# FOOD SAFETY- AN ASSESSMENT FOR QUALITY ASSURANCE SYSTEM DURING PANDEMIC OUTBREAK

**K. Sonia andJyoshna Rani Naik,**
Department of Pharmaceutical Quality Assurance; SRM College of Pharmacy SRMIST, Kattankulathur
Correspondence author: Dr. Sonia.K
E-mail: soniapharm68@gmail.com

**Abstract:**

**Background:** To study the briefs of development and assessing the food safety approach during COVID-19 pandemic. To attain this cogitation many countries were approached for this safety assessment held during the pandemic, according WHO 4.0 million fatalities taken place.**Method /design:** One of the most crucial analytical techniques for detecting antibodies is labelled immunoassay, which uses the labelled secondary antibody as a signal output and produces an antibody that produces antigen.**Result:** In this article it explains how detection and development of food security and dietary habits taken place during the outbreak.**Conclusion:** To control the COVID-19 outbreak, Detection, surveillance, and reporting combined in to another comprehensive structure. SARS-CoV-2 detection plays a vital role throughout this system because it not only involves population screening but also source monitoring. In light of prior research and the working hypotheses, researchers ought to go over through the findings and what they can be used for monitoring is crucial to preventing potential harm, particularly so for safeguarding and the food distribution system provides rife with unknowns.

**Keywords:** COVID-19, food safety, food system, public health, food samples pre-treatment, SARS – COV- 2 Transmission.

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## 1. Introduction

World Health Organization (WHO) called COVID-19 a worldwide pandemic. New coronavirus causes deadly respiratory illness. This COVID-19 virus, often known as SARS-CoV-2, threatens human life worldwide. Local, national, and international tactics to stop COVID-19 spread include social withdrawal and lockdown(1).On March 11 of that year, COVID-19 was proclaimed a global epidemic by the World Health Organization (WHO)(2).As of July 2021, the epidemic had killed over 4.0 million people worldwide. As of July 2021, the epidemic had killed over 4.0 million people worldwide(3).Coronaviruses were previously observed as human infections in the 1960s, despite the recent havoc that COVID-19 has wrought(4,5).SARS-CoV-2 coronavirus, also known as COVID-19, infected humans through an intermediary host after breaching the species shield. Domestic (pigs, fowl, dogs, cats) or wild (tigers, lions, ferrets, minks, frogs) creatures may have been host (6-8).COVID-19 threatened food security. Food insecurity doesn't exist when people have access to affordable, nutritious food(9). Safe food management, preparation, and storage reduce the risk of contracting food-borne infections(10,11). Lack of scientific proof for SARS-CoV-2 foodborne transmission minimizes food safety issues(12-15).COVID-19 epidemic affected food security and still does. Due to the pandemic's effects on infrastructure, distribution, and public transportation, as well as food costs, many foods were in short supply, and some people couldn't get enough to meet their nutritional needs(16).In response to COVID-19 infections among workers, many nations have proclaimed (and implemented) food processing facility slowdowns, cutbacks, and shutdowns(17,18).Multiple cases of unexplained pneumonia linked to China Sea Food Store were found after December 2019. Bronchitis affects the airways and other organs. Coronavirus-2 and Sars became its branch and family (SARS-CoV-2)(19).Since then, SARS-CoV-2 has prompted thousands of investigations worldwide. Preliminary research showed COVID-19 is easily transferred. cough, sneeze, inhale, exhale(20)which requires masks or isolation. By evaluating its genomic sequence, protein structure, and infection behavior, SARS CoV-2 must be related to ARES virus and SARS-CoV. (MERS-CoV)(21). The key difference is due to substantial alterations in the virus's membrane (S) glycoprotein receptor-binding region, which dramatically increases the cell surface accord power of SARS-CoV-2. Contagious COVID-19(22).The severe acute respiratory syndrome coronavirus (SARS-CoV) and the Middle East respiratory syndrome virus (MERS-CoV), both enveloped RNA viruses, have previously caused extensive illnesses(23).SARS-CoV-2 is the only coronavirus with significant human infection rates; it's the sixth in the familyWHO declared COVID-19 a worldwide epidemic on March 11, 2020(24,25,26).

**2. Transparency in the Food Supply Chain**

The spread of SARS-CoV-2 via individual contact from one to the three main methods that have been hypothesised and discussed(27,28) transmission of aerosols(29,30) and the transfer of droplets(31). In addition, there is evidence that the virus may spread through the digestive system(32).Its function and significance need more study. Human-to-human contact or touching infected objects can spread illness(33,34).Additionally, Virus-carrying droplets may be dispersed into the air when an infected person coughs or sneezes. and create aerosols, which can spread to other persons(35).

**3. Sample Pre-treatment in Numerous SARS-CoV-2 Detection Platforms**

The preparation of food samples is a crucial step before viral detection(36).Nucleic acid assays examine DNA or RNA sequences to discover dangerous bacteria. Polymerase chain reaction (PCR), which was first employed in nucleic acid amplification, is a preferred method since it's simple, widely utilized, and has easy-to-access ingredients and equipment(37).Due to its sensitivity and sequence specificity, polymerase chain reaction (PCR) is a polymerase used to boost RNA abundance(38).Researchers have modified PCR-based procedures to meet research and application objectives. Fluorescence reverse transcription PCR (RT-PCR), quantitative PCR (QC-PCR), and PCR have been developed(39). Due to the high particularity that durability of DNA, further based upon nucleotides techniques like the same way that electrochemistry, fluorescent, and electromagnetic relaxing switching have created(40-42). RT-qPCR, extraction, and ultrafiltration were employed to detect SARS-COV-2 in effluent, showing their usefulness for preparing water samples for viral identification. After finding hepatitis A and norovirus, Hennechart-Collette used ultra-filtration for bottled water (HAV)(43). Fruits, vegetables, and their products can become infected during watering and fertilizing. Inability to detect viruses in fruits, vegetables, and their products required a pre-treatment procedure. Yang et al. and Melgao et al. infected fruits and vegetables to test food contamination(44-45).Immunoassays use the specificity of the antigen-antibody response, in which the antibody and antigen can bind selectively. ELISA, LFA, fluorescence biosensor, and electrochemistry immunoassay are used to detect antigen-antibody reactions(46-48). The Direct immunoassay, which also goes by the name "direct immunoassay," is a method for detecting viruses. It covers direct ELISA, sandwich ELISA, and competitive ELISA models(49).Antibody immunoassays measure viral size. An antigen-mimicking virus can trigger antibody



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production. Immunoassay antibodies are produced from virus surface glycoprotein. Antibodies that react with N are employed to identify viruses because the resultant antigen properly depicts virus concentration. Urine, mucus, and plasma create antibodies, therefore pretreatment includes ultrafiltration, centrifugation, and concentration. Virus diagnostics involves antigen detection. Wu et al. created a bendable PCV2 immunosensor(50). Immunohistochemistry uses section staining. Combining aptamer and magnetic segregation identified viruses. Sizhu and Ga reported an immunohistochemistry study that found hepatitis E in Tibetan pig liver (HEV)(51).

## 4. Approaches involving detection Products Contain SARS-CoV-2 Have Developed

Nucleic acid detection is one of the most popular and widely used methods for finding SARS-CoV-2. This includes the reverse transcription polymerase chain reaction (RT-PCR), CRISPR system, reverse transcription recombinase-aided amplification assay (RT-RAA), reverse transcription loop-mediated isothermal amplification (RT-LAMP), metagenomics approach, and others. SARS-unique CoV-2 RNA can be used to diagnose COVID-19(52). One of the most crucial analytical techniques for detecting antibodies is labelled immunoassay, which uses the labelled secondary antibody as a signal output and produces an antibody that can bind to antigen precisely(53,54).Their examination provides a beneficial chance to quantify two very different SARS-CoV-2 strains exposure and immunity. Two ELISA tests—the NovaLisa and ELISA—and their analytical and clinical results SARSCoV-2 as well as the SARS-CoV-2 Platelia techniques, for identifying immune responses to the viral polypeptide nucleocapsid was also examined by Tré-Hardy et al(55).

## 5.COVID-19: Implications for Food Security and Safety

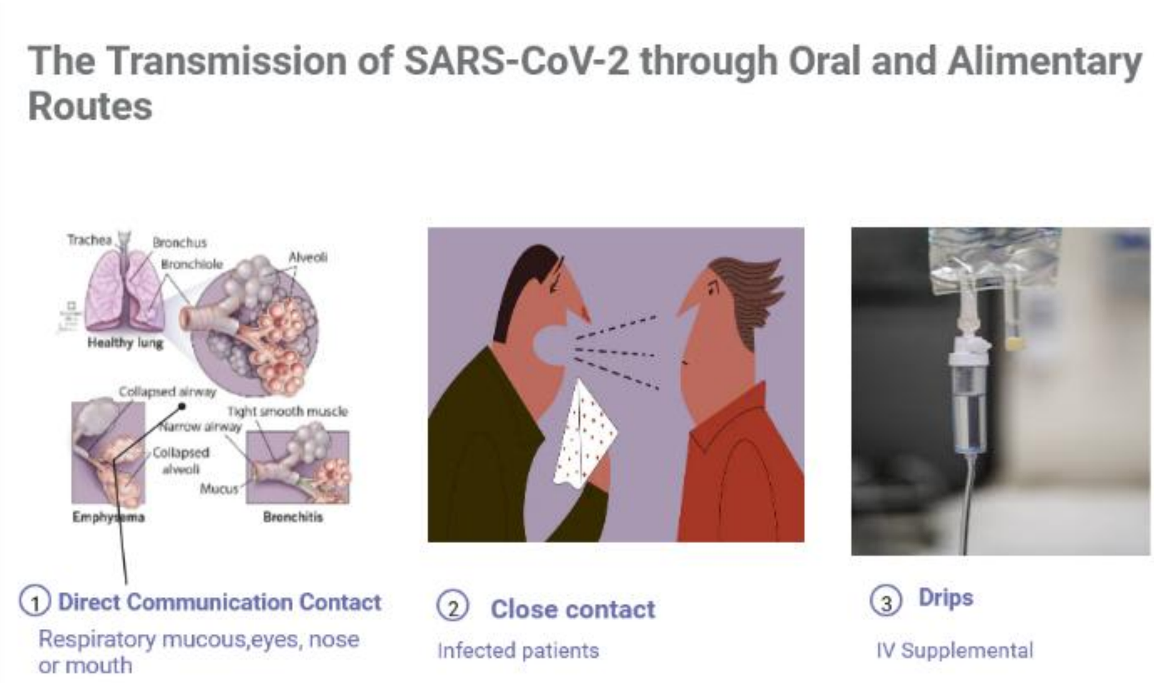
The WHO estimates there were 600 million cases of foodborne illnesses linked to tainted foods per year before to the pandemic, resulting in 420,000 fatalities(56).COVID-19's forced isolation and social segregation policies (such as limitations, lockdowns, curfews, quarantines, etc.) have affected food security. In the past, global health outbreaks like African swine fever and avian flu affected meat production. The COVID-19 epidemic has also harmed agricultural production, reducing food security. COVID-19 affects everyone. Food security has four pillars: accessibility (food production), availability (demand vs. food availability), use (nutrient consumption), and predictability (constant access to food)(57).

1. **Food security versus dietary habits throughout the COVID-19 outbreak**

   COVID-19 has changed people's eating and drinking habits. Obese people are more likely to die from SARS-CoV-2 and have more severe symptoms(58).These presumptions based on a restricted selection of papers that indicate SARS-CoV-2 patients have low vitamin D. Regardless of professional consensus on its function, vitamin D has various immune-boosting advantages. The substance's usefulness in preventing SARS-CoV-2 infection is uncertain(59).

2. **The Transmission of SARS-CoV-2 through Oral and Alimentary Routes**

   SARS-CoV-2 transmission is characterized by close contact with infected patients and direct communication contact (absorbed via respiratory mucous membranes, eyes, nose, or mouth), especially by drips(60-66). Even though a person with the coronavirus could sneeze or cough directly into food, eating is not a primary route of SARS-Cov-2 transmission(67,68).




3. **The Dangers of Consuming Animal Origin Products**

   There is no proof of ongoing virus transmission creatures to people via way of the food supply chain, regardless of the functioning idea that SARS-CoV-2 might possess started With other animals, in bats species avoid contaminating humans with ingestion List dietary items made from animals(68-69).

**6. SARS-Cov-2 Transmission Risks to Humans from Live Animals**

SARS-Cov-2 is believed to have through an intermediary host, the virus initially infected humans. may or may not either a wild animal or a farmed animal(70-76). Additionally, although the virus does not always result in a clinical illness, animals that are under a lot of stress or who are extremely unwell are thought to be reservoir hosts(77).

1. **Animal Species Susceptible to Infection with SARS-CoV-2**

   Ferrets can catch SARS-CoV-2 in a lab and spread the disease, which helps with vaccine and treatment studies. SARS-CoV-2 infections have been found in various animal species in many countries, however they are not thought to be the source of the COVID-19 pandemic(78).

2. **Common Transmission Pathways and Precautionary Steps for SARS-CoV-2 in Humans and Animals in Close Contact**

Those suspected of having SARS-CoV-2 should minimize animal contact. Carnivorous animals, especially dogs and cats, may be reservoirs for SARS-CoV-2. Numerous studies imply pets can get infections from their owners, minks, wild animals, or tiger and lion keepers. Diseased (or potentially infected) dog owners should take care. Pets should stay indoors if possible, avoid close contact (less than 2 m), and be isolated if they have SARS-CoV-2 symptoms(79).

**7. Possibilities for Mitigating the Risk of SARS-CoV-2 Contamination**

Avoiding physical contact, limiting engagement, and practicing excellent hygiene are the best measures to minimize virus transmission. Alternative: viral eradication. remains unfinished. Gamma irradiation can inactivate SARS-CoV-2. Fruit, rice flour, fruits, grains, vegetables, poultry, fish, and shellfish can all be irradiated in the EU. Feldmann and co. (80).Heat treatments impact mutual connection reproduction by modifying the virion's protein shape and inactivate viruses by denaturing protein secondary structures. SARS-CoV-2 is stable at 4 °C but heat-sensitive. On day 14, highly infectious sample volume declined 0.7 log units at 4 °C, but was completely inactivated in 5 minutes at 70 °C(81). Application of nanotechnology is yet another promising strategy to prevent virus spread and shield preventing SARS-CoV-2 food contamination and containers(82).Nanometals, natural extracts, essential oils, and other viricidal compounds may be used to generate antiviral biopolymers. Nanopackaging may emit compounds that affect nutrition. Warnes&co(83). As demonstrated by Balagna et al., nanoparticles may potentially be useful in strengthening personal protective equipment(84).

**8. Coronavirus Disease (COVID-19): Food Industry Guideline for Employee Healthcare**

Food enterprises should implement FSMS work processes to keep contaminated staff and their contacts away of food-preparation facilities. To ensure staff can get reliable facts from earlier periods of the SARS-CoV-2 outbreak, a phone (or email) reporting process for sickness should be developed(87,88). Jones et al. Physical separation protocols propose a 1 to 2 m distance. SARS-CoV-2 can be transferred through a Victorian-era notion, notwithstanding the need of physical distance in managing COVID-19. A practical, universally applicable social distance guideline needs work. These include the use of PPE and its type, indoor versus outdoor environments, changeable ventilation rates, changing occupancy levels, period of exposure, host infectious load, time of exposure, and population of infected individuals(89,90).

**9.COVID-19 Exposure: Contact Retracement**

Quarantine should be imposed in two situations: (1) for tourists to avoid the spread of new infections across the community, equation (2), so those in frequent contact with those that have known infections(91).

**10.Monitoring and Eliminating COVID-19 inside the Food Industry: Processing Facilities**

To mitigate, In an epidemic, governments and researchers must quickly evaluate the greatest food production risks. SARS-Cov-2 In the food business, transmission is considered negligible, but it can still spread through sick workers and the surroundings. SARS-Cov-2 Although there is limited transmission in the food industry, sick personnel and the environment can still spread it. Food law background Whether food distribution networks are legal(92).The food supply network used the aggregate dataset to understand and regulate food quality and safety hazards based on each microprocessor's risk tolerance. The food business should use pandemic knowledge to establish and maintain management systems and food safety requirements. Every food-production stage includes dangers(93). Generic HACCP plans can help with planning, but their structure depends on production cycle. Research and development through HACCP installation, including upkeep and risk evaluations for facilities, are required for hazard analysis. In the food processing industry, optimizing FSMS and HACCP needs hazard analysis(94).

## 4. Conclusion

The COVID-19 epidemic still affects our health and lifestyle. SARS-CoV-2 is highly invasive, causes high fatality rates, and threatens food distribution and supply. Unfortunately, there isn't enough focus on the food network to monitor where food is produced, cooked, preserved, distributed, promoted, etc. After COVID-19, risks were carefully covered to provide helpful guidance for SARS-CoV-2 food identification. Virus paths within products were vital for their better analysis, practical use, quick and on-site identification, and simple mechanics. Ensures food safety.New SARS-CoV-2 detection techniques are discussed. Detection, surveillance, and reporting coupled to regulate COVID-19. SARS-CoV-2 identification is crucial since it entails both population screening and source surveillance. In light of earlier study and working hypotheses, researchers should go over the findings and what they may be used for monitoring is vital to preventing potential harm, especially for safeguarding and the food distribution chain provides many unknowns. Food sector must deploy a Food Safety Management System and SARS-CoV-2 detection tools quickly to protect food employees and ensure food supply chain integrity. Despite the enormous effort made by scientists to understand SARS-CoV-2 in a short length of time, there are still many unanswered questions concerning this infection, especially about transmission pathways and factors affecting its persistence and contagiousness. Research on these issues is continuing and encouraged to limit future disasters.

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