

# **PHILIPPINE NATIONAL STANDARD**

**PNS/BAFS 328: 2022  
ICS 67.120.30**

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## **Chilled or Frozen Crabs — Code of Practice**



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## **Foreword**

In the past seven years, the BAFS has adopted applicable Codex standards related to finfish, molluscs, crustaceans, and aquatic plants consistent with Sections 9 (Setting of Food Safety Standards) and 16 (Specific Responsibilities of the Department of Agriculture) of Republic Act No. 10611 (Food Safety Act of 2013). In 2022, BAFS commenced the adoption of the Codex Code of Practice for Chilled or Frozen Crabs, which is a section of the Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003 Rev. 12).

The Technical Working Group (TWG) tasked to develop the PNS was created through Special Order (SO) No. 103, series of 2022 (Creation of TWG for the Development of PNS for Agriculture and Fishery Products, Machinery, Tools, and Equipment). The TWG was composed of representatives from the relevant government agencies, academe/research institution, private sector, and Civil Society Organization (CSO). The draft PNS underwent a series of TWG meetings and stakeholder consultations conducted physically and via online platforms before its endorsement to the DA Secretary for approval.

It is drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2.

## **Table of contents**

Foreword .....	ii
1 Scope .....	1
2 Normative References .....	1
3 Terms and Definitions .....	1
4 General .....	3
4.1 Facilities .....	3
4.2 Hygiene and handling .....	3
5 Processing of Chilled and Frozen Crab .....	4
5.1 Live crab reception .....	4
5.2 Live crab holding .....	4
5.3 Washing and drowning or pacifying .....	5
5.4 Cooking .....	5
5.5 Cooling .....	6
5.6 Cleaning, Sectioning or meat extraction .....	6
5.7 Shell or viscera fragment removal .....	7
5.8 Freezing .....	7
5.9 Glazing .....	7
5.10 Packaging and labeling .....	8
5.11 Metal detection .....	8
5.12 Chilled storage .....	8
5.13 Frozen storage .....	8
5.14 Distribution and transport .....	9
6 Labor and community .....	10
6.1 Child labor .....	10
6.2 Person with disabilities (PWD) rights .....	10
6.3 Anti-discrimination/ unequal treatment of employee policy .....	10
6.4 Training on safety and first aid .....	10
6.5 Salary, wages and benefits .....	10
6.6 Living conditions for employed workers .....	10
6.7 Social aspects .....	11
Annex A .....	12

Annex B..... 13  
Bibliography ..... 15

## 1 Scope

This standard applies to chilled or frozen crabs, mangrove crab (*Scylla*) Christian/crucifix crab (*Charybdis*), blue swimmer/flower crab (*Portunus*) of the Family Portunidae, king crab-related species of the Family Lithodidae as well as other species of marine and freshwater crabs which are similar in physical structure to the abovementioned.

## 2 Normative References

The following documents are referred to in the text in such a way that some or all their contents constitute requirements of this document. The latest edition of the referenced documents (including any amendments) applies.

Codex Alimentarius Commission (CAC). (2020). Code of Practice (COP) for fish and fishery products (CAC/RCP 52-2003 Rev. 12).  
[http://www.fao.org/input/download/standards/10273/CXP\\_052e.pdf](http://www.fao.org/input/download/standards/10273/CXP_052e.pdf)

## 3 Terms and Definitions

For the purposes of this document, the following terms and definitions apply:

### 3.1

#### **batch systems**

methods of processing crabs as bulk units (CAC, 2020)

### 3.2

#### **biotoxins**

poisonous substances naturally present in fish and fishery products or accumulated by the animals feeding on toxin producing algae or in water containing toxins produced by such organisms (Bureau of Agriculture Fisheries Standards-Department of Agriculture [BAFS-DA], 2021)

### 3.3

#### **butchering**

process of removing crab back shell, viscera and gills. In some fisheries, it may also include the removal of walking legs and claws. Butchering may take place either before or after cooking (CAC, 2020)

### 3.4

#### **chilling**

process where the product is cooled to the temperature of melting ice (0 °C) (Department of Natural Resources [DNR], 1975)

**3.5**

**claw**

the pincer appendage at the end of the crab (CAC, 2020)

**3.6**

**cooking**

boiling of crabs in potable water, clean seawater or brine or heating in steam for a period of time sufficient for the thermal center to reach a temperature adequate to coagulate the protein (CAC, 2020)

**3.7**

**freezing**

process carried out in appropriate equipment in such a way that the range of temperature of maximum crystallization is passed quickly. The quick freezing process shall not be regarded as complete unless and until the product temperature has reached  $-18\text{ }^{\circ}\text{C}$  or below at the thermal center after thermal stabilization (CAC, 2020)

**3.8**

**glazing**

application of a protective layer of ice formed at the surface of a frozen product by spraying it with, or dipping it into chilled potable water or chilled clean seawater (CAC, 2020)

**3.9**

**insensible**

state of unresponsiveness resulting from the pacifying of a crab through a thermal, electrical or physical process imposed on crabs prior to cooking (CAC, 2020)

**3.10**

**leg tips**

third leg segments counting from the crab shell (CAC, 2020)

**3.11**

**picking**

process of removing meat from the crab shell by machine or by hand (CAC, 2020)

**3.12**

**pounding**

holding of live crabs in water tanks or floating crates for extended periods of time (CAC, 2020)

**3.13**

**sections**

cleaned, eviscerated and de-gilled crab parts usually consisting of one half of the crab body and the attached walking legs and claw (CAC, 2020)

**3.14**

**shaking**

industrial practice of manual meat extraction used for crabs. The cooked sections are processed by removing the meat out of the shell (CAC, 2020)

**3.15**

**shell**

hard outer covering of crabs (CAC, 2020)

**4 General**

**4.1 Facilities**

**4.1.1** Inactivation tank, cooker, and cooling tank in batch systems should be located adjacent to each other and should be provided with an overhead hoist or gantry to transfer baskets from one process to another.

**4.1.2** Cookers should be designed to provide constant and adequate supply of heat so that all crabs will be given the same time/temperature exposure during the cooking operation.

**4.1.3** Tanks and wells for pounding live crabs should be constructed and in-place to ensure survival of the crabs.

**4.2 Hygiene and handling**

**4.2.1** Since quality of crabs deteriorates over time, crabs should be maintained alive prior to processing.

**4.2.2** All operations in crab product processing should be achieved as rapidly as possible since time control is one of the most effective methods in controlling crab product quality.

**4.2.3** Live crabs should be handled with care at all times since legs and other appendages can be easily broken and the damage can cause the risk of infection and weakening of the crabs.

**4.2.4** Live crabs should be carefully packed in clean tanks, wells, crates, open-weave bags or in boxes covered with wet sack or cotton cloth. They should be held at a temperature as close as possible to 0°C, as required of varying species.

**4.2.5** Clean hessian or jute bags should be used for transport. Bags made of woven synthetic material should not be used.

**4.2.6** Precautions should be taken to avoid suffocation of crabs due to slime or mud during transport. Holding tanks are regarded as a better method of storage for long-term handling than well storage.

- 4.2.7** Care should also be taken to maintain the necessary humidity in holding the crabs live in containers for transport.
- 4.2.8** Claws should be tied as soon as possible after catching to prevent crabs from injuring each other.
- 4.2.9** Crabs should be butchered if it is not possible to keep them alive until the time of processing. Crab sections should be carefully separated and cleaned before freezing or cooling down to the temperature as close as possible to 0°C, which should be done as rapidly as possible.
- 4.2.10** Good quality of crab butchered sections should be maintained by immediate cooking and chilling or freezing.

## **5 Processing of Chilled and Frozen Crab**

The flow chart of chilled and frozen crab processing line is shown in Annex A (Flow chart of the process control of chilled and frozen crabs). The potential hazards and defects for the processing of chilled or frozen crabs are listed in Annex B (Specified potential hazards and defects in the processing of chilled and frozen crabs).

### **5.1 Live crab reception**

- 5.1.1** Live crabs should be inspected upon receipt to ensure that they are alive, which can be demonstrated by active leg movement when the crab is picked up.
- 5.1.2** Dead crabs should be rejected. Crab parts with ectoparasites and other fouling organisms should be removed and disposed properly.
- 5.1.3** Weak crabs should be processed immediately.
- 5.1.4** Where marine biotoxins are likely to be present in crab species in an area, susceptible species should be identified and kept segregated from other crabs. Risk reduction strategies (e.g., testing or evisceration) should be undertaken prior to processing.
- 5.1.5** Training in species identification and communication in product specification should be provided to crab handlers and staff to ensure that the source of incoming crabs is safe.

### **5.2 Live crab holding**

Live crabs should be held in circulated seawater or freshwater, as appropriate at temperatures of their natural environment or slightly lower, depending on the species. Some species can be held, during short periods, without water and with or without refrigeration.



### **5.3 Washing and drowning or pacifying**

**5.3.1** Crabs should be washed in potable running water or clean seawater to remove all impurities. For some species, scrubbing by brush may be necessary. These methods can be combined.

**5.3.2** Crabs should be pacified or killed immediately prior to cooking to prevent the loss of legs or claws. This should be accomplished by either of the following:

- a) Crabs should be cooled to 0°C or lower, depending on the species;
- b) Crabs should be immersed in potable water or clean seawater which is approximately 10–15°C warmer than the natural environment of the species;
- c) Stainless steel skewer or rod should be used in piercing the two nerve centers. A rod should be inserted through one of the eyes and through the vent; or
- d) Crabs should be stunned by passing a weak electric current through seawater or freshwater in which the crabs are immersed.

**5.3.3** Newly dead crabs and crabs that are rendered insensible or killed should be cooked immediately to avoid the decrease in meat quality.

### **5.4 Cooking**

**5.4.1** Cooking schedule for boiling or steaming should be designed to take into consideration the appropriate parameters such as cooking time, temperature, and size of the crab.

**5.4.2** Adequate uniform cooking should be considered as overcooking causes excessive meat shrinkage, moisture loss, lower yields, and poor texture. On the other hand, undercooking makes it difficult to remove the meat from the shell and may cause discoloration.

**5.4.3** Cooking should be carried out by trained staff who have acquired the necessary skills to monitor and ensure that all crabs are given the same time/temperature exposure and adequate heat penetration during the operation.

**5.4.4** Cooking of crabs in boiling water should be preferred to steaming. Steaming has a tendency to dry the meat, resulting in the flesh adhering to the shell. Cooking utilizing continuous conveyors should be done.

**5.4.5** Each cooker should be equipped with a suitable thermometer to show the cooking temperature. Appropriate recording thermometer is strongly recommended. Simple device to indicate time of cooking should be supplied.

**5.4.6** Crabs should be cooked according to size, structure, and physiology of different species so that the meat can be easily removed from the shell.

**5.4.7** There should be a separate area for cooking crabs.

**5.4.8** Cooking time and temperature should be sufficient to kill trematode parasites and other microbiological hazards.

**5.4.9** Where the final product is to be marketed as cooked crabs in-shell or as shucked meat, the product should be chilled to a temperature approaching 4°C or less and either passed into the distribution chain or processed within 18 hours.

**5.4.10** Staff involved in the operations of cooked and uncooked crabs should take steps to minimize cross-contamination.

## **5.5 Cooling**

**5.5.1** Cooling should be done in cold circulated air and running potable water. Cooling is best accomplished in an ice water bath. The size of the cooling water bath should be sufficient to allow for the addition of ice to cool the product to an internal temperature of 4°C or below as quickly as possible.

**5.5.2** The process of cooling should be done in a place without direct contact with the raw product. Care should be taken to ensure that cross contamination of cooked crabs does not occur. The following are examples of preventing cross contamination of cooked crabs:

- a) Crab cooling baskets should not be placed on the floor;
- b) When cooling, crabs should be covered or otherwise be protected from condensation; and
- c) Product contact surfaces should be washed and/or sanitized at regular intervals to avoid bacterial build up and contamination.

**5.5.3** Cooling water should only be used once.

**5.5.4** In some species, the body cavity may contain a considerable amount of cooling water, which should be properly drained in a dedicated area set aside for the purpose.

## **5.6 Cleaning, Sectioning or meat extraction**

**5.6.1** After cooling, the feces in the gut is thoroughly cleaned or tail (abdominal flap) is removed for packaging of whole cooked crabs.

**5.6.2** Butchering shall be done after cooling. Proper cleaning shall be done at this stage, particularly for species at risk of biotoxins, since it eliminates the risk of foreign material being included in the finished product.

**5.6.3** Staff involved in operations with cooked and uncooked crabs shall take steps to minimize if not eliminate cross-contamination.

- 5.6.4** The product shall be adequately cooled before shell removal or sectioning.
- 5.6.5** Picking or shaking operations shall be carefully controlled to prevent contamination from bacteria and/or foreign materials.
- 5.6.6** All types of meat shall be picked, packaged, and either chilled (internal temperature of 4°C or less) or frozen within two hours.
- 5.6.7** Crab meat shall be appropriately chilled in clean containers and stored in specially designated and appropriate areas within the processing facility.
- 5.6.8** Claws, leg tips, and shell parts containing recoverable meat should be continuously separated rapidly and efficiently from waste materials during the picking operation. They should be kept chilled and protected from contamination.
- 5.6.9** Recovery, packing in appropriate container, and chilling of extracted meat , should be carried out continuously.

## **5.7 Shell or viscera fragment removal**

- 5.7.1** Particular care should be taken to ensure that shell and viscera fragments, and foreign materials are removed from crab meat since they are objectionable to consumers and in some circumstances, they may pose health risks.
- 5.7.2** Design of the meat extraction and shell fragment removal line should be continuous to permit a uniform flow without stoppages or slow-downs and waste removal to minimize time delays.
- 5.7.3** Crab meat should be appropriately chilled in clean containers and stored in specially designated and appropriate areas within the processing facility.
- 5.7.4** Any method used to detect shell fragments (e.g., ultraviolet light) should be in compliance with the requirements of the competent authority.

## **5.8 Freezing**

Appropriate freezing equipment (e.g., cryogenic, blast, or brine freezing systems) should be used to quickly freeze the product.

## **5.9 Glazing**

- 5.9.1** Glaze water should be replaced regularly to ensure that high bacterial load does not occur and prevent build-up of foreign materials.
- 5.9.2** Glaze water should be chilled to result in a more uniform application of glaze that will protect the product.

## **5.10 Packaging and labeling**

The product label should include pertinent instructions for use such as proper storage, preparation, and cooking as indicated in the provisions of the CXS 1-1985 (Codex general standard for the labeling of prepackaged foods) and Department of Health-Food and Drug Administration (DOH-FDA) Administrative Order (AO) 2014-0030 (Revised rules and regulations governing the labeling of prepackaged food products further amending certain provisions of Administrative Order No. 88-B s. 1984 or the “Rules and regulations governing the labeling of prepackaged food products distributed in the Philippines,” and for other purposes) and their future amendments.

## **5.11 Metal detection**

**5.11.1** Metal detectors should be periodically calibrated to ensure proper operation.

**5.11.2** Metal detection should be considered accordingly prior to the packaging of products.

**5.11.3** The products in their primary packaging should undergo metal detection using an equipment designed to provide high sensitivity without sacrificing repeatability and reliability.

**5.11.4** Routine procedures should be initiated to ensure products rejected by the detector are investigated to determine the source of metal contaminants.

## **5.12 Chilled storage**

**5.12.1** The facility should be capable of maintaining the temperature at 0-4°C with minimal temperature fluctuations.

**5.12.2** Crab meat should be moved to the chilled storage facility without undue delay.

**5.12.3** Crab meat should be kept chilled at 0-4°C.

**5.12.4** The chill room should be equipped with a calibrated thermometer. Fitting of a recording thermometer is strongly recommended.

**5.12.5** Crates used to hold container in chilled storage should allow free passage of air currents in order to complete the cooling cycle.

**5.12.6** The processing facility should implement a traffic control system that will ensure that the unpasteurized product cannot be mixed with any pasteurized product.

## **5.13 Frozen storage**

**5.13.1** The facility should be capable of maintaining the temperature at –18 to –23 °C.

**5.13.2** Crabs should be properly packed to protect against freezer burn and dehydration.

**5.14 Distribution and transport**

**5.14.1** The temperature of the product should be checked and recorded before loading and unloading.

**5.14.2** Before loading, the cleanliness, suitability, and sanitation of the cargo hold of the vehicles should be verified.

**5.14.3** Unnecessary exposure to elevated temperatures should be avoided during loading and unloading.

**5.14.4** Load stabilizer devices should be used to ensure good air flow between product and wall, floor, and roof panels.

**5.14.5** Air temperatures should be monitored inside the cargo hold during transportation. Recording thermometer should be used.

**5.14.6** Loading and transportation should be conducted with care to avoid damage and contamination of the products and ensure packaging integrity.

**5.14.7** Systematic stock rotation plan, e.g. First In, First Out (FIFO), should be developed and maintained.

**5.14.8** For frozen products, temperature should be maintained at  $-18$  to  $-23^{\circ}\text{C}$ .

**5.14.9** For chilled products, the temperature should be kept as close as possible to  $0^{\circ}\text{C}$ . Adequate drainage should be provided to ensure that water from melted ice does not stay in contact with the products to prevent cross contamination.

**5.14.10** Transportation of crabs in containers with dry freezer bags and not iced should be considered where appropriate.

**5.14.11** Transportation of chilled crab products in an ice slurry, chilled seawater or refrigerated seawater should be considered where appropriate. Chilled seawater or refrigerated seawater should be used under approved conditions.

**5.14.12** Crab products should be provided with adequate protection against contamination from dust, exposure to higher temperatures, and drying effects of the sun or wind.

**5.14.13** After unloading, contamination of the product should be avoided.

## **6 Labor and community**

### **6.1 Child labor**

**6.1.1** Anti-child labor laws, policies, and practices should be observed.

**6.1.2** No child below 15 years of age should be employed, except when they work directly for the family enterprise and under the sole responsibility and guidance of the parents or guardian. Work in the family enterprise should not interfere with child's education and the assigned task does not pose any physical risk.

### **6.2 Person with disabilities (PWD) rights**

No PWD should be denied access to opportunities for suitable employment.

### **6.3 Anti-discrimination/ unequal treatment of employee policy**

Workers in the exercise of their functions/tasks, should not be discriminated based on gender, race, religion, culture, age, etc.

### **6.4 Training on safety and first aid**

**6.4.1** Training on safety procedures should be conducted for the workers.

**6.4.2** First aid kit should be available in adequate quantity and conveniently accessible in the facility.

**6.4.3** Workers should be able to demonstrate awareness and application of different first aid measures.

### **6.5 Salary, wages and benefits**

**6.5.1** Workers should receive compensation, salary, and benefits consistent with existing labor laws and regulations.

**6.5.2** Working hours should depend on the prevailing and acceptable practices in consonance with existing labor laws and regulations.

### **6.6 Living conditions for employed workers**

**6.6.1** Living quarters in production sites provided to workers should be safe, clean, and in good habitable condition.

**6.6.2** Potable water in adequate supply and suitable toilet facilities should be available and properly maintained.

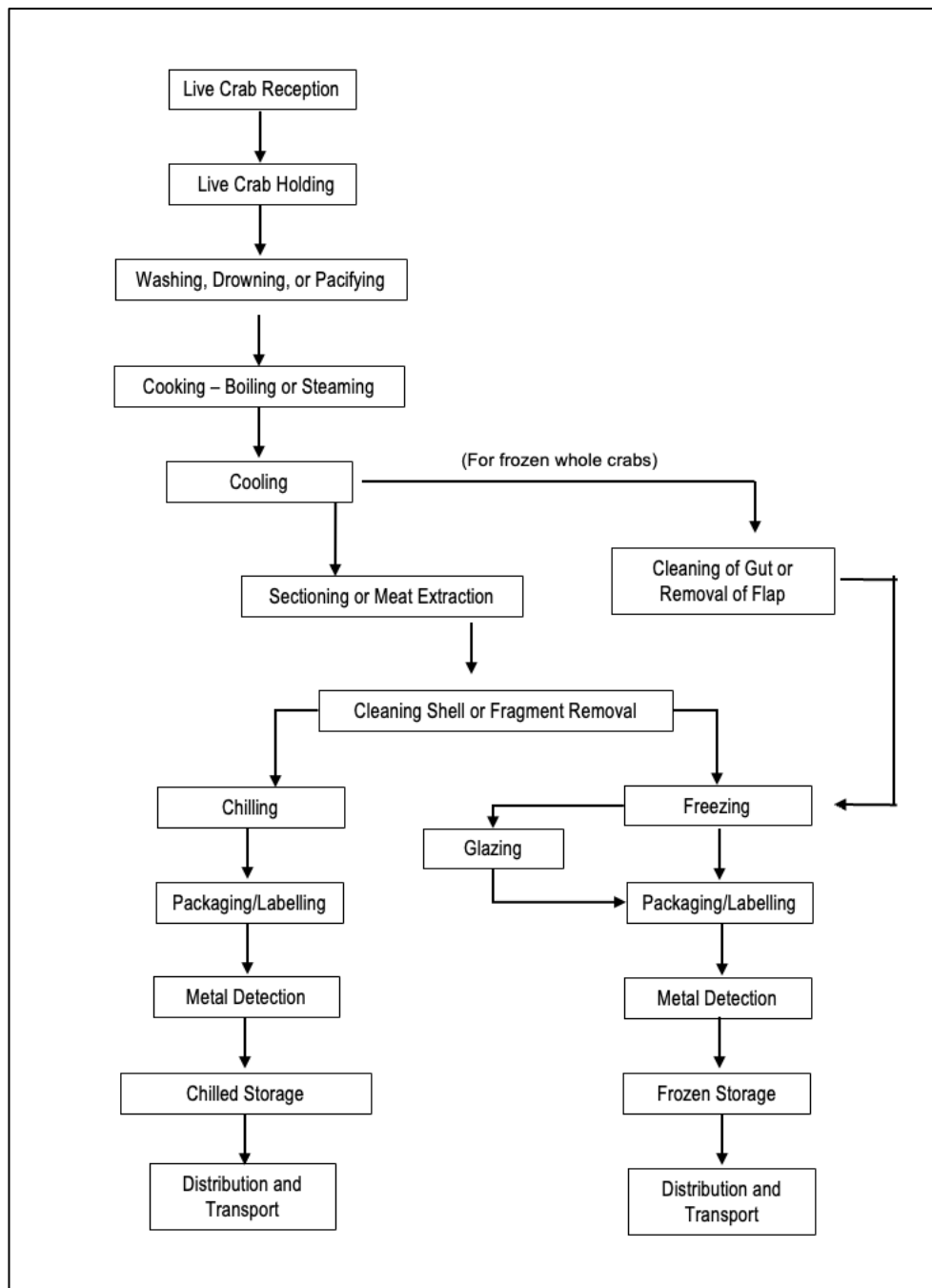
**6.6.3** Toilets should be situated in a safe distance from the working area.

**6.7 Social aspects**

- 6.7.1** Operations, including waste treatment and disposal should observe the rights of host local communities especially for Indigenous Peoples (IPs) and Indigenous Cultural Communities (ICCs), and Local Government Units (LGUs) on the use of public land and infrastructures, fishing grounds, and water resources following existing laws and regulations.
- 6.7.2** Crab processors should initiate activities that will foster harmonious, productive and mutually beneficial relationship with local community.

**Annex A**  
(Informative)

**Flow chart of the process control of chilled and frozen crab**





**Annex B**  
(Informative)

**Specified potential hazards and defects in the processing of chilled and frozen crabs**

<b>Process</b>	<b>Potential hazards</b>	<b>Potential defects</b>
Live crab reception	Biotoxins	Weak or injured crabs, mortality, presence of ectoparasites and other fouling organisms, presence of lesions, ammoniacal smell, abnormal discoloration of the shell
Live crab holding	Unlikely	Mortality
Washing and drowning or pacifying	Unlikely	Loss of legs and claws, ammoniacal smell
Cooking	Parasites, microbiological contamination	Poor texture due to overcooking, discoloration due to undercooking
Cooling	Microbiological contamination	Poor texture due to washing, retention of excess water
Cleaning, sectioning/ meat extraction	Microbiological contamination, biotoxins, metal contamination	Presence of gills and viscera or foreign materials, undesirable odor from the gut in whole crabs
Shell or viscera fragment removal	Microbiological contamination, presence of shell fragments and other foreign materials	Presence of viscera and shell fragments, and other foreign materials
Freezing	Microbiological contamination	Product deterioration due to breakdown of freezing equipment
Glazing	Microbiological contamination	Dehydration
Packaging and labeling	Presence of foreign materials	Subsequent dehydration, incorrect labeling, contaminated packaging
Metal detection	Presence of metal	Metals undetected by equipment, above the maximum allowable limit for presence of metal

<b>Process</b>	<b>Potential hazards</b>	<b>Potential defects</b>
Chilled storage	Microbiological contamination	Decomposition, quality deterioration (e.g., undesirable odor)
Frozen storage	Microbiological contamination	Freezer burn, dehydration, quality deterioration
Distribution and transport	Microbiological contamination	Decomposition, physical damage, chemical contamination (fuel)

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