CODEX ALIMENTARIUS COMMISSION

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Food and Agriculture Organization of the United Nations

World Health Organization

Viale delle Terme di Caracalla, 00153 Rome, Italy - Tel: (+39) 06 57051 - Fax: (+39) 06 5705 4593 - E-mail: codex@fao.org - www.codexalimentarius.org

Agenda Item 5 **CX/FH 15/47/6 add.1**
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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FOOD HYGIENE

Forty-seventh Session

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PROPOSED DRAFT GUIDELINES ON THE APPLICATION OF GENERAL PRINCIPLES OF FOOD HYGIENE TO THE CONTROL OF FOODBORNE PARASITES

Comments of Argentina, Brazil, Colombia, Costa Rica, El Salvador, Iran, Japan, Kenya, Saint Lucia, Switzerland, United States, African Union, FoodDrinkEurope, CEFIC (European Chemical Industry Council)

ARGENTINA

GENERAL COMMENTS

Argentina suggests the following comments:

1. To include drinking water in this document. According to the report of a joint FAO/WHO Expert Meeting on Multicriteria-based ranking for risk management of food-borne parasites water is an important vehicle for transmission for a number of food-borne parasites. Thus attention to water quality throughout the food-chain, from primary production through processing to consumption is very important.

   Drinking water section should address effective water sanitation treatments against parasites considering that many parasites are tolerant to chlorine disinfection.

   Common global water-related diseases are caused by parasites (such as but not limited to amebiasis, cryptosporidiosis and giardiasis). People become infected with these diseases when they swallow or have contact with water that has been contaminated by certain parasites. For example, individuals drinking water contaminated with fecal matter containing the ameba *Entamoeba histolytica* can get amebic dysentery (amebiasis).

2. To keep Appendix with examples of inactivation methods for the control of foodborne parasites because it is important to know in which case is useful to apply a treatment or another.

3. To Reference to relevant chapters of the OIE Codes should be included. It is not necessary to mention the version 2014 of the document because it is updated every year.

4. “Cattle” should be translated as “bóvidos” in Spanish version.

SPECIFIC COMMENTS

2.3 DEFINITIONS

Cyst – ~~environmental life cycle stage of some protozoan parasites, including cysts (e.g., Entamoeba histolytica, Giardia duodenalis); it may also refer to tissue cysts of Toxoplasma gondii, sarcocysts of Sarcocystis spp., or hydatid cysts of Echinococcus spp.~~

Cyst: a stage in the life cycle of certain parasites, during which they are enveloped in a protective wall.

(http://medical-dictionary.thefreedictionary.com/parasitic+cyst)

: Cyst definition is not clear, we recommends a better definition.

~~Definitive Host~~ ~~– The host in the life cycle of a parasite in which sexual reproduction occurs~~

Definitive host. In which the adult stage of animal parasites lives and sexual reproduction takes place.

(http://generalbacteriology.weebly.com/host-parasite-interactions.html)

Rationale: Sexual reproduction does not occur always in the definitive host.

3.1 ENVIRONMENTAL HYGIENE

21. Refer to Section 3.1 (Environmental Hygiene) of the General Principles of Food Hygiene (CAC/RCP 1-1969), and Section 5.5 (Hygiene of the Primary Production Environment) of the Code of Hygienic Practice for Meat (CAC/RCP 58-2005) **and chapters 4.13, 6.3 and 6.4 of the OIE Terrestrial Animal Health Code**

Rationale: Relevant chapters of the OIE should be referenced.

24. Sources of infection of food-producing animals with parasites during primary production include contamination of feed with infective stages, deliberate or inadvertent feeding of untreated/unprocessed animal tissues or whole carcasses infected with parasites, and the use of drinking water contaminated with faecal material containing infective stages of parasites.

Rationale: Argentina suggest keeping it from the original document because It provides important information for the hygienic production

- ~~47. During the parasite hazard analysis, producers should consider how the food will be further processed, prepared and consumed in order to determine appropriate parasite controls. For example, fish that may contain foodborne parasites, but may not have gone through appropriate parasite control can be marketed as "not suitable for raw consumption" if the fish is cooked before consumption although allergies may need to be considered.~~

Rationale: We suggest deleting it we consider that it is not an adequate control measures (see paragraph 96).

3.2 HYGIENIC PRODUCTION OF FOOD SOURCES

54. Refer to Section 3 (Prerequisite Programmes) and Section 6 (Aquaculture Production) of the Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003), and the Code of Practice on Good Animal Feeding (CAC/RCP 54-2004) **and OIE Aquatic Animal Health Code.**

- 63. Refer to Section 3.4 Hygiene Control Programme and 3.5 Personal Hygiene and Health of the Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003) and OIE Aquatic Animal Health Code .

Rationale: OIE Aquatic Animal Health Code should be referenced in these points

- 67. Certain fruits and vegetables are consumed raw without a cooking or freezing step to kill parasites. In this case, controls that reduce the parasite hazard to an acceptable level during primary production are especially important. Adequate and **intensive** washing is one control measure feasible to be used in ~~many~~ **some** cases, **although it should be noted that most parasite eggs or (oo) cysts are sticky and difficult to remove from fruits and vegetables.**

Rationale: It is important to note this, which is mentioned in paragraph 88 to avoid creating false expectations with washing.

[3.5 Water for direct human consumption

Water is an important vehicle for transmission for a number of food-borne parasites. Thus attention to water quality throughout the food-chain, from primary production through processing to consumption is very important

65. The typical water-transmitted foodborne parasites include, but are not limited to,Cryptosporidium spp.,Entamoeba histolytica, Giardia duodenalisand Toxoplasma gondii.

The waterborne route is numerically the most important means of transmission of cryptosporidiosis. Numerous waterborne outbreaks of cryptosporidiosis have occurred worldwide as a result of oocyst contamination of drinking water sources and recreational water.

With the exception of congenital transmission, the majority of infections with T. gondii are considered to be food-borne, although waterborne outbreaks can also be of local importance, and water-borne infection has been suggested to be the major source of Toxoplasma infection in developing countries (Petersen, Kijlstra and Stanford, 2012).

E. histolytica infection mostly occurs by ingestion of food or water contaminated with faeces containing E. histolyticacysts.

66. Refer to the Code of Hygienic Practice for Collecting, Processing and Marketing of Natural Mineral Waters (CAC/RCP 33-1985), the Code of Hygienic Practice for Bottled/Packaged Drinking Waters (Other than Natural Mineral Waters) (CAC/RCP 48-2001) and WHO Guidelines for drinking-water quality.]

[3.5.1 Environmental hygiene]. Refer to section 3.1 of the Code of Hygienic Practice for Collecting, Processing and Marketing of Natural Mineral Waters (CAC/RCP 33-1985) and section 2.1 of the Code of Hygienic Practice for Bottled/Packaged Drinking Waters (Other than Natural Mineral Waters) (CAC/RCP 48-2001)

Water used for direct consumption should be controlled in relation with parasites to be sure that this is not the source of food-borne diseases.

[3.5.2 Hygienic production of food sources]. Refer to section 3.2 of the Code of Hygienic Practice for Collecting, Processing and Marketing of Natural Mineral Waters (CAC/RCP 33-1985) and and section 2.2 of the Code of Hygienic Practice for Bottled/Packaged Drinking Waters (Other than Natural Mineral Waters) (CAC/RCP 48-2001)

Monitoring of the effectiveness of sanitization treatments can be useful, specially because parasites can be resistant to them. Such treatments should be validated.

[3.5.3 Handling, storage and transport]. Refer to section 3.3 of the Code of Hygienic Practice for Collecting, Processing and Marketing of Natural Mineral Waters (CAC/RCP 33-1985) and section 2.3 of the Code of Hygienic Practice for Bottled/Packaged Drinking Waters (Other than Natural Mineral Waters) (CAC/RCP 48-2001)

Transport conditions should be appropriated to avoid contamination or minimize risks of possible and additional contamination.

[3.5.4 Cleaning, maintenance and personnel hygiene at primary production]. Refer to section 3.4 of the Code of Hygienic Practice for Collecting, Processing and Marketing of Natural Mineral Waters (CAC/RCP 33-1985)

Personnel should be instructed in relation with good practices as well as the knowledge to identify risks during production.

Rationale: Argentina suggests including water in this document (see general comment about water).

BRAZIL

SECTION 3 - PRIMARY PRODUCTION

Paragraph 20- Replace frogs snake for fish, reptile and amphibians

20. Important meat-transmitted foodborne parasites include, but are not limited to, *Taenia saginata (cattle),Taenia solium (pigs), Trichinella spiralis (pigs, horse, game), Toxoplasma gondii (pigs, cattle, sheep, goats,horses, game)*, *Trichinella* spp. (other than *T. spiralis*) (pigs and game), *Sarcocystis* spp.,(pigs, cattle) and *Spirometra* spp.(~~frogs snake,~~ fish, reptile and amphibians).

3.2 HYGIENIC PRODUCTION OF FOOD SOURCES

Paragraph 31- Include contaminated before surface water and a sentence in the end of the paragraph.

31. Primary producers should supply water which is not a significant source of transmission of foodborne parasite to food-producing animals and block access of food producing animals to contaminated surface water to minimize the potential for infection with parasites. Water collections should be protected not to allow the animals access.

3.4 CLEANING, MAINTENANCE AND PERSONNEL HYGIENE AT PRIMARY PRODUCTION

C. Fish and fishery products

3.1 ENVIRONMENTAL HYGIENE

Is there scientific evidence to support the statement in paragraph 50?

3.2 HYGIENIC PRODUCTION OF FOOD SOURCES

Paragraph 57: Include a sentence in the end of the paragraph.

57. Particular attention should be given to animals that serve as intermediate hosts in the life cycle of

fishborne parasites. For example, in the case of aquaculture, the exclusion of snails, as intermediate hosts for fishborne trematodes, from fish farm areas, may help interrupt trematode life cycles in fish ponds. For wild fish, intermediate hosts cannot be controlled, and fish migrate from different areas with varying risks for exposure to parasites. When the production conditions cannot be controlled the inspection assumes a vital importance. Procedures such as an inspection using a candling table or freezing at a controlled time and temperature could be used.

SECTION 5 - CONTROL OF OPERATION

We suggest include an item addressing a post-mortem inspection

10.3 INSTRUCTION AND SUPERVISION

We suggest replacing the number of the paragraph for a section reference, because the paragraph numbering may be removed after publication.

103. Inspectors or other relevant authorities, who inspect fields, post-harvest processing plants, and food service facilities, should also be trained as per paragraph 92.

COLOMBIA

We reference the Spanish version of document CX/FH 15/47/6.

I. GENERAL COMMENTS

Colombia expresses its concern with regards to carrying out Step 5/8 of the standard, as the document contains a number of conditions that require a more detailed examination, such as the alternative methods in Section 5 for water or those proposed for fishery products.

Proposal follow the standard procedure to gather comments at Step 5.

II. SECTION 3.2

The inclusion of the word "independent" is proposed, since the establishment carries out controls of the health of the workers, but not visitors. Therefore not having independent sanitary services might lead to possible cross-contamination.

> *28. Good Hygienic Practices including management of waste, such as maintaining and using sanitary toilet facilities should be in place and implemented. Toilets for staff and visitors should be provided. Human faeces should be disposed of in such a way as to eliminate contact with animals or pasture land.*
>
> **Proposal 28.** *Good Hygienic Practices including management of waste, such as maintaining and using sanitary toilet facilities should be in place and implemented.* ***independent*** *toilets for staff and visitors should be provided. human faeces should be disposed of in such a way as to eliminate* contact ~~**contact**~~ *with animals or pasture land.*

COSTA RICA

We support the wording in this proposed draft.

EL SALVADOR

General Observations:

We support the recommendation of the eWG to forward the Proposed Draft Guidelines to CAC for adoption at Step 5/8.

Specific Observations to the Spanish version:

1. Paragraphs 1 and 6: [Translator's note: this change applies only to the Spanish version].

Paragraph 1:

...in populations that traditionally consume raw and undercooked food dishes. [Translator's note: this change applies only to the Spanish version].

Paragraph 6:

...as the increasing tendency to eat meat, fish and seafood raw, undercooked, [Translator's note: this change applies only to the Spanish version].

2. Definitions:

Definitive Host: The host in the life cycle of an **adult** parasite in which sexual reproduction occurs.

Intermediate Host: The host which harbors the **developing** larval stages of the parasite **or in which it reproduces asexually**.

3. Paragraph 26:

26. ...unauthorized people should be excluded from barns and outdoor areas used for food animals, and the primary production environment to the extent possible; for example Felidae are the definitive hosts for Toxoplasma gondii and feces from contaminated cats contains oocysts... [Translator's note: this change applies only to the Spanish version].

4. Paragraph 28:

28. "...Human feces should be disposed of in such a way as to eliminate contact with animals or pasture land." [Translator's note: this change applies only to the Spanish version].

5. Paragraph 36:

1. We propose to amend the paragraph to read as follows:

36. “In order to minimize the opportunity for contamination of the production environment with parasitic stages from human feces, on-farm sanitary facilities should be installed and used**,** e.g., functional latrines in the field, and adequate means of hygienically washing and drying hands**; as** farm workers may originate from endemic areas and homes with poor sanitary facilities and practices. The workers may be infected with parasites and not feel ill or may show no symptoms. Waste originating from sanitary facilities must be correctly disposed of."

Additionally, El Salvador proposes including the paragraph in the introduction or in a general section as it is repeated under "Meat" and "Fresh Fruits and Vegetables".

6. Paragraph 40:

40. “… Tachyzoites of Toxoplasma in recently infected animals may be excreted in the milk, resulting in milk-borne infection. ~~Unpasteurized milk has been associated with outbreaks of toxoplasmosis and cryptosporidiosis in Australia and the United Kingdom."~~

The sentence should be deleted because it is repeated and this is the only paragraph that refers to specific outbreaks.

7. Paragraph 47:

47. “… ~~For example,~~ **F**ish that may contain foodborne parasites, but may not have gone through appropriate parasite control can be marketed as “not suitable for raw consumption” if the fish ~~is cooked~~ **requires cooking** before consumption although allergies may need to be considered.

8. Paragraph 77:

77. Control measures are used to address specific foodborne parasite hazards, [Translator's note: this change applies only to the Spanish version].

9. Paragraph 80:

80. "...Specific processing steps and processing combinations should be subject to rigorous validation to ensure consumer protection. [Translator's note: this change applies only to the Spanish version]. For additional information on validation, refer to the Guidelines for the Validation of Food Safety Control Measures (CAC/GL 69-2008). Control measures may include: freezing, heat treatment, salting, drying, high pressure processing, filtration, sedimentation, UV light, ozone and irradiation. Specific processing steps and processing combinations (hurdle concept) to control parasites should be used in accordance with guidance from competent authorities, where available." [Translator's note: this change applies only to the Spanish version].

10. Paragraph 82:

82. Time and temperature control treatments (freezing and heating) that will result in the reduction/elimination of viable parasites are the most commonly used preventative control measures. [Translator's note: this change applies only to the Spanish version]. Such treatments should be done in accordance with validated parameters, as described in relevant and reliable guidelines and other scientific literature. [Translator's note: this change applies only to the Spanish version].

11. Paragraph 87:

5.2.2.4 Irradiation

87. Irradiation serves as another possible measure for parasite control.

This paragraph may be expanded to include a Reference to: CODEX STAN 106-1983 General Standard for Irradiated Foods.

12. Paragraph 88:

88. "Fruit**s** and vegetables should be washed with ~~running, clean~~ **potable** water to reduce parasites; ~~although~~ it should be noted that most parasite eggs or (oo)cysts are sticky and difficult to remove from fruits and vegetables."

13. Paragraph 90:

We suggest including in this paragraph a reference to the WHO Guidelines for drinking-water quality.

IRAN

GENERAL COMMENTS:

1. Section 8 is missing.
2. The text needs to be edited.

SPECIFIC COMMENTS:

SECTION 2 - SCOPE, USE AND DEFINITION

2.1 SCOPE

8. Since this guideline in this paragraph mentions "except for water", we propose to include a reference to the **WHO Guideline for Drinking Water Quality.**

11. The remaining sections contain guidelines applicable to the food chain after primary production (i.e., processing, food service and home preparation **and consumption**), but are not subdivided into food categories.

SECTION 3 - PRIMARY PRODUCTION

22**.** *Rewrite the first sentence as follows:*

Both human and animal faeces may contain parasites that are infective to domestic food-producing animals. Some parasites. Examples are *Toxoplasma* oocysts in felids domestic and wild animal faeces and *Taenia*eggs in human faeces.

NOTE: *In the sentence as it is in the Document, Toxoplasma oocysts in felids is given as an example for "Faeces of…animals" and Taenia eggs an example for "…human faeces".*

B. Some parasites may also be transmitted to domestic animals or other animal hosts when these animals eat infected tissues from other animals. **Control measure should be in place from the initial to the final stages to control the parasitic hazard.**

Where parasites will not be controlled at a later processing stage, the feasibility of producing meat products with concepts to avoid environmental contamination of foodborne parasites by controls during primary production should be considered before production begins. A production area maybe unsuitable if controls cannot be applied at primary production and they will not be controlled at later stages. The risk associated with the introduction of organic material (e.g., faecal and other material that maycontain oocysts or eggs) from non-food-producing animals into the production environment should also beaddressed.

23. Game meat may contain parasites that infect humans. The environment of wild animals, and open range

domesticated animals cannot be controlled, requiring measures to be taken in order **to mitigate** (DELETE MINIMIZE) the risk at a later stage in the food chain.

2 HYGIENIC PRODUCTION OF FOOD SOURCES

30. Feed should be effectively protected against rodents (for *Trichinella*spp. control), cats (for *Toxoplasma gondii* control) and other animals. All dead animals should be immediately removed from feed storage and food-producing animal production areas **and disposed of**.

32. In order to assess whether foodborne parasite controls at primary production are properly implemented and effective, control measures should be documented and verified. Animal surveillance may be a useful tool for assessing control measure needs/shortcomings; however, because of the practical limitations of sampling and testing methodology, testing cannot assure the absence of a parasite hazard.

SUGGESTION: *give a "general guidance" as to what should be done when testing cannot assure the absence of a parasite hazard.*

3.5 MONITORING AND SURVEILLANCE AT PRIMARY PRODUCTION

39. It is important to exchange information between primary production and the slaughterhouse or processing plant e.g.

Rewrite the third bullet as follows:

- **Information on** the status of the meat, following a post-mortem inspection in the slaughterhouse should be **communicated** (DELETE provided) to owner of herds, to facilitate a more targeted control at primary production.

  NOTE: It is not the status, but rather the "*information* on the status" that should be *communicated t*o herd owners.

B. Milk and milk products

40**. Potentially** important milk-transmitted foodborne parasites include *Cryptosporidium* spp. and *Toxoplasma gondii.* Unpasteurized milk has been associated with outbreaks of cryptosporidiosis and toxoplasmosis.

Contamination of unpasteurized milk with *Cryptosporidium* may result from unsanitary milking conditions,such as when the udders are not properly cleaned. Outbreaks of toxoplasmosis have been associated withthe consumption of unpasteurized goat and camel milk. Tachyzoites of *Toxoplasma* in recently infectedanimals may be excreted in the milk, resulting in milk-borne infection. Unpasteurized milk has beenassociated with outbreaks of cryptosporidiosis in Australia and the United Kingdom.

3.2 HYGIENIC PRODUCTION OF FOOD SOURCES

59. Toilets should not (***DELETE THE WORD directly***) empty into fishponds. Fishponds should be protected from contamination from human and animal faeces, pollution with sewage and other wastes. Untreated human and animal excreta should not be used as fertilizer or as fish food.

60.**(PLEASE SEE *SUGGESTION ON ITEM 32*).**Where needed, control measures at primary production should be assessed in order to determine if they are properly implemented and effective. Fish surveillance may be a useful tool for assessing control measure needs/shortcomings; however, because of the practical limitations of sampling and testing methodology, testing cannot assure the absence of a parasite hazard.

SUGGESTION: *give a "general guidance" as to what should be done when testing cannot assure the absence of a parasite hazard.*

D. Fresh fruits and vegetables

67. Certain fruits and vegetables are consumed raw without a cooking or freezing step **or disinfection** to kill parasites. In this case, controls that reduce the parasite hazard to an acceptable level during primary production are especially important. Adequate washing is one control measure feasible to be used in many cases.

SECTION 10 – TRAINING

100. Workers engaged in primary production, processing, preparation, retail or food service **or health services** should be trained and/or instructed in the control of foodborne parasites (e.g. good animal husbandry practices to hygiene and sanitation measures) to a level appropriate to the operations they are to perform in particular abattoir workers who may be performing post-mortem inspection procedures.

NOTE: Health service-providers are in direct contact with health-service receivers, i.e., consumers, and they can have an instrumental role in raising consumers' awareness if they are trained properly in food hygiene.

10.2 TRAINING PROGRAMMES

101. Training programs should contain information on the following, as appropriate to those beingtrained:

ADD A BULLET AT THE END:

- **The importance of proper home food preparation and consumption – the WHO Five Golden Keys**

JAPAN

General Comments

Japan supports the Proposed Draft Guidelines in general with a view to forward it to the Commission for adoption at Step 5/8.

Specific Comments

Para 33:

~~33. Information exchange between primary production and the slaughterhouse or processing plant should be encouraged e.g.:~~

- ~~the status of the herd (controlled housing or not, history of parasitic infection) in order to facilitate a more targeted control on parasites in the slaughterhouse;~~
- ~~feedback from findings in slaughterhouse to the herds on findings during inspection, with the purpose to review preventive measures at the farm.~~

Rationale: To avoid duplication. (Para 39 in *Section 3.5 Monitoring and Surveillance at Primary Production* covers information exchange.)

Para 39:

39. It is important to exchange information between primary production and the slaughterhouse or processing plant e.g.

- ~~If the herd of origin is kept under controlled management conditions, this information should be provided to the slaughterhouse in order to facilitate a more targeted control on parasites.~~
- When the status of the herd in relation with parasite infection (e.g. raised in controlled housing or not (where applicable), history of parasitic infection) is known, it should be communicated to the slaughterhouse in order to facilitate a more targeted assessment of parasite controls in the slaughterhouse….

Rationale: The content of the 1st bullet is covered by the 2nd bullet in the same paragraph.

Para 40, last sentence:

40. Important milk-transmitted foodborne parasites include *Cryptosporidium* spp. and *Toxoplasma gondii*. Unpasteurized milk has been associated with outbreaks of cryptosporidiosis and toxoplasmosis. Contamination of…resulting in milk-borne infection. ~~Unpasteurized milk has been associated with outbreaks of cryptosporidiosis in Australia and the United Kingdom.~~

Rationale: To avoid duplication. (The 2nd sentence in the same paragraph covers outbreaks of cryptosporidiosis via unpasteurized milk.)

Para 47:

~~47. During the parasite hazard analysis, producers should consider how the food will be further processed, prepared and consumed in order to determine appropriate parasite controls. For example, fish that may contain foodborne parasites, but may not have gone through appropriate parasite control can be marketed as "not suitable for raw consumption" if the fish is cooked before consumption although allergies may need to be considered.~~

Rationale: The content of Para 47 is covered by the last two sentences in Para 4. Also, the 2nd sentence in Para 47 does not suit for *Section 3 Primary Production*.

Para 100:

100. Workers engaged in primary production, processing, preparation, retail or food service should be trained and/or instructed in the control of foodborne parasites (e.g. good animal husbandry practices to hygiene and sanitation measures) to a level appropriate to the operations they are to perform. Particular attention should be paid to ~~in particular~~ abattoir workers who may be performing post-mortem inspection procedures and workers in processing plants and food service facilities who prepare fish and fishery products for raw consumption.

Rationale: Editorial.

Add for handling of fish and fishery products (ex.sushi).

Para 103:

103. Inspectors or other relevant authorities, who inspect fields, post-harvest processing plants, and food service facilities, should also be trained as per paragraph ~~92~~**101**.

Rationale: Editorial.

KENYA

Table of Content

Comment

Kenya proposes to adopt the layout of the standard as outlined on the standard layout page. This is in line with codex procedure outlined in the 23rd edition of the procedural manual and also in line with other codex general guideline

SECTION 1 - OBJECTIVES

7. The primary purpose of these guidelines is to provide guidance on preventing, ~~inactivating~~ **controlling**, or reducing foodborne parasite hazards that present a public health risk to an acceptable level. The guidelines provide science-based advice to governments and the food industry with the aim of protecting the health of consumers against foodborne parasites and ensuring fair practices in food trade. The guidelines also provide information that will be of value to consumers and other interested parties.

Comment: Kenya proposes the objective (no.7) the word inactivating to be replaced with controlling.

Justification: To be consistent with other codex standards and texts and gives a greater meaning than inactivating where inactivating is one of the control measures.

SECTION 3 - PRIMARY PRODUCTION

A. Meat

20. Important ~~meat-transmitted foodborne~~ **meatborn**e parasites include, but are not limited to, *Taenia saginata (cattle), Taenia solium (pigs), Trichinella spiralis (pigs, horse, game), Toxoplasma gondii (pigs, cattle, sheep, goats, horses, game)*, *Trichinella* spp. (other than *T. spiralis*) (pigs and game), *Sarcocystis* spp.,(pigs, cattle) and *Spirometra* spp.(frogs snake). Foodborne parasites, present in domestic and wild animals and which are not transmissible to human via meats, but are transmissible via fecal contamination of food (e.g. *Echinococcus, Cryptosporidium, and Giardia*) should be controlled in animal production in order to interrupt the life cycle of parasites. For information on specific food vehicles for these parasites, see Table 2 in *Multicriteria-Based Ranking for Risk Management of Food-Borne Parasites*, Report of a Joint FAO/WHO Expert Meeting, 2012.

Comment: We propose the editing of clause 20 by deletion of (~~meat-transmitted foodborne~~**) and replacement of meatborne.**

Justification: For clarity purposes and to avoid repetition within the same statement.

3.2 HYGIENIC PRODUCTION OF FOOD SOURCES

30. Feed should be effectively protected against rodents (~~for~~ **e.g** *Trichinella* spp. control), cats (for *Toxoplasma gondii* control) and other animals. All dead animals should be immediately removed from feed storage and food-producing animal production areas

Comment: We propose the replacement of "for" with e.g. (for e.g *Trichinella* spp. control)

Justification: Rodents can be host to a number of parasites Trichnella being one of them.

31. Primary producers should supply water which is not a significant source of transmission of foodborne parasite to food-producing animals **and to the extent possible** block access of food producing animals to surface water to minimize the potential for infection with parasites.

Comment: We propose addition of "to the extent possible" in clause 31.

Justification: It's only possible in intensive primary production. It may not be applicable in extensive farming systems such as ranches.

33. Information exchange between primary production, ~~and the~~ slaughterhouse or processing plant **and animal health providers** should be encouraged e.g.:

Comment: We propose the inclusion of clause "and animal health providers" in clause no.33

Justification: Animal health providers are players in the control and prevention of parasites

3.5 MONITORING AND SURVEILLANCE AT PRIMARY PRODUCTION

38. Assurance that a parasite hazard is adequately controlled can be attained through demonstration of properly implemented controls and hygienic practices, which may be supported by a series of **acceptable** ~~**negative test**~~ results over a sufficient time period through risk-based surveillance programme.

Comment: We propose the replacement of negative test with "acceptable results'' in clause 38. Justification: It's impractical to achieve negative test results in a risk-based surveillance programme.

39. It is important to exchange information between primary production, and the slaughterhouse or processing plant **and animal health providers** e.g.

Comment: We propose the addition of and animal health providers in clause 39.

Justification: Animal health providers are players in the control and prevention of parasites.

C. Fish and fishery products

47. During the parasite hazard analysis, producers should consider how the food will be further processed, prepared and consumed in order to determine appropriate parasite controls. For example, fish that may contain foodborne parasites, but may not have gone through appropriate parasite control ~~can~~ **should** be {marketed} as **"not suitable for raw consumption". However**, if the fish is cooked before consumption ~~although~~ allergies may **still** need to be considered.

Comment: We propose the edition of the second sentence in clause 47. To read '*For example, fish that may contain foodborne parasites, but may not have gone through appropriate parasite control should be {marketed} as "not suitable for raw consumption". However if the fish is cooked before consumption allergies may still need to be considered."*

Justification: For clarity. The word can has been replaced with should to be consistent with other codex standards and texts on general guidelines.

3.5 MONITORING AND SURVEILLANCE AT PRIMARY PRODUCTION

65. Assurance that a parasite hazard is adequately controlled can be attained through demonstration of properly implemented controls and hygienic practices, which may be supported by a series of ~~**negative test**~~ **acceptable** results over a sufficient time period through risk-based surveillance programme.

Comment: We propose replacement of 'negative tests" with acceptable on statement clause 65.

Justification: It's impractical to achieve negative test results in a risk-based surveillance programme.

5.7 DOCUMENTATION AND RECORDS

91. Documentation related to validation, monitoring and verification activities regarding the control measures used for parasites should be kept.

92. Monitoring and review of foodborne parasite safety control systems is an essential component of application of a risk management framework (RMF). It contributes to verification of process control and demonstrating progress towards achievement of public health goals.

93. Information on the level of control of parasite at appropriate points in the food chain can be used for several purposes e.g. to validate and/or verify outcomes of food control measures, to monitor compliance with ~~public health goals~~ **acceptable level of protection**, and to help prioritise regulatory efforts to reduce foodborne parasite illnesses.

Comment: We propose replacement of 'public health goals" with 'acceptable level of protection" in clause 93.

Justification: To be in line with WTO/SPS agreement.

General comment – Correct numbering.

3.3; 4.1 skipped on the numbering system.

SAINT. LUCIA

(i) Specific Comments

Section 9.2 Product information -- Paragraph 96

Delete explanatory text which does not apply to product information to be provided:

~~However, labels are often overlooked by the consumer and are not considered to be adequate control measures.~~

Section 10.3

Insert New paragraph:

Periodic retraining of existing personnel should be given as refresher and to maintain competence level of all personnel.

SWITZERLAND

Specific comments

Paragraph 6: We propose to delete the below text in paragraph 6 to avoid vague statements.

6. The occurrence and distribution of parasitic species in the raw commodities used for food can be affected by climate changes, land use, and other environmental factors. The spread of foodborne parasitic diseases is also affected by human behavior (for instance, the environmental contamination by human faeces due to the lack of latrines, and the human-to-human contacts favoring the spread of intestinal parasites, mainly protozoa), demographics, and global trade. For example, globalization of food trade offers new opportunities for parasite dissemination into new areas. ~~In addition, variations in food preferences and consumption patterns, such as the increasing tendency to eat meat, fish and seafood raw, undercooked, smoked, pickled or dried, and the demand for free-range and exotic foods such as bush meat or wild game also influence the spread of parasitic diseases.~~

Paragraph 8: Since this guideline in this para mentions “except for water”, we propose to add a reference to the WHO Guidelines for drinking-water quality as a footnote.

Paragraph 15: We propose to delete this paragraph as there is currently no decision to elaborate parasite specific annexes.

~~15. Additional guidance for the control of specific parasites in certain food may be found in annexes and supplements.~~

Paragraph 22: We feel that there is a lot of text without added value and propose the following amendment.

22. Faeces of domestic and wild animals (e.g. Toxoplasma oocysts in felids), as well as human faeces (e.g. Taenia eggs), may contain parasites that are infective to domestic food-producing animals. Some parasites may also be transmitted to domestic animals or other animal hosts when these animals eat infected tissues from other animals. Where parasites will not be controlled at a later processing stage, **control measures should be in place to control the parasitic hazard.** ~~the feasibility of producing meat products with concepts to avoid environmental contamination of foodborne parasites by controls during primary production should be considered before production begins. A production area may be unsuitable if controls cannot be applied at primary production and they will not be controlled at later stages. The risk associated with the introduction of organic material (e.g., faecal and other material that may contain oocysts or eggs) from non-food-producing animals into the production environment should also be addressed.~~

Paragraph 23: We propose editorial changes to provide clarity in the text.

23. Game meat may contain parasites that infect humans. The environment of wild animals~~,~~ and open range domesticated animals cannot be controlled. **Therefore**~~, , requiring~~ **mitigating** measures **should be in place** ~~to be taken in ordershould be in place~~ to minimize the risk at a later stage in the food chain.

Paragraph 24/29: We propose to add a reference to sections 4 and 6 of CAC/RCP 54-2004 and to delete paragraph 29.

24. For information related to the control of parasites related to animal feed, refer to the *Code of Practice on Good Animal Feeding* (CAC/RCP 54-2004) *Section**s** **4.,** 5**., and 6.** (Primary production)* of the *Code of Hygienic Practice for Meat* (CAC/RCP 58-2005), and *Chapter 6.3.* (The Control of Hazards of Animal Health and Public Health Importance in Animal Feed) and *Chapter 6.4.* (Biosecurity Procedures in Poultry Production) of the *OIE Terrestrial Animal Health Code* (2014), and the WHO/FAO/OIE Guidelines for the surveillance, prevention and control of taeniosis/cysticercosis, and FAO/WHO/OIE Guidelines for the surveillance, management, prevention and control of trichinellosis.

~~29. Feed for food-producing animals should be manufactured and stored in such a manner as to avoid~~

~~parasite contamination. Food sources should conform to section 4, 5 and 6 of the *Code of Practice on Good Animal Feeding* (CAC/RCP 54-2004).~~

Paragraph 28: We propose to delete this paragraph and to keep only paragraph 36.

~~28: Good hygienic practices including management of waste, such as maintaining and using sanitary toilet facilities should be in place and implemented. Toilets for staff and visitors should be provided. Human faeces should be disposed of in such a way as to eliminate contact with animals or pasture land.~~

Paragraph 31: We propose the below changes to allow flexibility.

31. Primary producers should supply water which is not a significant source of transmission of foodborne parasite to food-producing animals and should, **to the extent possible,** block access of food producing animals to surface water. ~~to minimize the potential for infection with parasites.~~

Paragraph 33: We propose to delete paragraph 33, as this is redundant with requirements stated in paragraph 39.

~~33. Information exchange between primary production and the slaughterhouse or processing plant should be encouraged e.g.:~~

~~• the status of the herd (controlled housing or not, history of parasitic infection) in order to facilitate a more targeted control on parasites in the slaughterhouse;~~

~~• feedback from findings in slaughterhouse to the herds on findings during inspection, with the purpose to review preventive measures at the farm.~~

Paragraph 40: We suggest editorial changes in order not to restrict unpasteurized milk cryptosporidiosis outbreaks to Australia and UK.

40. Important milk-transmitted foodborne parasites include Cryptosporidium spp. and Toxoplasma gondii. Unpasteurized milk has been associated with outbreaks of cryptosporidiosis **(e.g. in Australia and the United Kingdom)** and toxoplasmosis. Contamination of unpasteurized milk with Cryptosporidium may result from unsanitary milking conditions, such as when the udders are not properly cleaned. Outbreaks of toxoplasmosis have been associated with the consumption of unpasteurized goat and camel milk. Tachyzoites of Toxoplasma in recently infected animals may be excreted in the milk, resulting in milk-borne infection~~. Unpasteurized milk has been associated with outbreaks of cryptosporidiosis in Australia and the United Kingdom.~~

Paragraph 42: We propose the below amendments to allow flexibility.

42. Cats should be excluded, **to the extent possible,** from barns and food production, handling and storage areas used for dairy herds (e.g., cows, goats, sheep and camels). **To the extent possible, d**airy herds should not be allowed to graze areas where Felidae are commonly found since cats are the only definitive hosts for Toxoplasma gondii and faeces from recently infected cats contain environmentally resistant oocysts that contaminate fields and other feeding areas.

Paragraph 47: We propose to move the example given regarding labelling to the appropriate section 9.

47. During the parasite hazard analysis, producers should consider how the food will be further processed, prepared and consumed in order to determine appropriate parasite controls. ~~For example, fish that may contain foodborne parasites, but may not have gone through appropriate parasite control can be marketed as "not suitable for raw consumption" if the fish is cooked before consumption although allergies may need to be considered.~~

Paragraph 51: We propose to delete this paragraph as it is redundant with paragraphs 56 and 57.

~~51. Animals and people present in the vicinity of aquaculture ponds can be infected with foodborne parasites that are transmitted to humans through fish. Animals and humans may excrete parasite eggs that enter water and develop into larval stages that subsequently infect farmed fish.~~

Paragraph 81: The first sentence is too general, and should be complemented with examples.

81. Newer technologies or combinations of technologies are being developed for inactivating parasites**, such as …..** Prior to implementation in the food production chain, methods to inactivate parasites should be validated for the specific parasite/food combination. Some treatments may be subject to prior approval by the relevant competent authority.

Paragraphs 96 – 99: We propose to rearrange and shorten the text in this section as there are duplications with other Sections and/or with Section 9 of the General Principles of Food Hygiene (CAC/RCP 1-1969).

96. Labels may be used to help differentiate between products that are intended for raw consumption, and products that are intended to be cooked by the consumer. ~~However, labels are often overlooked by the consumer and are not considered to be adequate control measures. Therefore, even with the beneficial use of labels instructing consumers to cook the product, a parasite hazard should be reduced to an acceptable level before marketing products that are likely to be consumed raw or undercooked.~~ **For example, fish that may contain foodborne parasites, but may not have gone through appropriate parasite control can be labelled as "not suitable for raw consumption".**

~~97. In order to increase consumer awareness of foodborne parasite hazards, education, is an important component of risk management, and in some cases may be the only practical option available. Consumers should recognize the risks associated with consumption of raw, undercooked, and lightly processed (e.g., marinated, smoked) meat and fish. Consumer advice should be provided on how to prepare foods (e.g., cooking times and temperatures) and on the importance of good hygiene (e.g., hand washing) in order to avoid infection with foodborne parasites. Consumer should always make sure to separate raw foods from cooked foods, and ready to eat fruit and vegetables to prevent cross-contamination while handling and preparing meals. The WHO Five keys to safer food could assists in this process.5~~

Paragraphs 100 –103: We propose to delete the text in the Paragraphs "100 - 103", and just make reference to Section 10 of the General Principles of Food Hygiene (CAC/RCP 1-1969), as the additional value of the proposed text is already covered in other Sections.

~~100. Workers engaged in primary production, processing, preparation, retail or food service should be trained and/or instructed in the control of foodborne parasites (e.g. good animal husbandry practices to hygiene and sanitation measures) to a level appropriate to the operations they are to perform in particular abattoir workers who may be performing post-mortem inspection procedures.~~

~~10.2 TRAINING PROGRAMMES~~

~~101. Training programmes should contain information on the following, as appropriate to those being trained:~~

~~• The potential for food to be a vehicle of transmission of foodborne parasites if contaminated.~~

~~• The potential sources and routes of transmission of foodborne parasites.~~

~~• The potential for persistence of parasites in/on contaminated foods and food production settings.~~

~~• The need to comply with good animal husbandry practices and the importance of compliance with such practices, including:~~

~~- the role of domestic and wild animals in the transmission of certain parasites;~~

~~- the importance of on-farm sanitation and hygiene in interrupting the life cycle of parasites~~

~~and minimizing the opportunity for faecal-oral transmission; and~~

~~- the importance of animal feed management to avoid domestic and wild life parasite~~

~~contamination.~~

~~- Proper hand washing practices and the importance of strict compliance with hand washing instructions at all times, particularly after being in contact with faecal matter. It is advisable to educate each new employee in the proper practices that are to be followed for hand-washing.~~

~~- The importance of adequate food processing and preparation to eliminate potential parasite risks.~~

~~- Task-specific practices to reduce or eliminate the risks of parasites in foods.~~

~~10.3 INSTRUCTION AND SUPERVISION~~

~~102. Training and instructions should be given to all new personnel on the transmission and management of foodborne parasites.~~

~~103. Inspectors or other relevant authorities, who inspect fields, post-harvest processing plants, and food service facilities, should also be trained as per paragraph 92.~~

Section 10: TRAINING

Refer to General Principles of Food Hygiene (CAC/RCP 1-1969)

UNITED STATES OF AMERICA

GENERAL COMMENTS

Many editorial changes will be needed if this document is to move forward. Suggested changes are provided below.

SPECIFIC COMMENTS

In the comments below, text to be removed is indicated by strike outs and text to be added is underlined and bolded. We have also added some highlights where single letters have been deleted or commas inserted or deleted so the Secretariat does not miss them.

Table of Contents

Section 3 – Primary Production

Comment: Section A should be titled "Meat **and Meat Products**

Rationale: The document addresses both; the change provides consistency with Fish and Fishery Products.

INTRODUCTION

Paragraph 1

Comment: Edit as follows:

Foodborne parasites are a major public health burden worldwide, particularly **in areas** with poor sanitary facilities and in populations that traditionally consume raw and undercooked food dishes. It is estimated that over 2 billion people are currently infected by ~~foodborne~~ parasites **that may be transmitted by food**. Infections may have prolonged, severe, and sometimes fatal outcomes, and result in considerable hardship in terms of food safety, security, quality of life, and negative impacts on livelihood.

Rationale: Adding "in areas" is an editorial correction. The 2 billion number could be completely inaccurate if it includes soil transmitted parasites like *Ascaris, Trichuris, Echinococcus,* etc. that may be transmitted with food but are usually considered soil transmitted rather than food transmitted. In addition, the source of the number 2 billion is unclear.

Paragraph 2

Comment: Edit 3rd sentence as follows:

The ranking was based on 7 criteria ~~of which 5 were~~ **and 80% of the weighting was** public health related~~, and based primarily on public health concerns, i.e. 85% of weighting~~.

Rationale: Edited to eliminate duplicate discussion of health related criteria. The number of criteria that are health related is not as important as the percentage weighting. Refer to Section 2.5 Definition of Criteria Weights for correct health based weighting (80%, not 85% listed in the Executive Summary.)

Paragraph 2

Comment: Delete 4th sentence:

~~Overall scores of each parasite was calculated by normalised parasite criteria scores based on published data multiplied by fractional weights and summed up to the definite score per parasite.~~

Rationale: The rankings were not based on published data. In addition, the sentence is confusing and does not provide additional useful information. The reader should refer to the original document for details on the ranking procedure.

Paragraph 2

Comment: Edit 6th sentence:

~~That~~ **The** ranking indicates that the foodborne parasites of great**est** concern~~s~~ from a global public health perspective are not limited to a single parasite group or a food vehicle, but ~~could~~ span a number of different parasites **groups**~~, sources~~ and food vehicles.

Rationale: Editorial

Paragraph 3

Comment: Edit as follows:

Knowledge of ~~the~~ parasite **life** cycles, transmission routes and environmental requirements is needed to understand which control measures may be effective. Foodborne parasites ~~can be~~ **are** transmitted to humans by ingestion of fresh or processed foods that ~~have been~~ ~~infested~~ **are hosts in the parasite's life cycle** (e.g., meat that contains *Trichinella* larvae or *Toxoplasma* tissue cysts) or that ~~have been~~ **are** contaminated with **soil or water carrying** ~~the~~ infective stages of parasites (e.g., cysts, oocysts, eggs). In the first case, human infection can occur through the consumption of an infective stage in raw, undercooked or poorly processed meat and offal from domesticated animals, game, fish, crustaceans, cephalopods and molluscan shellfish. In the second case, human infection can ~~also~~ occur from ingestion of infective stages in water and on foods such as fresh fruit and vegetables resulting from animal or human faecal contamination (e.g. oocysts of *Cryptosporidium* in fresh vegetables).

Rationale: Editorial; 2nd sentence was edited to clarify the intended differentiation of meat tissue stage transmission from fecal contamination (soil/water) transmission.

Paragraph 4

Comment: Revise as follows:

Control of foodborne parasites can be achieved through the prevention of infection of farmed food animals (e.g., livestock, poultry, fish) with infective stages, ~~laboratory testing and follow-up actions (e.g. those included in the section 7.2.1 in the Guidelines for the Control of *Trichinella* spp. in meat of Suidae),~~ the prevention of contamination of fresh and processed foods with infective stages, and/or the inactivation of parasites in or on foods during processing.

Rationale: Testing is not a control. Testing, sampling, monitoring, surveillance, etc. are used to verify that controls are working. This was generally agreed for all parasites (including *Trichinella*) during the Tokyo Physical Working Group. Testing does not prevent contamination, nor can it assure that product is free of contamination.

Paragraph 5

Comment: Edit 2nd - 4th sentences as follows:

The details of the epidemiology (both human and animal disease) and **the** life cycle of each parasite are essential in the identification, prevention and control of the risks associated with that parasite. Epidemiological data collection in meat**-** producing animals and environmental parasite surveys ~~could~~ **can** be effective in identifying hazards and collecting information to be used for ~~the decisions making of~~ risk management ~~strategies~~ **strategy decisions**. Surveillance for parasitic diseases in humans is complicated by the often prolonged incubation periods, sub-clinical nature, ~~and~~ unrecognized chronic sequelae and lack of easily available diagnostic procedures.

Rationale: Editorial

Paragraph 6

Comment: Revise as follows:

The spread of foodborne parasitic diseases is also affected by human behaviour (for instance, ~~the~~ environmental contamination by human faeces due to the lack of latrines~~,~~ and ~~the~~ human-to-human contact~~s~~ ~~favouring~~ ~~the~~ **that** spread ~~of intestinal~~ parasite~~s~~ **eggs and cysts**~~, mainly protozoa~~), demographics, and global trade.

[Revised sentence would read: The spread of foodborne parasitic diseases is also affected by human behaviour (for instance, environmental contamination by human faeces due to the lack of latrines and human-to-human contact that spread parasite eggs and cysts), demographics, and global trade.]

Rationale: To avoid focus on only intestinal parasites and protozoa. A top-listed FAO/WHO foodborne parasite illness, neurocysticercosis, is spread by feces and contact, and is a neurological disease caused by a tapeworm. Other editorial changes.

SECTION 1 - OBJECTIVES

Paragraph 7

Comment: Edit as follows:

The primary purpose of these guidelines is to provide guidance on preventing~~, inactivating,~~ or reducing **to an acceptable level** foodborne parasite hazards that present a public health risk ~~to an acceptable level~~.

Rationale: Editorial. "Inactivating" is one way to reduce parasites to an acceptable level.

SECTION 2 - SCOPE, USE AND DEFINITION

2.1 SCOPE

Paragraph 8

Comment: Change “bacterial” to “bacteria” in the second sentence

They should complement guidelines in place for any other pathogens (e.g. bacteria~~l~~ and viruses).

Rationale: Editorial – change the adjective to a noun.

Paragraph 10

Comment: Delete “the” at the beginning of the sentence before “Section 3.” Add an “s” to “milk product” at the end of bullet 2.

Rationale: Editorial.

Paragraph 12

Comment: Revise the second sentence as follows:

The ~~24 top-ranked parasite-food combinations corresponding to~~ **most important foodborne parasites and the primary** ~~four~~ food categories **with which they are associated** (~~shown in the~~ **based on T**~~t~~able 2 of the FAO/WHO report) are as follows (other parasites may be more important locally/regionally).

Rationale: The description of the list is confusing and misleading. The FAO/WHO meeting ranked parasites, not parasite-food combinations. The list in this document does not contain 24 parasite-food combinations and the list is not a ranked list (since it is first divided by food type); it could be inferred that meat ranks higher than other commodities. The list is based on the “primary food category” from Table 2 of the FAO/WHO report.

Paragraph 12

Comment: Remove *Toxoplasma gondii* from the Fresh Fruits and Vegetables list.

Rationale: Only land animals are listed in Table 2 as the primary food category for *T. gondii*.

2.3 DEFINITIONS

Comment: Change the definitions as follows:

~~Cyst – environmental life cycle stage of some protozoan parasites, including cysts (e.g., Entamoeba histolytica, Giardia duodenalis); it may also refer to tissue cysts of Toxoplasma gondii, sarcocysts of Sarcocystis spp., or hydatid cysts of Echinococcus spp.~~

Cyst - **A resting transmission stage of a parasite that can cause infection when consumed. Environmental cysts are resistant to outside conditions and can be transferred with soil, dust, and water to food. Tissue cysts are located within animal tissues.**

Rationale: The current definition would be confusing to the non-scientists because it defines a cyst as an “environmental stage” and then includes “tissue cysts” without explaining the contradiction, or the meanings of these terms. The definition implies that the term is mainly used for protozoans, but it is used more broadly for any encysted stage as evidenced by the tapeworm example (also see definition for metacercariae.) The proposed definition addresses the broad usage of the term more clearly, and provides helpful information for the target audience.

Foodborne Parasite - Any parasite that can be transmitted to human**s** by ingesting food.

Rationale: Editorial.

Definitive Host - The host in the life cycle of a parasite in which sexual ~~reproduction~~ **maturity** occurs**. For parasites without sexual reproduction, the host of most importance is usually considered to be the definitive host.**

Rationale: To be more accurate and complete.

Intermediate Host – ~~The~~ **A** host which harbours ~~the larval~~ **a developmental** stage~~s~~ of the parasite **prior to sexual maturity**.

Rationale: Changed “the” to “a” because there may be more than one intermediate host. Changed “larval” to “developmental” because not all parasites have larvae. Need to be clear that sexual maturity does not occur in an intermediate host.

Metacercariae – (singular: metacercaria) – Encysted infectious larval stage of trematodes; found in the tissues of animal intermediate hosts or attached to aquatic plant**s**.

Rationale: Editorial.

Larvae - immature form of any parasite, before the assumption of the mature shape. ~~It~~ **They** can be infective or not.

Rationale: Editorial ("Larvae" is plural.) [Note: this definition is not in alphabetical order and should move to precede **Metacercariae.]**

Delete: ~~Tachyzoite – motile life cycle stage of some coccidian parasites (e.g. Toxoplasma gondii); undergo rapid multiplication in the host before developing into bradyzoites and forming tissue cysts.~~

Rationale: It was agreed that definitions were appropriate when a term was used more than once in the document. Consider elaboration of the one instance of this term in paragraph 40, if the term is retained (we suggest deletion there).

SECTION 3 – PRIMARY PRODUCTION

Paragraph 19

Comment: Edit as follows:

Sources of parasitic contamination of ~~feed,~~ food and food producing animals at the primary production site include **feed,** water, soil, workers, untreated manure, sludge or fertilizers contaminated by faeces of human and domestic or wild animals, or proximity to other activities which could result in run-off or flooding with contaminated water. In addition to the above, food-producing animals feeding on other live and dead animals (e.g., mammals, fish, birds, invertebrates), are important sources of parasitic infections.

Rationale: Feed is a source of contamination of food-producing animals and not a source of human infection.

A. Meat

Comment: Edit Title to A:

A. Meat **and meat products**

Rationale: Editorial

Paragraph 20

Comment: Edit as follows:

Important meat-transmitted foodborne parasites include, but are not limited to, *Taenia saginata* (cattle), *Taenia solium* (pigs), *Trichinella spiralis* (pigs, horse**s**, game), *Toxoplasma gondii* (pigs, cattle, sheep, goats, horses, game), *Trichinella* spp. (other than *T. spiralis*) (pigs and game), *Sarcocystis* spp.,(pigs, cattle) and *Spirometra* spp.(frogs **and** snake**s**). ~~Foodborne parasites, present in domestic and wild animals and which are not transmissible to human via meats, but are transmissible via fecal contamination of food (e.g. *Echinococcus*, *Cryptosporidium*, and *Giardia*) should be controlled in animal production in order to interrupt the life cycle of parasites.~~ **Certain foodborne parasites present in domestic animals may be transmitted to food plants via fecal contamination (e.g., *Echinococcus* spp., *Cryptosporidium* spp., and *Giardia duodenalis*.) These parasites are not associated with human illness from consumption of meat, however they should be controlled in animal production in order to interrupt their life cycle.** For information on specific food vehicles for these parasites, see Table 2 in *Multicriteria-Based Ranking for Risk Management of Food-Borne Parasites*, Report of a Joint FAO/WHO Expert Meeting, 2012.

Rationale: To clarify an awkward sentence. "Wild" is removed because domestic animal infection is primarily what is being controlled. Changed "not transmissible to humans via meat" to "not associated with human illness from consumption of meat" because these parasites are transmissible to humans via meat if processing conditions are not sanitary.

Comment: The Committee should consider whether to add "chickens" to the list of animals associated with *Toxoplasma gondii* based on the literature data demonstrating *Toxoplasma* infection in free range and backyard chickens.

See the following references for *Toxoplasma gondii* in chickens:

http://www.researchgate.net/profile/Chirukandoth_Sreekumar/publication/8998126_Characterization_of_Toxoplasma_gondii_isolates_from_free_range_chickens_from_Paran_Brazil/links/53e0f7f90cf2d79877a510a4.pdf

http://www.sciencedirect.com/science/article/pii/S0020751901003642

http://www.researchgate.net/profile/Chirukandoth_Sreekumar/publication/10730935_Isolation_and_molecular_characterization_of_Toxoplasma_gondii_from_chickens_and_ducks_from_Egypt/links/53e0f7f50cf2d79877a510a0.pdf

http://www.bioone.org/doi/abs/10.1645/12-25.1

http://www.journalofparasitology.org/doi/abs/10.1645/GE-463R

http://www.journalofparasitology.org/doi/abs/10.1645/GE-124R

Paragraph 22

Comment: Revise as follows:

Faeces of domestic and wild animals (e.g. *Toxoplasma* oocysts in felids), as well as human faeces (e.g. *Taenia* eggs), may contain parasites that are infective to domestic food-producing animals. Some parasites may also be transmitted to domestic animals or other animal hosts when these animals eat infected tissues from other animals. Where parasites will not be controlled at a later processing stage, the feasibility of ~~producing meat products with~~ ~~concepts to avoid~~ **controlling** environmental ~~contamination~~ **introduction** of foodborne parasites ~~by controls~~ during primary production **with available methods** should be ~~considered~~ **determined** before **primary** production begins. A production area may be unsuitable if controls cannot be applied at primary production and ~~they~~ **parasites** will not be controlled at later stages. The risk associated with the introduction of organic material (e.g., faecal and other material that may contain oocysts or eggs) from non-food-producing animals into the production environment should also be ~~addressed~~ **assessed**.

Rationale: For clarity. The message should be that the producer needs to determine the feasibility of producing safe product in the area before beginning to raise domestic animals there.

Paragraph 26

Comment: Edit as follows:

Domestic animals (e.g., cats and dogs), wild animals (e.g., foxes and rodents), and unauthorized people should be excluded from barns and outdoor areas used for food animals, and the primary production environment to the extent possible~~;~~**.** **F**or example**,** Felidae are the definitive hosts for *Toxoplasma gondii* and faeces from contaminated cats contain~~s~~ oocysts that contaminate fields and other feeding areas.

Rationale: Editorial

Paragraph 27

Comment: Edit as follows:

Fully enclosed animal housing systems, or other systems that prevent intrusions of potentially contaminated small animals or unauthorized people, combined with other good production practices, can be effective in controlling foodborne parasite hazards in meat, since such systems have been demonstrated to be ~~very~~ effective for a number of parasites (e.g. *Trichinella*~~, *Toxoplasma*~~).

Rationale: The term “very” is not needed, and appears un-scientific and subjective. Joke W. B. van der Giessen (DVM PhD Dipl. EVPC National Institute for Public Health and the Environment (RIVM) center Zoonoses & Environmental Microbiology, Netherlands) indicated that *Toxoplasma* should not be listed as an example because the effectiveness of enclosed animal housing systems for the control of *Toxoplasma* has not been as well proven as it has been for *Trichinella*.

Paragraph 28

Comment: Edit as follows:

Good hygienic practices including management of waste, such as maintaining and using sanitary toilet facilities, should be ~~in place and~~ implemented. Toilets for staff and visitors should be provided. Human faeces should be disposed of in such a way as to eliminate contact with animals or pasture land.

[Note: This paragraph should be combined with paragraph 36 which covers the same material. The information should be located in one section or another.]

Rationale: Editorial

Paragraph 31

Comment: Edit as follows:

Primary producers should supply water ~~which~~ **that** is not a significant source of transmission of foodborne parasite**s** to food-producing animals and block access of food producing animals to surface water to minimize the potential for infection with parasites.

Rationale: Editorial

Paragraph 33:

Comment: delete

~~Information exchange between primary production and the slaughterhouse or processing plant should be encouraged e.g.:~~

- ~~the status of the herd (controlled housing or not, history of parasitic infection) in order to facilitate a more targeted control on parasites in the slaughterhouse;~~
- ~~feedback from findings in slaughterhouse to the herds on findings during inspection, with the purpose to review preventive measures at the farm.~~

Rationale: The paragraph is redundant with paragraph 39 and is more appropriate in the section on Monitoring and Surveillance at Primary Production than in the one on Hygienic Production of Food Sources.

Paragraph 34

Comment: We recommend deleting this paragraph.

~~Refer to section 5.6 Transport of the *Code of Hygienic Practice for Meat* (CAC/RCP 58-2005) and Chapter 7.2. (Transport of animals by sea), 7.3. (Transport of animals by land), 7.4. (Transport of animals by air) of the *OIE Terrestrial Animal Health Code* (2014).~~

Rationale: We question the appropriateness of this paragraph. Transportation is not usually associated with parasite infection. CCFH should verify that controls specific to parasites are contained in these transportation documents if the paragraph is retained. General sanitation during transportation (not specific to parasites) is adequately covered by the GPFH.

Paragraph 36

Comment: Edit as follows:

Farm workers may be from endemic areas and homes with inadequate sanitary facilities. Workers may be infected with parasites without feeling ill or showing any symptoms. In order to minimize the opportunity for contamination of the production environment with parasitic stages from human faeces, ~~installation and use of the~~ on-farm sanitary facilities should be installed **and used**, e.g., functional latrines in the field, and an adequate means of hygienically washing and drying hands. Waste from sanitary facilities should be hygienically disposed **of**.

[Note: This paragraph should be combined with paragraph 28 which covers the same material. The information should be located in one section or another.]

Rationale: Editorial

Paragraph 37

Comment: Edit the last sentence as follows:

Monitoring and surveillance can be useful as tools to verify the effectiveness of parasite controls, **and** should begin at primary production**.**

Rationale: Editorial

Paragraph 38

Comment: Edit as follows:

Assurance that a parasite hazard is adequately controlled can be attained through demonstration of properly implemented controls and hygienic practices, which may be supported by a series of negative test results over a sufficient time period through **a** risk-based surveillance programme.

Rationale: Editorial

Paragraph 39

Comment: Revise as follows:

It is important to exchange information between primary production and the slaughterhouse or processing plant e.g.**:**

- If the herd of origin is kept under controlled management conditions, this information should be provided to the slaughterhouse in order to facilitate ~~a~~ more targeted ~~control on~~ **monitoring of** parasites **at the slaughterhouse**.
- When the status of the herd in relation with parasite infection (e.g.**,** ~~raised in controlled housing or not(where applicable),~~ history of parasitic infection) is known, it should be communicated to the slaughterhouse in order to facilitate a more targeted ~~assessment of parasite controls~~ **monitoring of parasites** in the slaughterhouse**.**
- The status of the meat, following a post-mortem inspection in the slaughterhouse should be provided to owner of herds, to facilitate a more targeted control at primary production.

Rationale: The term "monitoring" is appropriate in place of "control" because testing at the slaughterhouse is verification that preventive control measures on the farm are working.

The 2nd bullet repeats guidance in the 1st bullet about conveying information on controlled management conditions.

B. Milk and milk products

Paragraph 40

Comment: Revise as follows:

Important milk-transmitted foodborne parasites include *Cryptosporidium* spp. and *Toxoplasma gondii*. Unpasteurized milk has been associated with outbreaks of cryptosporidiosis and toxoplasmosis. Contamination of unpasteurized milk with *Cryptosporidium* may result from unsanitary milking conditions, such as when the udders are not properly cleaned. Outbreaks of toxoplasmosis have been associated with the consumption of unpasteurized goat and camel milk. ~~Tachyzoites~~ **Infective stages** of *Toxoplasma* in recently infected animals may be excreted in the milk, resulting in milk-borne infection. ~~Unpasteurized milk has been associated with outbreaks of cryptosporidiosis in Australia and the United Kingdom.~~

Rationale: See comment for "Tachyzoite" in the Definition section. "Infective stages" is more informative and appropriate for the target audience than "tachyzoites." The last sentence is duplicative of the second sentence, but adds country names that are not relevant to risk identification because *Cryptosporidium* is found worldwide.

C. Fish and fishery products

Paragraph 47

Comment: Revise as follows:

During the parasite hazard analysis, producers should consider how the food will be further processed, prepared and consumed in order to determine appropriate parasite controls. ~~For example, fish that may contain foodborne parasites, but may not have gone through appropriate parasite control can be marketed as "**not suitable for raw consumption**" if the fish is cooked before consumption although allergies may need to be considered.~~ **For example, fish that contain foodborne parasites may be marketed without parasite control where consumers are likely to cook the fish before consumption.**

Rationale: All fish may contain foodborne parasites. Almost all fish do not undergo a parasite control. Fish are not marketed with labels or signs stating "not suitable for raw consumption." Furthermore, the processor is not expected to control Anisakid allergens for sensitive individuals. They can be in any fish and have no practical control. The allergy issue is appropriately covered in paragraph 99.

Paragraph 49

Comment: Edit 1st sentence as follows:

Wild fish**,** and aquacultured fish with**out** ~~no~~ controlled rearing conditions**,** may contain parasites that infect people.

Rationale: Editorial

Paragraph 50

Comment: Edit as follows:

Some species of wild large tuna (e.g. *Thunnus alalunga*, *Thunnus albacares*) appear to have few or no parasites **in the edible portion,** and thus m**a**y not have ~~a~~ significant parasite hazards.

Rationale: These species may have foodborne parasites in the viscera; editorial corrections.

Paragraph 53

Comment: Edit 1st sentence to delete the "s" from "parasites":

Some aquaculture methods may reduce a parasite~~s~~ hazard to an acceptable level…

Rationale: Editorial.

Paragraph 55

Comment: Add the last sentence from paragraph 58 to this paragraph. Use "GAqP" as the abbreviation for Good Aquacultural Practices.

To prevent potential transmissions of parasites, fingerlings should only be purchased from producers who implement reliable source management systems and Good Aquaculture Practice (GA**g**P). **Fingerlings collected from the wild may contain foodborne parasites that remain a hazard in adult fish**.

Rationale: The two statements on fingerlings should be together. The second sentence provides the rationale for using fingerlings from producers using Good Aquacultural Practices, which should be abbreviated GAqP as GAP is the common abbreviation for Good Agricultural Practices.

Paragraph 56

Comment: Edit as follows:

Animals, including dogs and cats, ~~may be~~ **are definitive hosts for freshwater trematode** fishborne parasite**s** ~~hosts~~ and should be excluded from aquaculture ponds to the extent possible, for example by placing fences around ponds.

Rationale: Species are classified as hosts regardless of current infection. Alternatively say "**may be infected with fishborne parasites.**"

Paragraph 57

Comment: Edit as follows:

~~Particular~~ **A**ttention should **also** be given to animals that serve as intermediate hosts in the life cycle of fishborne parasites.

Rationale: The term "particular" may appear to indicate that control of snails is more important than control of mammals, which should not be the message conveyed. The previous paragraph on excluding mammal definitive hosts may be more practical than removing snails, which may require draining the pond.

Paragraph 58

Comment: Delete the last sentence on "fingerlings" and move it to paragraph 55.

Using raw fish as feed for aquaculture is likely to introduce a risk of parasitic infection, therefore it should be avoided as much as possible. Raw fish used for feed may be previously frozen in order to inactivate parasites. It is particularly important to inactivate parasites in feed where the fish will not be subsequently frozen, and may be consumed raw or undercooked. ~~Fingerlings collected from the wild may contain foodborne parasites that remain a hazard in adult fish.~~

Rationale: It is more appropriate in the paragraph about purchasing fingerlings from producers using Good Aquacultural Practices.

Paragraph 61

Comment: We recommend that this paragraph on eviscerating fish without delay be moved into section 3.3 Handling. Storage and Transport.

Rationale: Evisceration seems to be more appropriate in the section on Handling than in the section on Hygienic production of food sources.

Paragraph 64

Comment: Revise as follows:

~~Monitoring and surveillance can~~ **Examining fish for live fishborne parasites may** be **a** useful tool~~s~~ to assess the effectiveness of ~~the~~ **fishborne parasite preventive** control measures ~~of parasites and, for better effectiveness, may need to begin at primary production.~~ Data from monitoring and surveillance can be useful to develop and review risk management strategies.

Rationale: This section is primary production so it is not necessary to say that these tools are more effective if they begin at primary production. Examining fish for live parasites may be useful for certain aquaculture situations, where it is believed that parasites are under control, although this type of verification has not been widely established by industry or regulatory agencies. To verify adequate control for wild fish (mainly freezing), records are examined to assure proper times and temperatures were attained; however this does not pertain to primary production.

Paragraph 65

Comment: Revise as follows:

Assurance that a parasite hazard is adequately controlled ~~can~~ **may** be attained through demonstration of properly implemented controls and hygienic practices, which may be supported by a series of negative test results over a sufficient time period through **a** risk-based surveillance programme.

Rationale: Revised to say "may" because no such assurance of adequate control has been demonstrated for aquaculture.

D. Fresh fruits and vegetables

Paragraph 66

Comment: Delete *Toxomplasa gondii*

Important fruit- and vegetable-transmitted foodborne parasites include, but are not limited to, *Taenia solium, Echinococcus granulosus, Echinococcus multilocularis, ~~Toxoplasma gondii~~, Entamoeba histolytica, Cryptosporidium* spp., *Ascaris* spp., *Giardia duodenalis, Fasciola* spp., *Cyclospora cayetanensis, Trichuris trichiura, Balantidium coli*, and *Toxocara* spp. For information on specific food vehicles for these parasites see Table 2 in Multicriteria-Based Ranking for Risk Management of Food-Borne Parasites, Report of a Joint FAO/WHO Expert Meeting, 2012.

Rationale: Only the parasites associated with the primary food vehicle in Table 2 of the FAO/WHO Report should be listed.

Paragraph 67

Comment: Delete the last sentence.

Certain fruits and vegetables are consumed raw without a cooking or freezing step to kill parasites. In this case, controls that reduce the parasite hazard to an acceptable level during primary production are especially important. ~~Adequate washing is one control measure feasible to be used in many cases.~~

Rationale: Washing is a control measure during packing or processing in a facility. What is referred to here is control at primary production. Washing is discussed in Section 5.2.2.5. Moreover, as noted in paragraph 88, washing may not be able to reduce the parasite hazard to an acceptable level.

Paragraph 75

Comment: Edit as follows:

Farm workers may be from endemic areas and homes with inadequate sanitary facilities. Workers may be infected with parasites without feeling ill or showing any symptoms. In order to minimize the opportunity for contamination of the production environment with parasitic stages from human faeces, ~~installation and use of the~~ on-farm sanitary facilities should be ~~established~~ **installed and used**, e.g., functional latrines in the field, and an adequate means of hygienically washing and drying hands. Waste from sanitary facilities should be hygienically disposed of.

Rationale: This paragraph should read the same as paragraph 36.

SECTION 4 - ESTABLISHMENT: DESIGN AND FACILITIES

4.2 PREMISES AND ROOMS

Paragraph 76

Comment: Delete "presence of hygiene barrier" in the parenthetical statement at the end or provide an example.

Rationale: It is unclear what is meant by the "presence of hygiene barrier" (to minimize the introduction of soil that may contain feces). An example could clarify this.

SECTION 5 - CONTROL OF OPERATION

5.1 CONTROL OF FOOD HAZARDS

Paragraph 78

Comment: Revise as follows:

During the parasite hazard analysis, food business operators should consider how the product will be further processed, prepared and consumed in order to determine appropriate parasite controls. Where the hazard analysis indicates the presence of a significant foodborne parasite hazard, slaughter and postharvest processing operations should have control measures in place that prevent or eliminate the hazard or reduce it to an acceptable level. **For certain food/parasite combinations that are not associated with foodborne parasite illnesses because the product is generally thoroughly cooked before consumption (e.g., certain finfish), the competent authority may decide that consumer education is the practical approach, and the parasite hazard may not require control at the processor level.**

Rationale: It is not always possible, or necessary, to ensure control of parasites at slaughter or post-processing.

5.2 KEY ASPECTS OF HYGIENE CONTROL SYSTEMS

Paragraph 83

Comment: Revise as follows:

Many parasites in food are susceptible to freezing. However, specific time/temperature combinations are required to inactivate parasites by freezing, and these are also dependent on the food type and portion size. Some parasites (e.g.*Trichinella nativa* and *T britovi* larvae or eggs of *Echinococcus multilocularis*) are resistant to freezing. *T. nativa* can survive up to 5 years at -18°C. Freezing of meat cannot be recommended **as a control measure** in areas where ***T. nativa* or** *T. britovi* is found in wild mammals.

Rationale: Add the purpose of freezing meat; include *T. nativa* as well as *T. britovi*, as *T. nativa* is also a risk in areas where it is found in wild mammals.

Paragraph 86

Comment: Edit as follows:

Processing methods such as salting, curing, marinating, pickling, ~~and~~ smoking ~~at 40°C~~, and addition of food additives that may be effective for the control of certain other foodborne pathogens~~,~~ are generally not sufficient for the control of foodborne parasites. Combination**s** of several treatments…

Rationale: There is no rationale for including 40°C. It implies that smoking at other temperatures is adequate, and does not consider a time component. Other editorial changes.

Paragraph 87

Comment: Edit as follows:

Irradiation ~~serves as another~~ **is a** possible measure for parasite control.

Rationale: Editorial.

5.7 DOCUMENTATION AND RECORDS

Paragraph 93

Comment: Add an “s” to “parasite”

Information on the level of control of parasite**s** at appropriate points in the food chain can be used for several purposes e.g. to validate and/or verify outcomes of food control measures, to monitor compliance with public health goals, and to help prioritise regulatory efforts to reduce foodborne parasite illnesses.

Rationale: Editorial

SECTION 9 – PRODUCT INFORMATION AND CONSUMER AWARENESS

Paragraph 96

Comment: Edit as follows.

Labels may be used to help differentiate between products that are intended for raw consumption, and products that are intended to be cooked by the consumer. However, labels are ~~often overlooked by the consumer and are~~ not considered to be adequate control measures. Therefore, even with the beneficial use of labels instructing consumers to cook the product, a parasite hazard should be reduced to an acceptable level before marketing products that are likely to be consumed raw or undercooked.

Rationale: The key point should be that labels not be used as a control measure.

Paragraph 97

Comment: Edit as follows.

In order to increase consumer awareness of foodborne parasite hazards, education, is an important component of risk management, and in some cases may be the only practical option available. Consumers should recognize the risks associated with consumption of raw, undercooked, and lightly processed (e.g., marinated, smoked) meat and fish**, as well as the consumption of certain fruits and vegetables that may not be rendered safe simply by washing alone**. Consumer advice should be provided on how to prepare foods (e.g., cooking times and temperatures) and on the importance of good hygiene (e.g., hand-washing) in order to avoid infection with foodborne parasites. Consumer**s** should always make sure to separate raw foods from cooked foods~~,~~ and ready to eat fruit and vegetables to prevent cross-contamination while handling and preparing meals. The WHO Five keys to safer food could assist~~s~~ in this process

Rationale: Consumers need to recognize the risk from fresh fruits and vegetables that may be contaminated by protozoan parasites that cannot be removed by washing.

SECTION 10 - TRAINING

Paragraph 100

Comment: Edit as follows:

Workers engaged in primary production, processing, preparation, retail or food service should be trained and/or instructed in the control of foodborne parasites (e.g. **from** good animal husbandry practices to hygiene and sanitation measures) to a level appropriate to the operations they are to perform**,** in particular abattoir workers who may be performing post-mortem inspection procedures.

Rationale: Editorial

Paragraph 103

Comment: Edit as follows:

Inspectors or other relevant authorities, who inspect fields, post-harvest processing plants, and food service facilities, should also be trained as per paragraph ~~92~~ **101**.

Rationale: Correct the cross-reference

AFRICAN UNION

Issue & Rationale:

The document is not a stand-alone document and must be considered in conjunction with other documents e.g. OIE documents. There are distinct sections of the various commodities which render the document user-friendly. Even though there are only 24 top-ranked foodborne parasites that have been considered by FAO/WHO, there is provision made for member states to highlight other parasites of food safety concern as new work. Specific commodities shall address the issue of the quality of irrigation water at primary production where necessary.

A.U. Position:

The AU supports adoption of the Draft Guidelines of General Principles of Food Hygiene to the Control of Foodborne Parasites at Step 5/8.

General Comment:

Because of the relevance of parasites in water, the WHO Guidelines on Drinking Water should be referenced in this document. The adoption of a similar approach on the Annex for *Trichinella* and *C. bovis* was used, making the document user-friendly as it provides clarity and focus. The issue of dead *Anisakis* allergenicity has also been well addressed in the Consumer Education section for protection of public health and safety.

FOODDRINK EUROPE

General Comments:

Even though the document references many other documents, we miss in the introduction a point on the already implemented control measures along the food chain to the control of faecal oral routes of contamination (i.e. by enteric viruses or bacteria such as STEC and Viruses) that are also relevant to manage a wide range of parasites and should be taken into consideration ([Specific comment on paragraph 4.] below). Some gaps remain in the document with regards to points in the documents sometimes being very prescriptive [Specific Comment on paragraph 31.] and sometimes largely too vague [Specific Comment on paragraph 22. 23.]

Specific comments:

Paragraph 4: We propose amendment in the below text, to take into account the already implemented control measures along the food chain according to the general comment part. In addition having "laboratory testing" as a control measure contradicts with paragraph 32. that says "Animal surveillance may be useful tool for assessing control measure needs/shortcomings; however, because of the practical limitations of sampling and testing methodology, testing cannot assure the absence of a parasite hazard".

4. Control of foodborne parasites can be achieved through the prevention of infection of farmed food animals (e.g., livestock, poultry, fish) with infective stages, ~~laboratory testing~~ and follow-up actions (e.g. those included in the section 7.2.1 in the Guidelines for the Control of Trichinella spp. in meat of Suidae), the prevention of contamination of fresh and processed foods with infective stages, and/or the inactivation of parasites in or on foods during processing. Control during primary production is important for many parasite/food combinations, while control measures during post-harvest are necessary for other parasite/food combinations. **Along the food chain, the faecal oral routes of contamination with parasites are very similar to other pathogens such as enteric viruses, STEC or Salmonella. Therefore the already existing control measures implemented to manage these hazards are also relevant for parasites and need to be taken into consideration**. During a parasite hazard analysis, producers should consider how the product will be further processed, prepared and consumed in order to determine appropriate parasite control measures. Education and awareness-raising are important components of consumer protection from foodborne parasitic diseases and, in many cases, may be the only feasible option available."

Paragraph 6: We propose to delete the below text in paragraph 6 to avoid vague statements in the Codex guidelines and instead should just have text which can be substantiated.

6. The occurrence and distribution of parasitic species in the raw commodities used for food can be affected by climate changes, land use, and other environmental factors. The spread of foodborne parasitic diseases is also affected by human behavior (for instance, the environmental contamination by human faeces due to the lack of latrines, and the human-to-human contacts favoring the spread of intestinal parasites, mainly protozoa), demographics, and global trade. For example, globalization of food trade offers new opportunities for parasite dissemination into new areas. ~~In addition, variations in food preferences and consumption patterns, such as the increasing tendency to eat meat, fish and seafood raw, undercooked, smoked, pickled or dried, and the demand for free-range and exotic foods such as bush meat or wild game also influence the spread of parasitic diseases~~.

Paragraph 8: Since this guideline in this para mentions "except for water", so propose to include a reference to the WHO Guidelines for drinking-water quality.

Paragraph 15: Propose to delete this paragraph as there is currently no decision to elaborate parasite specific annex (as per Para 13 of CX/FH 15/47/6). However, at the same time we support the need for reference inactivation guidance for the various combinations of product categories and technologies (e.g. freezing, pasteurization) covered in the document.

Paragraph 22: Some of the text mentioned in the paragraph is vague due to the improper use of "should" or sentence construction or absence of added value prescription giving for some points room in the interpretation and implementation of the prescription and so propose the below amendment to Para 22:

22: Faeces of domestic and wild animals (e.g. *Toxoplasma* oocysts in felids), as well as human faeces (e.g. *Taenia* eggs), may contain parasites that are infective to domestic food-producing animals. Some parasites may also be transmitted to domestic animals or other animal hosts when these animals eat infected tissues from other animals. Where parasites will not be controlled at a later processing stage, **control measures should be in place to control the parasitic hazard**. ~~the feasibility of producing meat products with concepts to avoid environmental contamination of foodborne parasites by controls during primary production should be considered before production begins. A production area may be unsuitable if controls cannot be applied at primary production and they will not be controlled at later stages. The risk associated with the introduction of organic material (e.g., faecal and other material that may contain oocysts or eggs) from non-food-producing animals into the production environment should also be addressed.~~

Paragraph 23: We propose the below editorial changes in paragraph 23 to provide clarity in the text:

23: Game meat may contain parasites that infect humans. The environment of wild animals, and open range domesticated animals cannot be controlled, requiring **mitigating** measures to be taken in order to minimize the risk at a later stage in the food chain.

Paragraph 28: We propose the below editorial changes in paragraph 28 to provide clarity in the text:

28: Good hygienic practices including management of waste, such as maintaining and using sanitary toilet facilities should be in place and implemented. Toilets for staff and visitors should be provided. Human faeces should be disposed of in such a way as to eliminate contact **of potentially infectious faeces** with animals or pasture land.

Paragraph 31: We propose the below changes in paragraph 31 to provide clarity in the text and also at the same point of time to make the guidelines practical from implementation standpoint of view:

31: Primary producers should supply water which is not a significant source of transmission of foodborne parasite to food-producing animals ~~and block access of food producing animals to surface water to minimize the potential for infection with parasites~~.

Paragraph 33: We propose to delete paragraph 33, as this is extra and is already covered by requirements stated in para 39.

~~33. Information exchange between primary production and the slaughterhouse or processing plant should be encouraged e.g.:~~

~~ the status of the herd (controlled housing or not, history of parasitic infection) in order to facilitate a more targeted control on parasites in the slaughterhouse;~~

~~ feedback from findings in slaughterhouse to the herds on findings during inspection, with the purpose to review preventive measures at the farm.~~

Paragraph 36: We propose to delete paragraph 36, as this is extra and is already covered by requirements stated in para 28.

~~36: Farm workers may be from endemic areas and homes with inadequate sanitary facilities. Workers may be infected with parasites without feeling ill or showing any symptoms. In order to minimize the opportunity for contamination of the production environment with parasitic stages from human faeces, installation and use of the on-farm sanitary facilities should be installed, e.g., functional latrines in the field, and an adequate means of hygienically washing and drying hands. Waste from sanitary facilities should be hygienically disposed.~~

Paragraph 40: We suggest amending the paragraph “40.” as below. To be more concise as we are not aware of outbreaks with camel milk. Association with drinking camel milk has been suggested in several studies based on milk analyses but was not evidenced in the frame of a toxoplasmosis outbreak. Also suggesting some editorial changes in the text below to make it more relevant.

In the point “40.” we suggest as well not to restrict unpasteurized milk cryptosporidiosis outbreaks to Australia and UK as other countries reported outbreaks.

40. ~~Important~~ **Potentially** milk-transmitted foodborne parasites include Cryptosporidium spp. and Toxoplasma gondii. Unpasteurized milk has been associated with ~~outbreaks~~ **human cases** of cryptosporidiosis and toxoplasmosis. Contamination of unpasteurized milk with Cryptosporidium may result from unsanitary milking conditions, such as when the udders are not properly cleaned. **Unpasteurized milk has been associated with outbreaks of cryptosporidiosis (e.g. Australia and the United Kingdom)**. **Human cases** ~~Outbreaks~~ of toxoplasmosis have **only** been **linked directly** ~~associated with the consumption of~~ to unpasteurized goat**'s milk consumption** ~~and camel milk~~ **although risk factors studies have suggested an association with drinking unpasteurized milk in several other countries (e.g. Poland, USA, Mexico**. Tachyzoites of Toxoplasma in recently infected animals may be excreted in the milk, **potentially** resulting in milk-borne infection. ~~Unpasteurized milk has been associated with outbreaks of cryptosporidiosis in Australia and the United Kingdom~~.

Dubey, J.P., Jones, J.L. Comments on "detection of toxoplasma gondii in raw caprine, ovine, buffalo, bovine, and camel milk using cell cultivation, cat bioassay, capture ELISA, and PCR methods in Iran" (2014) *Foodborne Pathogens and Disease*, 11 (6), pp. 500-501.

Boughattas, S. Commentary on: "Detection of Toxoplasma gondii in raw caprine, ovine, buffalo, bovine, and camel milk using cell cultivation, cat bioassay, capture ELISA, and PCR methods in Iran" (2015) *Frontiers in Microbiology*, 6 (MAR), art. no. 215,

Paragraph 42: We propose the below amendments in paragraph 42 to provide clarity in the text to avoid issues with interpretation and also at the same point of time to make the guidelines practical from implementation standpoint of view:

42. Cats should be excluded, **as far as reasonably practical,** from barns and food production, handling and storage areas used for dairy herds (e.g., cows, goats, sheep and camels). Dairy herds should ~~not~~ **be limited as far as reasonably practical**, ~~allowed~~ to graze areas where Felidae are commonly found since cats are the only definitive hosts for *Toxoplasma gondii* and faeces from recently infected cats contain environmentally resistant oocysts that contaminate fields and other feeding areas.

Paragraph 47: We propose the below amendment to paragraph "47." and remove the example given regarding labelling, to avoid issues with interpretation as other non-parasitic biological hazards might also be present as well and pose a safety issue despite parasite control measures are implemented and working.

47. During the parasite hazard analysis, producers should consider how the food will be further processed, prepared and consumed in order to determine appropriate parasite controls. ~~For example, fish that may contain foodborne parasites, but may not have gone through appropriate parasite control can be marketed as "not suitable for raw consumption" if the fish is cooked before consumption although allergies may need to be considered.~~

Paragraph 51: We propose the below amendment to paragraph "51." which may create issues with interpretation of the text and also implementation of the guidelines and so propose to be amended.

51. Animals and people **surrounding** ~~present in the vicinity of~~ aquaculture ponds can be infected with foodborne parasites that are transmitted to humans through fish. Animals and humans may excrete parasite eggs that enter water and develop into larval stages that subsequently infect farmed fish.

Paragraph 75: We propose to delete Paragrpah 75, as this is already mentioned in section 3.2.3 of the *Code of Hygienic Practice for Fresh Fruits and Vegetables (CAC/RCP 53-2003)* and is referenced in paragraph 74 of this proposed draft guidelines and is just duplicity of the text.

> ~~75. Farm workers may be from endemic areas and homes with inadequate sanitary facilities. Workers may be infected with parasites without feeling ill or showing any symptoms. In order to minimize the opportunity for contamination of the production environment with parasitic stages from human faeces, installation and use of the on-farm sanitary facilities should be established, e.g., functional latrines in the field, and an adequate means of hygienically washing and drying hands. Waste from sanitary facilities should be hygienically disposed of.~~

Paragraph 96 – Paragraph 99: We propose to delete the text in the Para "96 - 99", and just make reference to Section 9 of *General Principles of Food Hygiene (CAC/RCP 1-1969)* in Section 9, as this is the already agreed Codex text and we should avoid duplicity of text unless it is of specific reference or relevance in these proposed draft guidelines. This is also followed in other guidelines e.g. *Code of Hygienic Practice for Fresh Fruits and Vegetables (CAC/RCP 53-2003) or in Code of Hygienic practice for Eggs and Egg products (CAC/RCP 15-1976).*

~~96. Labels may be used to help differentiate between products that are intended for raw consumption, and products that are intended to be cooked by the consumer. However, labels are often overlooked by the consumer and are not considered to be adequate control measures. Therefore, even with the beneficial use of labels instructing consumers to cook the product, a parasite hazard should be reduced to an acceptable level before marketing products that are likely to be consumed raw or undercooked.~~

~~97. In order to increase consumer awareness of foodborne parasite hazards, education, is an important component of risk management, and in some cases may be the only practical option available. Consumers should recognize the risks associated with consumption of raw, undercooked, and lightly processed (e.g., marinated, smoked) meat and fish. Consumer advice should be provided on how to prepare foods (e.g., cooking times and temperatures) and on the importance of good hygiene (e.g., hand-washing) in order to avoid infection with foodborne parasites. Consumer should always make sure to separate raw foods from cooked foods, and ready to eat fruit and vegetables to prevent cross-contamination while handling and preparing meals. The WHO Five keys to safer food could assists in this process.5~~

~~98. Education is particularly important for consumers in endemic areas, and in high risk groups, such as those who are pregnant or immunocompromised (e.g., *Toxoplasma gondii* in pregnant women and immunocompromised groups; *Cryptosporidium* in children, immunocompromised groups and older adults.) For such consumers, advice on the preparation and consumption of high-risk foods such as fresh produce, adequate cooking of meat and fish prior to consumption and the importance of hygiene, e.g., hand-washing, is critical.~~

~~99. When people are diagnosed with an *Anisakis* spp. nematodes allergy, they should be advised to avoid eating marine fish.~~

Section 9: PRODUCT INFORMATION AND CONSUMER AWARENESS

Refer to *General Principles of Food Hygiene (CAC/RCP 1-1969)*

Paragraph 100 – Paragraph 103: We propose to delete the text in the Para “100 - 103”, and just make reference to Section 10 of *General Principles of Food Hygiene (CAC/RCP 1-1969)* in Section 10, as this is already agreed text and we should avoid duplicity of text unless it is of specific reference or relevance in these proposed draft guidelines. This is also followed in other guidelines e.g. *Code of Hygienic Practice for Fresh Fruits and Vegetables (CAC/RCP 53-2003) or in Code of Hygienic practice for Eggs and Egg products (CAC/RCP 15-1976).*

~~100. Workers engaged in primary production, processing, preparation, retail or food service should be trained and/or instructed in the control of foodborne parasites (e.g. good animal husbandry practices to hygiene and sanitation measures) to a level appropriate to the operations they are to perform in particular abattoir workers who may be performing post-mortem inspection procedures.~~

~~**10.2 TRAINING PROGRAMMES**~~

~~101. Training programmes should contain information on the following, as appropriate to those being trained:~~

~~• The potential for food to be a vehicle of transmission of foodborne parasites if contaminated.~~

~~• The potential sources and routes of transmission of foodborne parasites.~~

~~• The potential for persistence of parasites in/on contaminated foods and food production settings.~~

~~• The need to comply with good animal husbandry practices and the importance of compliance with such practices, including:~~

~~- the role of domestic and wild animals in the transmission of certain parasites;~~

~~- the importance of on-farm sanitation and hygiene in interrupting the life cycle of parasites~~

~~and minimizing the opportunity for faecal-oral transmission; and~~

~~- the importance of animal feed management to avoid domestic and wild life parasite~~

~~contamination.~~

~~- Proper hand washing practices and the importance of strict compliance with hand washing instructions at all times, particularly after being in contact with faecal matter. It is advisable to educate each new employee in the proper practices that are to be followed for hand-washing.~~

~~- The importance of adequate food processing and preparation to eliminate potential parasite risks.~~

~~- Task-specific practices to reduce or eliminate the risks of parasites in foods.~~

~~**10.3 INSTRUCTION AND SUPERVISION**~~

~~102. Training and instructions should be given to all new personnel on the transmission and management of foodborne parasites.~~

~~103. Inspectors or other relevant authorities, who inspect fields, post-harvest processing plants, and food service facilities, should also be trained as per paragraph 92.~~

Section 10: TRAINING

Refer to *General Principles of Food Hygiene (CAC/RCP 1-1969)*

CEFIC

Although it is relatively easy to understand that the draft guidance will apply mainly to primary production and further processing of food from animal or plant origin, the point 2.1 Scope may confuse the reader of the guidelines. In the scope it is mentioned that the it is applicable to all foods, except for water, from primary production throughout consumption. We do believe that it might be appropriate to specify either in the text or with a footnote that additives and especially synthetic food additives, are excluded from the scope as they are not derived from animal or plant origin.