

Impact of COVID-19 on Food Safety

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ABSTRACT

COVID-19 is a new infectious disease caused by virus SARS-CoV-2. It is a new disease with little scientific knowledge on how it is spread. Scientific literature confirms its very contagious nature. This article examines the routes of transmission of COVID-19 through food. we relate nutritional recommendations and hygiene and safety conditions for the consumption of safe food during the Covid-19 pandemic. To conclude, we stress, first of all, the need to respect personal and environmental hygiene and of course food hygiene. Second, the need to consume a balanced and varied diet is essential to strengthen the human immune system to better fight against respiratory distress caused by COVID-19.

Keywords: COVID-19, SARS-CoV-2, pandemic, food



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INTRODUCTION

Over the last decade, food safety has taken up several challenges, namely chemical, by way of example not restricting trace metals [1,2] and biological, in particular with the advent of several new diseases around the world, with pathogens such as Ebola, Zika, Nipah and coronaviruses (CoV) [3]. Coronaviruses are a large family of viruses and cause illnesses ranging from the common cold to more serious illnesses such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV) [4]. Until 2020, six coronaviruses were known to infect humans: 229E, NL63, OC43, HKU1, SARS-CoV and MERS-CoV. The first four types of viruses regularly cause infections in the human population and infect the respiratory system with mild symptoms in children and adults. The other two types (MERS-CoV and SARS-CoV) present more severe symptoms, which appeared in 2002 and 2012 respectively [5]. At present, a new coronavirus has emerged in December 2019, in Wuhan city, Hubei province of China, which could pose a threat to global health given the ongoing epidemic in China and in other territories [6]. This new virus is a significant threat to global public health and is completely different from the viruses responsible for the Middle East Respiratory Syndrome Coronavirus (MERS-CoV) and Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV). All the modes of transmission of this virus have not yet been determined. However, as a rule, the route of transmission of respiratory viruses is primarily through direct and indirect contact with respiratory droplets from infected individuals [7]. Among the first people infected with the virus, two-thirds of those infected were found to be linked to the wholesale seafood market in Havana, where live animals are also sold [8,9]. The exact origin of this virus is not yet known. Some researchers have suggested that the Huanan Seafood wholesale market may not be the original source of viral transmission to humans [10]. However, regardless of the main source of the disease, people are concerned about the transmission of the virus through food [7]. Studies have shown that coronaviruses are not water and foodborne. There is currently no scientific evidence to suggest that the virus can infect us through the digestive system [9,10]. But food workers can pass the virus to food by coughing or sneezing, or by transmitting the virus to food through contaminated hands [11]. The main risk of transmission therefore comes from close contact with infected people. In this regard, in order to avoid any kind of contamination and food quality assurance in food

production and distribution units, prior hygiene requirements such as good manufacturing practices (GMP) and good hygiene practices (BPH) can be effective.

It should be noted that the new coronavirus is a respiratory virus that is spread mainly by droplets generated when an infected person coughs or sneezes, or by droplets of saliva or nasal secretions. Therefore, the virus can survive on surfaces and foods. However, it is not known how long the virus that causes COVID-19 survives in food [12]. Food hygiene is therefore very important in this regard. This article refers to the factors of food safety and hygiene during the covid-19 epidemic.

FOODS OF ANIMAL ORIGIN

According to the World Health Organization classifications, COVID-19 is a zoonotic disease. Therefore, food hygiene of animal origin like meat, poultry, fish, milk and eggs will be important.

‘Cross-contamination’ is the term used to describe the transmission of microorganisms from raw to cooked foods [13]. In order to avoid cross-contamination, the following measures should be taken:

- Hand wash before food preparation and cooking for at least 20 seconds
 - Washing and disinfecting surfaces and equipment It is important to distinguish between “cleaning” and “disinfection”. “Cleaning” is the physical process of removing food particles. “Disinfection” is the process of disinfecting or destroying germs / viruses [14]. Either way, it is still essential to follow the Four Keys.
- Food safety steps (clean, separate, cook and refrigerate) to prevent foodborne illness [15]. It is also important to wash your hands frequently with soap and water before preparing, cooking, and eating.
- Face masks are essential for people who may sneeze or cough while processing food.
 - Separate raw food from cooked food
 - Avoid buying bulk or unpackaged foods

It is possible to transmit the coronavirus through food packaging. It is recommended to be washed and disinfected before consuming a variety of dairy products, canned and prepared foods, drinking water bottles, beverages and other packaged food products [16].

- Avoid eggs, meat, poultry and raw fish that are not fully cooked. And boil the milk before consuming it.

Favorable cooking of food can destroy almost all dangerous microorganisms. Thorough cooking at a core temperature of 70 °C is recommended to inactivate pathogenic microorganisms. 70 °C is the critical temperature limit for cooking. Cooking food up to 70 °C ensures food safety. The COVID-19 virus is sensitive to a temperature of 70 °C for 5 minutes or 56 °C for 30 minutes [17]. In another research, it is reported that the virus is killed at a temperature and duration of 56 °C and 70 °C after 10 and 5 minutes, respectively [18]. The cooking process is expected to kill the virus completely.

- Store food near or above 60 °C COVID-19, SARS-CoV and MERS-CoV have different durability according to different conditions such as temperature, humidity and light. Coronaviruses are active and stable even at -20 °C or less for 2 years. Therefore, storing food in the refrigerator (4-8 °C) will not deactivate the coronavirus [19].

Vegetables and Fruits

Here are some recommendations for the consumption of vegetables and fruits.

- Choose the vegetable and fruit with desirable appearance
- Wash fruits and vegetables thoroughly after purchase, or before eating and cooking.
- Peel the fruit before use
- Whenever possible, eat cooked vegetables.

Any contamination of the coronavirus in cooked vegetables is removed by heat. In addition, some vegetables are more nutritious when cooked. Such as tomatoes, asparagus, spinach, mushrooms, celery, and green beans [20].

Bread

Bread is one of the most widely used staple foods that almost all people consume on a daily basis. So the possibility of bread contamination with coronavirus is very high. Traditional breads, which are baked in traditional bakeries, can transmit the virus and cause illness if health advice is not followed. Fortunately, due to the use of high baking temperatures in the preparation of bread, all traces of the virus will be removed. But, when the rules of safety and hygiene have not been respected in the bakery, the bread will

be an agent of transmission of the virus. In addition, the bread cannot be washed or disinfected. Thus, in order to prevent cross-contamination, it is necessary to reheat bread at home [20].

SURFACES IN CONTACT WITH FOOD AND FOOD PACKAGING

Food contact surfaces are defined as any surface that touches food, such as knives, saucepans, cutting boards, etc. [21]. The cleaning, disinfection and disinfection of surfaces in contact with food are very important to avoid possible contamination caused by microorganisms such as the coronavirus. Recent laboratory research has shown that the covid-19 virus can remain infectious on different surfaces. This virus is cleared on tissue paper, cloth and stainless steel after 3 hours, 2 days and 7 days, respectively. They 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. Therefore, contamination of food and hands will be possible both in stores and at home. In addition, food packaging may have become contaminated when handled by an infected person. That's why it's important to follow these rules:

- Clean and dry food packaging with disinfectant wipes or a disposable wet paper towel
- Use of latex gloves when removing food packaging from store shelves
- Do not touch your face while shopping
- Wash your hands when you get home after packing your groceries.
- Cleaning and disinfection of hard-touch surfaces daily in the kitchen Chin et al. (2020) reported that household bleach (1:49), ethanol (70%), povidone-iodine (7.5%), chloroxylonol (0.05%), chlorhexidine (0.05) and benzalkonium chloride (0.1%) can kill the virus for 5 min; To disinfect surfaces, ether, 75% ethanol, chlorine disinfectant, peracetic acid and chloroform can be used, with the exception of chlorhexidine [22].

ADVICE ON COVID-19 AND NUTRITION

A balanced and varied diet has strengthened the human immune system. Therefore, in order to reduce the risk of chronic and infectious diseases during the epidemic, adequate nutrition is essential. According to the World Health Organization, you should eat a variety of fresh,

unprocessed foods each day to get vitamins, minerals, dietary fiber, protein, and antioxidants. To reduce the risk of overweight, obesity, heart disease, stroke, diabetes, and some types of cancer, drink enough water and avoid sugar, fats, and salt. Recently, studies have shown that vitamin D supplementation may prevent and treat several infections, including the flu, coronavirus, and pneumonia. In one study, Grant et al. (2020) mentioned the mechanism and role of vitamin D in reducing the risk of respiratory infections. They reported that vitamin D may reduce the risk of influenza and COVID-19 infections by reducing the levels of pro-inflammatory cytokines and increasing the levels of anti-inflammatory cytokines. In addition, they recommended that consumption of vitamin D3 may be useful for the treatment of people infected with COVID-19. In other research, Zhang and Liu (2020) have also proposed significant nutritional interventions for the prevention and treatment of COVID-19. They suggested taking vitamins (A, B complex, C, D, and E), minerals (selenium, zinc, iron), and omega-3s to prevent and treat infections [23].

In this review study, we suggested coconut oil as an effective antiviral agent against the novel coronavirus. The antiviral properties of coconut oil are due to its compounds such as lauric acid, monolaurin, and sodium lauryl sulfate [24]. In addition, Dushianthan et al. (2011) focused on the consumption of omega-3 supplements and foods containing antioxidants in patients with acute respiratory distress syndrome (ARDS). Since coronaviruses involved most patients with weak immune systems, using foods with high antioxidants may be effective in controlling and preventing infections [25].

FOODBORNE VIRUSES AND COVID-19

Norovirus and hepatitis A are the most important foodborne viruses. Since they originate from the intestines of humans and animals, these viruses are spread and transmitted primarily through the oral fecal route. Therefore, these viruses, as food pathogens, have the ability to survive in food. According to WHO advice, coronaviruses cannot multiply in food; they need an animal or human host to multiply [9].

COVID-19 is a respiratory pathogen. Its main route of transmission is through person-to-person contact and direct contact with respiratory droplets generated when an infected person coughs or sneezes [3]. Recently, new research in China has shown that the new coronavirus is also spread by fecal-oral transmission.

Xiao et al. (2020) reported that out of a total of 73 patients tested, 53 patients were positive for faecal SARS-CoV-2 RNA [26]. In addition, Jin et al. (2020) showed that among 651 patients tested, 74 (11.4%) patients presented at least one gastrointestinal symptom (nausea, vomiting or diarrhea) [27]. Fortunately, the Center for Diseases Control (CDC) has reported that the risk of transmitting COVID-19 from the feces of an infected person is low based on data from previous outbreaks of related coronaviruses. However, according to these results, it is very important to observe and implement food hygiene in order to avoid fecal contamination of food. In addition, many efforts should be made to detect and diagnose viruses in food.

CONCLUSION

Until that date, no sign of food transmission of COVID-19 has been reported. Coronaviruses cannot grow and multiply in an external environment (such as food, food packaging and food contact surfaces), they need a living host (animal or human) to multiply. But, there is a possibility of transmission of the virus in food by touching a contaminated surface, an object or the hand of an infected person. Therefore, observing hygiene advice such as frequent hand washing, separation of raw materials from cooked raw materials, cleaning of food contact surfaces and not using raw food, can play a preventive role in the transmission of the virus through food. In addition, due to the diagnosis of the virus in the stools of patients, there is also a possibility of fecal contamination. Therefore, more attention should be paid to the disposal of sanitary wastewater. Finally, it can be concluded that to avoid contamination of food with the coronavirus, personal hygiene and food hygiene are vital during the epidemic period.

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