Principles applicable to the control of bovine cysticercosis

12. Overarching principles for good hygienic practice for meat are presented in the *Code of Hygienic Practice for Meat* (CAC/RCP 58-2005) section 4: *General Principles of Meat Hygiene*. Three principles that have particularly been taken into account in these Guidelines are:

- i. The principles of food safety risk analysis should be incorporated in the design and implementation of meat hygiene programmes wherever possible and appropriate.
- ii. As appropriate to the circumstances, the results of monitoring of cattle populations at slaughter and surveillance of [animal and human] populations should be considered when reviewing or modifying meat hygiene requirements
- iii. Competent authorities should recognise the equivalence of alternative hygiene measures where appropriate, and promulgate meat hygiene measures that achieve required outcomes in terms of safety and suitability and facilitate fair practices in the trading of meat.

6. Preliminary risk management activities

6.1 Identification of a food safety hazard

13. Preliminary risk management activities appropriate to these Guidelines include:

- Development of a national or regional level risk profile taking into account the generic Codex risk profile
- Evaluation of the epidemiological evidence supporting a risk-based approach relative to the national or regional situation or trade in meat.

6.2 Risk Profile

14. Risk profiles provide a collation of scientific information that guides risk managers and industry in taking further actions as part of applying a RMF approach to a food safety concern. Both risk profiles and risk assessment can assist in the design of food control systems that are tailor-made to individual food production and processing systems. [A generic risk profile will be available as an addition to the repository of risk profiles on the FAO/WHO websites].

15. Epidemiological evidence to support decisions on appropriate control measures to be applied can be obtained from a number of sources. For example, both industry and governments may have historical records

¹¹ This definition is taken from the OIE Terrestrial Animal Health code www.oie.int

on test results from slaughter populations and farm investigations. Human health surveillance and treatment data, where available, are useful in assessing any residual risks that may exist in different regions or countries.

6.3 Risk Assessment Policy and Risk Assessment

[16. Paragraph 6. 3 will refer to any work initiated at the request of CCFH to FAO/WHO JEMRA on risk-based examples of control measures and be finalised in due course. Development of risk-based control measures should be based on slaughterhouse information (e.g., intensities of slaughter inspection or types of post-harvest control measures) and epidemiological information from other sources as relevant].

7. Identification and selection of control measures using a risk-based approach

7.1. Control measures at farm level for cattle

17. The selection and application of control measures at the farm level are described in the *FAO/WHO/OIE Guidelines*. [Serology using validated methodology may be used for epidemiological studies or diagnosis of highly-infected populations].

18. A traceability system between slaughterhouse and farm should be available so the information on carcasses positive for [*T. saginata* / *C. bovis*] can be utilised in investigation of risk factors at the farm level and possible intensification of post mortem inspection. Similarly, a traceability system between farm and slaughterhouse can be utilised to identify farms without risk factors that would allow for a lesser intensity of routine post mortem inspection.

7.2 Post-slaughter control measures

7.2.1. Post mortem inspection

19. Routine post-slaughter control measures for [*T. saginata* / *C. bovis*] are essentially limited to meat inspection and the range and intensity of inspection procedures varies from country-to-country.

20. [New post mortem detection methods based on laboratory procedures may be used if appropriately validated].

21. Suspect cysts should be submitted for laboratory identification according to validated techniques acceptable to the national competent authority.

22. Any laboratory-based test should have known performance characteristics, i.e. sensitivity and specificity, if a risk-based approach to ensuring food safety is to be applied. Since the sensitivity of routine post mortem meat inspection for [*T. saginata* / *C. bovis*] is very low, particularly in lightly infected animals, a significant proportion of individual carcasses containing [*T. saginata* / *C. bovis*] cysts. would pass undetected. Only a proportion of undetected cysts would be viable and this proportion depends on the extent and cycle of infection in the herd of origin.

7.2.2. Supplementary inspection procedures

23. When a suspect carcass or part is identified during routine inspection procedures, additional inspection of the suspect carcass and its parts and cohorts can increase the sensitivity of inspection for identifying infected parts and/or further infected carcasses. The range and intensity of supplementary post mortem inspection procedures varies from country to country and should be applied according to a risk-based approach.

7.2.3. Treatment of meat

24. Temperature treatment at regimes that ensure lethality for [*T. saginata* / *C. bovis*] is an available control measure. Heat treatment can also also used for meat from suspect or confirmed [*T. saginata* / *C. bovis*] carcasses and lines of carcasses. Such treatments should be validated and applied as specified in national legislation.

25. Salting and irradiation according to validated processes are further treatments that may be available.

7.2.4. Traceability system for slaughtered cattle

26. A traceability system between slaughterhouse and farm should be available so that information on carcasses positive for [*T. saginata* / *C. bovis*] can be utilised in application of pertinent control measures at farm level (and elsewhere) when deemed appropriate by the Competent Authority / Veterinary Authority.

This may include notification of “suspect” cohorts of animals sent to the slaughterhouse for application of intensified post mortem inspection procedures.

7.2.5. Movement control and surveillance

27. The Competent Authority / Veterinary Authority may apply movement control measures to herds where it is determined from monitoring information that this is would be an appropriate risk-based measure.

7.3. Selection of risk-based control measures

7.3.1. Risk-based approach

28. A risk-based approach to control of [*T. saginata* / *C. bovis*] in the carcasses of domestic cattle [over six weeks of age] should take into account options for:

- Routine procedures applied during post mortem inspection (visual, palpation and incision)
- Further post mortem procedures applied to an individual carcass or a related group of carcasses when a suspect [*T. saginata* / *C. bovis*] cyst is detected
- Routine procedures applied according to knowledge of an animal’s pre slaughter status
- Carcass disposition requirements, including post-harvest treatments applied to carcasses or parts
- Epidemiological information that supports targeting of risk-based inspection procedures.

29. Slaughter populations may be assigned a specific category at the farm, compartment, region or country level e.g. designation of “free” or “negligible risk”, on the basis of:

- Slaughterhouse information demonstrating a very low prevalence of suspect cysts in the meat of the slaughtered population over time or
- If available, public health data demonstrating that human infection attributable to the domestic slaughter population is very rare
- Other epidemiological data as relevant.

[Paragraph 28 and 29 will refer to any work initiated at the request of CCFH to FAO/WHO JEMRA on risk-based examples of control measures and be finalised in due course. Development of risk-based control measures should be based on slaughterhouse information (e.g., intensities of slaughter inspection or types of post-harvest control measures) and epidemiological information from other sources as relevant].

30. On this basis, the national Competent Authority / Veterinary Authority may provide derogation from some routine post mortem inspection procedures and/or reduce the intensity of some routine post mortem inspection procedures (palpation and/or incision) according to their national situation and risk assessment.

31. Intensified post mortem procedures applied to an individual carcass when a suspect cyst is detected, and further post mortem inspection procedures applied to a related group of carcasses after a “suspect” [*T. saginata* / *C. bovis*] is detected, should also be established according to the characteristics of infection in the slaughter population and the likelihood of reduction of risks to the consumer.

9. Monitoring and review

32. A robust system for monitoring of data obtained at the farm and slaughterhouse levels by both organoleptic and laboratory processes should be in place. This system should provide for evaluation of the performance of the selected control measures relative to the level of consumer protection that is sought and may include:

- Collection and evaluation of slaughterhouse and on-farm information;
- Traceback to the farm when suspect cysts are found in the slaughterhouse and application of on-farm controls and more intensive slaughterhouse inspection if required by the Competent Authority/Veterinary Authority;
- Notification of results of intensified inspection to the Competent Authority/Veterinary Authority.

- Involving appropriate public health authorities.

33. The farm or compartment of origin may be ascribed a “risk status” until slaughterhouse results or epidemiological investigation indicates that the prevalence of *T. saginata* in the slaughter population no longer warrants intensified control measures.

10. Risk communication

34. Best practice in the control of [*T. saginata* / *C. bovis*] in the meat of domestic cattle should be communicated to all stakeholders in cattle production.

35. All persons involved in cattle production should receive basic public health awareness on the life cycle of the parasite and how humans may pose a risk as a source of the cattle infection.

36. The Competent Authority/Veterinary Authority should apply transparency (e.g. make available monitoring and investigation information) where there is a public health risk and conduct public education campaigns as appropriate.