CODEX ALIMENTARIUS COMMISSION

Food and Agriculture Organization of the United Nations

World Health Organization

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Agenda item 5 **CX/FH 22/53/5 Add.1**

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JOINT FAO/WHO FOOD STANDARDS PROGRAMME

CODEX COMMITTEE ON FOOD HYGIENE

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Proposed Draft Guidelines for the Control of Shiga Toxin-Producing *Escherichia coli* (STEC) in Raw Beef, Fresh Leafy Vegetables, Raw Milk and Raw Milk Cheeses, and Sprouts
Comments in reply to CL 2022/56/OCS-FH

Comments of Argentina, Australia, Canada, Colombia, Costa Rica, Cuba, Egypt, India, Japan, Kenya, Malaysia, Morocco, Peru, Republic of Korea, Saudi Arabia, Singapore, Thailand, United Kingdom, USA and IDF/FIL

Background

1. This document compiles comments received through the Codex Online Commenting System (OCS) in response to CL 2022/56/OCS-FH issued in September 2022. Under the OCS, comments are compiled in the following order: general comments are listed first, followed by comments on specific sections.

Explanatory notes on the appendix

2. The comments submitted through the OCS are hereby attached as **Annex I** and are presented in table format.

Annex I

GENERAL COMMENTS

COMMENTS REGARDING ADVANCING THE DOCUMENT We agree that Appendix I, Annex I RAW BEEF and Annex II FRESH LEAFY VEGETABLES should be advanced to the next step. Regarding the Annexes III RAW MILK AND RAW MILK CHEESES and IV SPROUTS, agreeing to advance to the next step is subject to the work done during the meeting of the Physical Working Group and during the plenary session of CCFH53.	**Argentina**
Would support advancing the proposed guidelines through the Codex step process. However, we note that guidance on safe use/reuse of water in the dairy sector is still to be developed. This has linkages with the raw milk and cheese STEC annex and provides context around water being 'fit for purpose'. Generally, all text in these STEC guidelines on the safe use of water, should align with the guidelines being developed for the safe use and reuse of water.	**Australia**
Costa Rica supports advancing this document in the Codex step process.	**Costa Rica**
Cuba appreciates the opportunity to provide comments on CL 2022/56/OCS-FH and supports the Proposed Draft Guidelines document for the Control of Shiga Toxin-Producing *Escherichia coli* (STEC) in Raw Beef, Fresh Leafy Vegetables, Raw Milk and Raw Milk Cheeses, and Sprouts proposed by the Electronic Working Group	**Cuba**
Control measures should be discussed in CCFH after JEMRA report (as final version) on Prevention and Control of Microbiological Hazards in Fresh Fruits and Vegetables (Part 2: General principle and fresh fruits and vegetables) is available. And guidelines on control measures that are specific and effective for STEC, while ensuring flexibility in the choice of control measures, taking into account the diversity and feasibility of primary production.	**Japan**
Malaysia would like to thank the Electronic Working Group chaired by Chile and co-chaired by United States of America, France and New Zealand for preparing the Proposed Draft Guidelines for the Control of Shiga Toxin-Producing Escherichia coli (STEC) in Raw Beef, Fresh Leafy Vegetables, Raw Milk and Raw Milk Cheeses, and Sprouts and also appreciates the opportunity to provide comments on the draft guidelines. Malaysia supports this document to be advanced in the Codex Step process.	**Malaysia**
Singapore would like to thank Chile, the United States of America, France, and New Zealand for putting together this document summarizing the comments received on the May 2022 eWG consultation paper, and the Virtual Working Group Meeting (Jun 2022).	**Singapore**
The UK consider that the document has progressed well and will be a useful document. In principle the UK could support advancing the document in the Codex Step process.	**United Kingdom**
The United States, as co-lead, for this document, is pleased with the progress of the electronic Working Group and we have limited comments on this document at this time. We may have additional comments when we have completed reviewing the JEMRA report on control measures for STEC associated with meat and dairy products; if so, we will address these during the physical working group meeting.	**USA**
The IDF would like to thank and congratulate the chairs for this new version. The IDF consider that this document is ready for progression in the next step.	**IDF/FIL**

COMMENTS ON SUMMARY OF DISCUSSION IN EWG REPORT

10.6	This revision concerns paragraph 70, not paragraph 69	**Morocco**
11.3	Saudi Arabia suggests replacing "E. coli O157:H7" with E. coli O157 and non-O157 (Big six) or with E. coli (STEC) (Big six +1), for the reason that all serotypes secrete shiga toxin.	**Saudi Arabia**

REPLIES TO QUESTIONS POSED IN CL 2022/56/OCS-FH

Do you think it relevant for the purpose of this document to add a "Post-Mortem inspection step" to this flow diagram between Splitting and Carcass Washing?

We agree with incorporating a "Post-Mortem inspection" step in the proposed place	**Argentina**
We would support the inclusion of "Post-Mortem inspection step". The flow chart has a reference to ante-mortem inspection, so a reference to post-mortem inspection would seem reasonable. Further, paragraph 15 provides flexibility for where the various steps may occur, with the flow chart in no way prescribing where each step is to occur or when, but simply demonstrates one possible flow of activities.	**Australia**
The rest of the steps describe the physical processing of the carcass. No other step describe inspection. For that reason, it may not be relevant. However, if the post-mortem inspection can help mitigate the risk of STEC, then it could be considered for inclusion.	**Canada**
It is consistent with what has been implemented in slaughterhouses in the inspection model.	**Colombia**
Costa Rica believes that, since what is indicated in this draft document is not evaluated during ante-mortem inspection, this reference should not be included in the flow diagram, nor should post-mortem inspection be included between the "splitting" step and "carcass washing," as such references are not pertinent.	**Costa Rica**
Egypt support to add a "Post-Mortem inspection step" to this flow diagram between Splitting and Carcass Washing which more relevant for the purpose of this document	**Egypt**
Kenya proposes that post-mortem inspection step should be between carcass washing and chilling. Rationale: It is the final verification step to minimize STEC contamination. It is at this point that evisceration has been properly done.	**Kenya**
Yes, post-mortem inspection should be included	**Peru**
Post-Mortem inspection is an integral part of safe meat production together with Ante-mortem inspection. Singapore notes that "Ante-mortem inspection" has already been included as part of the flow diagram. Hence, Singapore supports the inclusion of a "post-mortem inspection step" to the flow diagram between splitting and carcass washing.	**Singapore**
Yes, it should be mentioned, as it will help identify which controls should carried out before and after PMI. This addition would need to be reflected in section 4.5.2, as paragraphs 69 and 70 would be linked to a Post Mortem Inspection.	**United Kingdom**
The United States does not object to adding a post-mortem inspection step to the flow diagram in the raw beef annex. Although there are no control measures for STEC that would apply at the step, including post-mortem inspection would be consistent with the Guidelines for the Control of Nontyphoidal Salmonella spp. in Beef and Pork Meat (CXG 87-2016).	**USA**

Questions for CCFH53 with respect to the Fresh Leafy Vegetables Annex:

Bullet one: *In paragraph 2, we say that "There is no processing treatment applied that would eliminate or inactivate STEC, although contamination can be reduced by washing in water containing antimicrobials." One comment asked about ozone treatments. Should we say that "…contamination can be reduced by treatments such as washing in water containing antimicrobials?" Is there something we should add about ozone based on information from JEMRA?*
The United States recommends that the words "treatments such as" be added in paragraph 2 pending the JEMRA report, which may provide information on the efficacy of ozone.

The following addition to paragraph 2 is proposed: - There is no processing treatment applied that would eliminate or inactivate STEC, although contamination can be reduced by treatments such as washing in water containing antimicrobials. Examples of field level control measures provided in this document are illustrative only and their use and approval may vary by country. - Other contamination reduction measures with other treatments such as for example ozone treatments should be considered based on JEMRA recommendations	**Argentina**
Supports using the term 'treatments such as'	**Australia**
We agree with the proposed text. Would recommend keeping text high level without going into the specifics of each antimicrobial that could be used.	**Canada**
Colombia believes that measures with scientific support that could reduce contamination should be included. As such, if the information from JEMRA provides analysis on the elimination, inactivation, or reduction of STEC through ozone or other methods, those should be considered in the document, which would be useful for decision making within each region.	**Colombia**
Costa Rica considers it appropriate to maintain the original wording and not include the phrase "treatments such as" because this addition does not add value. We consider it more appropriate to directly reference ozone treatments in fruits and vegetables, in accordance with the information from JEMRA.	**Costa Rica**
Egypt recommends the same sentence without edit or adding ozone treatment "There is no processing treatment applied that would eliminate or inactivate STEC, although contamination can be reduced by washing in water containing antimicrobials." because generally accepted method of dissolving the antimicrobial with water to sterilize vegetables and fruits, additionally the ozone is a high cost, and we can request for JEMRA information.	**Egypt**
Japan suggests that CCFH should proceed with scope of this annex taking into consideration of JEMRA's scientific advice. It is noted that in summary report of Joint FAO/WHO Expert Meeting on the Prevention and Control of Microbiological Hazards in Fresh Fruits and Vegetables, Part 4: Commodity-specific interventions, we haven't found a description about ozone treatment.	**Japan**
Kenya Proposes that the last part of para 2 to read: 'There is no processing treatment applied that would eliminate or inactivate STEC, although contamination can be reduced by treatments such as washing in chlorinated water. Examples of field level control measures provided in this document are illustrative only and their use and approval may vary by country.' Rationale: 1. To replace the word antimicrobials by treatments such as washing in chlorinated water. This is to avoid misinterpretations on antimicrobials that cause AMR. 2. Ozone is another example of the numerous ways of reducing microbial log, which may include other methods such as irradiation and therefore proposal to delete it from the sentence.	**Kenya**

The phrase could be written as follows: "…contamination can be reduced by treatments such as washing in water containing antimicrobials. Additionally, the microbial load could also be reduced by the use of ozone, as an antimicrobial agent whose antimicrobial properties have been demonstrated."	**Morocco**
Yes, include: "contamination can be reduced by treatments such as washing in water containing antimicrobials." If there are studies concerning the use of ozone, it would be pertinent that they should be considered in the document.	**Peru**
Singapore is of the view that the use of antimicrobial for pathogen reduction on contaminated fresh leafy vegetable would need assurance that the end product is in compliance with codex residue limits. [(CXC 49-2001) or CXC53-2003.] Singapore notes that the sanitisation of leafy vegetables by integrating gaseous ozone treatment into produce process has been proposed by USDA in 2017 to overcome external and internal contamination with E coli 0157:H7. However, as it is not mentioned in the CXC 53-2003, Singapore seeks clarification if this technology has been validated for its effectiveness on green leafy vegetables.	**Singapore**
The UK agrees that this would be a useful clarification; including the word "treatment" provides scope to include other treatments, such as UV. We would prefer to keep the generalised term of "antimicrobial" rather than make specific reference to ozone.	**United Kingdom**
The United States recommends that the words "treatments such as" be added in paragraph 2 pending the JEMRA report, which may provide information on the efficacy of ozone.	**USA**

Bullet two: *The definition of Fresh Leafy Vegetables refers to those intended for consumption without cooking. However, there are processes other than cooking that can adequately reduce microbial pathogens. JEMRA has defined "fresh fruits and vegetables" as "Fruits and vegetables that are not processed in a manner that changes their physical properties. Cooked, canned, juiced, frozen, candied, dried, pickled, fermented, or otherwise preserved foods derived from fruits and vegetables were excluded from this definition and this report." In this annex we only refer to "cooking," but in the Code of Hygienic Practice for Fresh Fruits and Vegetables, Annex III "fresh leafy vegetables," the scope refers to those "intended to be consumed without further microbiocidal steps" (terminology also used in the definition of ready-to-eat fresh fruits and vegetables). Do we need to consider other processes and say, "for consumption without any further microbiocidal steps" instead of "for consumption without cooking"?*

Supports consistency with text used in the Code of Hygienic Practice for Fresh Fruits and Vegetables "for consumption without any further microbiocidal steps".	**Australia**
Suggest to add both: for consumption without cooking, or without any other microbiocidal steps.	**Canada**
For the purpose of maintaining the uniformity of Codex terms and mandates, we believe that "for consumption without any further microbiocidal steps" is appropriate.	**Colombia**
Costa Rica supports the suggested modification of the phrase: "for consumption without any further microbiocidal steps."	**Costa Rica**
Egypt prefer "for consumption without cooking"	**Egypt**
Japan suggests that CCFH should proceed with taking into consideration of JEMRA's scientific advice. It is noted that in summary report of Joint FAO/WHO Expert Meeting on the Prevention and Control of Microbiological Hazards in Fresh Fruits and Vegetables Part 4: Commodity-specific interventions, we haven't found a description about some treatment having same pathogen reduction level as cooking.	**Japan**
Kenya proposes that the committee considers other processes and say, "for consumption without any further microbiocidal steps". This is to align it to other Codex Texts	**Kenya**

Consider: “for consumption without cooking.” Because disinfection is already included in the washing of fresh fruits and vegetables step.	**Peru**
Singapore would like to suggest to align with the Code of Hygienic Practice for Fresh Fruits and Vegetables, Annex III “fresh leafy vegetables,”, where the scope refers to those “intended to be consumed without further microbiocidal steps”.	**Singapore**
The UK believes that “for consumption without any further microbiocidal steps” is a more accurate representation and is in line with Annex III of the “Code of Hygienic Practice for Fresh Fruits and Vegetables”.	**United Kingdom**
The United States recommends changing the definition to say “for consumption without any further microbiocidal steps” to be consistent with the Code of Hygienic Practice for Fresh Fruits and Vegetables, Annex III “fresh leafy vegetables” (CXC 53-2003).	**USA**

Raw milk and raw milk cheeses annex

Overview of comments – bullet 5: Revised what is meant by a “country’s highest priority” and how this relates to corrective actions to be consistent with paragraph 69 in the general section.

Paragraph 70 in the general section explains what is meant by “country’s highest priority” and how this relates to corrective actions “70. Consideration of virulence genes plays a role in the management of STEC in food commodities, including the actions to be taken when STEC is detected in the food. As shown in Table 1, different combinations of virulence genes create differences in risk for severe illness, but factors other than the virulence genes also play a role. The priority of STEC strains carrying specific virulence genes varies from country to country, and, thus, the corrective actions needed on finding STEC in a food will also vary by country. In general, more stringent corrective actions would be applied for STEC strains considered to be a country’s highest priority (e.g., those strains with virulence factors capable of causing severe illness or considered to cause significant illness in that country country) than for those that are a lower priority.”	**Egypt**

Question for CCFH 53 with respect to the Sprouts Annex:

Overview of comments – bullet 3: Regarding the physical and chemical treatments mentioned in the annex, one member indicated that we must include the quantity and concentration for these treatments in the annex. This is not a common practice, but the co-chairs believe it would be useful, and decided that this should be discussed at CCFH53.

This could be useful and reasonable if a limited number of standard treatments with validated impacts have been identified.	**Canada**

Bullet one: *In paragraph 48 there are several chemical treatments mentioned. Since scientific references will be deleted in a later step of the document, should we include the concentrations that were shown in the referenced studies to achieve the log reduction (after JEMRA validation*)?

We believe that the general parameters of the various chemical treatments should be described in detail, considering that they can affect not only the efficacy for the elimination of STEC, but also the seed embryo's ability to germinate. If the seeds lose their ability to germinate, the quantity of the end product (sprouts) is diminished during the process.	**Argentina**
Propose that specific parameters of treatments are not included in the text	**Australia**
The inclusion of the concentrations of chemicals reported effective for 3 log reduction in STEC could be useful. Keeping in mind that the wording should offer guidance that is not prescriptive. Also, since the effectiveness of chemical decontamination can be impacted by heavy soiling, paragraph 48 may wish to include wording to the importance of application of decontamination treatments in addition to good hygienic practices (GHPs) to ensure product hygiene, and not as a replacement for GHPs.	**Canada**
• With the intention of facilitating the implementation and validation of treatments, we consider it reasonable to include the concentrations of the substances used as chemical treatments. • With the intention of facilitating the implementation and validation of treatments, we consider it important to include the variables examined for recommended physical treatments.	**Colombia**
Costa Rica supports including the concentrations mentioned in the reference studies that will be removed, with the goal of keeping the information about log reduction accessible to the user, once it has been validated by JEMRA.	**Costa Rica**
Yes, Egypt agree for include the concentrations that were shown in the referenced studies to achieve the log reduction (after JEMRA validation)	**Egypt**
It should be discussed in CCFH after JEMRA report (as final version) on Prevention and Control of Microbiological Hazards in Fresh Fruits and Vegetables (Part 3: Sprouts) is available. Although the description of the concentration is useful, it is supposed that should be stated as an example, since the required concentration varies depending on the conditions of each production site.	**Japan**
Kenya proposes the inclusion of concentrations that were shown in the referenced studies to achieve the log reduction. Rationale: The concentrations give clear explanation on the log reduction being indicated by JEMRA since it is a critical step where expert opinions are important.	**Kenya**
The concentrations are obtained in the context of specific studies, and therefore if they must be cited it would be as an example.	**Morocco**
Yes, it's useful to provide a previous reference point to the user, but it must clearly be mentioned that they are examples.	**Morocco**
Yes, the concentrations should be included.	**Peru**
The Republic of Korea agrees on including the concentrations in the paragraph 48, but only as an example to the guideline.	**Republic of Korea**
Singapore supports the inclusion after JEMRA's validation, since the scientific references will be deleted in the later step of the document.	**Singapore**
Yes the concentrations should be included after JEMRA Validation and could be included in a table for clarity.	**United Kingdom**

The United States does not support adding the specific concentrations used in the studies. The effective concentrations can depend on a number of factors as applied in the specific study, and these factors may be different in other situations; this document cannot fully describe the conditions that achieve at least a 3-log reduction and is not intended to be used as a source of validated chemical treatments for seeds.	**USA**

Bullet two: *In paragraph 49 there are several physical treatments mentioned. Do you think it would be useful include examples (e.g., time and temperature) for each one of the treatments recommended (after JEMRA validation)?*

Yes, we consider it useful to add the examples previously validated by JEMRA, the rationale being the same one expressed in paragraph 48.	**Argentina**
Propose that specific parameters of treatments are not included in the text.	**Australia**
Support the inclusion of examples and parameters for validated treatments. If treatment parameters verified in commercial settings are available, these would be useful. Keeping in mind that the wording should offer guidance that is not prescriptive.	**Canada**
Costa Rica believes it would be useful to include examples (e.g., time and temperature) for each one of the treatments recommended, once they have been validated by JEMRA.	**Costa Rica**
Yes, Egypt considers it very useful to include examples (e.g., time and temperature) for each one of the treatments recommended (after JEMRA validation)	**Egypt**
It should be discussed in CCFH after JEMRA report (as final version) on Prevention and Control of Microbiological Hazards in Fresh Fruits and Vegetables (Part 3: Sprouts) is available. It is supposed that the description of examples (e.g., time and temperature) is useful.	**Japan**
Kenya proposes the inclusions of the examples of each of the treatments as cited by the three articles after JEMRA validation. Rationale: This should act as guidance to the users.	**Kenya**
It is expedient to include microgreens in the scope, (given that they exhibit the same initial processes and steps, and that they come from similar seeds and that seed contamination spreads through them in the same way). The document will also be applicable in a situation where STEC are reported to appear in microgreens.	**Morocco**
Yes, the examples should be included.	**Peru**
The Republic of Korea agrees on including the mentioned physical treatments in the paragraph 49, but only as an example to the guideline.	**Republic of Korea**
Singapore would like to suggest to consider only after JEMRA's validation, and there are consideration for single and combined treatment methods. Since the treatments are meant as examples, WG could consider to make it comprehensive or not to include at all.	**Singapore**
If the concentrations in relation to the chemicals mentioned in p.48 are kept, for consistency purposes, it would be appropriate to indicate examples of the treatments appearing in those scientific studies.	**United Kingdom**
Similar to our comments on the chemical treatments, the United States does not support having example values for physical treatments, as these can be interpreted as being validated for all situations.	**USA**

Bullet three: *Microgreens share characteristics with sprouts. They have the same initial process and steps, originate from similar seeds, and seed contamination will spread similarly. However, STEC outbreaks have not been associated with them to date. Should we include microgreens under the scope of this annex?*

We agree with the addition of microgreens to the scope because they correspond to a later growth phase than sprouts with similar process steps and control measures.	**Argentina**
We recommend there is consistency in scope of this annex and the scope of the sprouts annex of the Code of Hygienic Practice for Fresh Fruits and Vegetables (CXC 53-2003).	**Australia**
Seeds appear to be the main source of contamination in sprout-associated outbreaks. If seeds are not included in the final product (i.e. microgreens), it may not be necessary to include them under the scope of the sprouts annex. Canada would like to listen to the discussions and the update from FAO at the meeting to decide on the appropriate scope of this annex.	**Canada**
Costa Rica supports the inclusion of microgreens under the scope of this annex, given the similarities they share with sprouts and the possibility that future outbreaks emerge from these products.	**Costa Rica**
No, Egypt recommends to separate microgreens from Sprouts because microgreens part of the leafy vegetables not Sprouts.	**Egypt**
Kenya does not support the inclusion of microgreens to the scope of the Annex. Rationale: Unless there is new information. They have not been associated with outbreaks of STEC as seen in sprouts. Risk is low.	**Kenya**
Yes, microgreens should be included	**Peru**
Although microgreens have not been associated with an outbreak of STEC to date, the UK would welcome discussion about which annex Microgreens could fit into.	**United Kingdom**
The United States does not support including microgreens in the scope of the sprouts annex, based on the following: (1) This document relates to control of STEC. Microgreens have not been associated with any outbreaks in the United States between 2011 to the present. There have been six microgreen product recalls since 2016 due to contamination by either Salmonella or L. monocytogenes (none associated with STEC contamination) in the finished product as reported by the FDA Food Recalls, Withdrawals, and Safety Alerts Database and by the Canadian Food Inspection Agency – of these recalls, no consumer illnesses were reported; in all cases the contamination was discovered during routine quality control procedures (Riggio, G.M., Q. Wang, K.E. Kniel, and K.E. Gibson. Microgreens—A review of food safety considerations along the farm to fork continuum, International Journal of Food Microbiology 290:76-85, 2019). (2) Microgreens are typically grown in soil or substrate and harvested above the soil or substrate line. Although they are similar to soil-grown sprouts that are harvested above the root-line. They are more similar to fresh herbs (e.g., basil, thyme, and cilantro) and petite (“baby”) greens such as baby spinach and spring mix and less like the sprouts frequently implicated in foodborne illness outbreaks. At CCFH52 we had indicated that the Sprouts Annex EWG address whether to include microgreens, and that if they were excluded from the Sprouts Annex they would be included in the Fresh Leafy Vegetables Annex. The United States therefore suggests that microgreens be included in the scope of the Fresh Leafy Vegetables Annex (as described in our Specific Comments on that annex).	**USA**

SPECIFIC COMMENTS

GUIDELINES FOR THE CONTROL OF SHIGA TOXIN-PRODUCING *E. COLI* (STEC) IN RAW BEEF, FRESH LEAFY VEGETABLES, RAW MILK AND RAW MILK CHEESES, AND SPROUTS

TITLE

Proposed Draft Guidelines for the Control of Shiga Toxin-Producing *Escherichia coli* (STEC) in Raw Beef, Fresh Leafy Vegetables, Raw Milk and Raw Milk Cheeses, and Sprouts Change in translation *[Translator's note: the suggested changes do not impact the English translation]*	**Colombia**

1. INTRODUCTION

3	Propose using the term 'raw non-intact beef products' in the general section to link with terminology used in Annex I.	**Australia**
7	Examples of control measures in each commodity-specific annex have been subjected to a scientific evaluation by the Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment (JEMRA) in development of the Guidelines. Such examples are ~~illustrative~~ illustrative only~~, and~~ their use and approval may vary among member countries. Change wording to replace (and) with (;)	**Colombia**
1	… STEC strains that can cause hemorrhagic colitis may be referred to as enterohemorrhagic *E. coli* (EHEC). … Suggest sentence "STEC strains that can cause hemorrhagic colitis may be referred to as enterohemorrhagic E. coli (EHEC)." to be reworded as follows: STEC strains that is associated with human disease are be referred to as enterohemorrhagic E. coli (EHEC).	**IDF/FIL**
5	It is difficult to predict pathogenicity from serotypes as new serotypes constantly emerge. Suggest to shorten the end of the first sentence as follows: "may require different approaches to control STEC." Proper heat treatment will eliminate STEC. Reword last sentence as follows: In most instances, control measures, except heat treatment, will reduce STEC but not eliminate them.	

2. OBJECTIVES

10	These Guidelines provide information to governments and food business operators (FBOs) on the control of STEC that aims to reduce foodborne disease from raw beef, fresh leafy vegetables, raw milk and raw milk cheeses, and sprouts. Additionally, t~~They~~ provide a [science-based and	**Colombia**

	practical] tool for the effective control of STEC in raw beef, fresh leafy vegetables, raw milk and raw milk cheeses, and sprouts according to national risk management decisions and regulations. The control measures that are selected can vary among countries and production systems. Proposed wording	
10	Singapore agrees with the proposed text in square brackets for paragraphs 10.	**Singapore**

3. SCOPE AND USE OF THE GUIDELINES

13	The Guidelines provide specific control measures for STEC in raw beef, fresh leafy vegetables, raw milk and raw milk cheeses, and sprouts according to a primary production-to-consumption food chain approach, with potential control measures being identified at applicable steps in the process flow. The Guidelines are supplementary to and should be used in conjunction with the *General Principles of Food Hygiene* (CXG 1-1969), the *Code of Hygienic Practice for Meat* (CXC 58-2005), the *Code of Hygienic Practice for Fresh Fruits and Vegetables* (CXC 53-2003), the *Code of Hygienic Practice for Milk and Milk Products* (CXC 57-2004), the *Guidelines for the Validation of Food Safety Control Measures* (CAC/ CXG 69-2008), *Principles and Guidelines for the Conduct of Microbiological Risk Management (MRM)* (CXG ~~63-2007)~~63-2007), and the Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods (CAC/GL 21-1997). These general and overarching provisions are mentioned as appropriate, and their content is not duplicated in these Guidelines. We consider it important to reference the Principles and Guidelines for the Establishment and Application of Microbiological Criteria Related to Foods (CAC/GL 21-1997) in this paragraph, as this is a document that complements the information regarding microbiological specifications in the different annexes.	**Argentina**
13	The Guidelines provide specific control measures for STEC in raw beef, fresh leafy vegetables, raw milk and raw milk cheeses, and sprouts according to a primary production-to-consumption food chain approach, with potential control measures being identified at applicable steps in the process flow. The Guidelines are supplementary to and should be used in conjunction with the *General Principles of Food Hygiene* (CXG 1-1969), the *Code of Hygienic Practice for Meat* (CXC 58-2005), the *Code of Hygienic Practice for Fresh Fruits and Vegetables* (CXC 53-2003), the *Code of Hygienic Practice for Milk and Milk Products* (CXC 57-2004), the *Guidelines for the Validation of Food Safety Control Measures* (CXG 69-2008), and the *Principles and Guidelines for the Conduct of Microbiological Risk Management* (MRM) (CXG 63-2007). These general and overarching provisions are mentioned as appropriate, and their content is not duplicated in these Guidelines. Change in wording *[Translator's note: the suggested changes do not impact the English translation]*	**Colombia**
15	Several control measures as presented in these Guidelines are based on the use of physical, chemical ~~and~~and/or biological decontamination processes to reduce the prevalence or concentration of STEC-positive commodities, for example decontamination of beef carcasses from slaughtered cattle (i.e., beef from animals of the species of *Bos indicus*, *Bos taurus*, and *Bubalus bubalis*). The use of these control measures is subject to approval by the competent authority, where appropriate, and varies based upon the type of product being produced. Also, these Guidelines do not preclude the choice of any other control measure that is not included in the examples provided herein, and that may have been scientifically validated as being effective in a commercial setting. And/or indicates that one or various can be used. Change in wording.	

17	The Guidelines should be useful when assessing whether different food safety measures for raw beef, fresh leafy vegetables, raw milk and raw milk cheeses, and sprouts in different countries are appropriate. Delete “de” in the Spanish version. *[Translator’s note: the proposed change does not impact the English translation]*	

4. DEFINITIONS

19	We wonder if colocasia leaves are ever consumed without cooking? It was mentioned that these are usually boiled or baked before they are eaten to reduce the amount of oxalates in them, otherwise they can be severe irritants or toxic to humans.	**Canada**
20	Indicator microorganisms: Microorganisms used as an indicator of quality, process efficacy, or hygienic status of food, water, or the environment, commonly used to suggest conditions that would allow the potential presence or proliferation of pathogens, a failure in process hygiene or in food processing. Examples of indicator microorganisms include mesophilic aerobic bacteria, coliforms or faecal coliforms, *E. coli* and Enterobacteriaceae. Terminology change *[Translator’s note: the proposed change does not impact the English translation]*	**Colombia**
26	Singapore agrees with the proposed text in square brackets for paragraphs 26.	**Singapore**
26	Kenya proposes that beans be removed from the definition of sprouts Rationale: Beans are examples of seeds hence no need to include them.	**Kenya**

7. PRIMARY PRODUCTION CONTROL MEASURES

37	Controls in the primary production phase of the process flow are focused on decreasing the number of animals that are carrying and/or shedding STEC, as well as preventing or reducing ~~plants~~processing plants ~~being contaminated with STEC on the farm~~that can be contaminated. In addition, Good Agricultural Practices (GAPs) and animal husbandry practices related to water, worker hygiene, appropriate use of fertilizers and biosolids, appropriate handling during transport, temperature control, and cleanliness of contact surfaces can reduce the incidence of STEC at primary production. Proposed wording	**Colombia**

10. IMPLEMENTATION OF CONTROL MEASURES

42	Kenya proposes that the statement in square brackets should be retained Rationale: It clarifies on what needs to be validated.	**Kenya**

42	While the proposed text in square bracket for paragraph 42 spells out that the capacity of the control measures should decrease the risk for public health, it may not be necessary as the description of the effectiveness of the validation process in the subsequent paragraph (i.e. 43) would suffice. (i.e. 43. Where validation is undertaken for a measure to control STEC, evidence will need to be obtained to show that the measure is capable of controlling STEC to a specified target or outcome. This may be achieved by use of a single measure or a combination of control measures. The Guidelines for the Validation of Food Safety Control Measures (CXG 69-2008) (Section VI) provides detailed advice on the validation process.)	**Singapore**

11. MONITORING AND REVIEW

70	~~Consideration of~~ The virulence genes ~~plays a role in the management of~~ carried by STEC isolates should be considered when deciding how STEC will be managed in food commodities, including the actions to be taken when STEC is detected in the food. As shown in Table 1, different combinations of virulence genes ~~create differences~~ differ in the risk for severe illness, but ~~factors~~ other ~~than the virulence genes~~ factors also play a role. ~~The priority of STEC strains carrying specific~~ Both the virulence genes ~~varies from country to country~~and other factors associated with a greater risk of severe illness, ~~and~~or number of illnesses, ~~thus, the corrective actions needed on finding~~ may vary regionally. Countries may identify factors to differentiate STEC that are considered to be a higher priority (e.g., those strains with virulence factors capable of causing severe illness or considered to cause significant illness in that country), than for those that are a ~~food will also vary by country~~lower priority. In general, more stringent corrective actions would be applied ~~for STEC strains considered~~ in response to ~~be a country's highest~~ the presence of high priority STEC strains~~(e.g., those strains with virulence factors capable of causing severe illness or considered to cause significant illness in that country country) than for those that are a lower priority.~~ The paragraph lacks clarity. We propose the following alternative paragraph.	**Canada**
65	The IDF highly appreciate the paragraphs 65, 66, 67 & 70, particularly the consideration of virulence genes and have clarified the definition of "STEC strains considered to be a country's highest priority". Such consideration is of core interest in the appropriate management of STEC in food commodities, especially the consideration of corrective actions, as referenced in JEMRA report (2018).	**IDF/FIL**
70	Reword parenthesis in last sentence as follows: (e.g., those strains with virulence factors capable of causing severe illness or considered have the potential to cause significant illness in that country)	**IDF/FIL**

ANNEX 1

1. INTRODUCTION

2	Unclear why this paragraph is placed here. It disrupts reading and seems out of place. Suggest placing after current paragraph 5 below for better flow.	**Canada**
6	Footnote - spelling of comminuted beef products on 1st line	

3. DEFINITIONS

9	**Tenderized raw beef**[121]: Supports the proposed definitions	**Australia**
9	**Tenderized raw beef**[121]: Cuts of beef that have gone through a technological process for the rupture of muscle ~~fibbers~~ fibers by mechanical action with small blades or needles which penetrate the muscle surface thereby resulting in tenderizing. Fibers is the correct spelling.	**Canada**

4. PRIMARY PRODUCTION-TO-CONSUMPTION APPROACH TO CONTROL MEASURES

13	Interventions to control enteric pathogens should always be part of an integrated food safety system that includes all the stages from primary production to consumption. Measures to reduce STEC shedding or hide contamination prior to slaughter have the potential to reduce environmental exposure to STEC and may improve raw beef safety, but they cannot prevent STEC contamination or compensate for poor hygienic practices during slaughter, processing and distribution. Conversely, there is evidence that the adoption of good hygienic practices during slaughter and processing can minimise carcass contamination with STEC. Consequently, the adoption of best practices for preharvest management of cattle ~~should be promoted as a~~ can support ~~to~~ hygienic slaughter and processing. Rationale: As noted in paragraph 12, pre-harvest measures can reduce but cannot prevent STEC contamination. The United States believes that best practices should be developed and adopted, but it is not clear who would be "promoting" these best practices.	**USA**
14	Operations to decontaminate carcasses or raw beef cuts will be of limited effectiveness if poor hygienic practices during subsequent processing and distribution permit recontamination or if the initial contamination load is high. Decontamination only reduces STEC by a certain amount, which can be quite variable depending on the type of treatment, duration, the method of application, operator training, temperature, etc. Change in wording	**Colombia**

4.1 GENERIC FLOW DIAGRAM FOR APPLICATION OF CONTROL MEASURES

A step that can be present and should be included in the primary production phase is housing at livestock gatherings. In the slaughter phase, other practices should be included in the "Bunging" step. For example, in Colombia rectum tying and bagging are done. In the processing phase, a "Quartering or boning" step should be included after chilling, rather than "carcass fabrication" In countries like Colombia it is very common for animals to pass through auctions, fairs, or commercial livestock gatherings, where the possibilities that the animals get contaminated with STEC could increase, and therefore control measures in this step should be considered. We propose that the step read: "Bunging or bagging and tying of rectum" The subsequent processes such as tenderisation or grinding and mincing are done to slices or pieces of the carcass and not to the carcass itself. For this reason a quartering or boning step should be included, as well as, therefore, the corresponding control measures, such as cleaning and disinfection of	**Colombia**

surfaces, hands, and utensils before and during the process, management of products that are contaminated or fall to the floor, temperature maintenance, etc.	
Include 'Post-mortem Inspection step' before 'Splitting and Carcass Washing step' Rationale: Post-mortem inspection step is important to control the incidence of pathogens including STEC in raw beef	**India**
(As a response to the question for CCFH53 with respect to the raw beef annex) According to para 10, the flow diagram identifies the main steps and where control measures may potentially be applied. Therefore, "Post-Mortem inspection step" seems not to be necessary since any interventions at this step are not proposed in Section 4.	**Japan**
Kenya proposes that post-mortem inspection step should be between carcass washing and chilling. Rationale: It is the final verification step to minimize STEC contamination. It is at this point that evisceration has been properly done.	**Kenya**
Malaysia supports the addition of a "Post-Mortem inspection" step to this flow diagram between Splitting and Carcass Washing.	**Malaysia**
Post-mortem inspection is a vital step in the detection of eventual contaminations. We propose adding post-mortem inspection to the diagram after the "splitting" step.	**Morocco**
We would like to propose the added step of Post-Mortem Inspection in the flow diagram between Splitting and Carcass Washing. Also, the control measures as existed in Section 8.1.3.1 of the Guidelines for the Control of Nontyphoidal Salmonella spp. in Beef and Pork Meat (CXG 87-2016) can be added under this new sub-section of Post-Mortem Inspection between Sections 4.5.2 and 4.5.3 Rationale: The post-mortem inspection is an important and regular step of slaughter house. The detail should be specified in order to prevent possible contamination from STEC. The processing steps in the process flow diagram of this Draft annex should be consistent with the process flow diagram of primary production-to-consumption – Beef in CXG 87-2016. This consistency will facilitate the use of this Guidelines when adopted.	**Thailand**

4.2 PRIMARY PRODUCTION

19	A wide variety of cattle diets have been investigated for their impact on STEC O157:H7 prevalence and/or level of shedding, including hay, barley, distillers and brewers' grains, sage brush, millet, alfalfa, (Callaway et al., 2009). Both STEC serotype O157:H7 and generic *E. coli* populations have been demonstrated to respond to changes in diet, but replication of results indicating STEC serotype O157:H7 reduction has been poor, and no dietary composition has been identified that reliably reduces STEC serotype O157:H7. Some diets that have been proposed increase STEC serotype O157:H7 shedding (Thomas and Elliott, 2013). The word serotype is missing.	**Canada**
21	~~[Use of probiotics or direct-fed~~The prevalence of faecal STEC O157:H7 excretion in cattle can be reduced by using direct-fed microbials (DFM), such as Lactobacillus acidophilus (NP51) and Propionibacterium freudenreichii (NP24). The impact of DFM against STEC is highly specific, thus a	**Japan**

	positive response in STEC reduction with one probiotic product cannot be necessarily extrapolated to another product. ~~microbials, involves feeding animals with viable microorganisms which are antagonistic toward pathogens, either by modifying environmental factors in the gut or producing antimicrobial compounds. There is evidence that specific direct-fed microbial treatments, such as *Lactobacillus acidophilus* (NP51) and *Propionibacterium freudenreichii* (NP24), can reduce STEC serotype O157:H7 shedding by cattle (Wisener et al., 2015, Venegas-Vargas et al 2016). The probiotics used should not contain antimicrobial resistance genes.]~~ Japan proposes to replace para 21 by the following sentences based on p.20 of JEMRA report MRA 39 (final report). “The prevalence of faecal STEC O157:H7 excretion in cattle can be reduced by using direct-fed microbials (DFM), such as Lactobacillus acidophilus (NP51) and Propionibacterium freudenreichii (NP24). The impact of DFM against STEC is highly specific, thus a positive response in STEC reduction with one probiotic product cannot be necessarily extrapolated to another product. “	
21	Kenya Proposes that the statement in square brackets be retained, except for the last sentence in the paragraph. Rationale 1: It contradicts the essence of using probiotics. Probiotics are known to be beneficial and alternatives to use of antimicrobials. Rationale 2. Microbes naturally have inherent resistant genetic element. In this aspect the main target is the pathogen and not the probiotic.	**Kenya**
21	Singapore is of the view that recommendations proposed shall be corresponding to the latest development of science- and risk-based information. As driver of antimicrobial resistance is multi-factorial and the understanding of the risk of antimicrobial resistance would further evolve, Singapore proposes to consider the previous recommendation provided in CCFH52 (2022) Agenda 7 (below) which is based on a broader perspective to highlight the importance of leveraging science- and risk-based information for recommendation. CCFH52 (2022) Agenda 7: The addition of viable microorganisms to feed should be assessed with respect to whether these microorganisms pose a risk for emergence of antimicrobial resistance in pathogens in the gut1. 1Thermization, a sub pasteurization heat treatment (55.0–71.7°C), has been proposed to reduce the risk of pathogens in raw cheese milk while retaining some quality attributes in the cheese.	**Singapore**
21	~~[~~Use of ~~probiotics~~ probiotics, or direct-fed microbials, involves feeding animals with viable microorganisms which are antagonistic toward pathogens, either by modifying environmental factors in the gut or producing antimicrobial compounds. There is evidence that specific direct-fed microbial treatments, such as *Lactobacillus acidophilus* (NP51) and *Propionibacterium freudenreichii* (NP24), can reduce STEC serotype O157:H7 shedding by ~~cattle (Wisener et al., 2015,~~ cattle~~Venegas-Vargas et al 2016)~~. The probiotics used should not contain antimicrobial resistance genes. To be effective, the component strains in the product must be consistent and the products have to be administered at the recommended CFU/g doses in feed.~~]~~ The United States supports retaining the paragraph and adding that the information is supported by the JEMRA 2022 report on STEC in meat and dairy products (MRA 39).	**USA**
22	~~**Use of other feed additives**~~	**Japan**
22	~~The seaweed *Ascophyllum nodosum* is marketed as a supplement for cattle feed. It has been reported to reduce faecal and hide prevalence of STEC serotype O157:H7 when added to corn feed (Braden et al., 2004).~~	**Japan**

	Japan also proposes to delete para 22 since JEMRA concluded that feed additives are not recommended for consideration for the control of STEC, at present and based on the available evidence. (Please see P.126-127 of MRA39.)	
23	4.2.1.3 Good management practices at ~~primary~~ primary production As part of good livestock practices at primary production, the fasting of animals before slaughter should be included. An insufficient fasting period contributes to the rupture of the gastrointestinal tract during the dressing process and, as such, the contamination of the carcass.	**Colombia**
23	Various vaccines have been designed and tested for preventing colonisation and/or reducing faecal shedding of STEC serotype O157:H7. Some vaccines have been shown to reduce faecal shedding of STEC serotype O157:H7 but their efficacy is dependent on the type of vaccine and the number of doses administered. Only a few vaccines have been tested under production conditions, and the duration of immunity after vaccination is unknown because the evaluation period in feedlot studies has been relatively short. The use of vaccination in cattle has not been commercially adopted due to the lack of evidence to support the reduction of STEC in beef following vaccination and the lack of farm-level incentives to cover additional costs associated with vaccines and their administration (JEMRA, 2020). Japan wonders if para 23 (vaccination) should be included as a proposed intervention in this document, since neither commercialized vaccine is widely used at present due to the lack of evidence. (Please see P.22-23 of the JEMRA report, MRA 39.) In case of para 23 retained in this document, the last sentence based on JEMRA 2020 should be replaced by the following sentence with reference to the JEMRA report MRA 39 (as final). “At present, neither commercialized vaccine is widely used.”	**Japan**
23	Various vaccines have been designed and tested for preventing colonisation and/or reducing faecal shedding of STEC serotype O157:H7. Some vaccines have been shown to reduce faecal shedding of STEC serotype O157:H7 but their efficacy is dependent on the type of vaccine and the number of doses administered. Only a few vaccines have been tested under production conditions, and the duration of immunity after vaccination is unknown because the evaluation period in feedlot studies has been relatively short. The use of vaccination in cattle has not been ~~commercially~~ widely adopted commercially due to ~~the lack of~~ limited evidence under production conditions to support the reduction of STEC in beef ~~following vaccination~~ and the ~~lack~~ duration of ~~farm-level incentives to cover additional costs associated with vaccines and their administration (JEMRA, 2020)~~immunity following vaccination. Rationale: This revision aligns more closely with the 2022 JEMRA report on STEC in meat and dairy products. The United States also believes the Guidelines should focus on the science rather than economic factors.	**USA**
24.3[1]	Reducing animal destiny~~Maximize living space~~ to reduce direct animal-to-animal transmission (e.g. maintain ample space for animals to move to reduce defecation directly onto one another).	**Japan**

[1] 24.4 refers to paragraph 24, and bullet 3 under that paragraph. This numbering format is used in all subsequent paragraphs where there are bullets.

	Japan proposes to amend the 3rd bullet in para 24 based on the advice from JEMRA: The degree of support for reducing animal density on-farm as an intervention specifically for the control of STEC in cattle herds was medium. (please see the JEMRA report MRA 39, p.14.) Reducing animal density to reduce direct animal-to-animal transmission…	
24.5.2[2]	notes that water use and re-use should be in-line with water-re-use guidelines	**Australia**
24.5.3	Clean water troughs frequently to ~~reduce replication~~ prevent the growth and/or survival of STEC (Lejeune et al 2001). According to pp.16-17 and 136 of the JEMRA report, quality drinking water is a GAP and no effect is found on improved water hygiene. Japan suggests that the last two bullets of para 24 should be more general as follows: o Clean water troughs frequently to prevent the growth and/or survival of STEC	**Japan**
24.5.4	Use materials in water troughs that facilitate the cleaning process; when possible~~, use metal troughs rather than troughs manufactured from concrete or plastic (Lejeune, 2001), which may chip or crack, creating areas for the bacteria to hide in and that are difficult to clean~~. According to pp.16-17 and 136 of the JEMRA report, quality drinking water is a GAP and no effect is found on improved water hygiene. Japan suggests that the last two bullets of para 24 should be more general as follows: o Use materials in water troughs that facilitate the cleaning process; when possible.	**Japan**
24.5.5	Use materials in water troughs that facilitate the cleaning process; ~~when possible, use metal troughs rather than troughs manufactured from concrete or plastic (Lejeune, 2001), which may chip or crack, creating areas for the bacteria to hide in and that are difficult to clean.~~ Control measure should be objective driven without being too prescriptive. Also, the Control measures for Shiga toxin-producing Escherichia coli (STEC) associated with meat and dairy products (MRA39) only mentions about the cleaning of water troughs of which the degree of support is low. The material used is not specifically mentioned in the MRA39.	**Thailand**
26.2	~~Transport animals from the same herd in the same truck where possible to avoid social stress.~~ The relation between social stress and prevalence of STEC is not clear in the JEMRA report, MRA 39. The 2nd bullet of para 26 can be deleted since the basic idea of avoiding stress is provided in the 1st bullet.	**Japan**
27.1	~~Improve truck design, allowing for separation of animal lots.~~ Rationale: Changing truck design is a major economic undertaking, and usually outside the control of the cattle producer or beef processor. The JEMRA 2022 report on STEC in meat and dairy products indicates that transport density and trailer design, such as multi-level trailers, may influence the degree that hides are positive with STEC O157:H7 resulting from faecal-coat contamination, but does not discuss ways to improve truck deign as an intervention for STEC.	**USA**
48	~~Rinsing of the rectum and disinfection of the perianal hide should be performed in order to reduce or eliminate contamination prior to dehiding. Hide-on carcass washes are frequently used for that purpose.~~	**Japan**

[2] 24.5.2 refers to paragraph 24, bullet 5 under that paragraph and sub-bullet 2 under bullet 5. This numbering format is used in all subsequent paragraphs where there are bullets and sub-bullets.

	JEMRA report (MRA39), 45p said, The degree of support for hide washes using ambient or hot water, organic acids and other chemicals as an intervention specifically for the control of STEC in raw beef was low. Therefore Japan suggests to delete para 48	
48	Rinsing of the rectum and disinfection of the perianal hide and stuffing the bung with physical materials (as discussed in 4.4.5 Specific Control Measures as Bunging) should be performed in order to reduce or eliminate contamination prior to dehiding. Hide-on carcass washes are frequently used for that purpose. Rationale: Stuffing the bung is an important procedure to prevent contamination, and it may be done at this step, so it is helpful to include this information here.	**USA**
69	Targeted removal of visible contamination on carcasses by trimming may be applied to carcasses, but the disadvantage of trimming is potential cross-contamination from dirty knives (if not using a knife-switching disinfection protocol in-between cuts), aprons, mesh gloves, and waste. Also, even though practices may ~~be effective at removing~~ remove visible defects, the effectiveness of these practices to reduce pathogen contamination, including STEC, is limited. Simpler read	**Canada**
69	Targeted removal of visible contamination on carcasses by trimming may be applied to carcasses, but ~~the disadvantage of~~ trimming ~~is potential~~ may also contribute to possible redistribution of contamination on the carcass or cross-contamination of other carcasses from ~~dirty knives~~knives (if not using a knife-switching disinfection protocol between cuts) and personnel hands/gloves. Removal of visible faecal material from carcasses is a GHP; there is published evidence of efficacy for in reducing STEC in raw beef, although the efficacy of this intervention is dependent on the workers' skill level. ~~(if not using a knife-switching disinfection protocol in-between cuts), aprons, mesh gloves, and waste. Also, even though practices may be effective at removing visible defects, the effectiveness of these practices to reduce pathogen contamination, including STEC, is limited.~~ Rationale: Revised to use information from the JEMRA 2022 report on STEC in meat and dairy products, which gives trimming a "medium" ranking.	**USA**
70	Carcass trimming should be done in an area designated for that purpose and should result in trimmed carcasses that are free of stick wounds, blood clots, bruised tissue, pathological defects, visible contaminants, and dressing defects. 4.5.2 bis Specific Control Measures at Post-Mortem InspectionLine speeds and the amount of light should be appropriate for effective post-mortem inspection of carcasses.The procedures should be planned to avoid cross-contamination. Touching the carcasses with hands, tools or garments may cause cross-contamination.Routine palpations and incisions during post-mortem inspection should be minimized and cross-contamination with STEC through the application of these techniques should be controlled. The control measures as existed in Section 8.1.3.1 of the Guidelines for the Control of Nontyphoidal Salmonella spp. in Beef and Pork Meat (CXG 87-2016) can be added under this new sub-section of Post-Mortem Inspection between Sections 4.5.2 and 4.5.3 Rationale: The post-mortem inspection is an important and regular step of slaughter house. The detail should be specified in order to prevent possible contamination from STEC. The processing steps in the process flow diagram of this Draft annex should be consistent with the process flow diagram of primary production-to-consumption – Beef in CXG 87-2016. This consistency will facilitate the use of this Guidelines when adopted.	**Thailand**

74	The carcasses are sprayed with steam and then an aspiration is performed, which fulfils a double function of eliminating and / or inactivating surface contamination. The manual device includes a vacuum tube with a hot water spray nozzle, which delivers water at approximately 82-88 ° C on the surface of the carcass. The process is effective ~~in~~ at removing visible contamination ~~in~~ on the carcasses.	**Canada**
75	Rapid chilling minimizes the potential for bacterial growth; STEC can only replicate at temperatures of 7 °C and above. The potential for bacterial growth is also dependent upon the water activity at the carcass surface, and if water activity is low enough (less than a_w 0.95), a decline in bacterial numbers will occur. Thus, controlling the humidity of the chilling process can impact STEC levels on the carcass. Alternatively, spray chilling with antimicrobial agents may reduce STEC survival, but more evidence is needed on performance under commercial processing conditions. Rationale: Revised to use information from the JEMRA 2022 report on STEC in meat and dairy products.	**USA**
79	Since processes such as grinding/mincing may ~~potentially~~ spread contamination in the meat, there should be increased awareness when handling ground/minced beef products throughout the rest of the food chain. "may" and "potentially" indicate the same idea they are slightly redundant. Here using the word "may" alone would be adequate.	**Canada**

4.7. CONSUMERS

88	Reference should be made to WHO 5 keys for safer food.	**Japan**

6. MONITORING OF CONTROL MEASURES

91	Process performance monitoring may be accomplished more effectively and efficiently by quantitatively monitoring indicator microorganisms. These indicator microorganisms do not indicate pathogen presence; instead, they provide a quantitative measure of the control of microbial contamination in the product and processing environment. Periodic testing for the STEC strains considered to be a country's highest priority (e.g., those strains with virulence factors capable of causing severe illness or considered to cause significant illness in that ~~country~~ country) may also be conducted for verification of process performance.	**Argentina**

7. VERIFICATION OF CONTROL MEASURES AND REVIEW OF CONTROL MEASURES

93	STEC testing is an important part of verification of process performance. However, STEC are generally present at very low levels and are characterised by heterogeneous distribution (including in ground/minced products), making STEC detection challenging. This means that there may be a significant delay in ~~detecting~~ identifying loss of process control based on STEC detection. Consequently, verification programs should also include quantitative monitoring of indicator microorganisms. Hygiene indicators used should be those that are the most informative for the specific processing environment. An increase in the numbers of the selected indicator microorganisms indicates decreasing process control and corrective action should be taken. The speed in detecting a loss of control increases with the verification frequency. Verification at multiple points in the processing chain can assist in rapid identification of the specific process where corrective action should be taken.	**Canada**

	Suggest a different word since detecting and detection are both used in the sentence.	
94	Regular testing for STEC strains considered to be a country's highest priority (e.g., those strains with virulence factors capable of causing severe illness or considered to cause significant illness in that country country) can also be conducted for verification of process performance~~. Lot testing is of significant utility, particularly in raw beef that is intended for further processing into ground/minced beef and contributes .to directly reducing contamination rates in retail ground/minced beef and promoting continuous process improvement.~~ The 2nd sentence of the para 94 is not clear. Japan suggests either to delete it or to make it clear.	**Japan**
95	Verification of other control measures, ~~e~~(e.g., concentration of organic acid, temperature of a steam/vacuum or hot water treatment, etc.), should be routinely conducted in addition to appropriate microbiological testing. Suggest adding parenthesis to provide consistency with other lists of examples placed throughout the document.	**Canada**

8. CONSIDERATIONS FOR LABORATORY TESTING FOR DETECTION OF STEC IN RAW BEEF

96	Intact raw beef cuts used for purposes other than the manufacture of finished ground or blade tenderized raw beef products do not present the same level of risk, since STEC will be on the external surfaces that will receive the most heat in cooking; testing for STEC therefore offers ~~little~~ limited value. However, when the final intended use of raw beef cuts is not known, sampling should be implemented for STEC strains considered to be a country's highest priority verification. There may be value under certain circumstances, such as High event days or discrete contamination events. Those should not be dismissed. Suggested language is reflective of this.	**Canada**
97	Propose moving paragraphs 97, 98 to the introduction: noting the occurrence of STEC in meat product is lower in intact raw been than in non-intact raw beef products as this information is general in nature and is relevant to other aspects, not just testing	**Australia**

ANNEX 2

INTRODUCTION

2	2. Outbreaks of illness caused by a broad range of microbial pathogens, including Shiga toxin-producing *Escherichia coli* (STEC), have been linked to the consumption of fresh leafy vegetables. Epidemiological evidence, outbreak investigations, research, and risk assessments have identified several possible contamination sources of fresh leafy vegetables with STEC, including water, domestic and wild animals, workers and manure-based soil amendments[22]. Fresh leafy vegetables are typically grown and harvested in large volumes, increasingly in places where harvest and distribution of fresh leafy vegetables is efficient and rapid. Fresh leafy vegetables are packed in diverse ways, including: field packed direct for market; extracted in ~~field cored~~the field and prepared for ~~its~~ later processing; and as pre-cut fresh leafy vegetable mixtures and blends with other vegetables. Control measures such as antimicrobial washes to minimize cross-contamination may be applied prior to packaging and/or shipment to market. As fresh leafy vegetables move through the supply chain, there is also the potential for the introduction and growth of pathogens, including	**Colombia**

	STEC. The increasing worldwide use of pre-packaged fresh-cut leafy vegetables to expand the supply chain might increase the potential for the presence of contaminated product in the marketplace through cross-contamination with STEC, and STEC replication during distribution and storage if fresh-cut leafy vegetables are improperly handled. There is no processing treatment applied that would eliminate or inactivate STEC, although contamination can be reduced by washing in water containing antimicrobials. Examples of field level control measures provided in this document are illustrative only and their use and approval may vary by country.	
2	Position: Kenya Proposes that the last part of para 2 to read: There is no processing treatment applied that would eliminate or inactivate STEC, although contamination can be reduced by treatments such as washing in chlorinated water. Examples of field-level control measures provided in this document are illustrative only and their use and approval may vary by country. Rationale: 1. To replace the word antimicrobials by treatments such as washing in chlorinated water. To avoid possible misinterpretations on antimicrobials that cause AMR. 2. Ozone is another example of the numerous ways of reducing microbial log, which may include other methods such as irradiation and therefore proposal to delete it.	**Kenya**

2. SCOPE AND DEFINITIONS

5	This Annex covers specific guidance for the control of STEC related to fresh leafy vegetables that are intended to be consumed without ~~cooking~~cooking or other microbiocidal treatment. The Annex is applicable to fresh leafy vegetables grown in open fields or in fully or partially protected facilities (hydroponic systems, greenhouses/controlled environments, tunnels etc.). add: or other microbiocidal treatment	**Australia**
5	This Annex covers specific guidance for the control of STEC related to fresh leafy vegetables that are intended to be consumed without cooking. The Annex is applicable to fresh leafy vegetables grown in open fields or in fully or partially protected facilities (hydroponic systems, greenhouses/controlled environments, tunnels etc.).This Annex also includes microgreens (fresh leafy vegetables harvested when the cotyledon leaves have fully developed and the first true leaves have emerged).	**USA**
6	Definition proposal: Fresh Leafy Green Vegetables: Vegetables of a leafy nature where the leaf is intended for consumption in its raw form, without the application of any additional microbiocidal phases. Can include any leafy green vegetable that has been washed, cut, or physically modified in any other way from its original form, but which is kept in a fresh state. Includes, but is not limited to, all varieties of lettuce, spinach, cabbage, chicory, endive, kale, radicchio, and fresh herbs such as cilantro, basil, curry leaf, colocasia leaves and parsley, among other local products for foliar consumption.	**Argentina**
6.	Fresh leafy vegetables - Vegetables of a leafy nature where the leaf is intended for consumption without ~~cooking~~cooking or other microcidal treatment~~,~~ including, but not limited to, all varieties of lettuce, spinach, cabbage, chicory, endive, kale, radicchio, and fresh herbs such as coriander, cilantro, basil, curry leaf, colocasia leaves and parsley, among other local products for foliar consumption. add: or other microbiocidal treatment	**Australia**
6	Fresh Leafy Green Vegetables: Vegetables of a leafy nature where the leaf is intended for consumption without ~~cooking~~ any further microbiocidal steps, including, but not limited to, all varieties of lettuce, spinach, cabbage, chicory, endive, kale, radicchio, and fresh herbs such as cilantro, basil, curry leaf, colocasia leaves and parsley, among other local products for foliar consumption.	**Colombia**

	Taking into consideration: In the *Code of Hygienic Practice for Fresh Fruits and Vegetables*, Annex III "fresh leafy vegetables," the scope refers to those "intended to be consumed without further microbiocidal steps" (terminology also used in the definition of ready-to-eat fresh fruits and vegetables).	
6	Malaysia agrees with the phrase "intended to be consumed without further microbiocidal steps" to be in-line with the definition of Ready-to-eat Fresh Leafy Vegetables in the Code of Hygienic Practice for Fresh Fruits and Vegetables (CXC 53 – 2003).	**Malaysia**
6	Thailand supports the current definition of "Fresh leafy vegetables." However, we are also agreeable with changing from without cooking to "without further microbiocidal steps" Rationales: The current version is understandable and acceptable. The change, if needed, is in line with the Code of Hygienic Practice for Fresh Fruits and Vegetables (CXC 53-2003)	**Thailand**

3. PRIMARY PRODUCTION

9	Potential sources of STEC contamination should be identified prior to primary production activities and periodically evaluated for changes. Where possible, growers should evaluate present and previous uses of both indoor and outdoor fresh leafy vegetable primary production sites and the nearby and adjacent land (e.g., animal production, sewage treatment site) in order to identify potential sources of STEC. The assessment of environmental conditions is particularly important because subsequent interventions would not be sufficient to fully remove STEC contamination that occurs during primary production, and in some cases, conditions may enable the growth of STEC, thereby increasing the risk of illness for consumers. *[Translator's note: the proposed change does not impact the English translation]*	**Colombia**
10	Kenya supports the inclusion of this statement in the paragraph Rationale: These are green leafy vegetables that are ready to eat.	**Kenya**
10	Singapore notes that the text in square brackets is referring to product, and seems out of place in this context of primary production site contaminated with STEC. Singapore would like to suggest to remove it. CXC 53-2003 recommends control measures in the event the primary production site is detected with STEC, i.e. topsoil replacement or solar heat disinfection. Should these control measure failed to reduce the contamination to detection level, then to consider not to use it as production site. [Reference to CODE OF HYGIENIC PRACTICE FOR FRESH FRUITS AND VEGETABLES CXC 53-2003 , 3.2.1.3, Soils should be evaluated for hazards. If the evaluation concludes that such hazards may compromise the safety of crops, control measures (e.g. topsoil replacement or solar-heat disinfection) should be implemented to reduce hazards to acceptable levels. If this cannot be achieved by available control measures, growers should not use these soils for primary production.]	**Singapore**
11	The effects of some environmental events cannot be controlled and may need to be evaluated. For example, heavy rains or flood events may increase the exposure of fresh leafy vegetables to STEC if soil contaminated with STEC ~~splashes onto~~ comes in contact with them. When heavy rains occur, growers should evaluate the need to postpone harvesting fresh leafy vegetables for consumption without cooking and/or to subject them to a treatment that will minimize consumer exposure to STEC. If fresh leafy vegetables that contact flood waters are not subjected to any	**Canada**

	measure to mitigate risks from STEC to consumers, they should not be consumed raw. This does not include flooding of furrows for irrigation purposes, where the source of water is known and of appropriate quality and is not the result of a weather event. Surmise with flooding the action of "splashing" may not be exclusive and concept misplaced. Suggest different wording in text.	
15	~~[Growers~~ [Where necessary, growers should periodically test the water they use for appropriate indicator microorganisms and, in addition where necessary, STEC,] according to the risk associated with the production. The frequency of testing will depend on the water source (i.e., lower for adequately maintained deep wells, higher for surface waters), the risks of environmental contamination, including intermittent or temporary contamination (e.g., heavy rain, flooding), or the implementation of a new water treatment process by growers. If the intended water source is found to contain unacceptable levels of indicator microorganisms or is contaminated with STEC, corrective actions should be taken to ensure that the water is suitable for its intended use. Possible corrective actions to prevent or minimize contamination of water for primary production may include the installation of fencing to prevent large animal contact, the proper maintenance of wells, water filtering, chemical water treatment, the prevention of the stirring of the sediment when drawing water, the construction of settling or holding ponds or water treatment facilities. The effectiveness of corrective actions should be verified by periodic water testing. Where possible, growers should have a contingency plan in place that identifies an alternative source of water fit for purpose. If there is no additional information of mandatory testing from JEMRA after vWG, this para should be consistent with the text of CXC53 water testing, for feasibility. (CXC53-2003) 3.2.1.1 Water for primary production • Where necessary, growers should have the water they use tested for microbial and chemical contaminants, according to the risk associated with the production. The frequency of testing will depend on the water source (i.e. lower for adequately maintained deep wells, higher for surface waters), the risks of environmental contamination, including intermittent or temporary contamination (e.g. heavy rain, flooding), or the implementation of a new water treatment process by growers. • If water testing is limited to non-pathogenic indicators, frequent water tests may be useful to…	**Japan**
15	Kenya supports the testing of indicator microorganism with the exception of STEC. Rationale: The indicator microbes are adequate to inform of any possible contamination with STEC. STEC determination is an elaborate process that may be challenging for growers in developing countries especially smallholder growers.	**Kenya**
15	Singapore is supportive to include the text in square brackets as growers should be accountable to ensure the products are free from pathogenic microorganism.	**Singapore**
15	~~[Growers~~ Where necessary, growers should ~~periodically~~ test the water they use for appropriate indicator microorganisms and, where necessary, STEC~~,]~~, according to the risk associated with the production. The frequency of testing will depend on the water source (i.e., lower for adequately maintained deep wells, higher for surface waters), the risks of environmental contamination, including intermittent or temporary contamination (e.g., heavy rain, flooding), or the implementation of a new water treatment process by growers. If the intended water source is found to contain unacceptable levels of indicator microorganisms or is contaminated with STEC, corrective actions should be taken to ensure that the water is suitable for its intended use. Possible corrective actions to prevent or minimize contamination of water for primary production may include the installation of fencing to prevent large animal contact, the proper maintenance of wells, water filtering, chemical water treatment, the prevention of the stirring of the sediment when drawing water, the construction of settling or holding ponds or water treatment facilities. The effectiveness of	**Thailand**

	corrective actions should be verified by periodic water testing. Where possible, growers should have a contingency plan in place that identifies an alternative source of water fit for purpose. We would like to retain the sentence from the previous version of Annex 2 Fresh leafy vegetables. We are of the opinion that the expected occurrence of STEC in the water is low and sporadic. Only where necessary, growers should test for appropriate indicator organisms in accordance with risk associated with the production.	
15	~~[Growers~~ Growers should periodically test the water they use for appropriate indicator microorganisms and, where necessary, STEC~~,]~~, according to the risk associated with the production. The frequency of testing will depend on the water source (i.e., lower for adequately maintained deep wells, higher for surface waters), the risks of environmental contamination, including intermittent or temporary contamination (e.g., heavy rain, flooding), or the implementation of a new water treatment process by growers. If the intended water source is found to contain unacceptable levels of indicator microorganisms or is contaminated with STEC, corrective actions should be taken to ensure that the water is suitable for its intended use. Possible corrective actions to prevent or minimize contamination of water for primary production may include the installation of fencing to prevent large animal contact, the proper maintenance of wells, water filtering, chemical water treatment, the prevention of the stirring of the sediment when drawing water, the construction of settling or holding ponds or water treatment facilities. The effectiveness of corrective actions should be verified by periodic water testing. Where possible, growers should have a contingency plan in place that identifies an alternative source of water fit for purpose. Rationale: The United States supports retention of this statement.	**USA**
18	Hygiene and health requirements should be followed to ensure that personnel who come into direct contact with fresh leafy vegetables prior to, during or after harvesting will not contaminate them with STEC. Adequate access to, and use of, hygienic and sanitary facilities, including adequate means for hygienically washing and drying hands, are critical to minimize the potential for workers to contaminate fresh leafy vegetables. People known or suspected to be suffering from illness due to STEC should not be allowed to enter any area where handling leafy ~~vegetables~~vegetables occurs, including the harvest area. Refer to section 3.2.3 of the *Code of Hygienic Practice for Fresh Fruits and Vegetables* (CXC 53-2003) for practices to minimize microbial pathogens such as STEC Grammar. Full sentence. Area does not handle leafy greens people do..	**Canada**
21	Fresh leafy vegetables should be stored and transported under conditions that will minimize the potential for STEC contamination and/or growth. Fresh leafy vegetables should not be transported in vehicles previously used to carry potentially contaminated materials, e.g., heavily soiled root vegetables, live animals, animal manure, compost, or biosolids. When vehicle receptacles or containers have been used for the transport of products other than fresh leafy vegetables, effective cleaning should be carried out between loads to avoid ~~the risk of~~ cross contamination. For consistency with Codex terminology around the use of the word risk.	**Canada**

4. PACKING OPERATIONS

24	As far as possible, the cooling of fresh leafy vegetables should take place as rapidly as possible to ~~minimize~~ prevent growth of any STEC that may be present and in a manner that does not contribute to contamination of product with STEC. For example, fresh leafy vegetables can be cooled immediately after harvest by using ice (e.g., for parsley), forced-air cooling, vacuum cooling (e.g., for iceberg lettuce), hydrocooling or spray-vacuum (hydro-vac) cooling. Prevent is more applicable in this context.	**Canada**
26	Packers washing fresh leafy vegetables should follow good hygienic practices (GHPs) to prevent ~~or minimize~~ the ~~potential for the~~ introduction or spread of STEC in wash water. Where used, biocides should be added to wash water as per GHPs, with their levels monitored, controlled and recorded regularly during production to ensure the maintenance of effective concentrations. The characteristics of post-harvest water that may impact the efficacy of the biocidal treatments (e.g., the pH, turbidity and water hardness) should be controlled, monitored and recorded. Prevent is more applicable in this context.	
31	**5.3 Washing and dewatering/drying cut fresh leafy vegetables** Dewatering is not mentioned in the text below. It is unclear why it is relevant in the section title? Suggest to remove if/where it does not add information.	
32	When feasible Fresh leafy vegetables should be maintained at appropriate temperatures after cooling to ~~minimize~~ prevent growth of any STEC that may be present. The temperature of the cold storage should be controlled, monitored and recorded. Prevent is more applicable in this context.	
32	"when feasible" and "should" are concepts that are opposite in intent and meaning. Thus, if the idea that is conveyed here is that temperature control is optional or to be done when feasible, suggest changing the sentence to a recommendation style such as: It is recommended that fresh leafy vegetables are maintained at appropriate temperature after cooling....	
34	It is recommended that harvesting, processing, production, and distribution records ~~should be~~ are retained long enough to facilitate STEC illness investigation and recalls if needed. This period may significantly exceed the shelf-life of fresh leafy vegetables. Refer to section 5.7 of the *Code of Hygienic Practice for Fresh Fruits and Vegetables* (CXC 53-2003) for the types of records that should be maintained by growers, harvesters and packers that may be important when investigating foodborne illness outbreaks due to STEC. Since the sentence is a recommendation, we suggest removing should be.	

11. RETAIL AND FOODSERVICE

43.3	thoroughly wash fresh leafy vegetables, with biocides when needed, prior to use, and	**Argentina**
43	Fresh leafy vegetables (intact and pre-cut) should be held at an appropriate temperature to ~~minimize~~ prevent growth of STEC. Cross-contamination from or to other food items should be prevented. Food business operators serving fresh leafy vegetables for consumption without cooking to consumers should take appropriate measures to	**Canada**

	Prevent is more applicable in this context.	

Figure1: Fresh Leafy Vegetables Flow Diagram

	In the flow diagram, correct the spelling of “manufacturer” (or change it to “processor”) and change “leafy greens” in two boxes to “leafy vegetables.”	**USA**

ANNEX 3

1	[24]Thermization, a sub pasteurization heat treatment (55.0–71.7°C), has been proposed to ~~reduce the risk of pathogens~~reduce in raw ~~cheese~~ milk ~~while retaining some quality attributes in the cheese~~. The following correction is made with regards to the objective of thermization, given that while it does aim to reduce the total bacterial load it is not specific to the elimination of pathogenic microorganisms; in this way, consistency will be maintained with what is expressed on page 27 in the Definitions section.	**Argentina**
1	Question if this text is needed?	**Australia**
1	If thermization is a heat treatment between 55.0–71.7°C, what is considered a treatment between 40 and 55°C?	**Canada**
1	Position 1: Kenya supports the inclusion of the statement in square brackets to the paragraph and proposes deletion of the word drinking since it is already implied in consumption. Rationale: Studies have shown that Consuming raw milk without any control measures is associated with a higher risk of illnesses. see references below 1,2,3 Position 2: Kenya supports the inclusion of the statement in the second square brackets into the paragraph. Rationale: Since raw milk is the raw material, there is no control measures to reduce any contamination in the process of making raw milk cheeses. Ref 1. https://www.sciencedirect.com/science/article/abs/pii/S0168160516300101 2. https://www.hindawi.com/journals/ijfs/2020/3616713/ 3. https://www.fda.gov/food/buy-store-serve-safe-food/raw-milk-misconceptions-and-danger-raw-milk-consumption	**Kenya**
1	Singapore is supportive of the addition of the text in square brackets in paragraph 1, as it spells out the difference in risk between raw milk and milk that has undergone certain treatment such as pasteurisation or sterilisation.	**Singapore**
1	Although most milk for drinking is either pasteurized or sterilized by ultra-high temperature (UHT) processing, raw drinking milk is consumed in many countries. [~~Consuming~~ Consuming raw drinking milk without any control measures is associated with a higher risk of ~~illness~~]illness. Raw milk cheeses are fermented products made from raw milk that are consumed in a variety of countries around the world. [~~Without~~ Without any control measures, they are associated with a higher risk of foodborne illness than those cheeses made from milk subject to heating such as thermization[24] or pasteurization to reduce the risk from foodborne ~~pathogens~~]pathogens. Cheeses are produced by both large manufacturers and small factories	**USA**

	such as farm cheese producers, artisanal cheese producers or large-scale industry and cheese makers. Specific combinations of ingredients and cheese-making processes are used by manufacturers to obtain a wide variety of cheeses with desired characteristics that meet consumer expectations. Rationale: The United States supports these statements, which are factual statements about relative risk. Without such statements there is a risk that these Guidelines could be interpreted as providing measures that eliminate the STEC risk from consuming such products.	
1	Paragraph 1 deals with the consumption and method of making raw milk cheese. The sentences in square brackets does not have to be placed in this paragraph and could be reformulated in paragraph 2. Paragraph 2 deals with food safety and human impact.	**IDF/FIL**
2	Question - does this need more context? Propose that text is added 'more so than with milk/cheese that has undergone pasteurisation or other treatment'?	**Australia**
3	3Cattle are a main source of STEC. Infected cattle can carry the bacteria in their gastrointestinal tract without any symptoms of disease and shed them in their faeces. STEC have also been isolated from the faeces of other species of animals, including buffaloes, goats, camels and sheep, that are commonly milked for human consumption. Detailed investigations have shown that without observance of appropriate cleaning and disinfecting steps and udder good hygiene practices, faecal matter can contaminate the cow's teats and udders, which can increase the risk of microbial contamination of the milk during the milking process. For this reason, STEC can potentially be found in raw milk. When STEC-contaminated milk is used to produce raw milk cheeses, STEC may survive ~~and be isolated from some~~ in the resulting ~~raw milk cheeses~~cheese. To simplify the sentence.	**Canada**
3	This paragraph could be completed by : "The implementation of effective control and monitoring measures is essential to ensure the sanitary quality of raw milk and raw milk cheeses."	**IDF/FIL**
4	Question if this text is needed?	**Australia**
4	4Raw milk cheeses are made from raw milk coagulated through the action of rennet, selected microbiological organisms or other suitable coagulating agents, and then partially or completely draining the whey resulting from the coagulation, ~~, while adhering to the principle that cheese-making~~ . This process results in a concentration of milk protein and milk fat. Following this step, ~~different~~ various processing techniques are applied to produce the end-products. Different microbiota and very diverse enzymatic reactions play a complex role during processing and maturation. This results in very different cheese types, including ~~ripened or unripened~~ fresh, blue, soft, semi-soft, semi-hard, hard, or extra-hard product, which may be ~~coated~~ripened, ~~uncooked~~coated, ~~pressed, and sold fresh (unripened)~~ cooked or ~~ripened~~pressed. The different processing steps applied, and the raw milks used from different species (e.g., cow, buffalo, goat, sheep) can influence the behavior (survival, growth or inactivation) of STEC strains. This sentence is hard to read. Sentence as written is difficult to understand (long) and is unclear. Please consider suggestion to break up into 2 sentences to help with reading flow and clarity.There are so many combinations that it is hard to have them in one sentence. For example, fresh cheese is unripened and unpressed. We tried modifying the sentence but not sure if it works.	**Canada**

	Suggest removing since ripened and unripened is mentioned twice in the same sentence	

3. SCOPE AND DEFINITIONS

8.2	**Milk:** Milk is the normal mammary secretion of milking animals obtained from one or more ~~milking's~~ milkings without either addition to it or extraction from it, intended for consumption as liquid milk or for further processing[25]	**Canada**
8.3	[27] Heat treatment beyond 40ºC results in changes such that the structure of the resultant product is no longer the same as that of raw milk. In addition, a point temperature of 40ºC, and ~~temperatures in the range of~~ up to pasteurization temperatures, is generally considered to be insufficient to kill STEC in raw milk. This addition of "up to pasteurization temperatures" in the Spanish document is done to remain consistent with what is expressed in the English document.	**Argentina**
8.3	We understand that thermized milk is excluded from the definition of raw milk and therefore from the scope of these Guidelines. However, since footnote 27 says that this is generally considered to be insufficient to kill STEC in raw milk, should we explain some of the reasons why thermized milk is excluded? Alternatively, perhaps we should consider deleting footnote 27 as well as the text related to thermization in paragraph 1 to avoid confusion.	**Canada**
8.3	The second sentence of the footnote 27 (i.e., In addition, a point temperature of 40ºC, and up to pasteurization temperatures, is generally considered to be insufficient to kill STEC in raw milk.) somewhat contradicts the footnote 24 which states that thermization has been proposed to reduce the risk of pathogens in raw cheese milk. We understand that there is a difference between (insufficient to kill STEC) and (reduce the risk of pathogens), however, we wonder if this will be well understood by the reader.	
8.3	In this definition, we would like to understand what are the criteria to determine that a treatment as an equivalent effect? Is there an example of a treatment that has an equivalent effect? This would allow us to understand and appropriately comment on the different footnotes and the use of thermization and microfiltration in these guidelines.	
8.3	Modify footnote 28 to read as follows: Milk that has been subject to processing techniques such as microfiltration and/or bactofugation is no longer considered raw milk because these processes require milk to be heated above 40°C. Rationale: Clarifies why the milk would not be considered raw (as noted in the JEMRA 2022 report on STEC for meat and dairy).	**USA**

4. PRIMARY PRODUCTION-TO-CONSUMPTION APPROACH TO CONTROL MEASURES

10	Raw milk should come from healthy animals, be obtained by hygienic milking practices and be free of colostrum. Raw milk can be a potential source of microbial pathogens, including STEC. It is of major importance to ensure the sanitary quality of the raw milk, ~~which~~ as it does not undergo a microbial reduction treatment prior to packaging for drinking milk or before cheese making.	**Australia**
10	This is not limited to milk that is consumed raw. We would want to avoid the impression that if the sanitary quality of the raw milk is questionable, it could just be pasteurized. For consideration, "Although applicable to all milk, it is of especial importance to ensure the sanitary quality of the raw milk which will not undergo a ……"	**Canada**
10	Raw milk should come from healthy animals, be obtained by hygienic milking practices and be free of colostrum. Raw milk can be a potential source of microbial pathogens, including STEC. It is of major importance to ensure the sanitary quality of the raw milk, which does not undergo a microbial reduction treatment prior to packaging for drinking milk or before cheese ~~making~~making of raw milk cheeses. Rationale: Clarification; there are microbial reduction treatments for raw milk prior to use in making many cheeses.	**USA**

5. PRIMARY PRODUCTION – MILK PRODUCTION AT DAIRY FARM

12	STEC are commonly present in the microbiota of milk-producing animals, and it is not possible to eradicate them. The excretion of STEC by ruminants seems to be sporadic but may also be persistent over several months. Studies have shown that excretion varies according to the season, peaking in warmer months. Excretion also varies among individual cows, with some individuals considered to be "high shedders" (a high-level excretion of STEC), and excretion levels may even differ between cow droppings of the same animal. Other factors proposed to contribute to changes in STEC excretion include age, diet, housing, stress, herd size, animal health, geographical area, and previous contamination with STEC strains. Faecal contamination of ~~sheep~~ sheep's and ~~goat milks~~ goat's milk exist but is less likely than for cows, because of anatomical differences and because~~as~~ their faeces tend to be more solid and thus are less likely to cross-contaminate. There are no established methods to prevent STEC carriage or ensure reduced shedding by ruminants. In addition, no interventions specific for small ruminants are suggested. Control measures should be implemented to minimize spread between animals and their environments. The following are examples of measures that may be useful:	**Canada**
12.2	keep ~~litter and~~ hygienic condition of bedding ~~as dry as possible~~ and remove them when they become soiled with excess manure. To be consistent with P.126 of the JEMRA report MRA39, Japan proposes to change the 2nd bullet of para 12 as follow: Keep hygienic condition of bedding and remove…	**Japan**
13	Other wildlife or livestock, pests, and birds can also carry STEC and thus contribute to their circulation in milking herds. Applying comprehensive pest management practices may be useful. Word missing.	**Canada**
13	Other wildlife or livestock, pests (e.g., rodents), and birds can also carry STEC and thus contribute to their circulation in milking herds. Applying comprehensive ~~pest~~ management of each one of these potential sources, according to scientifically validated methods, thereby reducing or minimizing the risk of transmission by these sources, may be useful.	**Colombia**

15	Environmental transmission has also been demonstrated due to poor housing conditions or to the survival period of STEC (potentially more than a year) in effluent and the environment (soil, plants, crops, grain and water). Pastures can also maintain bacterial circulation by faeces deposited onto the ground and/or spreading of effluent. ~~A~~The application of ~~pply~~ good hygienic practices for manure and slurry management, with frequent removal from the milking herd environment and the maintenance of necessary intervals between spreading on pasture and the reintroduction of animals for grazing is recommended. Sentence modified to be a recommendation instead.	**Canada**
16	When appropriate, other control measures at primary production, such as diet, vaccination, administration of probiotics and additional good management practices (as described in the Raw Beef Annex) may be helpful in minimizing the shedding of STEC and, thus, contamination of raw milk~~, but more research on efficacy is needed~~. This may not be necessary here since this is better explained in the Beef Annex.	**Canada**
16	When ~~appropriate~~appropriate and validated, other control measures at primary production, such as diet, vaccination, administration of probiotics and additional good management practices (as described in the Raw Beef Annex) may be helpful in minimizing the shedding of STEC and, thus, contamination of raw milk, but more research on efficacy is needed.	**Japan**
16	16. When appropriate, other control measures at primary production, such as diet, vaccination, administration of probiotics and additional good management practices (as described in the Raw Beef Annex) may be helpful in minimizing the shedding of STEC and, thus, contamination of raw milk, ~~but more research on efficacy is needed.~~ Rationale: the last part of the paragraph may not be appropriate as part of control measures.	**Thailand**
17	Contaminated feed and water (surface water, roofing water, contaminated drinking water) can contribute to the introduction or circulation of ~~STEC, following direct or indirect contamination~~STEC in the herd. The presence of STEC in feed can be minimized by application of good manufacturing practices and appropriate manure and slurry management when the feed is produced on the farm (*Code of Practice on Good Animal Feeding* (CXC 54-2004)). Secure storage of feed is important to prevent STEC contamination from runoff water, pests and birds. In addition, it is important to limit water contamination for watering animals by adequate maintenance of water troughs. Suggest removing since it does not seem to add anything to the sentence's key message.	**Canada**
18	The major route of raw milk contamination is from faecal sources (directly or indirectly). This in turn soils the teats, and consequently the milk can ~~be subsequently~~ be contaminated during the milking process. Therefore, limiting faecal contamination during milking is of key importance to manage STEC on the farm. For this it is important to apply good hygiene practices during milking, to keep animals clean, and most importantly to prevent contamination with faeces.	**Australia**
18	The major route of raw milk contamination is from faecal sources (directly or indirectly). ~~This in turn soils~~ Faeces can soil the teats, and ~~consequently~~ the milk can ~~be~~ subsequently become contaminated during the milking process. Therefore, limiting faecal contamination during milking is of key importance to manage STEC on the farm. For this it is important to apply good hygiene practices during milking, to keep animals clean, and most importantly to prevent contamination with faeces. For precision.	**Canada**
18.1	Ensure~~Manage~~ a clean and hygienic environment for the milking animals to reduce faecal contamination. For example, the area where milking will be performed should be cleaned after each milking and allowed to dry when possible.	**Canada**

	For precision.	
19	STEC can also potentially persist on milking equipment and pipelines if these are not adequately cleaned and disinfected (Annex I Guidelines for the primary production of milk from CXC 57-2004). Cleaning and disinfecting are more challenging if equipment is not well designed for cleaning, and/or not well maintained. STEC can form biofilms in milking machines if they are improperly designed, poorly maintained and/or poorly cleaned. Studies have shown biofilm formation by STEC serotype O157:H7 ~~STEC~~ and non-O157 STEC with increased tolerance to sanitizers commonly used in the food processing environment, particularly if cleaning is not done effectively ~~(resulting in biofilm formation in which the sanitizer cannot reach microorganisms)~~ or ~~the unintended application of~~ where a sanitizer is applied at sub-lethal concentrations. All equipment that may come in contact with milking animal teats and milk as it is collected, such as milk collecting buckets, should be thoroughly cleaned and disinfected before every use. The hygienic quality of the water used for the last rinse is very important to prevent contamination of the milking machine (CXC 57-2004). In line with the *General Principles of Food Hygiene* (CXC 1-1969), only water fit for purpose (i.e., it does not cause contamination of the milk) should be used. If recycled water is used, it should be treated and maintained under conditions ensuring that its use does not impact the safety of the milk (CXC 57-2004). Consistency with wording in previous annexes and the current one. Remove certain text sections that were contributing to lack of clarity (too long and redundant). Reformulation for clarity.	
20	~~If~ The temperature of raw milk ~~is processed immediately after milking, cooling is not necessary~~should be kept cold where necessary to prevent the growth of STEC..	**Japan**
22	STEC can rapidly multiply in raw milk if the milk is at the temperature of STEC growth, so temperature control of the milk post-harvest is crucial, including during its storage at the farm and throughout the collection route to prevent microbial growth. Temperatures ≥ 6°C, extended storage of raw milk, and high initial bacterial counts in raw milk during collection, storage and transportation have been associated with increased counts of *E. coli* in raw milk. Milk temperature should be monitored during storage and checked before it is unloaded, when ~~possible.~~possibleWhen milk intended for later processing is not collected nor used during the two hours following milking, it should be cooled to a temperature of ≤ 6 °C if it is collected daily; or to a temperature of ≤ 4 °C if it is not collected daily. (Refer to the section Additional provisions for the production of milk used for raw milk products in the *Code of Hygienic Practice for Milk and Milk Products* (CXC 57-2004), Annex I Guidelines for the Primary Production of Milk) Considering that storing milk at a refrigerated temperature in the phase following its collection is a fundamental intervention measure to avoid the spread of STEC, we believe it important to reference the specified storage temperatures indicated in the section “Additional provisions for the production of milk used for raw milk products” in Annex I of the Code of Hygienic Practice for Milk and Milk Products (CXC 57-2004).	**Argentina**
22	STEC can rapidly ~~multiply~~ replicate in raw milk if the milk is at the temperature of STEC growth. Therefore, ~~so~~ temperature control of the milk post-harvest is crucial, including during its storage at the farm and throughout the collection route to prevent microbial growth. Temperatures ≥ 6°C, extended storage of raw milk, and high initial bacterial counts in raw milk during collection, storage and transportation have been associated with increased counts of *E. coli* in raw milk. Milk temperature should be monitored during storage and checked before it is unloaded, when possible.	**Canada**
23	The stage of transport has not been identified as a step likely to contaminate the milk with STEC, if good hygiene practices are followed. Transport is also identified as a stage where growth of STEC may occur if the temperature of the milk is not properly maintained during transportation.	**Argentina**

23	The stage of transport has not been identified as a step likely to contaminate the milk with STEC, if good hygiene practices are followed. ~~Transport is also~~ However, transport is identified as a stage where growth of STEC may occur if the temperature of the milk is not properly maintained during transportation. Suggested edit to improve text readability	**Australia**
23	~~The stage of transport~~ Transport has not been identified as a step likely to contaminate the milk with STEC, if good hygiene practices are followed. Transport is also identified as a stage where growth of STEC may occur if the temperature of the milk is not properly ~~maintained during transportation~~maintained.	**Canada**

7. CONTROL DURING PROCESSING

25	At the initial stages of cheese-making, the temperature (ranging from 27°C – 35°C) and a_w value of milk provide favorable conditions for the growth of STEC. During the first hours of cheese-making (transition from milk to curd), an increase in STEC level by 1-3 log can be observed in some cheese-making process. This increase in number is due to the multiplication of the cells in the liquid milk and then in the curd where cells are entrapped. However, “cooking” of cheese curd, as well as rapid acidification (when pH decreases to under 4.3), coupled to the increase of non-dissociated lactic acid, have been associated with STEC or *E. coli* log reductions of 1 to 4 log CFU/g. During the ripening step, the microbial stability of cheeses is determined by the combined application of different hurdle factors (pH, a_w, titratable acidity, sodium chloride, non-dissociated lactic acid, amount of starter cultures (such as lactic acid bacteria) still active in the cheese, brining of the cheese, as well as the temperature and length of time for ~~ripening~~ripening). These hurdles create an increasingly challenging environment for STEC during the manufacturing process and ripening. The food business operator (FBO) should analyze the risks associated with its manufacturing process with respect to the potential for growth or decline of STEC. Based on this assessment, the FBO should adapt the process and/or implement controls to reduce any identified risks for STEC contamination and growth.	**USA**

9. VALIDATION, MONITORING AND VERIFICATION OF CONTROL MEASURES

31	For consideration, Codex members might have different levels of oversight of milk suppliers and some responsibilities could reside in provincial or regional authorities. For example, in Canada, this would not be the responsibility of the operators but oversight by provinces. Is there an expectation that the FBO would do an audit on milk suppliers? See also paragraph 36.	**Canada**
32	May require analysis to determine if the processing steps are the same. To use a collective approach, best practices would be identical processing and control measures.	**Canada**
36	General hygiene audits can be useful to check periodically that the GHPs are effectively implemented at each farm where the milk is collected. They might be conducted by the dairy ~~establishment~~ establishment, competent authority or by a local professional association.	**United Kingdom**
40	Sampling and testing of raw milk cheeses are an important part of verification plans, to confirm that practices and procedures described in the food safety programme are successful. Accurate safety and quality test results are crucial and depend on appropriate sampling and sample handling, the type of representative samples, and proper methods. For routine surveillance, FBOs should consider analyzing cheese during the early stages of ~~manufacturing~~manufacturing (e.g., after pressing, before brining), when the peak of STEC growth is likely to take place. Testing at this time would have a greater sensitivity than end product testing and would save producers the expense of aging and storing contaminated products. Analysis could also be done during ripening and / or before placing the cheese on the market.	**USA**

	Rationale: Provides additional information on what the “early stages” could be (as noted in the JEMRA 2022 report on STEC for meat and dairy).	
41	When STEC is detected ~~are~~t in raw milk, it has been found at very low levels in cheeses. This contamination is characterized by heterogeneous distribution, making STEC difficult to detect. Sampling plans should therefore be designed according to the ~~accidentally present in raw milk, it has been found at very low levels in cheeses. This contamination is characterized by heterogeneous distribution, making STEC difficult to detect. Sampling plans should therefore be designed according to the~~ *General Guidelines on Sampling* (CXG 50-2004). In addition, sampling plans should be adapted over the entire production chain (number of samples, nature of the samples (for example: milk, cheese at the start of coagulation, during ripening, etc.), quantity analyzed, frequency of analysis, etc.).	**Australia**
41	Please clarify accidentally. Introduced vs intrinsic presence?	**Canada**
42	Suggest this paragraph is moved to be the first para in the section (i.e. moved from 42 to 39) as it sets the scene for this section.	**Australia**
43	Should the different type of public health risk be clarified (e.g. recall, outbreak, etc.). Would there be a distinction of the level of public health risk STEC detection? Wouldn’t detecting STEC in itself in cheese or curds be considered a public health risk.	**Canada**
43	43. Enhanced surveillance can be put in place when STEC are detected in curds or in cheeses or in the case of a public health risk. For example, other batches of cheeses can be screened in greater detail for STEC to assess the magnitude of contamination. In addition, it is important to identify the remaining contaminated milk, if any, and stop using ~~it~~it for production of raw milk cheese. Additional wording for clarification.	**United Kingdom**
	Figure 1. Process Flow Diagram for Raw Milk Production, Distribution and Sale In figure 2, there is mention of cold storage, not just storage. Indicating cold storage in Figure 1 would align with the recommendations above (paragraph 22) that milk should be stored (if not used right away) at <6ºC. Recommend adding cold to the storage box to read: cold storage	**Canada**
	Figure 2: Making Cheese from Raw Milk Position: On the Aging Step Kenya proposes the word ‘Optional’ to be used instead of ‘Optional and more or less long’. Rationale: As it is "Optional and more or less long" is not clear and causes confusion. ‘Optional’ is sufficient.	**Kenya**

ANNEX 4

4	Figure 1 provides a flow diagram illustrating a generalized process flow to produce sprouts. This flow diagram is for illustrative purposes only. Steps may not occur in all operations ~~in grey line sand~~ and may not occur in the order presented in the flow diagram. Sprouts are grown in production environments that vary based on size and resources of the operation, seeds type, available equipment, etc.	**USA**
5	During ~~seeds~~ seed production, conditioning and storage, the application of Good Agricultural Practices (GAPs) and Good Hygienic Practices (GHPs) should aim to prevent the contamination of seeds by microbial pathogens such as STEC. During sprout production, the microbiological decontamination of seeds step is aimed at reducing potential contaminants and the GHPs at preventing the introduction of microbial pathogens and minimizing their potential growth. The degree of control in these two areas has a significant impact on the safety of sprouts.	

3. SCOPE, USE, AND DEFINITIONS

7	**3.1 Scope** We are of the opinion that sprout should be separated from the fresh leafy vegetables since the process is different. For microgreens, we would like to ask for more information and clarification from JEMRA about appropriateness of inclusion of microgreens to Annex on Sprout or Fresh Leafy Vegetables.	**Thailand**
7	This Annex covers specific guidance for the control of STEC related to sprouts that are intended for ~~human~~ consumption without ~~cooking~~any further microbiocidal steps. Rationale: For consistency with the United States recommendation for the change to the definition of Fresh Leafy Vegetables to be consistent with the Code of Hygienic Practice for Fresh Fruits and Vegetables, Annex III "fresh leafy vegetables."	**USA**
8	This statement seems to contradict the definition of sprouts provided below (i.e., cut sprouts). Is one of the differences between sprouts versus microgreens the presence of the seed in the final product? If so, we should consider if the definition of sprouts should state that the final product contains the seed.	**Canada**
8	Malaysia prefers that microgreens to be excluded from the scope of this document since STEC outbreaks have not been associated with them to date.	**Malaysia**
8	Paragraph 8 indicates that home-sprouting, and shoots, cress, and microgreens where the seed is not kept in the final product are out of scope. The United States requests clarification about the "seed not kept in the final product." Illustrations we have on sprout morphology show that the seed coat eventually falls away once the root and cotyledon emerge (or when the sprouts are washed during harvesting). The other components of the seed form the plant itself (including the root), so sprouts harvested with the root would include everything from the seed except the seed coat.	**USA**
9	**Sprouts:** Sprouted seeds ~~or beans~~ harvested when the cotyledons (or seed leaves) are still un- or underdeveloped and true leaves have not begun to emerge. They can be grown in water, soil or substrate and can be harvested with or without the root (cut sprouts).[30] We suggest eliminating the term "bean" in Spanish as a synonym of "seed," as they are not the same. A seed is destined to sprout while a "bean" is destined for industrialization (e.g., flour, oil, etc.).	**Argentina**
9	**Seeds for sprouting**: Seeds ~~or beans~~ used to produce sprouts for human consumption.[31] We suggest eliminating the term "bean" in Spanish as a synonym of "seed," as they are not the same. A seed is destined to sprout while a "bean" is destined for industrialization (e.g., flour, oil, etc.).	
9	**Sprouts** - Not sure if "cut sprouts" should be included in the definition because seeds have been reported to be the main source of contamination in sprout-associated outbreaks.	**Canada**

	Consider if the definition of sprouts should state that the final product contains the seed.	

4. PRIMARY PRODUCTION OF SEEDS / BEANS FOR SPROUT PRODUCTION

11	Grazing of domestic animals should not occur in fields while crops are actively being grown for sprout seed production. History of the growing area regarding previous uses for grazing of domestic animals should also be considered, as STEC may survive for several weeks in bovine ~~feces~~feces and longer periods in the environment. Suggestion of additional concept to complement this recommendation.	**Canada**
12	In addition, nearby fields with livestock can increase the ~~risk~~ likelihood of STEC contamination. Livestock should be located as far as ~~feasibly~~ possible from fields growing sprouted seed, because the ~~risk~~ probability of crop contamination decreases as the distance of livestock increases (Berry et al., 2015, 2019). Repetitive word. For consistency of terminology with other Codex documents.	
58 note	Mark each container ~~o~~ to identify source and lot. For any seed that has been treated, clearly state this on the label.	**USA**

5. SPROUTS PRODUCTION

39	HACCP principles should be applied to sprout production, with all the steps well documented and potential critical control points (e.g., decontamination of the seeds) identified and controlled. If a problem is identified (e.g., STEC contamination of sprouts), corrective actions should be taken and a critical review of all the steps should be performed to determine whether changes are needed. ~~Not mixing~~ Keeping seeds and sprouts from different batches separated can facilitate the identification of batches with problems and tracing seeds back to the supplier**.** ~~Water used throughout sprouts production should be fit for purpose.~~ For precision. Deleted text stated above. Redundant.	**Canada**
39	Where appropriate, HACCP principles should be applied to sprout production, with all the steps well documented and potential critical control points (e.g., decontamination of the seeds) identified and controlled. If a problem is identified (e.g., STEC contamination of sprouts), corrective actions should be taken and a critical review of all the steps should be performed to determine whether changes are needed. Not mixing seeds and sprouts from different batches can facilitate the identification of batches with problems and tracing seeds back to the supplier**.** Water used throughout sprouts production should be fit for purpose. It is not always feasible to apply HACCP at primary production as written in CXC1. (CXC1-1969)	**Japan**

	CHAPTER TWO INTRODUCTION 2nd para HACCP principles can be considered throughout the food chain from primary production to final consumption, and their implementation should be guided by scientific evidence of risks to human health. Although it is not always feasible to apply HACCP at primary production, some of the principles can be applied and may be incorporated into good practices programmes (e.g. Good Agricultural Practices (GAPs), etc.). It is recognised that implementation of HACCP may be challenging for some businesses.	
46	Treatment of seeds to reduce the presence of pathogens such as STEC is a potential critical control point. However, seed treatment can be challenging due to the low water activity of the seeds, and the need to preserve the viability of the seeds, including their ability to germinate. ~~Therefore, because~~ Because treating seeds used for sprouting reduces contamination (Montville et al., 2005; Fett, 2002) but does not guarantee pathogen-free sprouts, efforts should be made to avoid contamination. Rationale: This sentence does not follow from the previous sentence, which says that seed treatment can be challenging.	**USA**
47	We believe it should be left.	**Colombia**
47	Known seed treatment methods include those that work by chemical means (liquid or gas), physical means, or a combination of these. The use of certain seed treatments may be subject to approval by competent ~~authorities.~~authorities in accordance with national legislation. To provide clearer information for the users of this Guidelines.	**Thailand**
48	Since scientific references will be deleted in a later step of the document, Malaysia agrees to include the concentrations that were shown in the referenced studies to achieve the log reduction of pathogen for easy reference.	**Malaysia**
48	We are of the opinion that it is difficult to include the concentrations of chemicals in the text since according to JEMRA's summary report, effectiveness of treatments is highly variable between published studies and are rarely validated under industrial conditions which is a limitation for the extrapolation of results to industrial applications.	**Thailand**
49	Malaysia agrees to include examples for each treatments recommended for better clarity.	**Malaysia**
49	Due to the limitation and variation of the treatments, we think that examples might not be available for every treatment. However, we do not object the inclusion of those examples related to physical treatments as long as they are validated by JEMRA.	**Thailand**
56	In addition to the seed treatment methods described above, research has also indicated a novel growing method, e.g., growing sprouts at 4.4 °C following a 2,000 ppm sodium hypochlorite seed treatment, can result in a decrease in *E. coli* ~~*O157:H7,*~~ O157:H7, and a significant increase in product shelf life (Lonergan et al., 2018). Delete Italics after "E. Coli"	**USA**
57	Sprouts are harvested manually by removing them from growing units. Sprouts may be washed to remove hulls and/or to help lower the temperature of the sprouts ~~ant~~ and then spin-dried. Soil-grown sprouts are harvested by cutting them from the trays, prior to washing and	**Canada**

	packaging, or the sprout trays are sent to retailers and cut at the point of sale. GHPs should be applied to prevent these operations from being source of contamination (e.g., if some of the sprouts are contaminated with STEC from the environment or from handlers).	
58	The minimum temperature for growth of E. coli is usually quoted at 7 °C. The foot note should read “A temperature of 6 °C or below will prevent growth of STEC.”	**Canada**

7. DISTRIBUTION AND POINT-OF-SALE

71	STEC growth and contamination can occur during transport, distribution and at point-of-sale due to improper handling and poor personal hygiene, and contamination through comingling with other raw commodities and animals/animal products, and exposure to unsanitary surfaces and water**.** Control measures should be applied during distribution and at point of sale to prevent contamination with STEC. For precision.	**Canada**

8. PRODUCT INFORMATION AND CONSUMER AWARENESS

73	Producers should provide relevant information to the consumer to assure the safety of sprouted seeds during storage, handling and preparation of the product~~, to~~ . This information may include: (1) recommended temperature of storage; (2) use-by date; (3) cooking instructions, which should be included on the label if the product is intended to be consumed as non-RTE. Suggestion to provide additional clarity and because some countries do not use "use-by dates". This is why we suggest the word may include.	**Canada**
74	Consumers should hold sprouts at temperatures ~~they~~ that will ~~minimize~~ prevent the growth of pathogens such as STEC and adhere to the use-by date when provided. Prevent is more applicable in this context. For consideration since some countries may not apply a use-by date on sprouts.	
76	Seed producers, handlers, distributors, and processors should be aware of GAPs, GHPs and their role and responsibility in protecting seeds intended for sprouting from ~~STEC contamination~~bacterial contamination including STEC. For consideration. While STEC is the focus of this document other bacterial pathogens may contaminate sprouts.	

10. RETAIL AND FOODSERVICE

78	Sprouts for retail sale should be held at an appropriate temperature to ~~minimize~~ prevent growth of STEC. Temperatures should be monitored. Prevent is more applicable in this context.	**Canada**
79.2	maintain sprouts at an appropriate storage temperature to ~~minimize~~ prevent growth of STEC that may be present, and	

	Prevent is more applicable in this context.	
	Figure1: Sprouts Flow Diagram[33] Since there would be a difference description between this GL states “Germination and Grow 3-7 days” and CXC53 annex II Introduction states "2-10 days", it is supposed that should be discussed in CCFH after JEMRA report (as final version) on Prevention and Control of Microbiological Hazards in Fresh Fruits and Vegetables (Part 3: Sprouts) is available.	**Japan**