



BIOLOGICAL HAZARDS UNIT

Network on Microbiological Risk Assessment Minutes of the 21st meeting

WEB-conference, 5 and 6 October 2021

(Agreed on 26 October 2021)

Participants

Country	Name
Austria	Monika Matt
Belgium	Lieven De Zutter, Kim Feys, Elien De Boeck
Bulgaria	Hristo Najdenski, Dora Petlova
Croatia	Brigita Hengl, Jasenka Petric
Cyprus	Christos Kourtis
Czechia	Veronika Vlasakova, Zuzana Ileninová
Estonia	Mati Roasto
Finland	Jukka Ranta
France	Pauline Kooch, Laurent Guiller, Juliana De Oliveura Mota
Germany	Anja Buschulte
Greece	Panagiota Gousia
Hungary	Zsuzsanna Sréterné Lancz, David Toldi
Ireland	Mary Lenahan
Italy	Maria Elisabetta De Angelis
Lithuania	Indre Stoskuvienė
Netherlands	Aarieke de Jong, Linda Verhoef
Poland	Elzbieta Mackiw
Portugal	Manuela de Sol
Romania	Laurentiu Ciupescu
Slovakia	Lubomír Valík
Spain	Elena Carrasco Jimenez, Antonio Valero Diaz
Sweden	Jakob Ottoson
Norway	Danica Grahek-Ogden
Switzerland	Francoise Fridez

EFSA:

BIOCONTAM Unit: Maria Teresa Da Silva Felicio, Beatriz Guerra Roman, Michaela Hempfen, Maria Francesca Iulietto, Ernesto Liebana, Winy Messens, Pietro Stella

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5 October 2021

1. Welcome and apologies for absence

The Chair welcomed the participants from 22 EU Member States, Norway and Switzerland.

Apologies were received from Denmark, Malta and Slovenia.

2. Adoption of agenda

The agenda was adopted without changes.

3. Agreement of the minutes of the 20th meeting of the Network on Microbiological Risk Assessment held on 29/30 October 2020, web-conference.

The minutes were agreed by written procedure on 18 November 2020 and published on the EFSA website 19 November 2020.¹

4. Topics for discussion

4.1. EFSA opinions on transport of fishery products and report on alkaline phosphatase to verify pasteurisation

The BIOHAZ secretariat presented the BIOHAZ Panel opinions on the use of the so-called 'superchilling' technique for the transport of fresh fishery products² with some reference to the opinion on the use of the so-called 'tubs' for transporting and storing fresh fishery products³ and the scientific report on the use of alkaline phosphatase and possible alternative testing to verify pasteurisation of raw milk, colostrum, dairy and colostrum-based products.⁴

4.2. Risk ranking of pathogens in food

The participant from Norway presented a report on risk ranking in foods. The assessment approach used here consisted of (1) risk ranking of 20 selected pathogens based on the incidence and severity and (2) a source attribution process aimed at identifying the main pathogen-food combinations that may pose a risk to human health. The six highest-ranked pathogens were, in descending order: *Toxoplasma gondii*, *Campylobacter* spp., *Echinococcus multilocularis*, enterohaemorrhagic *E. coli* (EHEC), *Listeria monocytogenes*, and non-typhoid *Salmonella*. It should be emphasized, however, that confidence intervals revealed considerable overlaps between the scores.

The food vehicles associated with the pathogens varied widely. It is notable, however, that fresh produce was identified as being among the main food vehicles for 12 of the 20 pathogens, drinking water was associated with 8, and 5 were linked to raw milk or products thereof.

The results presented may be subject to change over time as new data become available from surveillance and research on pathogens and the diseases they

¹ <https://www.efsa.europa.eu/sites/default/files/event/2020/20th-meeting-efsa-network-microbiological-risk-assessment-minutes.pdf>

² <https://www.efsa.europa.eu/en/efsajournal/pub/6378>

³ <https://www.efsa.europa.eu/en/efsajournal/pub/6091>

⁴ <https://www.efsa.europa.eu/en/efsajournal/pub/6576>

cause. Thus, the systematic and transparent process described in this report is probably most useful if it is repeated and updated regularly such that recent information can be taken into account.

4.3. Risk of consuming meat from wild boars infected with *Salmonella Choleraesuis*

The participant from Sweden presented the results of a rapid risk assessment on *S. Choleraesuis*, which had not been detected in Swedish pigs since the 1970's. However, in 2020, it was found in a farm in the south of Sweden and in wild boars in the same area. Since more wild boars ought to be shot and more of the meat should end up on the plate this will lead to an increased exposure for potentially vulnerable populations e.g. in schools and elderly homes.

Risk management departments asked for a rapid risk assessment on the potential risk of *S. Choleraesuis* being present in wild boar meat (from a systemic infection, not contamination) as well as an updated hazard identification and characterization of this potentially virulent *Salmonella* serotype.

4.4. STEC in flour

The participant from Germany presented the results of a risk assessment on STEC in flour.⁵ Due to repeated STEC detection in flour in Germany, the increasing offer of the product raw (cookie) dough, and several foodborne outbreaks in North America attributed to flour or flour-based products, the German Federal Institute for Risk Assessment (BfR) was asked to provide a risk assessment on this topic. Based on the scientific literature, the risk of STEC infection was presented for the following two exposure scenarios: (1) production personnel working with flour and (2) consumption of flour (products). Mainly, the consumption of raw dough poses a risk to all population groups, but especially to small children. In general, more research data is needed, for example, on STEC entry, transmission, and behaviour in the flour production chain, to address various uncertainties and improve the risk assessment.

4.5. Reclaimed wastewater: preventing bacterial pathogens on fresh fruit and vegetables

The participant from Germany also presented a risk assessment on reclaimed wastewater.⁶ As a result of climatic changes affecting Germany and Europe, the use of reclaimed wastewater for crop irrigation, including ready-to-eat crops, is expected to increase. Therefore, in 2020, the EU set up minimum requirements for water reuse in the new Regulation (EU) 2020/741.

In 2020 the German Federal Institute for Risk Assessment (BfR), the Julius Kühn Institute (JKI) and the Max Rubner-Institute (MRI) prepared a joint assessment of the risks to human health from *Salmonella*, Shiga-toxin producing *Escherichia coli* (STEC) and *Listeria monocytogenes* following the consumption of raw fruits and vegetables irrigated by reclaimed wastewater. This Opinion addresses the potential direct transmission of these bacterial pathogens from reclaimed wastewater, as well as indirect transmission from irrigated soil into plants. Accordingly, the BfR, the JKI and the MRI give several recommendations to

⁵ <https://www.bfr.bund.de/cm/349/escherichia-coli-in-flour-sources-risks-and-prevention.pdf>

⁶ <https://www.bfr.bund.de/cm/349/reclaimed-waste-water-preventing-bacterial-pathogens-on-fresh-fruit-and-vegetables.pdf>

reduce the risk of foodborne infections caused by consumption of fresh fruits and vegetables irrigated by reclaimed wastewater.

4.6. Risk ranking of biological hazards in raw milk cheeses

The participant from France presented a risk ranking method of raw milk cheeses and microbiological hazards.⁷ The opinion on raw milk cheeses will be published in October 2021 on the ANSES website.

4.7. One Health EJP CARE project: results of the European survey on the metadata used in QMRA

The participant from France presented findings from a European survey on metadata used in quantitative risk assessments (QMRA) in the context of a EJP CARE Project project. The objective was to investigate and benchmark the availability and quality of data commonly used for risk assessments and to describe any constraints for making them more easily accessible.

Other European initiatives were also briefly presented such as:

- ORION: One health suRveillance Initiative on harmOnization of data collection and interpretation
- COHESIVE : One Health Structure In Europe Surveillance data
- RaDAR: Risk and Disease burden of Antimicrobial Resistance
- NOVA: Novel approaches for design and evaluation of cost-effective surveillance across the food chain
- DiSCoVer: Discovering the sources of Salmonella, Campylobacter, VTEC and antimicrobial resistance

4.8. The prevalence, counts and AMR of *Campylobacter* spp. from fresh broiler chicken meat at Estonian retail level

The participant from Estonia presented on the current situation of enteric infections and trends within recent years in Estonia. Then the focus was given to two studies (2012 and 2018-2020) performed in co-operation of Estonian University of Life Sciences, Veterinary and Food Laboratory and Estonian Health Board. Results of genotyping indicated associations between imported fresh broiler chicken products with campylobacteriosis cases in Estonia.

Campylobacter counts in Estonian and imported products decreased compared with earlier study periods. Over time significant decrease in the prevalence and concentration of *Campylobacter* in Estonian broiler chicken meat products was found. This indicates the application of effective biosafety and other control measures within entire meat production chain by the Estonian broiler chicken meat company.

4.9. Comparison of *Campylobacter* genotypes

The participant from Austria gave a brief presentation on the comparison of *Campylobacter* genotypes on three Austrian broiler farms after a five-year-period. In total three broiler farms (A, B, C), linked to three independent slaughterhouses were investigated in two different projects (CamChain 2012-2015 and CampControl 2018-2021) in Austria. The strain panel of the younger

⁷ <https://www.anses.fr/fr/system/files/BIORISK2016SA0153Ra.pdf>

project (broiler farm level) was compared to *Campylobacter* spp. isolated from human, food and broiler in the older one. *C. coli* ST-828 clonal complex was isolated in both strain panels and was the most abundant CC within the project from 2015-2018. Interestingly, ST881 was isolated during both projects at farm C. These results underpin the variety of genotypes among broiler farms and an enormous change within each farm over time.

4.10. Prevalence of *E. coli* Sequence Type 131 as a foodborne pathogen in Swiss chicken

The participant from Switzerland presented results of a study on *E. coli* Sequence Type 131, which is an uropathogenic, multidrug resistant *E. coli* lineage. Within recent years, it has been suspected, that infections of ST 131 may occur as the result of contaminated food. Results of a literature review showed, that ST 131 occurs frequently in chicken and poultry. This exploratory study shows the result of a prevalence test, conducted on Swiss chicken in the summer of 2020. A total of 200 samples were bought in retail stores in a defined region of Switzerland. After selective plating, samples were analyzed via PCR, targeting a ST 131 specific region. Out of the 200 samples analyzed, 25 (12.5 %) were tested positive. These results are slightly higher than expected based on literature research (5-10 %).

6 October 2021

5. Welcome and apologies for absence

The Chair welcomed the participants from 22 EU Member States, Norway and Switzerland.

Apologies were received from Denmark, Malta and Slovenia.

6. Topics for discussion

6.1. Role played by the environment in the emergence and spread of antimicrobial resistance (AMR) through the food chain

The BIOHAZ secretariat presented the BIOHAZ opinion on the role played by the environment in the emergence and spread of antimicrobial resistance through the food chain⁸ and informed the network about the adopted opinion regarding maximum levels of cross-contamination for 24 antimicrobial active substances in non-target feed (publication in October 2021) and the ongoing mandate from the European on the transmission of AMR during animal transports.⁹

6.2. Evaluation of Strain Variability in Inactivation of *Campylobacter jejuni* in Simulated Gastric Fluid by Using Hierarchical Bayesian Modelling

The participant from Finland presented on a Hierarchical Bayesian Model for *Campylobacter jejuni*.¹⁰ Inactivation modelling of bacteria traditionally aims to describe the primary model of inactivation and the secondary model of how it depends on conditions such as pH. Inactivation of *Campylobacter* varies

⁸ <https://www.efsa.europa.eu/en/efsajournal/pub/6651>

⁹ <https://open.efsa.europa.eu/questions/EFSA-Q-2021-00435>

¹⁰ <https://journals.asm.org/doi/10.1128/AEM.00918-21>

according to strain. Hence, the results based only on resistant strains or cocktails of strains do not provide reliable estimates for this variation. Data from 11 strains under 5 pH levels was used to develop a model for between strain variation, that is reflected in predictions for each strain, the average strain, and new strain. The model is likewise applicable in microbiological risk assessment.

6.3. Challenge test studies of *L. monocytogenes* on raw pork chops and minced meat

The participant from Belgium presented challenge studies in raw pork following the 2014 EURL technical guidance document for conducting shelf-life studies on *L. monocytogenes*. Growth potential was assessed on three batches of self-cut pork chops and one batch of in-house prepared pure minced pork without any additives in air and MAP (70% O₂/30% CO₂) packaging. Pork chops did not support the growth of the pathogen throughout the shelf-life, for both air and MAP. Substantial growth (>0.5 log CFU/g) was obtained in minced pork after investigating only one batch. However, significant intra- and inter batch variability was observed; with extreme growth being evened out by the way growth potential is calculated in the 2014 EURL document, leading to underestimations and posing a potential risk to public health. Maximum growth rate in minced pork at a constant temperature of 7°C were estimated in air and MAP, respectively. Several existing and new modelling approaches were proposed, based on these obtained growth rates, including an approach based on the updated 2021 EURL technical guidance document. In a final step, the models are used to predict the obtained growth potential values and the predictions are put into the perspective of the observed intra- and inter batch variability.

6.4. *Anisakidae* in fish

The participant from Belgium presented results of a study assessing the occurrence of *Anisakidae* in 415 fish samples from 36 different fish species identified an overall prevalence of 53% [95%-CI: 42–63%] in the viscera and 27% [95%-CI: 23–32%] in the muscles, with a total of 2569 larvae recovered. Particularly high prevalences (>78%) were observed in the muscles from pollack, halibut, and gurnard. Most infections and larvae were identified in the belly flaps. Routine control of this parasite in the fish industry entails the application of the candling technique, whereby fish fillets are placed on a light table to detect and remove the larvae. However, when applied on 651 samples and compared to the reference standard, the estimated sensitivity of candling was only 32% [95%-CI: 23–41%] with a negative predictive value of 87% [95%-CI: 85–90%], and only 23% of all the larvae present in the fillets recovered.

The results of the ELISA and LC-MS/MS confirmed the presence of Anis 7 and six other *A. simplex* allergens respectively in the *P. decipiens* extract. Not only *A. simplex*, but also *P. decipiens* should therefore be considered a potential source of allergens that could lead to severe hypersensitivity reactions in humans.

6.5. Time-temperature indicators instead of a printed date mark on food

The participant from the Netherlands presented on the use of time-temperature indicators (TTIs) instead of a printed date mark. With the shift towards a sustainable world, reducing food spoilage is high on the European agenda. The use of TTIs may contribute to that. TTIs measure the cumulative heat to which

products had been exposed, and thereby may be better able to indicate the shelf-life. That is, provided that their course corresponds with microbiological growth in intended products.

In The Netherlands we assessed the risk of the use of TTIs for food safety, and found that the guideline recently proposed by EFSA on date marking is, with few additions, suitable to incorporate the TTI as a form of 'flexible date marking'.

In addition to microbiological safety, we also assessed the chemical risks, which may present if the producer did not follow legislation for allowance of active and intelligent food contact materials, or if TTIs containing chemical substances that are not on the positive-list, are recycled into food contact materials.

6.6. Opinion on raw drinking milk

The participant from the Netherlands presented the scientific Opinion on Raw Drinking Milk which was requested in relation to implementing new national rules for raw drinking milk in the Netherlands. The national rules concern food safety criteria, process hygiene criteria and shelf-life related criteria (storage time and temperature) for raw drinking milk. Both for raw cow's milk and raw drinking milk from other species.

6.7. Recent and ongoing mandates of BIOHAZ Panel

The EFSA BIOHAZ secretariat presented recently published BIOHAZ Panel opinions (in addition to those presented under 4.1 and 6.1):

- Scientific opinions providing guidance on date marking and related food information – part 2 (EFSA-Q-2019-00439)¹¹

Ongoing mandates:

- Efficacy and safety of high-pressure processing of food (EFSA-Q-2020-00380)¹²
- Microbiological safety of aged meat (EFSA-Q-2020-00527)¹³
- Selftask on microbiological hazards associated with the use of water in post-harvest handling and processing operations of fresh and frozen fruits, vegetables and herbs (EFSA-Q-2021-00374)

In addition, some topics were presented that may be developed further into a self-task mandate of the BIOHAZ Panel. Network participants were asked to share information on recent/ongoing activities on such topics at country level.

7. Renewal of Terms of Reference

The EFSA Engagement & Cooperation Unit informed the Network about Modifications on the New Management Board Decision on Scientific Networks and Consideration when setting the Terms of Reference (ToRs). The EFSA Management Board (MB) will receive activity reports of the EFSA networks and decide on their continuation on a basis of at least every three years. To resolve the complexities surrounding the issue of MS representation, MS network representatives and alternate representatives are now referred to as network

¹¹ <https://www.efsa.europa.eu/en/efsajournal/pub/6510>

¹² <https://open.efsa.europa.eu/questions/EFSA-Q-2020-00380>

¹³ <https://open.efsa.europa.eu/questions/EFSA-Q-2020-00527>

participants and alternate participants. The Network's TORs have been adjusted with minor changes and are renewed until December 2023.

8. Any Other Business

The participant from France informed the network about the "Pathogens-in-food database and web-application (PIF)". The database was developed through a joint project by the Polytechnic Institute of Braganza (IPB, Portugal) and ANSES (France). It is a dynamic database, containing prevalence and enumeration data of 14 pathogens (bacteria, viruses, parasites) in food categories useful for (quantitative) microbiological risk assessment, extracted from published peer-reviewed articles. The web application facilitates data access and produces interactive dashboards for data visualization, description and summarisation. Network Members were invited to explore the PIF at <https://fsqa.esa.ipb.pt/>.

The network was informed that France presented the topic also at the 80th Advisory Forum meeting on 9-10 June 2021 and it was considered by EFSA and the participants as an important project to be supported.

9. Date for next meeting

The next MRA network meeting is planned for autumn 2022. The network members suggested to have an additional web-meeting in spring 2022, if possible.

10. Closure of the meeting

The Chair thanked the speakers and participants for their contributions and closed the meeting.