Annex 2

Technical Guidelines for Prevention and Control of Novel Coronavirus and disinfection in Cold Chain Food Production and Operation

(Version Two)

1. Basis and scope of application

In order to standardize and guide the prevention and control of the new corona virus in the cold chain food production and operation process, and prevent food packaging materials from being contaminated by the new corona virus, in accordance to the "Guidelines for the Prevention and Control of the New Corona Pneumonia Epidemic of Meat Processing Enterprises" issued by the State Council's Joint Prevention and Control Mechanism for the New Corona Pneumonia Epidemic ”(Joint Prevention and Control Mechanism Zongfa [2020] No. 216), “Emergency Notice on Strengthening the Nucleic Acid Testing of New Coronavirus in Cold Chain Foods” (Joint Prevention and Control Mechanism Zongfa [2020] No. 220), Technical Guidelines for Prevention and Control of New Corona Pneumonia Epidemics in Agricultural Trade Market/Bazaar (Zongfa [2020] No. 223 of Joint Prevention and Control Mechanism), Coronavirus Pneumonia Prevention and Control Plan (Eighth Edition)" (Zongfa [2021] No. 51 of Joint Prevention and Control Mechanism), as well as relevant national food safety standards and the“Guidelines for Preventing the Spread of New Corona Pneumonia in Food Production and Operation (August 2021) and other documents issued by the Food and Agriculture Organization of the United Nations, and this guide is formulated.

This guideline is applicable to cold chain food processed by freezing, refrigeration and other methods, and the products are always in a low temperature state from the factory to the sale. It is used to guide the normal operation of food production and business units and individuals, in the process of loading and unloading, transportation, storage, production and sales, disinfection of cold chain food from overseas high-risk areas of the new corona pneumonia epidemic during the normalization of the prevention and control of the new corona pneumonia epidemic.

The business units and relevant practitioners of places where imported cold chain food is stored in the port area can refer to the implementation.

Relevant units and individuals of food production and operation shall strictly abide by the laws and regulations and relevant national food safety standards, and implement various regulations of the local competent authorities on the prevention and control of the new corona pneumonia epidemic, which is the prerequisite for the application of this guide.

2. Cleaning and disinfection during production and processing

In the process of cold chain food production and processing, an effective cleaning and disinfection system should be formulated for processing personnel, production environment and related equipment and facilities according to the characteristics of food raw materials and products, as well as the characteristics of production and processing technology, and the implementation and effect of disinfection measures should be regularly evaluated.

2. 1 Food production and processing personnel

Food production and processing personnel entering the work area should focus on hand hygiene, using quick-drying hand sanitizer, and rubbing their hands until dry on the premise of confirming that their physical health and personal protection meet the requirements. When using the quick-drying hand sanitizer, keep it away from fire sources.

2.2 Outer packaging of raw materials and semi-finished products

The outer packaging of cold-chain food raw materials and semi-finished products from high-risk areas (countries) of the new corona pneumonia epidemic should be strictly and effectively disinfected before entering the enterprise or warehouse.

The coordination and cooperation of departments should be strengthened, and in principle, only one preventive disinfection should be carried out on the transportation and packaging of food entering the cold chain, and repeated disinfection should be avoided.

2.2.2 Tools and utensils (such as transfer boxes, spoons, pliers, etc.) used to transport cold chain food raw materials or semi-finished products should be cleaned and disinfected in time after each use.

2.2.3 For food raw materials and/or semi-finished products from foreign epidemic areas that have been tested and contaminated by the new coronavirus, they should be implemented in accordance with the relevant requirements for the classification and disposal of cold chain food for the prevention and control of the new coronary pneumonia epidemic.

2.3 Production and processing equipment and environment

2.3.1 Equipment and appliances. Utensils used before and after processing should be placed separately and kept properly to avoid cross contamination. All equipment and utensils after production and processing (or when necessary during production and processing) should be effectively cleaned and disinfected, and the selected cleaning and disinfection procedures and disinfectants should be able to effectively kill the new coronavirus.

2.3.2 Environment. Increase the frequency of disinfection in high-risk areas such as the production workshop environment of each stage of cold chain food raw material processing, the workshop environment of each production stage of ready-to-eat and cooked food, and the storage cold storage. The environment must be thoroughly cleaned and disinfected during the production process and after production. In particular, it is necessary to strengthen the frequency of cleaning and disinfection of various operating surfaces, contact surfaces/points (such as door handles, switches, appliance handles, telephones, toilets, etc.) that people touch during production and processing, and crowded environments.

2.3.3 For all kinds of meat, aquatic products, egg products and other foods rich in protein and fat, it is difficult to remove dirt due to the easy formation of dirt on the surface of the contact object, and the production and processing environment is usually low in temperature and high in humidity, in order to improve the disinfection effect, minimize the amount of disinfectant used, shorten the action time of the disinfectant on the surface of the object, all containers, equipment or environmental surfaces that are in contact with foods rich in protein and fat such as meat, aquatic products, and egg products must be thoroughly cleaned before disinfection.

2.3.3.1 Selection of cleaning agent

Commonly used food processing equipment and environmental cleaning agents include alkaline solutions, salt solutions (such as phosphate, carbonate, silicate), acid (such as citric acid, phosphoric acid) solutions and synthetic detergents (such as anions, cations, non- Ionic alkaline detergent) and so on. Among them, alkaline solution is the most commonly used cleaning solution in the processing environment of meat, aquatic products and egg products. At present, the most commonly used cleaning agent for meat processing companies is 1.5% sodium hydroxide solution, which can saponify fat and hydrolyze protein deposits. In addition, various synthetic detergents can also effectively remove meat deposits, fats and dirt. They should be in full contact with the surface to be cleaned at an appropriate temperature and kept for a certain period of time before being rinsed with water. Another way to saponify fat and facilitate cleaning is to prepare a protease solution that can decompose protein with a low-concentration alkaline solution. Since the enzyme is inactivated at high pH and high temperature, the temperature and pH value of the enzyme solution are moderate, which can greatly reduce the corrosion of the surface to be cleaned.

2.3.3.2 Cleaning procedures

(1) To save detergent and water, first use physical methods to remove the dirt on the surface.

(2) Rinse off the dirt further with water. In order to reduce the generation of aerosol, try not to use high-pressure water to rinse.

(3) Apply an alkaline solution or a synthetic detergent/enzyme solution at a temperature of 50-55°C to the surface to be cleaned. After contacting for 6-12 minutes, clean and wipe the surface to be cleaned. In order to make the cleaning agent fully contact the surface to be cleaned, it is best to use foaming detergent to clean the vertical surface.

(4) Rinse the alkaline solution or detergent with clean water.

(5) Alkaline solution cannot remove scale or rust spots. Acid (such as phosphoric acid, hydrochloric acid or organic acids such as citric acid, gluconic acid) can be used to remove scale or rust spots.

2.3.3.3 Disinfection

(1) In order to improve the disinfection effect and prevent insufficient contact between the disinfectant and the surface of the object and reduce its activity, all equipment or environmental surfaces to be disinfected must be thoroughly cleaned according to the above procedures before they can be disinfected. Commonly used disinfectants include chlorine, iodine-containing disinfectants or quaternary ammonium salt solutions.

(2) Whether the disinfected surface needs to be cleaned depends on the disinfectant used. Quaternary ammonium salts and iodine-containing disinfectants should be thoroughly rinsed with water after use.

(3) If the surface of the equipment is corroded after disinfection, the corroded area can be coated with oil for protection. If the application oil is a food-grade product, it does not need to be removed. If it is a non-food-grade oil, the oil should be removed before the next processing shift begins.

(4) Use the in-situ cleaning method to continuously clean the moving conveyor belt and other parts of the production and processing equipment.

3. Cleaning and disinfection during transportation and distribution

3.1 Personnel

During cold chain food distribution, drivers and transport attendants shall maintain personal hand hygiene, and the car shall be equipped with alcohol-based hand sanitizer, disinfectant and paper towels to ensure that hands can be regularly disinfected without clean water.

3.2 Surface of objects

Drivers shall wash their hands or sanitize before transferring and submitting delivery documents to personnel from enterprises. To avoid cleaning returned items, documents shall be best placed in disposable containers and packaging materials. Regular, proper hygienic cleaning and disinfection of reusable containers shall be carried out.

Surfaces that are most likely to be contaminated by viruses, such as steering wheels, door handles, and mobile devices that are frequently touched by people, shall be disinfected regularly.

During transportation of cold chain food, it is strictly forbidden to unpack and dump the goods. If it is necessary to unpack and dump the goods, they must be disinfected according to requirements of 2.2.

3.3 Means of transportation

To avoid contamination of cold chain food, drivers need to ensure that transport vehicles, handling tools and containers are clean and disinfected regularly. When goods are mixed, keep food and other goods as separate as possible when loading onto vehicles. Before and after the vehicle carries a batch of goods, parts in the vehicle that may be touched by human hands, especially the inside and outside of the vehicle, must be thoroughly disinfected.

4. Cleaning and disinfection during sales and operation process

4.1 Employees in cold chain food sales and operation areas shall maintain good hygienic practices, frequently wash their hands with hand sanitizer to keep their hands clean and hygienic.

4.2 Clean and disinfect surfaces, handles (such as door handles, refrigeration equipment handles, container handles, cart handles, etc.) and buttons (such as calculators, buttons of electronic weighing appliances, etc.) that are frequently touched by personnel in a timely manner. After daily operation, operating area(s) shall be fully disinfected.

4.3 In order to provide convenience for customers to wash and sanitize their hands, ensure the in-store handwashing facilities operating properly and equip with quick-drying hand sanitizers. Inductive hand disinfection facilities can be equipped if conditions allow.

5. Cleaning and disinfection during food processing

5.1 Catering industry shall frequently clean and disinfect all cold chain food contact surfaces, outer packaging and utensils, and strengthen cleaning and disinfection of tableware (drinking utensils) and condiment containers.

5.2 Do a good job of disinfecting surfaces of high-touch objects, and carry out more frequent cleaning and disinfection of various equipment, areas, contact surfaces/high-frequency contact points (such as countertops/clips/service utensils/open self-service display stands/door handles), rash cans, sanitary ware and etc. At the same time, increase frequency on cleaning and disinfection of staff work clothes.

5.3 Ensure that the in-store handwashing facilities are in normal operation and are equipped with quick-drying hand sanitizers; sensor-based hand sanitizers can be equipped when conditions allow.

6. Commonly used disinfection methods in production and operation process

Chemical and physical disinfection techniques can be selected for disinfection during production, transportation and operation process of cold chain food.

6.1 Physical disinfection

Physical disinfection methods that have been validated by laboratories and on-site, and have been evaluated as qualified by relevant institutions can be used to disinfect all aspects of cold chain food production and operation.

6.2 Chemical disinfection

Please see table in appendix for commonly used disinfectants and methods of use.

6.3 Disinfection quality control

Relevant companies for cold chain food production and operation shall be equipped with professional disinfection personnel and special equipment to disinfect cold chain food, production equipment, environment, etc. Among them, disinfection personnel shall go through systematic training and pass examination before they can take up their posts. Disinfection equipment shall be regularly overhauled and maintained. Selection of chemical disinfectants, proportioning method, concentration for disinfection, temperature of space, action time, operation method, precautions and evaluation of disinfection effect shall be carried out in strict accordance with requirements of attached table or annex.

6.4 Whether chemical or physical techniques are used for disinfection, ensure that every side of food packaging material is thoroughly disinfected. In order to avoid the heterogeneity of artificial disinfection, it is recommended to give priority on using automatic disinfection equipment.

Appendix:

1. Low-temperature disinfectants commonly used in cold chain food production and operation and its use method
2. Guidelines for evaluation of low temperature disinfection work on cold chain food outer packaging

Appendix 1

Low-temperature disinfectants commonly used in cold chain food production and operation and its use method

Type of disinfectant	Main active ingredients & dosage forms	Instruction	Precautions
Chlorine-containing low temperature disinfectant	Sodium dichloroisocyanurae Binary packing, dust powder and liquid	1. Disinfection method: Spray disinfection, immersion disinfection, scrubbing disinfection. 2. Disinfectant dosage: The concentration for -18℃ low temperature disinfectant is 3000mg/L, the action time is 10-20mins, and the spraying is about 200ml per square meter. The concentration for -40℃ low temperature disinfectant is 500mg/L, action time is 10-20 mins, and spraying is 200ml per square meter.	1. Low temperature disinfectants that is used on site must be legal and effective; before the low temperature disinfectant is put on the market, the hygiene and safety evaluation and filling of disinfection product shall be done according to requirements of the *Notice of the General Office of the National Health Commission on Printing and Distributing Technical Requirements for the Hygiene and Safety Evaluation of Low temperature Disinfectants (Supervision Letter from National Health Commission [2020] No. 1062)*. 2. Disinfection shall be carried out in strict accordance with the scope of use and its instruction, and it is strictly prohibited to use it beyond the scope. It is recommended to measure the content of active ingredients (chlorine-containing disinfectant) before use.
Chlorine dioxide low temperature disinfectant	Chlorine dioxide	1. Disinfection method: Spray disinfection and scrubbing disinfection. 2. Disinfectant dosage: Strictly follow product manual for use.	
Peroxide type low temperature disinfectant	Hydrogen peroxide or peroxyacetic acid	1. Disinfection method: Spray disinfection, immersion disinfection, scrubbing disinfection.	

		2. Disinfectant dosage: Strictly follow product manual for use.	3. When mechanized low temperature disinfection, disinfection equipment shall be debugged so that it can be reasonably matched with low temperature disinfectant in order to ensure the low temperature disinfectant is sufficient to cover all six sides of the outer packaging. When using it for the first time, the on site disinfection effect evaluation shall be carried out, and disinfection effect shall be qualified before use. 4. During low temperature disinfection, technical training of disinfection staff shall be strengthened to ensure the disinfection operation is standard, ensure the disinfectant is sufficient and it has been fully covered. 5. Organic matter has a great influence on disinfection effect. When disinfection object is seriously polluted, rinse or soak it with low temperature disinfectant before processing. It is strictly forbidden to spray or scrubbing disinfection.
Quaternary ammonium salt low temperature disinfectant	Quaternary ammonium salt	1. Disinfection method: Spray disinfection, immersion disinfection, scrubbing disinfection. 2. Disinfectant dosage: Strictly follow product manual for use.	

			6. When preparing, sub-packaging and using low temperature disinfectants, personal protection shall be strictly carried out; work clothes, masks, gloves, etc. shall be worn to avoid contact with skin. 7. The low temperature disinfectant is an external disinfectant, shall not be taken orally, and shall be placed in a place that is not easily accessible by children. If accidentally splashed into eyes, rinse immediately with water, and seek medical attention immediately in severe cases. Do not come into contact with flammable materials, keep away from ignition sources.

Appendix 2

Guidelines for evaluation of low temperature disinfection work on cold chain food outer packaging

I. Evaluation principles

On-site low temperature disinfection evaluation includes process evaluation and effect evaluation. Process evaluation shall be carried out for every low temperature disinfection; generally, self-inspection and self-evaluation shall be carried out by disinfection implementation department. Relevant regulatory authorities can conduct random checks on disinfection process and process for self-inspection and self-evaluation to ensure that the disinfection process is effective; the effect evaluation shall generally adopt the method of regular random inspection, and it is recommended to evaluate once every six months. When changing the low temperature disinfection method, the disinfection effect evaluation shall be carried out, and it can be put into use only after the low temperature disinfection is proved to be effective.

II. Evaluation for on-site low temperature disinfection process

The disinfection implementation shall make disinfection records and conduct self-evaluation during each disinfection process. Evaluate whether the entire disinfection operation is carried out in accordance with the disinfection work plan, whether the low-temperature disinfection products used are legal and effective, whether the disinfection method matches the disinfection object and environment, whether the disinfection site is fully covered, whether the amount used meets requirements, whether the disinfection time is sufficient, and whether disinfection records are standardized, etc. Contents shall include but are not limited to disinfection date, disinfection location, disinfection scope, disinfection object, disinfection procedure, disinfectant preparation, disinfectant concentration and dosage, action time, disinfection method, use of disinfection equipment, personal protection, etc.

Low temperature disinfection products used shall meet requirements of relevant national health standards and specifications, and health and safety evaluation shall be qualified. Disinfectant information includes the name of disinfectant, main active ingredients and their contents, validity period, preparation method, scope of use, method of use, etc.; information of disinfection equipment includes equipment name, main bactericidal factors and their strengths, scope of use, methods of use, etc.

III. Evaluation for on-site low temperature disinfection effect

i. Evaluation objects and indicators

Low temperature disinfection effect evaluation object is the surface of the object. The indicator microorganism is selected based on resistance of COVID-19 to disinfection factor, and killing rate of indicator microorganism is used as the evaluation index. The resistance of the indicator microorganism shall be equivalent to or higher than the one of COVID-19, sahll be easy to cultivate and meet requirements of laboratory biosafety and WS/T 683 (Requirements of microorganism for disinfection test). For chemical disinfection, staphylococcus aureus (ATCC 6538) and escherichia coli (8099) can be used. During physical disinfection, indicator microorganisms that meet above requirements shall be selected according to characteristics of disinfection factor.

ii. Evaluation method

Prepare experimental bacterial tablets according to GB/T 38502 (tryptone soy broth medium is used as organic interfering substance when evaluating effect of on-site low temperature on-site disinfection), make recovered bacteria count of each bacterial tablet is 1x106CFU/tablet to 5x106CFU/tablet. Put indicator microorganism tablet into corresponding low temperature environment for at least 30 minutes, and ensure that indicator microorganism reaches the same low temperature before proceeding to the next step.

Before disinfection: place bacterial tablets on site, with desktops, doorknobs, buttons, etc. as key objects, with no less than two samples for each type of object. For cold chain food outer packaging, disinfection points shall be placed on all six sides of outer packaging; total amount of test samples shall not less than 30.

After disinfection: After disinfection to action time, use sterile tweezers to move bacterial tablets into a test tube containing 5.0 ml of corresponding neutralizer, vibrate 80 times in the palm of the hand or mix with a mixer, and neutralize for 10 minutes. Establish a positive control group at the same time.

Laboratory culture: shake the sampling tube on the mixer for 20s or vigorously vibrate 80 times, draw 1.0ml of the sample to be tested and inoculate it on a sterile plate, inoculate 2 plates in parallel for each sample, add 15ml to 18ml of dissolved medium at 45°C to 48°C, shake while pouring, wait for the agar to solidify; after incubating at 36°C ± 1°C for 48 hours, count the number of colonies, and calculate kill rate.

iii. Result judgment

The average killing rate of indicated microorganisms on the surface of the object shall be greater than or equal to 99.9%, and the number of samples with a killing rate greater than or equal to 99.9% accounts for more than 90%, and it is judged as qualified for disinfection.

IV. Precautions

i. According to characteristics of space, clarify disinfection objects, strictly follow disinfection procedures, and carry out disinfection work in a standardized manner.

ii. The department which implementing disinfection work shall have on-site disinfection capabilities, and operators shall undergo professional disinfection training, master basic knowledge of disinfection and personal protection, and shall be familiar with the use of disinfection equipment and preparation of disinfectants.

iii. All on-site disinfection shall be recorded and kept for at least two years, and self-monitoring shall be carried out at the same time. When carrying out evaluation of disinfection effect, attention shall be paid to standardized operation, samples and relevant test materials shall be treated in a harmless manner in strict accordance with biosafety requirements.

iv. During on-site disinfection, personal protection shall be done well; formal and effective personal protective equipment shall be selected according to site conditions and relevant standards.