

CODEX ALIMENTARIUS COMMISSION

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Food and Agriculture
Organization of the
United Nations



World Health
Organization

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Agenda item 8

CX/FH 22/53/8 Add.1

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

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Discussion paper on revision of the Guidelines on the Application of General Principles of Food Hygiene to the Control of Viruses in Food (CXG 79-2012)

Comments in reply to CL 2022/50/OCS-FH

Comments of Australia, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Ecuador, Egypt, European Union, India, Iran, Kenya, Mauritius, Peru, Philippines, Saudi Arabia, Singapore, Uruguay, USA and IFT, International Frozen Food Association

Background

1. This document compiles comments received through the Codex Online Commenting System (OCS) in response to CL 2022/50/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.

GENERAL COMMENTS

COMMENT	MEMBER / OBSERVER
<p>Australia thanks Canada and the Netherlands for preparing this discussion paper.</p> <p>Australia supports seeking additional information from JEMRA on all five of the elements listed. The proposed inter-related areas for review reflect important knowledge gaps and contribute to supporting a decision for new work to commence in revising and updating the guidelines.</p>	Australia
<p>Brazil agrees with the need to review the document taking into account the reasons presented in this CL.</p> <p>Many relevant points have been highlighted and Brazil will make specific comments at an appropriate step.</p> <p>About "recommendations" Brazil thinks that all issues are important and should be addressed by JEMRA. On discussion about prevention and intervention measures and the efficacy of interventions (bullet 2) attention should be taken to vaccination of food handlers/workers (e.g.: HAV). Hepatitis A vaccine could be recommended for food workers in a country or region where a community-wide outbreak has been recognized.</p>	Brazil
<p>We support the start of new work and the collection of more scientific data through JEMRA because these 2 agents (HAV and NoV) emerge as complex outbreaks when both environmental and person-to-person transmission occur.</p> <p>While all topics seem important, we believe that prioritization for the use of JEMRA resources and the delivery of timely information allowing this new work to begin more promptly would occur through the following points 1, which would allow the creation of some guides with greater specificity regarding their recommendations, point 2 about the mitigation, control, and prevention measures that the industry could implement throughout the production chain, and we think that numbers 3 and 4 should be considered together, as an update of the new available technology is required, but furthermore in general the viral detection methods cannot be easily used as routine monitoring in the food industry, due to cost or lack of technology when the production sites are in geographically remote areas.</p>	Chile
<p>Costa Rica supports the revision of these Guidelines, under the recommendations put forth by Canada and the Netherlands.</p>	Costa Rica
<p>In response to the CL 2022/50/OCS-FH, Cuba supports in principle the discussion paper on THE REVISION OF THE GUIDELINES ON THE APPLICATION OF THE GENERAL PRINCIPLES OF FOOD HYGIENE TO THE CONTROL OF VIRUSES IN FOOD (CXG 79-2012).</p>	Cuba
<p>Ecuador is grateful for the work conducted by Canada and the Netherlands; in accordance with and following the corresponding technical analysis of the aforementioned proposed draft; the country considers that yes all the hygiene guidelines and principles necessary for the control of viruses in food should be updated, according to the proposed recommendations in point 21 of the document; additionally Ecuador suggests analyzing the following points:</p> <ul style="list-style-type: none"> • The applicability and sustainability of the production chain in the Food Industry, based on the experience of member countries. • Prevention, control, and intervention measures, among others; in the post-pandemic phase, related to the health emergency, that affect food safety; (effects of COVID). • Implementation of monitoring systems that measure results for diseases caused by enteric viruses. • Support for monitoring in underdeveloped countries that do not have control systems for foodborne illnesses, caused by viruses. <p>It is also important to analyze the different realities that exist in each country in terms of geographic location, customs, disposal of waste and debris; among others.</p>	Ecuador

Egypt appreciates the work done in the document and agrees with it	Egypt
<p>The European Union and its Member States (EUMS) would like to thank and congratulate Canada and the Netherlands with the drafting of the very useful discussion paper, identifying several issues that may justify a revision of the guidelines on the application of The General Principles of Food Hygiene to the Control of Viruses in Food (CXG 79-2012).</p> <p>The EUMS support the recommendation to request additional information to JEMRA on the elements mentioned to be used as basis to determine if new work on the revision of the guidelines is necessary. The JEMRA work may include an assessment of other viruses such as sapovirus and picobirnavirus.</p>	European Union
<p>We highly appreciate this initiative and agree overall on the necessity to consider revision the existing guidelines in the light of new scientific insight on</p> <ol style="list-style-type: none"> 1- The scope of the guideline, considering an extension to Hepatitis E Virus (HEV) and a relevant food commodities such as frozen fruits. 2- Process-specific control systems (e.g. time-temperature recommendations for heat treatments based consolidated literature research) and recommendations for surface disinfection, developments in hand-disinfection and food handler hygiene. 3- The availability of new analytical methods and technologies and their recommended application. 4- The use of bacteriophages as indicators of human enteric viruses rather than classical hygiene indicators in water to control HAV and NoV in bivalve molluscs 	Iran
Kenya supports the review and revision of the guidelines on the basis of Evolving information on emerging and re-emerging viruses, coupled with emerging pandemics like COVID-19 justifies the call for an up-to-date review of all the recommendations.	Kenya
<p>We thank Canada and Netherlands for providing us with this discussion paper which depicts all the key areas where there have been recent developments.</p> <p>Based on the submission, the revision of the guidelines is warranted but the JEMRA could provide additional information on the first three bullets under section recommendations.</p>	Mauritius
<p>The Philippines supports the proposal to request JEMRA to provide the specified additional information to assess the need to revise the guidelines on the Application of the General Principles of Food Hygiene to the Control of Viruses in food (CXG 79-2012).</p> <p>Rationale: Additional information from JEMRA will provide scientific justification on the need to revise the existing guidelines. It will also provide guidance on the need to revise/amend our existing national standards on code of practice for bivalve molluscs (PNS/BAFS 236:2018), code of hygienic practice for fresh fruits and vegetables (PNS/BAFS 233:2018) and the subsequent adoption of the Codex Application of the General Principles of Food Hygiene to the Control of Viruses in food (CXG 79-2012) as Philippine national standard. Furthermore, additional significant commodities of public health concern that will be identified by JEMRA may also be reviewed accordingly.</p>	Philippines
Saudi Arabia support the Guidelines on the Application of General principles Of Food Hygiene to the Control of Viruses in Food (CXG 79-2012)	Saudi Arabia
Singapore supports the proposed new work, as it provides clarity on ensuring food safety in the increasingly-prevalent scenario where NoV and HAV were determined to be the viruses of greatest concern from a food safety perspective based on the incidence of reported foodborne disease, the severity of disease, including mortality, and their potential for transmission via foods.	Singapore
The Codex Committee on Food Hygiene (CCFH) was asked to consider the information in the paper and determine whether additional information from the Joint FAO/WHO Expert Meetings on Microbiological Risk Assessment (JEMRA) is required on one or more of the elements listed below, to be used as a basis to determine if new work on the revision of the guidelines is necessary (and to prioritize the requests):	USA

<ul style="list-style-type: none"> • an up-to-date review of the foodborne viruses and relevant food commodities of highest public health concern; • a review of the scientific evidence on prevention and intervention measures and the efficacy of interventions in the food continuum; • a review of the analytical methods for relevant enteric viruses in food commodities; • a review of scientific evidence on the potential utility of viral indicators or other indicators of contamination; and • a review of the various risk assessment models with a view towards constructing more applicable models for wide use among member countries, including a simplified risk calculator. <p>The United States recommends seeking additional scientific advice in the areas above to inform the revision of the Guidelines on the Application of General Principles of Food Hygiene to the Control of Viruses in Food (CXG 79-2012). The order of the list reflects an appropriate prioritization. We believe that hepatitis A virus and norovirus are still the viruses of most concern, but additional information may be needed to address the emergence of hepatitis E virus as a foodborne virus. Control measures for this virus may differ from those for other viruses, and, if so, this should be captured in an update to CXG 79-2012.</p> <p>The United States is interested in additional advice on analytical detection methods and the existing challenges. Given the limitations in testing methodology and the inability to distinguish between infectious and non-infectious virus particles, it would be valuable to obtain advice from JEMRA (and for CXG 79-2012 to include a discussion) on how to interpret testing results in the context of risk.</p> <p>The United States also has some specific comments made on the relevant paragraphs in the Discussion Paper below for consideration by JEMRA and in any revisions that are made to CXG 79-2012.</p>	
<p>The Institute of Food Technologists (IFT) agrees with the recommendations for control of viruses focused primarily on preventing human fecal material from contacting foods.</p> <ul style="list-style-type: none"> - IFT believes that there should be more emphasis on analytical detection methods and improved new analytical methods, both in sampling and detection. While PCR analytical methods are important tools, they are limited in the information they provide. PCR analytical methods are culture independent diagnostic tests and do not result in virus particles for further genetic analysis. In addition, they do not differentiate between infective and non-infective viruses. - IFT believes that personal hygiene practices, both on farm and in facility, should be significant focus areas for these general principles, including both water and wastewater management practices. - IFT believes that more emphasis should be placed on environmental sources of contamination and in root cause analysis of previous or current outbreaks. <p>IFT Recommendations:</p> <ol style="list-style-type: none"> 1) More emphasis on analytical methodology (see bullet point 3 in paragraph 21) 2) A thorough discussion of Good Agricultural Practices 3) A thorough discussion of lot tracing and traceback (traceability practices), given the long incubation period of some viruses (e.g., hepatitis). 	<p>IFT</p>
<p>This is a growing food safety concern and the International Frozen Food Association is grateful for this new work.</p> <p>IFFA calls on member states to prioritize the safety of fresh and frozen berries. We strongly believe that an emphasis on personal health and hygiene across the production sector is key to seeing progress. There are also significant opportunities to develop robust, scientific, and risk-based systems to support food safety efforts addressing the risks of enteric viruses in the supply chain. We thank Codex Alimentarius and the Codex Committee for Food Hygiene for the opportunity to provide these comments and look forward to providing input as needed and requested.</p>	<p>International Frozen Food Association</p>

INTRODUCTION

Para 2. The primary purpose of the Guidelines is to provide direction on how to prevent or minimize the presence of human enteric viruses in food, more specifically, hepatitis A virus (HAV) and <u>norovirus</u> NoV. These Guidelines are applicable to all foods, <u>from primary production through to consumption</u> , with a focus on ready-to-eat food, from primary production through to consumption , for the control of human enteric viruses.	Colombia
Comments: Statistical data of reported foodborne disease, the severity of disease, including mortality and their potential for transmission via foods may be mention in details. Rationale: For a better knowledge on the food borne diseases.	India

BASIS FOR POSSIBLE REVISIONS OF THE GUIDELINES

Scope

Para. 5 The EUMS consider a thorough assessment of JEMRA most essential before any new work on hepatitis E virus (HEV) in certain food commodities would be considered. The EUMS understand that this new work would involve the drafting of a new specific Annex for this purpose. However, the most relevant new scientific information available seems to be limited to an opinion of the European Food Safety Authority (EFSA) on this topic. That opinion includes an assessment of the importance of HEV in the EU, however, to decide on the need for guidelines at global level, the importance should be estimated at global level and taking into account the global human health burden compared to other foodborne disease. In addition, the EFSA opinion indicates that the only efficient control option for HEV infection from certain food is sufficient heat treatment. If this is confirmed by JEMRA, the usefulness of guidelines might be limited. Para. 6 The EUMS consider that the inclusion of a risk assessment in frozen fruit and vegetables should be included in the JEMRA work, and later on, considered in a revision of the Guidelines, considering the increasing number of outbreaks due to such food.	European Union
Para. 5 Comment: Incidence or prevalence report of virus contamination in other food products may also be discussed. Rationale: For better understanding on incidence of prevalence report. Para 6. Comment: The food commodities to be tested for Noro Virus (NoV) shall also include shrimps and crabs and inclusions of some important publicly available international foodborne outbreak data to explain the year wise incidence rate will enrich the discussion paper. Rationale: Scientific reports are available on the incidence of NoV in shrimps and crabs (Ref: Anbazhagi,S. and Kamatchiammal, S., 2010. Contamination of seafood by Norovirus in India. International Journal of Virology, 6 (3): 138-149.	India
Para. 6 - In addition, the enteric viruses can tolerate low temperature and survive under freezing condition for long time	Iran
Para. 6 Control of enteric viruses during harvest, production, and processing of fruits is critical for the frozen processing industry, as contamination results in persistence of the pathogen through the shelf life and there is typically no kill step prior to consumption. Para. 7 Traceability: Outbreaks associated with enteric viruses in fresh berries and other fruit are usually limited to their short shelf life (less than 6-8 wks.). In fact, due to the long incubation period and delayed onset of hep A symptoms (4-6 wks.), identification of illnesses in the community may not even occur before the fresh fruit is no longer in the marketplace. Product recalls of fresh fruit may therefore be irrelevant, however, the situation is very different for frozen fruit, where potential contamination can persist throughout shelf life (up to 2 yrs.). Improvements in traceability can address persistence of contamination in frozen berries and limit the scope of an ongoing outbreak. Thus, it	International Frozen Food Association

necessary to improve the supply chain's traceability capabilities. Foodborne outbreaks linked to contaminated soft fruits such as fresh and frozen berries are often associated with produce harvested in geographies endemic to hepatitis A (hep A) and/or norovirus. [Outbreaks, occurrence, and control of norovirus and hepatitis a virus contamination in berries: a review. Bozkurt et al., 2020. https://doi.org/10.1080/10408398.2020.1719383]	
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Process and disinfection

Para 8. It is important to include the different control measures that can be implemented in industrial processes that allow satisfactory disinfection.	European Union
Para 8. point to chlorination specially. It is one of the effective method for virus inactivation other than high temperatures	Iran

Testing of foods for foodborne viruses

The EUMS fully support a review of methods, for which there are a number of challenges (e.g. lack of discriminatory testing and identifying the most appropriate indicator to use when monitoring seawater quality).	European Union
Para 13. Based on this information, a review of the analytical methods, including sampling, for relevant enteric viruses in food commodities could be useful	Iran
Para 10. Paragraph 10 of the Discussion Paper refers to a two-part technical method for the detection (ISO 15216-2:2019) and quantification (ISO 15216-1: 2017) of hepatitis A virus and norovirus in food matrices, and it indicates that the method does not address viral infectivity or provide the resolution required for investigating viral foodborne outbreaks or source attribution. Any revision should clarify what resolution is needed. Para 12. Paragraph 12 refers to in vitro norovirus cultivation systems. Revisions should clarify the ability to culture norovirus derived from clinical samples and state that the current system does not allow propagation from foods.	USA
Para 10. Challenges associated with non-cultivability of enteric viruses: A key characteristic of enteric viruses and current detection methods is the inability to establish the presence of the viruses or their infectivity in food and environmental samples. Currently, only molecular assays such as reverse transcriptase-polymerase chain reaction (RT-PCR) are available and used. As both hep A and norovirus are not cultivable in vitro, the food safety community must recognize the important distinction between detection of these viruses (can only detect the presence of viral nucleic acid) versus detection of bacterial pathogens (which are, typically enriched to establish viability). This distinction impacts all levels of routine monitoring, surveillance, and regulatory compliance activities (testing of food, food workers hands, water, or other environmental samples) involved in food safety management. While multiple detection methods (ISO , U.S. FDA , Canada , and other countries) are used across the globe, there is no established equivalency between disparate tests, presenting barriers when utilizing test results across the supply chain. None of the published detection methods also specify a sampling regimen for fresh and frozen berries, consequently, sampling plans used for monitoring or surveillance activities, lack consistency or a sound scientific basis. Lastly, there is no standard confirmation step that available to follow up a positive RT-PCR finding, further complicating the interpretation of these results. Currently, there are no valid indicator organisms that offer a simpler means to establish potential enteric virus contamination. The global scientific community must address these limitations to truly support efforts toward prevention and control of enteric viruses in the food supply. References:	International Frozen Food Association

<p>https://www.iso.org/obp/ui/#iso:std:iso:15216:-2:ed-1:v1:en</p> <p>https://www.fda.gov/food/laboratory-methods-food/bam-chapter-26-and-appendices-concentration-extraction-and-detection-enteric-viruses-food</p> <p>https://www.canada.ca/en/health-canada/services/food-nutrition/research-programs-analytical-methods/analytical-methods/compendium-methods/methods-analysis-parasites-viruses-other-foodborne-pathogens-compendium-analytical-methods.html</p> <p>Para 13. Further, the low prevalence and heterogenous nature of pathogen distribution in soft fruit makes detection of potential viral contamination particularly challenging.</p>	
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Control of HAV and NoV in bivalve molluscs

<p>Para. 14 The EUMS welcome the initiative to invite the CCFH to ask JEMRA to revise the guidelines with the scope to update them with a special focus on the revision of the analytical methods for relevant enteric viruses in food commodities including the potential utility of viral indicators or other indicators of contamination and the revision of the various risk assessment models with a view towards constructing more applicable models for wide use among member countries, including a simplified risk calculator.</p> <p>The EUMS would like also to ask JEMRA to establish limits for NoV in live bivalve molluscs to be eaten raw, in particular oysters, in order to protect consumers from this risk.</p>	European Union
<p>Para. 14 It is recommended to replace microbiological word by biological since viruses are not alive and they aren't considered as microbe generally.</p>	Iran
<p>Para. 16 Paragraph 16 related to bivalve molluscs notes that pepper mild mottle virus (PMMV) may be used as an indicator of human fecal contamination in aquatic environments and water treatment systems. Reduction of PMMV through treatment does not consistently correlate with enteric viruses, so we caution against using it as a viral indicator. We also note that coliphages as indicators may look different for each area/region, so it may be difficult to assign values applicable to every area.</p> <p>Para. 19 The United States agrees with the statement that a review of the scientific evidence on the potential utility of viral indicators or other indicators of contamination could be useful.</p>	USA

Control of HAV and NoV in fresh produce

<p>Risk assessment models have also been developed for fresh produce since the publication of the guidelines, e.g. a quantitative farm-to-fork human norovirus exposure assessment of individually quick frozen raspberries and raspberry puree.</p> <p>Based on this information, a review of recent risk assessments for fresh produce could be useful.</p>	Iran
<p>Paragraph 20 addresses control of hepatitis A virus and norovirus in fresh produce. The United States believes that with regard to fresh and frozen produce (particularly berries), water management and basic employee hygiene practices should be emphasized as preventive methods. The United States agrees that a risk-based approach and assessment of the fitness of the water for the purpose intended could be valuable in the prevention of viral contamination. However, the United States supports referencing the Guidelines for the Safe Use and Reuse of Water in Food Production, which should be final by the time CXG 79-2012 is updated, rather than developing specific criteria for water quality in CXG 79-2012.</p>	USA
<p>In general, incidence of hep A (estimated 1.5 million cases each year globally)[http://doi.org/10.31646/gbio.100], results from lack of access to clean drinking water, which is a primary contributing factor to incidence and endemicity in specific berry producing geographies.</p> <p>Direct contact with an infected person and ingestion of contaminated food and water are important modes of transmission. The disease is also</p>	International Frozen Food Association

<p>associated with poor personal hygiene and high-risk groups. In the United States, homelessness [https://www.who.int/news-room/fact-sheets/detail/hepatitis-a] is strongly linked with higher risk of infection. As such, vaccination against hep A is recommended to minimize the risk of infection.</p> <p>Worldwide burden of norovirus illness is estimated at 700 million cases and is the leading cause of gastroenteritis outbreaks. It should be noted that in developed nations like the U.S., majority of outbreaks occur in foodservice settings like restaurants, cruise lines, etc., where infected food workers may touch ready-to-eat food before serving them.</p> <p>Worldwide burden of norovirus illness [https://www.cdc.gov/norovirus/trends-outbreaks/worldwide.html] is estimated at 700 million cases and is the leading cause of gastroenteritis outbreaks. It should be noted that in developed nations like the U.S., majority of outbreaks occur in foodservice settings like restaurants, cruise lines, etc., where infected food workers may touch ready-to-eat food before serving them.</p> <p>Contamination of fresh and frozen berries:</p> <p>From a food production perspective, both hep A and norovirus are transmitted primarily by the fecal-oral route. Dirty hands of infected persons during harvesting or handling of fruit, contact of fruit with sewage-contaminated or inadequately treated water, or poor sanitation in packing and processing facilities may result in contaminated fruit.</p> <p>It should be noted that certain types of berries are still harvested by hand to address the fragility of fruit and to maintain physical integrity and attractiveness, thus, health and hygiene of farm and food workers becomes paramount to prevent and control enteric viruses in the berry supply chain.</p> <p>In addition to the emphasis on hand hygiene practices, both production and processing operations also need to monitor and treat water, to ensure water quality. Waste management practices should also be implemented to prevent sewage, feces, and vomitus fluids/aerosols from contaminating food.</p> <p>Diverse and fragmented global berry supply chain:</p> <p>The frozen berry supply chain is diverse and fragmented across the world. Growing areas may be represented by small (less than an acre in size) family-owned farms and product from each may, ultimately be comingled in such a way that potential contamination from a single small farm may result in contaminating large lots of berries.</p>	
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RECOMMENDATIONS

<p>A review of the scientific evidence on prevention and intervention measures and the efficacy of interventions in the food continuum;</p> <p>Particular emphasis is requested for reviews of disinfection interventions applied to various foods after contamination to reduce viral loads.</p> <p>Rationale: Given the difficulties in identification and quantification of infectious virus particles, validated techniques to reduce viral load, as measured by RNA/DNA copies, should be reviewed as potential control measures to mitigate risk of viral foodborne illness. For instance, there are conflicting reports on the use of depuration techniques under variable parameters used to reduce/eliminate Norovirus in shellfish. If it is within scope of this new work, a literature review of depuration efficacy would be beneficial.</p> <p>A review of the analytical methods for relevant enteric viruses in food commodities;</p> <p>Particular emphasis is requested for reviews of analytical methods.</p> <p>Rationale: Any analytical method that is promoted should be applicable in a diagnostic setting allowing for high volume turn over testing. This is in contrast</p>	<p>Canada</p>
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<p>to methods employed in a research laboratory context. Further, methods capable of identifying and quantifying infectious versus non-infectious virus particles should be highlighted in any review.</p>	
<p>Para. 21 Colombia finds it opportune to express interest in supporting the need for JEMRA to create new work on the revision of the Guidelines, considering in the following order:</p> <ol style="list-style-type: none"> 1. A review of the scientific evidence on prevention and intervention measures and the efficacy of interventions in the food continuum 2. A review of scientific evidence on the potential utility of viral indicators or other indicators of contamination 3. A review of the various risk assessment models with a view towards constructing more applicable models for wide use among member countries, including a simplified risk calculator <p>The aforementioned would enable improved scientific analysis that would serve as a basis for updating the guidelines on the application of the general principles of food hygiene</p>	Colombia
<p>A review of the various risk assessment models with a view towards the goal of constructing more applicable models for an open model and its wide use among member countries, including a simplified risk calculator <u>respective metadata in a way that adapts to the available variables in each specific context and is easily reproducible by different actors.</u></p> <p>More than a calculator, an open model with its respective metadata could be built, which allows for adaptation to the available variables in each specific context and is easily reproducible by different actors.</p>	Colombia
<p>Para. 21 the EUMS propose to go a little more into detail of the recommendations:</p> <p>an up-to-date review of the foodborne viruses <u>(including emerging viruses)</u> and relevant food commodities of highest public health concern<u>concern (frozen food, for instance);</u></p> <p>Rationale: other types of viruses have been studied or emerged in recent years, and should be added to the scope of the guidelines. Moreover, important outbreaks were due to frozen foods (raspberries, for instance), so an update of food commodities involved would be useful).</p> <p>a review of <u>knowledge on the “behavior” of viruses in natural conditions (for example: binding of NoV to intestinal tissues of oysters, natural depuration of viruses in the seawater, risk of cross-contamination between batches, in production areas and in tanks)</u>a review of the scientific evidence on prevention and intervention measures and the efficacy of interventions in the food continuum;</p> <p>Rationale: recent or on-going studies are related to the natural behavior of some viruses (for instance NoV capacity to bind to some tissues of molluscs), which could enrich the factors of risk to be considered or the options of treatment in the food chain. In addition, an assessment of how viruses react in seawater (for instance) would be interesting to assess: natural disappearance in seawater, risks of cross contamination from a batch of molluscs to another.</p> <p>a review of the scientific evidence on prevention and intervention measures and the efficacy of interventions in the food continuum<u>continuum (including the treatment of water in establishments manipulating molluscs and efficiency of purification);</u></p> <p>Rationale: as bivalve molluscs are identified as major risk food type, options of treatments in the food chain should include the treatment of seawater used in storage or depuration devices.</p> <p>a review of the analytical methods for relevant enteric viruses in food commodities<u>commodities (including information on infectious potential of viruses);</u></p> <p>Rationale: some recent papers on infectivity of NoV have been published and should be included in the update of the guidelines.</p> <p>Appropriate indicators could be useful in addition to analytical methods.</p>	European Union

Quantitative risk assessment is indeed necessary, including some data on the “infectious dose: beside the “infectivity” issue, data on the quantity of viruses likely to cause diseases and more globally quantitative risk assessment need to be included in the scope of the guidelines”.	
JEMRA could provide additional information on these first three bullet points.	Mauritius
<p>Para. 21 Other: A revision is needed of the efficacy tests for disinfectants and their efficiency in controlling viruses on contact surfaces during the primary and industrial processing of food.</p> <p>Additional information is required from JEMRA. JEMRA should propose the testing methods of choice for virus detection in the food matrices significant to global health, such as ready-to-eat, fresh, and frozen foods.</p>	Peru
<p>As sources and contamination routes of zoonotic foodborne viruses such as Hepatitis E virus genotype 3 (HEV-3) and genotype 4 (HEV-4) may differ from Hepatitis A virus (HAV) and Norovirus (NoV), Singapore agrees that guidelines on prevention and intervention measures specific to HEV-3 and HEV-4 may be needed.</p> <p>Currently, publicity available international foodborne outbreak data from 2008 to 2020 identified prepared (ready-to-eat) foods, bivalve molluscs, and fresh produce to be significant food commodities of public health concern. Noting that frozen fruits have been a major vehicle of foodborne illnesses in recent years, mainly attributed to HAV and NoV infections, Singapore recognises the need for additional high risk food commodities like frozen produce to be considered and be included in the guidelines.</p> <p>Singapore supports the review. The current guidelines provide guide on the use of heat treatment in bivalve molluscs to inactivate the viruses and gave the example of a virucidal treatment of an internal temperature of 85 to 90 °C for at least 90 seconds. However, given the wide range of cooking options, it would be useful for countries to have a guide on the range of temperature/time parameters which would be virucidal for reference. This is especially useful, given that current analytical methods do not discriminate between infectious and non-infectious virus particles. Having a reference on temperature/time parameters which are effective in inactivating the viruses would allow countries to make a better-informed decision.</p> <p>Singapore recognises the importance of the review on analytical methods for enteric viruses, especially for NoV, in food commodities. The priority should be considered to review the analytical methods validating the infectious status of NoV and quantifying the NoV detected in food relating to food safety risk. The current gold standard for norovirus diagnosis is real-time PCR. However, this method does not discriminate between infectious and non-infectious virus particles on norovirus contaminated bivalves’ molluscs, particularly on norovirus contaminated food that have undergone steaming, UV/ozone-treatment, and high pressure (HP) processing. We agree that there should be a review to consider new detection and quantification methods, so that countries would be able to make decisions (e.g., whether to reject the imported consignment or to impose stop sale order) using the results from other test methods.</p> <p>Singapore recognises the relevance of the review on the scientific evidence and the potential utility of viral or other indicators, which can serve as proxies of viral contamination for identifying critical control points and informing measures to mitigate the source(s) of the contamination in the food production system.</p> <p>As scientific knowledge and epidemiological understanding on foodborne viruses have been improved over the recent years, Singapore recognises the need and timeliness of the review of the current risk assessment models. The review should eventually support towards constructing simplified risk calculator(s), that can be contextualised for both imported and local produce scenarios, for wider applications among member countries.</p>	Singapore
<p>Para. 21 Uruguay appreciates the invitation to participate and agrees with the documents.</p> <p>Uruguay agrees with requesting additional information from JEMRA on all the previously listed points.</p>	Uruguay
Para. 21 IFT believes new work should include more emphasis on bullet point 3 on reviewing analytical methods for relevant enteric viruses in	IFT

<p>food commodities</p>	
<p>Risk Assessment of the Supply Chain and Root Cause Analysis of Contamination Events and Outbreaks:</p> <p>Despite significant efforts to unravel the nature of outbreaks associated with enteric viruses and berries, the scientific community is yet to identify the true root causes that lead to contamination of fresh and frozen berries. Efforts must be placed to prioritize root causes of these events as they inform the mitigative steps that can be put in place for outbreak prevention.</p> <p>Risk assessment tools and modeling can play significant roles in the understanding of the nature of contamination and importantly steps to prevent and control cross contamination in the production environment. Member states should conduct risk assessments to establish and address key risk factors specific to their geographies.</p> <p>Building awareness of risk associated with enteric viruses in the food supply and improving personal hygiene practices:</p> <p>Given the nature of diverse berry production systems worldwide, endemicity of hep A and/or norovirus in certain berry producing regions, and the methodological limitations associated with detection of enteric viruses, the global food safety community needs to emphasize personal health and hygiene as a priority in controlling these pathogens in the food supply.</p> <p>Novel training and communication tools to reiterate awareness, knowledge and attention to the risks associated with enteric viruses in fresh and frozen berries across the production system is critical.</p> <p>Challenges associated with non-cultivability of enteric viruses</p> <p>A key characteristic of enteric viruses and current detection methods is the inability to establish the presence of the viruses or their infectivity in food and environmental samples. Currently, only molecular assays such as reverse transcriptase-polymerase chain reaction (RT-PCR) are available and used.</p> <p>As both hep A and norovirus are not cultivable in vitro, the food safety community must recognize the important distinction between detection of these viruses (can only detect the presence of viral nucleic acid) versus detection of bacterial pathogens (which are, typically enriched to establish viability). This distinction impacts all levels of routine monitoring, surveillance, and regulatory compliance activities (testing of food, food workers hands, water, or other environmental samples) involved in food safety management.</p> <p>While multiple detection methods are used across the globe, there is no established equivalency (ISO, U.S. FDA, Canada, and other countries) between disparate tests, presenting barriers when utilizing test results across the supply chain. None of the published detection methods also specify a sampling regimen for fresh and frozen berries, consequently, sampling plans used for monitoring or surveillance activities, lack consistency or a sound scientific basis. Lastly, there is no standard confirmation step that available to follow up a positive RT-PCR finding, further complicating the interpretation of these results.</p> <p>Risk Assessment of the Supply Chain:</p> <p>Despite significant efforts to unravel the nature of outbreaks associated with enteric viruses and berries, the scientific community is yet to identify the true root causes that lead to contamination of fresh and frozen berries. Efforts must be placed to prioritize root causes of these events as they inform the mitigative steps that can be put in place for outbreak prevention.</p> <p>Risk assessment tools and modeling can play significant roles in the understanding of the nature of contamination and importantly steps to prevent and control cross contamination in the production environment. Member states should conduct risk assessments to establish and address key risk factors specific to their geographies.</p> <p>Currently, there are no valid indicator organisms that offer a simpler means to establish potential enteric virus contamination. The global</p>	<p>International Frozen Food Association</p>

scientific community must address these limitations to truly support efforts toward prevention and control of enteric viruses in the food supply.