Briefing Note on Emerging Issues

[file name: ID0433_Covid 19 as food contamination]

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SARS-CoV-2 and food contamination (ID0433)

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KEYWORDS:

Covid-19, environmental circulation of SARS-CoV-2, food safety.

CLASSIFICATION:

Microbiological hazard

DESCRIPTION OF THE ISSUE[1]

SARS-CoV-2 mainly spreads through the respiratory droplets produced when an infected person coughs or sneezes. Therefore, like other viruses, it may reach fresh feed and food products at any phase of the food chain (harvesting, preparation, processing, transport) or food packaging material, when an infected person sneezes or coughs directly on them.

SARS CoV-2 is an RNA enveloped virus and as such is vulnerable to all sorts of environmental disturbances, including extreme changes in temperature: the virus is highly stable at 4°C, but sensitive to heat.

[1] "*Emerging issues*" are identified at the beginning of the Emerging Risk Identification process as issues that may merit further investigation and additional data collection. Emerging issues can include specific issues (*e.g.* specific chemical substance or a pathogen), as well as general issues such as drivers of change (*e.g.* climate change). Risk management issues resulting from a lack of compliance with existing regulations should be excluded.

A recent publication on the resistance of SARS-CoV-2 to cooking procedures: shows that, from a total of 10 studies, thermal disinfection at 60°C for 30 min, 65°C for 15 min and 80°C for 1 min was effective to strongly reduce coronavirus infectivity by at least 4 log10 [1].

SARS-CoV-2 maintains its ability to infect cells for up to 84 hours at 22-25 and 28°C on plastic surfaces, with marked reduction at latter temperature (hot season) [2]. Moreover, a moderate protein concentration in droplets markedly increases the infectivity of SARS-CoV-2 [3]. Hence the fomite infected with SARS-CoV-2 could play a key role in the indirect transmission of COVID-19.

Although SARS-CoV-2 is inactivated significantly faster than non-enveloped human enteric viruses, with the known waterborne transmission (eg. adenoviruses, norovirus, rotavirus, hepatitis A), as for others HCoV (SARS and MERS), can survive for extended periods in the aqueous environment [4].

Food and packaging contamination

To date data on the contamination and survival time of SARS-CoV-2 in feed and food are lacking. However under certain conditions, SARS-CoV-2 can survive on surfaces for a limited time, including food packaging [5].

European and worldwide institutions with competence in food safety currently state that, to date, there is no evidence that food or food packaging have been a source or vehicle of COVID-19 infection for people.

Several reported episodes on food contamination with SARS-CoV-2, such as imported salmon meat and frozen chicken wings shows that food is likely to have been contaminated at the producer, seller, or customer level as result of cross-contamination from an infected owner or customers, or other products that carried the virus [6].

Environmental contamination

It is well known that SARS-CoV-2 infection is followed by persistent shedding of virus RNA in faeces in high percentages (at densities until 7.5 log10 gene copies per gram) [7]. Hence despite the risk is low, it can be transmitted from infected patients via the fecal-oral route [8]. Importantly, a few studies have also detected live and culturable virus in faeces, and the longer persistence of SARS-CoV-2 in the gastrointestinal system compared to the respiratory tract [9].

These findings while confirming the possibility of the faecal route in the epidemiology of SARS-CoV-2 infection, has implications for the introduction of SARS-CoV-2 in natural aquatic environment by sewage contaminated by SARS-CoV-2 from faeces of infected patients, and any food production and processing

environment where it is essential to apply good hygiene practices (e.g. frequent hand washing and proper general hygiene).

The events of the environmental contamination recognize the transmission from human faeces, through municipal wastewater treatment plants (WWTP) effluents to natural aquatic environment, with contamination of irrigation waters used on agricultural lands by sludge, which typically applied as a soil amendment, and finally contamination of crops, aquaculture ponds, and edible filter-feeders, such as bivalve seafoods. Despite reports in a number of setting demonstrated the detection of non-infective RNA fragments of SARS-CoV-2 in untreated wastewater and/or sludge [10], WWTPs not operating efficiently (spills of untreated waste), could to the survival of the virus to wastewater treatment process. Moreover, accidental releases of untreated sewage into the environment are an additional mechanism whereby infectious SARS-CoV-2 could be released into nearby waterways [11]. There is also one documented instance during the peak of the epidemic in northern Italy of detecting RNA fragments of SARS-CoV-2 in a river from sewage that had undergone partial but not full treatment [12].

A study conducted in 2015 revealed that while wastewater treatment plants (WWTP) do reduce virus levels, HCoV infective virus is still detected in the effluent from these plants: based on metagenomics, 80% of the samples from effluent class B sewage sludge from 5 WWTP in the US were found to contain coronaviruses [13], which is typically applied to agricultural lands as a soil amendment [14].

Similarly, SARS-CoV-2 was detected for the first time in untreated wastewater in Australia and in sewage from WWTPs servicing six cities and an airport in the Netherlands [15], and in Paris wastewaters [16]. It has also demonstrated a correlation between SARS-CoV-2 RNA concentration in primary sludge and the epidemiology curves established by compiled COVID-19 testing data and hospital admissions, with the possibility to provide several days (4-7) advanced notice ahead of COVID-19 confirmed case data [17] [18]. These findings clearly signal the need to incorporate routine wastewater surveillance of SARS-CoV-2 into national COVID-19 monitoring as an innovative tactic (wastewater-based epidemiology-WBE) in public health surveillance to monitor the circulation of the virus in the population. Environmental surveillance also has the potential to detect SARS-CoV-2 shedding from animal sources, such as animal production facilities and wet markets; potentially supporting identification of any animal reservoirs [10].

ADDITIONAL SUPPORTING INFORMATION

The available supporting information are contained in the references

LEGAL AND INSTITUTIONAL ASPECTS

European and worldwide institutions with competence in food safety currently state that, to date, there is no evidence of food or food packaging has been a source or vehicle of COVID-19 infection for people. However, the above findings on potential SARS-CoV-2 spread in the environmental signal the need to conduct wastewater surveillance of SARS-CoV-2 in the community in the framework of epidemiological monitoring of COVID-19, and take actions to reduce the virus circulation in the environment.

SUPPORTING DOCUMENTS

- *Presentation from Maurizio Ferri* **(link to the ppt)**
- *Report provided by XXXX(**LINK**)*
- *Data provided by XXXX (**LINK**)*
- *Internet resources (**LINK**)*

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EVALUATION

MAIN CRITERIA

NEW HAZARD:	Yes	**X**	No		N/A[2]	
NEW OR INCREASED EXPOSURE:	Yes	**X**	No		N/A	
NEW SUSCEPTIBLE GROUP:	Yes		No		N/A	**X**
NEW DRIVER:	Yes	**X**	No		N/A	

OTHER QUALIFYING CRITERIA

- **Soundness:**

There is scientific evidence that: - infected person persistently shed SARS-CoV-2 in faeces; - SARS-CoV-2 can survives in fomites and for extended periods in the aqueous environment; - infective virus can be detected in the effluents from water-treatment plants. All this makes possible the contamination of food crops, aquaculture ponds, and edible filter-feeders, such as bivalve seafoods with SARS-CoV-2.

- **Severity:**

The severity is associated with the possible COVID-19 infection from handling or consumption of contaminated food products.

- **Imminence:**

In view of the large numbers of people infected in the world, probably higher than the official statists (90 milions), and the detection of SARS-CoV-2 in effluents from waste water treatment plants (WWTP), every nation should address the risk of contamination of harvested food from natural aquatic environment and irrigation water.

- **Scale:**

The massive environmental circulation of SARS-CoV-2 makes all countries potentially exposed, particularly low and middle-income ones with substandard wastewater treatment protocols and poor sanitization infrastructures, that might cause the corresponding augmented risk of waterborne spread of SARS-CoV-2.

[2] N/A information not available

CONCLUSIONS

- Whilst instances of food packaging and frozen food products found to be contaminated by SARS-CoV-2 have only been recently documented in China, there is no scientific evidence that contaminated food or food packaging materials have been associated with the transmission of SARS-CoV-2

- owing to the massive SARS-CoV-2 pandemic, there is a risk of widespread environmental circulation; the detection of SARS-CoV-2 in waste water treatment plants (WWTP), provided that the virus can survive to the treatment process, creates the condition for the subsequent contamination of food agricultural products (eg crops), and edible filter-feeders, such as bivalve seafoods. This poses challenges for the water and wastewater industries and community.

- more observational/monitoring studies are required to understand the prevalence of food and environmental SARS-CoV-2 contamination; with this purpose there is a need to develop rapid tests to detect SARS-CoV-2 in the food and feed supply chain sector

- the monitoring of SARS-CoV-2 contamination through the food and feed supply chains and the knowledge of its transmission are expected to provide substantial benefits for the consumer safety and Covid-19 free certification of food chain industries.

STADG-ER FEEDBACK ON

SARS-COV-2 AND FOOD CONTAMINATION (ID0433)

MEETING DATE: 9-10 DEC 2020

EVALUATION

MAIN CRITERIA

NEW HAZARD: Yes ☐ No ☐ N/A ☐

- *(e.g. Has a new hazard been identified? If so, which one and how?)*

NEW OR INCREASED EXPOSURE: Yes ☐ No ☐ N/A ☐

- *(e.g. Has a possible exposure through food/feed to the new hazard been identified?)*

NEW SUSCEPTIBLE GROUP: Yes ☐ No ☐ N/A ☐

- *(e.g. Has a new vulnerable group been identified?)*

- **NEW DRIVER:** Yes ☐ No ☐ N/A ☐
- (e.g. is this a new driver?)

OTHER QUALIFYING CRITERIA

In addition, the following criteria can be addressed if you have information readily available

- **Soundness:** *(e.g. What is the reliability of sources of information? e.g. peer-reviewed journals)*
- **Severity:** *(e.g. What could be the severity of the health effects in terms of morbidity and/or mortality?)*
- **Imminence:** *(e.g. how soon it is estimated that the potential hazard will manifest in the food, feed, environment? How soon is it estimated that this health risk will manifest in the population?)*
- **Scale:** *(e.g. number of people and Member States potentially exposed?)will IT, e.g. days, months, years)*

STADG-ER Discussion

STADG-ER CONCLUSIONS

Enter a brief summary of the reasoning that led to identify this as an emerging issue.

STADG-ER RECOMMENDATIONS

(e.g. *EFSA should keep monitor the issue/ EFSA should start a review of this issue aiming at publishing a report / EFSA should start a project to generate data on this issue (e.g. outsourcing) /EFSA should start a risk assessment / EFSA should consult other bodies*

It is necessary to regularly monitor scientific literature to prove evidence that food is not associated with the transmission of the virus and

also to develop fast sensitive tests (e.g. ELISA) to check and monitor SARS-CoV-2 in the feed and food chain This would also entail COVID-19 certification of food chain industries.

In Denmark the pork industry confronts difficulties to comply with the requirements to export meat to China. Measures in place create a logistic challenge with a questionable impact on the risk of Covid-19. Lis Alban recommended identifying safe ways for trading based on scientific risk assessment e.g. by EFSA.

RNA monitoring in sludge can be used as an indicator of the prevalence of COVID-19 infection in a population.

The raw wastewater and sludge-based surveillance of COVID-19 in the community would be an innovative tactic to support COVID-19 epidemic surveillance, e.g. to determine the general scale of community virus load when a vaccination campaign has started, or when movement restrictions in an area have been relaxed and/or reimpose.

MEETING DATE: XXXXX

EVALUATION

MAIN CRITERIA

NEW HAZARD:

Yes		No		N/A	

- *(e.g. Has a new hazard been identified? If so, which one and how?)*

NEW OR INCREASED EXPOSURE:

Yes		No		N/A	

- *(e.g. Has a possible exposure through food/feed to the new hazard been identified?)*

NEW SUSCEPTIBLE GROUP:

Yes		No		N/A	

- *(e.g. Has a new vulnerable group been identified?)*

- **NEW DRIVER:**

Yes		No		N/A	

- (e.g. is this a new driver?)

OTHER QUALIFYING CRITERIA

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EREN Discussion

EREN CONCLUSIONS

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EREN RECOMMENDATIONS

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