# Food Safety in the Conditions of Covid-19

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**Abstract**

*The purpose of the scientific article is to study food safety in the conditions of Covid-19. The methods used in writing the scientific article are descriptive-analytical method, systematic approach, study of the works of authors, comparative analysis, method of observation, induction, deduction. In the study is presented potential food safety risks in the context of Covid-19. There is no evidence to suggest that consuming food is associated infecting consumers with COVID-19. This opinion is confirmed both by the research of the scientific community and by the positions of some national, european and world institutions. Consumers have to don't worry about about food safety in the conditions of Covid-19.*

*Keywords: food safety, covid-19*

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## Introduction

Food is essential to life, hence food safety is a basic human right. Billons of people in the world are at risk of unsafe food. Many millions become sick while hundreds of thousand die yearly. The food chain starts from farm to fork/plate while challenges include microbial, chemical, personal and environmental hygiene. Historically, documented human tragedies and economic disasters due to consuming contaminated food occurred as a result of intentional or unintentional personal conduct and governmental failure to safeguard food quality and safety. The food producers, distributors and vendors bear primary responsibility while consumers must remain vigilant and literate. Government agencies must enforce food safety laws to safeguard public and individual health (Fung, et al., 2018).

Food safety is the basis of the quality of life of consumers in the modern conditions of the dynamically developing environment. Protection against risks of acquiring food that may endanger life and health of consumers includes requirements for the general safety of the food (Pashova, 2021).

COVID-19 (Coronavirus disease 2019) is global problem. The world has faced the challenge of the COVID-19 pandemic, which has an impact on the economy, social relations, and healthcare functions under new, unfamiliar conditions imposed by the Covid-19 pandemic (Pavlova, 2021; Pavlova and Zlatanova, 2021; Sim and Wiwanitkit, 2021). Since its first appearance in 2019, the new disease has already caused milions infected persons worldwide. COVID-19 is caused by a novel coronavirus pathogen. The infection causes acute febrile respiratory illness. People with COVID-19 can be asymptomatic and silently spread the disease. The contact with contamination in air environment is the main consideration in the disease spreading. The face mask wearing and respiratory infection control is the basic public health preventive recommendations. Nevertheless, the atypical possible mode of transmissions of COVID-19 becomes the important public health consideration. Of several possible atypical modes of transmission, food borne transmission is widely discussed. At present, there is no evidence that COVID-19 is a food borne disease. Whether the new virus is transmitted by food is still an interesting question. The contamination in food becomes a big issue for management. Since a hand contamination can result in pathogen carrying into the mouth or nose cavity, it is necessary to have good hand sanitation during COVID-19 outbreak. An infected person might cause contamination into surrounding environment. The contamination into food in case that an infected person works with food becomes a very important issue. The potential for food borne transmission of COVID-19 become a present discussed public health issue (Sim and Wiwanitkit, 2021).

*The main purpose* of the scientific article is to study food safety in the conditions of Covid-19.

*The methods used* in writing the scientific article are descriptive-analytical method, systematic approach, study of the works of authors, comparative analysis, method of observation, induction, deduction.

**1. Food safety risk in the conditions of Covid-19**

Potential food safety risks in the context of Covid-19 are presented at the point of the article.

*Impact of the COVID-19 pandemic crisis on the food supply system.* The food system is comprehensive, multifaceted, highly interconnected, and has the potential to address food security, safety, nutrition/quality, and manufacturing allocation. The Food and Agriculture Organization (FAO) stated that COVID-19 is affecting agriculture in two crucial ways, namely in terms of the supply of and demand for food, which are directly related to food security, which is therefore at risk. A food supply chain is a link that connects farm systems to consumers' tables via processes related to production, packaging, distribution, and storage. During the COVID-19 pandemic, all categories of the food supply chain, including fresh vegetables, fruit, bakery items, perishable goods, and food grains, have been extremely compromised. Food safety is one of the four pillars of the food system that has been badly affected by the COVID-19 pandemic. Food demand has decreased slightly nowadays because of uncertainty and the declining purchasing capacity of people. Moreover, these long-term pandemic conditions could create a worsening situation because of the lack of income and job losses. Indeed, the growing demand for food and beverages online is increasing daily due to the COVID-19 pandemic. A shortage of food items is inevitable under such strict lockdown conditions, during which most logistics activities have stopped. Food insecurity is growing due to the economic crisis caused by the COVID-19 pandemic, and the number of people facing food insecurity worldwide could be high. Both developing and developed countries are facing the same situation due to increased food insecurity during the COVID-19 pandemic, while vulnerable and low-income population groups are more severely affected (Han, et al., 2021).

*Potential indirect food safety impact*. The global food sector is being dramatically impacted both economically and socially, across the entire food network in relation to:

- ✓ human resources, such as changes in key personnel;
- ✓ supply chains of ingredients, packaging, finished products and equipment;
- ✓ sourcing, transportation of people, materials and goods.

The restrictions which many countries have put in place to manage the spread of COVID-19 have also in turn severely impacted the food sector. The sector may need to rely on alternative suppliers at short notice. Certain ingredients and packaging might be in short supply and food businesses may need to consider leaving out or substituting ingredients in a product. Taking on new staff will require training and ensuring they adopt the business's food safety culture, which is no mean task as some might not have a food background. The third party auditing process, which helps drivecontinuous improvement, food safety and quality and gives a degree of assurance to customers, has had to be put on hold. All of the recognised food safety certification programmes have issued official positions on how they are handling new certifications and recertifications in response to the current pandemic. This crisis might well hasten the move towards remote audits, which have already started to take place. All these factors do have the potential to impact negatively on food safety as the current situation is extremely disruptive and is stressing the whole global food supply network, reducing its capabilities and restricting the availability of food (COVID-19 Crisis, 2020).

*Food-contact surfaces*. It is known that the first cases of COVID-19 were associated with the Huanan Seafood Market, where live wild animals such as bats, snakes, and marmots, as well as animal organs, are sold, which suggests the zoonotic transmission of COVID-19. Although the WHO has indicated that food is not a transmission route for COVID-19 many authorities including the US Food and Drug Administration Agency (FDA), and the European Food Safety Authority ((EFSA 2020)) continue to gather information related to the potential persistence of the virus on

food and track the exact intermediate host for this virus. Meat from beef, poultry, pork, and wild animals are known to be abundant in heparin sulfate, which is required for COVID-19 to interact with host tissue epithelia. This virus' persistence in the environment and on food-contact surfaces such as plastic, wood, rubber, and stainless steel means that it can survive for several days, so meat tissue surfaces could be a potential or even critical transmission route for COVID-19 infection. Studies on the persistence of coronaviruses in food are extremely rare. Investigated is to the survival of COVID-19 in dromedary camel milk and found that the virus spiked in all samples stored at 22 °C with a great loss of infectivity when stored at 4 °C; the virus in the dromedary camel milk survived at 4 °C for 72 h, while the infectivity was lost at 22 °C after 48 h. In a research described the stability of bovine coronavirus on refrigerated romaine lettuce leaves to examine the potential foodborne transmission of the virus and found that they were detectable for at least 14 days, with the virus becoming more stable at lower temperature and relative humidity, suggesting that contaminated vegetables could be a potential route for the transmission of zoonotic coronaviruses to humans. Similar findings were reported for human coronavirus on lettuce leaves stored at 4 °C; the virus particles decreased by 0.2 log10 after two days and became inactive after four days. These studies are particularly important because of reporting the potential zoonotic transmission via fresh produce to which heat treatment cannot be applied to inactivate viruses and demonstrated that coronaviruses can survive on fresh produce for several days at the usual refrigeration storage temperature in the average consumer household. More recently, reported the prolonged survival of COVID-19 in salmon at low temperatures; COVID-19 remained viable in salmon at 4 °C for eight days and survived for 2 day at 25 °C, confirming that the infectivity of COVID-19 is associated with temperature and insinuating the potential risk of infection from fish or seafood that are mostly stored and transported while refrigerated (Han, et al., 2021).

*Cleaning and disinfection of surfaces*. Studies on efficacy of biocide substances against COVID-19 on surfaces are now starting to become available. They seem to support initial indications from different sources that this virus is not especially resistant to common biocides. This means that there are many options available for surface decontamination and good hygiene can help to contain the spread of this terrible disease. Employees in food processing facilities should continue to follow good food hygiene practices. This is however a good time to review and verify that you have the correct cleaning and sanitising procedures and frequencies in place. COVID-19 is an enveloped virus with an internal nucleocapsid. Disrupting the lipid envelope matrix layer will inactivate the genetic material. In terms of routine cleaning and disinfection programmes for contact and processing equipment, they should follow good hygienic practice and include a disinfectant product capable of inactivating viral contaminants. The disinfecting agent's viricidal efficacy must comply with BS EN 14476 (COVID-19 Crisis, 2020).

Presented are potential food safety risks in the context of Covid-19, having been found it to be - the impact of the COVID-19 pandemic crisis on the food supply system; the potential indirect food safety impact; food-contact surfaces and cleaning and disinfection of surfaces. The presented potential food safety risks have to review to scientific research about food safety in the conditions of Covid-19.

**2. Scientific research about food safety in the conditions of Covid-19**

The COVID-19 pandemic is continuing to challenge our health and affect our lives in many ways. COVID-19 is highly contagious and causes high morbidity and mortality, and it also has been posing a great challenge to food supply chain (figure 1) and food industry. The food chain is a possible means for the transmission of COVID-19, and unfortunately limited attention is paid on the food chain to ensure food safety by monitoring the environments where food is produced, processed, stored, delivered, marketed, and so on. Monitoring the risks is essential to avoid the potential harm in the post-COVID-19 era, especially for the safety of food supply chain, which is full of uncertainties. In the study, possible transmission routes in the food chain were summarized. Due to the essential roles of pretreatment methods for the virus-contaminated food samples, sample

pretreatment methods according to different detection platform such as nucleic acid assays, immunoassays, etc., were specifically discussed, aiming to provide informative guidance for effective detection of COVID-19 in foodstuffs. Advanced strategies for virus direction in foods play a critical role in food safety and verification due to their good analytical performance, convenient use, rapid and on-site detection, and simple operations. Herein, recent advances in detection method for COVID-19 were reviewed and discussed. Early warning, tracing, and detection should be united as a complete system in order to mitigate the COVID-19 outbreak, in which the detection for COVID-19 occupies a major position as it not only concerns screening of populations but also monitoring of possible contaminated sources (Zhang, et al., 2021).


Figure 1. Schematics for the critical stages of the food supply chain from farm to table and methods for detection of severe acute respiratory syndrome coronavirus-2 (COVID-19) (Zhang, et al., 2021).

Currently, there is no evidence to suggest that handling food or consuming food is associated with COVID-19. COVID-19 is primarily spread from human to human interaction, through respiratory droplets, which are usually released when an infected person coughs or sneezes. Since droplets are usually transported by airflow and fall within a few meters, the likelihood of transmission is decreased if people remain at least 2 m apart. It may be possible that a person can get COVID-19 by touching a contaminated droplet on a surface or object and then touching their own eyes, nose, or mouth (figure 2). In this scenario, the handling or consumption of contaminated food products could have the same risk of a surface or an object (Ceniti, et al., 2021).

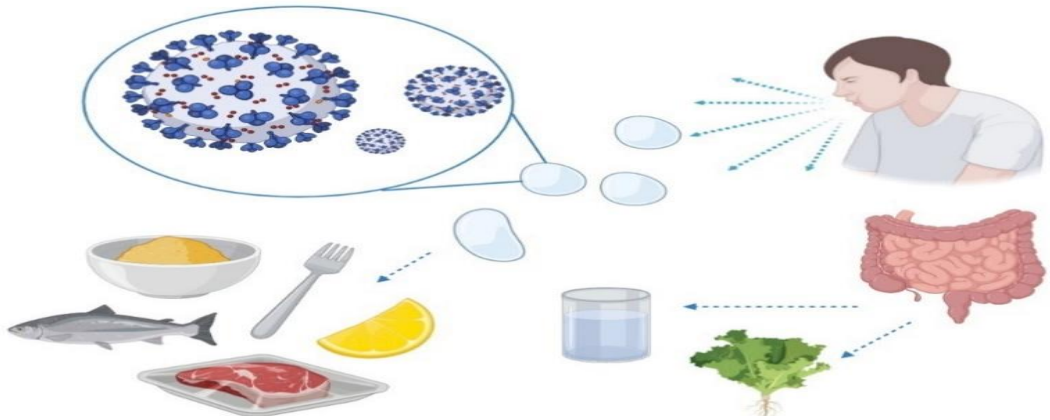

Figure 2. A simplified diagram of the possible transmission of COVID-19 to food or food supplies (Ceniti, et al., 2021).

In a study provides an important insight into the response of food safety systems during the first months of the pandemic, elevating the perspective of preventing Covid-19 within conventional food safety management systems. A multi-country survey was conducted in 16 countries involving 825 food companies. Based on the results of the survey, it is obvious that the level of maturity of a food safety system in place is the main trigger in classifying companies and their responses to the pandemic challenge. Staff awareness and hygiene are the two most important attributes in combating Covid-19, opposed to temperature checking of workers in food establishment and health protocols from the World Health Organization, recognized as attributes with limited salience and importance. Companies confirmed implementation of more restrictive hygiene procedures during the pandemic and the need for purchasing more additional personal protective equipment. Retailers were identified as the food supply chain link mostly affected by the pandemic opposed to food storage facilities ranked as least affected. During this challenging period, all companies declared that food safety has not been compromised at any moment. It is important to note that less than a half of the food companies had documented any emergency plans associated with pandemics and health issues in place (Djekic, et al., 2021).

In the study about assess the impact of COVID-19 on food products logistics, shown the need for prioritizing the modernization of the food safety management and updating the necessary control measures to ensure that products reaching end-users are appropriate and fit for human consumption. The focus of the research is on the European food legislation, and recommendations have been made to supplement and upgrade the introduced norms and good practices, observing the basic principles of precaution and preventive measures for the protection of food safety. The results show that the measures taken have the potential to minimize the risk to food safety in logistics processes, but the existing risks require more in-depth analysis and the implementation of new more significant measures to minimize the impact of increasing problems in logistics operations (Stefanova, 2022).

Data on the survival of COVID-19 on contact surfaces has been reported, but there is none on the survival of COVID-19 on food surfaces and packages. The potential survival and transmission of COVID-19 on/via food and packages are discussed based on data available for other respiratory viruses. However, studies are needed to explore its transmission via food and survival on food packaging materials. The implementation of food safety management systems such as Hazard Analysis and Critical Control Points (HACCP), and Good Manufacturing Practices (GMP) are important to reduce the risk of COVID-19 infection. Cleaning, sanitation, good hygienic practices, and active packaging are also needed from farm to fork (Olaimat, et al., 2020).

In the study is presented that the inclusion of additional measures within the scope of the HACCP system is a tool to increase food safety as a preventive measure for producers to respond to a pandemic. The measures related to the implementation of HACCP at the present moment manage to secure and ensure that the planned and implemented measures ensure the safety of finished products. The relationship between reducing food hazards and reducing the risk of adverse health effects for consumers is of particular importance for implementation of appropriate control measures to be able to influence in the direction of elimination. This is a prerequisite guaranteeing the reduction of the safety risk food and prevent the occurrence of health incidents through adequate use of resources (personnel and technological equipment) in accordance with the planned safety objectives. Applying established approaches helps achieve security related to consumer health by addressing various hazards in the direction of their minimization, including the potential dangers arising from Covid-19. By applying proven scientific approaches, ability is improved to manage food safety in crisis situations, such as draws attention to the degree of threat of these hazards and the degree of resulting risks to human health. This is the basis to determine the priorities among the

dangers and to plan adequate measures for their control, emphasizing those that represent a health risk for consumers (Stoyanova and Stefanova, 2021).

There is no evidence to suggest that consuming food is associated with COVID-19, and the virus is primarily spread from human to human interaction when an infected person coughs or sneezes. But it is extremely important to study positions of national, european and world institutions regarding food safety in the conditions of Covid-19 to track whether their opinions compare with science research are the same or different.

**3. Positions of national, european and world institutions regarding food safety in the conditions of covid-19**

*The British Association of Dietitians* recommends in this situation to minimize shopping through good planning of food purchases, optimal storage, planning meals for several days. It is necessary to observe rules of good hygienic practice in the preparation, storage and cooking of food at home (Duleva, 2020).

*The German Federal Institute for Risk Assessment* also commented on some issues related to food safety and the coronavirus (COVID-19) infection:

There are currently no cases to indicate that anyone has contracted the new type of coronavirus through consumption of contaminated food. There are also no known reports of foodborne infections with other coronaviruses. Transmission through surfaces that have recently been infected with viruses is possible for a short time post-contamination period due to the relatively low stability of coronaviruses in the environment (Duleva, 2020).

Although the virus is unlikely to be transmitted through contaminated food or imported foodstuffs, general everyday hygiene rules such as regular hand washing and food preparation hygiene should be observed. Since viruses are sensitive to heat, the risk of infection can be further reduced by adequate heat treatment and heating of foods (Duleva, 2020).

The coronavirus can usually get onto cutlery or dishes through an infected person sneezing or coughing directly onto them. The coronavirus can survive on these surfaces for some time. In these cases it is possible infection through cutlery if the virus gets on the hands, mucous membranes of the mouth, throat or eyes. However, the German Institute for Risk Assessment is not yet aware of any cases of coronavirus infection through this route of transmission (Duleva, 2020).

The coronavirus is covered by a layer of fat (lipid layer) and reacts sensitively to substances that dissolve fat, such as alcohols or surfactants that are contained in soaps and dishwashing detergents such as fat remover. Although specific data on the coronavirus is not yet available, there is a strong possibility that these substances can damage the surface of the virus and render it inactive. This mechanism is also valid if the dishes are washed and dried in a dishwasher at a temperature of 600°C or higher (Duleva, 2020).

So far, however, there are no data on infection with the coronavirus (COVID-19) through consumption of food, including frozen food. It is necessary to comply with the general hygiene rules when preparing food (Duleva, 2020).

*The European Food Safety Authority (EFSA)* is closely monitoring the scientific literature in relation to the possible role of food in the transmission of COVID-19 to humans. There is, up to now, no evidence that food is a source or transmission route of COVID-19. The scientific data indicates that the virus is transmitted person-to-person and via small respiratory droplets through sneezing, coughing, or when people interact with each other in close proximity. It can't be excluded that a person could become infected after touching a surface or object, including food or food packaging, contaminated by COVID-19 and transferring the virus to mucous membranes of the nose, eyes or mouth. However, there is no conclusive evidence for this form of transmission. There

is no scientific evidence of transmission of COVID-19 through handling or consumption of food and, as such, EFSA has not carried out any specific food safety assessments. EFSA is constantly monitoring the scientific literature for new and relevant information on this matter (EFSA, 2020).

In the scientific advice produced by the *French Agency for Food, Environmental and Occupational Health & Safety (ANSES)*, it is underlined that there is no evidence that contaminated food can lead to infection of the digestive tract although the possibility of the respiratory tract becoming infected during chewing cannot be completely ruled out (EFSA, 2020).

When good hygiene practices are not properly followed during the handling and preparation of food, the surface of food might become contaminated – for example, by infectious droplets being released by an infected person (e.g. via coughing, sneezing, speaking loudly) or by the food being touched with contaminated hands. Contamination can occur on food and surfaces used for food preparation (e.g. cutting boards) in the same way as for any other object and surface (EFSA, 2020).

Viruses can'not multiply in foods, but in certain conditions they can survive on foods (EFSA, 2020).

Laboratory studies showed that COVID-19 remained stable at 4°C on a variety of surfaces for several days and some positive samples have been detected from refrigerated facilities and cold-chain food or its packaging. This suggests that COVID-19 could persist on contaminated refrigerated or frozen products. However, no link has been established between COVID-19 infection and food consumption (EFSA, 2020).

Cooking at sufficiently high temperatures along with the application of good hygiene practices protects consumers against a wide range of foodborne infections and also inactivates COVID-19 if it were present on food (EFSA, 2020).

Scientific evidence shows that coronaviruses can persist in the environment and on different types of surfaces that might be in contact with food. Research has shown persistence on steel up to seven days and on plastic and glass for up to four days. Other surfaces have also been investigated e.g. copper, aluminium, paper, cardboard, wood, and rubber (EFSA, 2020).

On the other hand, coronaviruses are susceptible to, and inactivated by, certain biocidal agents. For example, disinfection procedures applying 62–71% ethanol, 0.5% hydrogenperoxide or 0.1% sodium hypochlorite for one minute exposure time are considered effective to inactivate coronaviruses (EFSA, 2020).

Persistence on food packaging or other materials does not imply that these materials are a source of infection. Currently there is no evidence of transmission of COVID-19 through food packaging or other materials (EFSA, 2020).

There is experimental evidence of the establishment of human intestinal infection with COVID-19, however there are many knowledge gaps, and direct evidence for the involvement of the gastro-intestinal tract in the pathogenesis of COVID-19 is insufficient (EFSA, 2020).

Although infection with COVID-19 through the oral route in humans cannot be totally excluded from a theoretical point of view, many scientific uncertainties remain and much more robust evidence is needed before drawing firm conclusions. This evidence relates in particular to the proportion of patients who have infectious particles in their faeces; the amount of viral particles that may be present in patients' faeces; how the virus behaves when it is exposed to a human's gastric and intestinal environment; and the amount of virus needed to cause infection in humans (EFSA, 2020).

Food business operators should scrupulously apply the same principles and procedures which are already in place in the EU for ensuring safe food production. In fact, healthy workers and compliance with good hygiene practices during all stages of the production, processing and manipulation of food are key to protecting against all microbiological agents causing foodborne infections (EFSA, 2020).


3a 3b 3c 3d 3e 3f

Figure 3. The logos of national, European and world institutions with positions regarding food safety in the conditions of covid-19 - 3a - British Dietetic Association (BDA); 3b - The German Federal Institute for Risk Assessment (BfR); 3c - French Agency for Food, Environmental and Occupational Health & Safety (ANSES); 3d - The European Food Safety Authority (EFSA); 3e - The Food and Agriculture Organization (FAO) 3f - World Health Organization (WHO); (https://www.bda.uk.com/; https://www.bfr.bund.de/de/start.html; https://www.anses.fr/en; https://www.efsa.europa.eu/en; https://www.fao.org/home/en; https://www.who.int/)

According to *The Food and Agriculture Organization (FAO)* to currently, there is no evidence that the new coronavirus that causes COVID-19 can be transmitted by food. The virus is transmitted primarily by people who are infected through coughing and sneezing droplets which are then picked up by another person. Coronavirus cannot grow on food. While bacteria under the right conditions can grow on food, a virus such as the one that causes COVID-19, requires a living host in order to multiply. Though the virus can survive on objects and surfaces, it is not known how long it can survive on food and what amount of contamination would make a person sick (FAO, 2020).

Foodborne transmission of viruses requires that a person consume enough infectious virus to result in infection. There is currently not enough data to say how much COVID-19 is required to result in infection. Moreover, the contamination of foods and food packaging has, to date, been an extremely rare event. Current evidence does not support food or food packaging as a route of COVID-19 transmission to humans.The best way to avoid COVID-19 is through good hygiene habits. Always wash your hands with soap and water for at least 20 seconds and dry thoroughly with a clean towel - after shopping, before handling food and during preparation, before eating and after using the bathroom. All equipment and surfaces used for food preparation should be washed and sanitized (FAO, 2020).

It is important to follow the measures put in place locally at the market or supermarket and maintain physical distance from other people when selecting food items and in line. Keep hands clean and do not shop if you have any symptoms (FAO, 2020).

Handling food packaging is an unlikely cause of COVID-19. Under experimental conditions, the virus can survive on a variety of surfaces such as plastic or cardboard used in packaging, but it is unlikely that this type of exposure would be sufficient to make a person sick. However, consumers must comply with certain requirements (FAO, 2020):

- ✓ always wash your hands after unpacking food;
- ✓ additional precautions include wiping down and disinfecting surfaces;
- ✓ avoid touching your eyes, nose or mouth when handling food and food packages;
- ✓ wash reusable shopping bags regularly;
- ✓ continue to follow national food safety regulations as well as COVID-19-related measures to protect food as well as staff;
- ✓ food businesses and their operators must reinforce good hygienic practices and standard operating procedures;
- ✓ strict personnel hygiene is crucial.

Keeping all workers in the food production and supply chains healthy and safe is critical to avoid food shortages. In order to balance this with the need to maintain the safety and integrity of the food supply chain and support international trade, food safety regulators need to prioritize critically important services during the ongoing COVID-19 pandemic. To facilitate this, FAO and WHO have developed guidance for food safety authorities, and FAO has provided policy guidance for various aspects of food safety and food security measures in the light of the pandemic. To ensure and maintain access to safe food, it is key to reinforce the implementation of the existing international standards developed by the Codex Alimentarius Commission, in particular on food hygiene and food Import and Export Inspection and Certification (FAO, 2020).

FAO supports measures that ensure the continuity of supply chains so that people have access to safe and nutritious food during the pandemic. FAO is working closely with WHO to provide targeted guidance to all those in the food chain to support their efforts to maintain the safety of the food supply during this crisis. FAO is providing policy guidance for agricultural and food systems which highlight food safety as one of the important aspects to be considered (FAO, 2020).

According to the *World Health Organization (WHO)* is highly unlikely that people can contract COVID-19 from food or food packaging. COVID-19 is a respiratory illness and the primary transmission route is through person-to-person contact and through direct contact with respiratory droplets generated when an infected person coughs or sneezes. There is no evidence of viruses that cause respiratory illnesses being transmitted via food or food packaging. Coronaviruses cannot multiply in food; they need an animal or human host to multiply. The most recent advice from the WHO is that current evidence indicates that COVID-19 virus is transmitted during close contact through respiratory droplets (formed on coughing or sneezing) and by fomites.The virus can spread directly from person-to-person when a COVID-19 case coughs or sneezes, producing droplets that reach the nose, mouth, or eyes of another person. Alternatively, as the respiratory droplets are too heavy to be airborne, they land on objects and surfaces surrounding the infected person. It is possible that someone may become infected by touching a contaminated surface, object, or the hand of an infected person and then touching their own mouth, nose, or eyes. This can happen, for instance, when touching door knobs or shaking hands and then touching the face. Recent research evaluated the survival of the COVID-19 virus on different surfaces and reported that the virus can remain viable for up to 72 hours on plastic and stainless steel, up to four hours on copper, and up to 24 hours on cardboard. This research was conducted under laboratory conditions (controlled relative humidity and temperature) and should be interpreted with caution in the real-life environment. It is imperative for the food industry to reinforce personal hygiene measures and provide refresher training on food hygiene principles to eliminate or reduce the risk of food surfaces and food packaging materials becoming contaminated with the virus from food workers. Personal protective equipment (PPE), such as masks and gloves, can be effective in reducing the spread of viruses and disease within the food industry, but only if used properly. In addition, the food industry is strongly advised to introduce physical distancing and stringent hygiene and sanitation measures and promote frequent and effective handwashing and sanitation at each stage of food processing, manufacture and marketing. These measures will protect staff from spreading COVID-19 among workers, maintain a healthy workforce, and detect and exclude infected food handlers and their immediate contacts from the workplace. Although COVID-19 genetic material (RNA) has been isolated from stool samples of infected patients, there are no reports or any evidence of faecal-oral transmission. Handwashing after using the toilet is always an essential practice especially when working with food (World Health Organization and Food and Agriculture Organization of the United Nations, 2020).

The positions of some national institutions (The British Association of Dietitians; The German Federal Institute for Risk Assessment and French Agency for Food, Environmental and

Occupational Health & Safety (ANSES)) about food safety in the conditions of covid-19 is that recommends in this situation to minimize shopping through good planning of food purchases, optimal storage, planning meals for several days. It is necessary to observe the rules of good hygienic practice in the preparation, storage and cooking of food at home There are currently no cases to indicate that anyone has contracted the new type of coronavirus through consumption of contaminated food. It is underlined that there is no evidence that contaminated food can lead to infection of the digestive tract although the possibility of the respiratory tract becoming infected during chewing cannot be completely ruled out.

The European Food Safety Authority (EFSA) has an opinion that there is, up to now, no evidence that food is a source or transmission route of COVID-19. The scientific data indicates that the virus is transmitted person-to-person. According to The Food and Agriculture Organization (FAO) also supports the opinion that Currently, there is no evidence that the new coronavirus that causes COVID-19 can be transmitted by food. The World Health Organization (WHO) has an opinion that is highly unlikely that people can contract COVID-19 from food or food packaging.

**Conclusion**

In conclusion is presented potential food safety risks in the context of Covid-19 such as the impact of the COVID-19 pandemic crisis on the food supply system; the potential indirect food safety impact; food-contact surfaces and cleaning and disinfection of surfaces.

In the study conducted shows there is no evidence to suggest that consuming food is associated with COVID-19, and the virus is primarily spread from human to human interaction when an infected person coughs or sneezes. This opinion is confirmed both by the research of the scientific community and by the positions of some national, european and world institutions.

Consumers have to don't worry about about food safety in the conditions of Covid-19 as there are currently no cases to indicate that anyone has contracted Covid-19 through consumption of contaminated food.

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