



JOINT FAO/WHO FOOD STANDARDS PROGRAMME CODEX COMMITTEE ON FOOD HYGIENE

Virtual

28 February - 4 March and 9 March 2022

REPORT OF THE WORKING GROUP ON 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

SUMMARY

1. The virtual working group (VWG) was held on 27 February 2022 to consider issues related to three of the four annexes (raw beef, fresh leafy vegetables, and raw milk and raw-milk cheeses) to the proposed draft guidelines for control of STEC. The session was chaired by Dr. Emilio Esteban, the Chair of the Codex Committee on Food Hygiene (CCFH) and Dr. Constanza Vergara (Chile), Lead Chair of the Electronic Working Group (EWG) on guidelines for control of STEC.
2. The Lead Chair of the EWG from Chile provided an overview of the document organization and noted that the tracked changes versions of the annexes as provided through an Information Package¹ to delegates were not CRDs. Following CCFH52, it was proposed that an EWG will consider comments submitted through the Online Commenting System (OCS), the CRDs submitted for CCFH52, and the comments made at the virtual working group meeting in revising the annexes.
3. After a presentation by the FAO on JEMRA activities related to STEC, the co-chairs for each of the annexes presented a brief summary of changes being made as a result of comments submitted through the OCS, followed by an overview of some specific issues to be considered by the VWG input, including the proposed recommendations of the Co-Chairs.
4. The VWG agreed to most recommendations from the Co-Chairs but asked for further deliberation on several issues as noted below.

DISCUSSION

JEMRA PRESENTATION

5. FAO provided an overview of JEMRA work related to STEC, which has been quite extensive. Information from outbreaks and case control studies and associated foods, along with information on virulence factors, detection methodology, and interventions, was presented. Specific STEC interventions include vaccination, bacteriophage and probiotics. Interventions such as Good Agricultural Practices, hygiene and temperature control are not specific for STEC, but scientific inference has been used to assess their importance for control of STEC. At their most recent meeting, experts ranked the efficacy of proposed control measures for STEC in beef and dairy products, considering the amount of evidence available to support the effectiveness of specific interventions. The take home messages noted that interventions need not be STEC specific to be effective and that there is no one single solution to control STEC; a multi-hurdle approach is needed.

RAW BEEF ANNEX

6. The Co-chair from Chile presented the Raw Beef Annex. It was explained to the working group that during the last round of consultation, comments received through the OCS were mostly editorial and aimed at:
- clarifying text;
 - avoiding repetition within the same section among recommendations;

¹ Available at <https://www.fao.org/fao-who-codexalimentarius/sh-proxy/?Ink=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-712-52%252FLinks%252FINFORMATIONPACKAGESTECWORKINGGROUP.pdf>

- improving the English language; and
 - including words and phrases like “may”, “where feasible”, “when possible”, etc., to provide flexibility to the recommendations.
7. Recommendations without scientific basis were not considered, and others are pending publication of the JEMRA report prior to consideration by the EWG.
8. The Co-Chairs identified the following key issues to be discussed:

1. Specific control measures vs GHP Processing practices

Comment received through the OCS:

- Delete recommendations with limited evidence of having specific impact on STEC.
Example: Parag 45 – 47 (rodding), para. 57

Considerations by Co-Chairs:

- It is difficult to get good enough research data specific to STEC to be able to make definitive statements about certain measures applied to control microbial pathogens.
- Practices are known to help prevent fecal contamination, therefore may have a positive impact.

Co-Chairs' Recommendations:

- To leave recommendations and change “specific control measures” from the sub section title to i.e. “Specific Control measures and GHP’s for rodding”.
- Add the following paragraph at the introduction of the Raw Beef Annex: “Whether some of the measures recommended in this annex are specific control measures for STEC, others are good hygiene practices aiming to remove fecal contamination from carcasses and likely to have an impact on STEC”

Comments Received at the virtual Working Group:

- No adverse comment to the Co-Chairs proposal in general was received, except for one Member that considered it to be an obvious statement. However, the Co-Chairs explained that even when it is obvious, it is often necessary to include to provide context for the reader.
- Because GHP is not only for removal of fecal contamination but also to prevent it, and the impact should be positive the following paragraph will be presented in the introduction of the Raw Beef Annex at the next EWG:

“**While** some of the measures recommended in this annex are specific control measures for STEC, others are good hygiene practices aiming to **prevent and** remove fecal contamination from carcasses and are likely to have ~~a~~ **a positive** impact on STEC”

2. Paragraph 17- Use of Direct-Fed Microbials

Comment received through the OCS: To delete last part of paragraph 17 (in bold).

17. Use of 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 O157:H7 shedding by cattle (Wisener et al., 2015, Venegas-Vargas et al 2016). **The addition of viable microorganisms to feed should be assessed with respect to whether these microorganisms pose a risk for the transmission of antimicrobial resistance genes to pathogens in the gut.**

Considerations by Co-Chairs:

- Evidence of antimicrobial resistance has not been reported for use of common probiotics as food and feed. They usually inhibit adherence of pathogens to the GI epithelium and also activate the immune system.
- It is unlikely that these types of probiotics would produce antimicrobials that would be used for the treatment of disease in animals or humans i.e. not an antibiotic.

Co-Chairs' recommendation:

- To delete the text in bold in paragraph 17 above.

Comments Received at the Working Group:

- Members continued to raise concerns about the possible transfer of AMR genes from the probiotic strain and also the potential for use of genetically modified probiotic strains.
- FAO commented that there was some evidence that AMR genes can be transferred between organisms in the GI tract although nothing was specifically raised about probiotic strains.
- It was agreed not to delete the last part of the paragraph, and to ask for countries to submit more evidence for discussion during the EWG.
- A proposed solution regarding a footnote ensuring that GMO probiotics are free of genetic manipulation will be further discussed during the EWG.

3. Section 4.1 Generic flow diagram for application of control measures

Comment received through the OCS:

- Indicate/ Highlight the sections where contamination occurs (mild, moderate and heavy) and also sections to show where the sampling has to be made by color coding or any other means as appropriate.

Considerations by Co-Chairs:

- As established in paragraph 11, the flow chart is generic, processes may vary from country to country as may the amount of contamination that occurs at each applicable step and where each country decides to sample.
- The purpose of the generic flowchart is illustrative to improve the reader's understanding of the document.

Co-Chairs' recommendation:

- To maintain flowchart with no highlighted sections that identified where contamination could occur.

Comments Received at the Working Group:

- Members agreed to the recommendation of the Co-Chairs.

4. Section 4.1 Generic flow diagram for application of control measures

Comment received through the OCS:

- To replace the flow diagram with the one included in Guidelines for the Control of Nontyphoidal *Salmonella* spp. in Beef and Pork Meat (CAC/GL 87-2016), annex I, 6.1. or just make a cross-reference to that flow diagram.

Considerations by Co-Chairs:

- As established in paragraph 11, the flow chart is generic and for illustrative purposes only.
- The structure of this document differs from the Guidelines for the Control of Nontyphoidal *Salmonella* spp. in Beef and Pork Meat (CAC/GL 87-2016)
- Reference to other Codex guidelines may make the understanding and usability of this annex more difficult.

Co-Chairs recommendations:

- To maintain the Annex 1 flowchart as currently presented.

Comments Received at the Working Group:

- One delegate proposed that the flowchart diagram not to be finalised until an agreement on carcass washing, paragraph 58, had been reached, since the only difference between the flow diagram in this document and that in in CXC 87-2016 was carcass washing and noted that this reflected comments received from members.
- The Co-Chairs replied that in the beginning the flowchart from CXC 87-2016 was used for the elaboration of the first draft of this annex, but due to comments received and amendments made, the flow diagram has been modified according with the content of this Annex on Raw Beef.

- It was agreed that the flow diagram would be further discussed at the next EWG.

5. Scope and Definition

Comment received at OCS:

- To make the following change, “This guidance applies to control of STEC in raw beef, including ~~cuts such as steaks~~ **non-intact products** such as raw ground/minced or tenderized beef.”

Considerations by Co-Chairs:

- The current definition of raw beef includes cuts,
- To avoid redundancy on the scope

Co-Chairs recommendations:

- To accept the change

Comments Received at the Working Group:

- Members agreed to the recommendations of the Co-chairs.
- Clarification was sought by one delegation on whether the current scope included raw beef preparations, where other ingredient such as herbs must be considered. The Co-Chairs explained that raw beef preparations were not within the scope; only raw ground/minced or tenderized beef were included as a non-intact raw beef product.
- Members asked the next EWG to provide a definition of “ground/minced raw beef”, possibly using that in the Code of Hygienic Practice for Meat (CAC/RCP 58-2005), and also to provide definitions for “tenderized raw beef” and “non-intact beef”.

FRESH LEAFY VEGETABLES ANNEX

9. The Co-Chair from the United States presented the annex on Fresh Leafy Vegetables. Changes shown with tracking in the Information Package² were based on comments submitted to the OCS and generally were for clarification. She explained that:
 - a footnote was added to explain “soil amendments”;
 - the definition of “Fresh Leafy Vegetables” was modified;
 - a sentence was added in the section on transport from the field to effectively clean containers between loads; and
 - a bullet to thoroughly wash fresh leafy vegetables was added to the measures for Retail and Foodservice.
10. In addition, a footnote was added to the flow diagram to emphasize that it is for illustrative purposes only and that not all steps may occur or may occur in a different order.
11. The specific issues in the Fresh Leafy Vegetables Annex for discussion by the VWG were shown with a recommendation from the Co-Chairs and an explanation for the recommendation³. These were addressed as follows:
 - With respect to the proposal to add “hygiene” before “indicator microorganisms” in paragraph 15 on water testing, the VWG agree with the Co-Chairs’ recommendation to not make the change because it was not necessary to specify the purpose of using an indicator microorganism.
 - A request to replace paragraphs 14-16 on water for primary production and paragraph 26 on washing fresh leafy vegetables with a cross-reference to the *Guidelines for the Safe Use and Re-use of Water in Food Production* was not supported by the Co-Chairs because these steps are key controls for STEC and because the guidelines for safe water use are still in

² Available at <https://www.fao.org/fao-who-codexalimentarius/sh-proxy/it/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-712-52%252FLinks%252FINFORMATIONPACKAGESTECWORKINGGROUP.pdf>

³ The presentation of the key issues is available at <https://www.fao.org/fao-who-codexalimentarius/sh-proxy/it/?lnk=1&url=https%253A%252F%252Fworkspace.fao.org%252Fsites%252Fcodex%252FMeetings%252FCX-712-52%252FLinks%252FCompiled-STECC-Annexes-CCFH52-final.pdf>

development. The recommendation by the Co-Chairs to not make a change at this time but to add a cross-reference later if appropriate was accepted.

12. With respect to the specific temperature at which to store fresh leafy vegetables to prevent the growth of STEC, the Co-Chairs recommended deleting the specific temperature of 7°C where it appears and to refer instead to “an appropriate temperature.” In addition, the Co-Chairs proposed adding the following sentence at the end of paragraph 29 on Time and Temperature Control: “A temperature of 7°C or below will prevent growth of STEC and is appropriate for those fresh leafy vegetables that are not subject to cold injury.” The VWG agreed to these changes.
13. The Co-Chairs recommended retaining the section on Retail and Foodservice in its current location in the annex because the section is logically positioned in the flow of product after establishment-related activities and just prior to the consumer. The VWG agreed with this recommendation.
14. Several suggested modifications to the flow diagram were recommended for acceptance by the Co-Chairs, e.g., adding “Soil Preparation” prior to “Planting;” amending to “planting / sowing” since seeds are sowed and plants planted, turning the boxes for “Irrigation,” “Fertilizing,” and “Other Chemical Applications” into bullets in a box called “Growing” (since these activities do not flow in one direction); and modifying “cold storing” to say “Cold storing at warehouse, manufacturing or packing house.” The VWG agreed with these changes.
15. The Co-Chairs recommended to not indicate on the flow diagram the steps at which contamination may occur (mild, moderate and heavy) and steps where the sampling should be conducted; since the points where contamination may occur, the amount of contamination and the points of sampling may vary by country and commodity. The VWG agreed with this recommendation.
16. The Co-Chair from the United States noted that the annex will also need to be further revised to incorporate the recommendations from JEMRA expert working group report when this is available.

RAW MILK AND RAW-MILK CHEESES ANNEX

17. The Co-Chair from France presented the specific issues and recommendations from the Co-Chairs where agreement was sought from the VWG in the Annex on Raw Milk and Raw-Milk Cheeses. The specific items were:

1. Raw milk definition

18. The following amendment to the raw milk definition was presented:

*Raw milk –Milk (as defined in Codex General Standard for the Use of Dairy Terms (CXS 206-1999)) that is intended for direct consumption or a primary input for dairy products and which has not been heated beyond 40°C or undergone any treatment that has an equivalent effect. **This definition excludes processing techniques used for microbiological control (e.g. heat treatment above 40 °C microfiltration and bactofugation)***

Comments Received at the Working Group:

- There were differing views expressed in relation to the bold text; one country preferred the original definition (CXS 206-1999) and suggested the last part be deleted, whereas one observer asked to remove the example about “heat treatment beyond 40°C” since that temperature could not be considered as a heat treatment for milk.
- The Co-chairs proposed to delete the last part of the definition but to retain the information in the scope.
- The Co-Chairs proposed that this definition should be discussed further in the EWG.

2. Control measures for STEC at the dairy farm

Comment received through the OCS:

- Clarify why control measures included in Annex I, 4.2 primary production, are not mentioned here (Diet ingredients, microbials, feed additives, vaccination, good management practices at primary production).

Co-Chairs’ Recommendation:

- The Co-Chairs recommendation was to not make a change as milking hygiene was the main control measure that would limit the contamination of milk.
- A new paragraph 16bis was proposed for addition as follows:

Other control measures at primary production, such as diet ingredients, vaccination and additional good management practices (as described in the Raw Beef Annex) may be helpful in minimizing STEC shedding, and thus, contamination of raw milk, but more research on efficacy is needed.

Comments Received at the Working Group:

- The VWG agreed to the recommendations.

3. Control during processing

Comment received through the OCS:

- to modify paragraph 33.: testing the raw milk for the presence of STEC ~~can be established, as well as an audit program of milk suppliers effective but needs to assess their hygienic practices be~~ utilized in combination with other control measures starting at the farm and continuing through to the consumer.

Co-Chairs' Recommendation:

- Specific changes were not made **in that section** and the Co-Chairs proposed to insert a new paragraph 36 bis in section 9 "**Verification**" as follows:

Testing raw milk for the presence of STEC can be established, but since it is unlikely to be effective on its own because of low prevalence of STEC, it should be used in combination with other control measures including an audit program of milk suppliers to assess hygienic practices on the farm.

Comments Received at the Working Group:

- One comment suggested that indicator microorganisms should also be tested. The Co-Chairs noted that these were included on paragraph 35 of the same section.
- Another member commented that the phrase "*it is unlikely to be effective on its own*" is not to be clear enough.
- The Co-Chair proposed to update the new paragraph 36 bis for clarity and present to EWG for consideration.

4. *E. coli* enumeration and STEC testing

Comment received through the OCS:

- In paragraph 36 the following deletion and insertion was proposed: Periodic testing for "~~high risk~~" STEC **virulence genes** may also be conducted for verification of hygienic practices (FAO/WHO, 2018).

Co-Chairs' Recommendation:

- The text should not be amended
- The Co-Chairs noted that the term "high risk STEC" had been already discussed, accepted, and used in other annexes.
- They acknowledged that the detection of virulence genes had not been discussed before and may be confusing.
- A point about virulence genes was captured by the footnote: "High risk STEC are generally isolates that present pathogenic virulence factors that are responsible for significant numbers of illness and/or that cause the most severe illnesses".
- The Co-Chairs reminded the VWG that approaches may vary by country.

Comments Received at the Working Group:

- The member who provided the comment further explained that this recommendation should apply to all STEC, since even those that produce just diarrhoea should be considered.
- Since time was limited, the Co-Chairs proposed to leave the terms "high risk" bracketed along with the insertion of "virulence genes" and present for further discussion at the EWG along with further consideration of the information from the JEMRA 2018 report on Shiga toxin-producing *Escherichia coli* (STEC) and food: attribution, characterization, and monitoring.

5. Verification of control measures

Comment received through the OCS:

- There was a request to add the following in paragraph 42 "*Collection of filters from the milking machine at the time of milking, could constituted a sample library at the cheese factory for use in any possible*

investigation according to the results of the analyses of the cheeses, customer complaints, or during enhanced surveillance.”

Co-Chairs' Recommendation:

- Change was not made as suggested as it was considered to be unpractical for farmers.
- However, the following phrase was added at the end of the paragraph to capture some key elements of the comment:

“Milk filter samples can also be useful in investigating the source of contaminated cheese.”

Comments Received at the Working Group:

- The VWG accepted the recommendation from Co-Chairs.

RECOMMENDATIONS

19. CCFH52 is invited to consider the re-establishment of the EWG to consider all the comments received at the working group along with the Co-Chair's proposals in the elaboration of new drafts for the 3 Annexes.