Policy Notes

Controlling COVID-19 Transmission due to Contaminated Imported Frozen Food and Food Packaging

Li Bai[1]; Yeru Wang[1]; Yibaina Wang[1]; Yongning Wu[1]; Ning Li[1]; Zhaoping Liu[1,#]

BACKGROUND

The emergence of the coronavirus disease 2019 (COVID-19) has been sharply increasing with more than eighty million confirmed cases worldwide (*1*). It has been contained in China through stringent non-pharmaceutical interventions (*2*). A combination of strict border control and quarantine measures have effectively prevented the spread of the virus from infected travelers, but the risk of resurgence caused by other routes of transmission (fomite transmission) has been identified in a number of localized outbreaks (*3–7*). Although the COVID-19 virus is highly unlikely to cause an epidemic through foodborne transmission, epidemiological investigation on the source of infection have found that all these outbreaks in different cities in China could be tracked to fomite transmission originating from workers at port cold storage, seafood processing facilities, and market sites related to imported cold-chain food (Table 1) (*3–4*). Furthermore, COVID-19 viral RNA has been detected on the surface of frozen food (salmon, white shrimp, lophiiformes, cod fillets, frozen hairtail, frozen beef, frozen pig elbow, frozen chicken wings, and frozen pork) and their packaging materials imported from countries with significant COVID-19 epidemics across 18 provincial level administrative divisions (PLADs) in China (Figure 1).

Additionally, several COVID-19 outbreaks have occurred in meat and poultry processing facilities abroad. COVID-19 was diagnosed in 18.2% workers in some states of the USA (*8*). Those who work in these cold, high humidity, and congregate locations are at high risk for both the acquisition and transmission of respiratory infections. Thus, the food and food packaging materials are likely to become contaminated through droplets expelled from COVID-19 carriers by breathing, coughing, singing, sneezing, or even talking. Moreover, scientific studies have shown that COVID-19 virus remained highly stable under refrigeration (4 ℃) and freezing conditions (–20 ℃ and –80 ℃), on fish, chicken, and pork for 21 days (*9*). In the investigation of the COVID-19 outbreak in Qingdao, live COVID-19 virus was successfully isolated and cultured from samples taken from imported frozen seafood packaging (*10*). These findings indicated that COVID-19 virus could survive on cold-chain food and food packaging during long distance shipping and may cause human infection, in particular to high-risk people (such as dockworkers or stevedores). It was confirmed in these studies that COVID-19 outbreak could be caused by fomite transmission in the cold food chain, although the likelihood of this food-to-human transmission is considered lower when compared with other routes of transmission.

Keeping all workers in the whole food supply chains healthy and safe is vital for their personal wellbeing, for their families, and for ensuring that consumers' needs are met. This is also important for maintaining consumer trust and confidence in securing safe and sustainable food supply. In this regard, Chinese authorities have developed a series of guidance documents to protect food workers from contracting COVID-19, to prevent cross-contamination of COVID-19 virus across the whole food chain to avoid possible exposure of the virus to consumers, and to strengthen food hygiene and sanitation practices.

TABLE 1. Coronavirus disease 2019 outbreaks related with the cold-chain food and food packaging in 2020.

Date	City	Place	Zero patient	Cold-chain food contamination
June 11	Beijing	Wholesale market	Employee	Imported salmon
July 22	Dalian	Dock	Dockworker	Food packaging of imported fish
September 24	Qingdao	Dock	Dockworker	Food packaging of imported frozen cod
November 8	Tianjin	Cold storage	Stevedore	Food packaging of frozen pork