

1. Key points of management when preparing food preparing food



When preparing food, any bit of carelessness by food businesses may lead to food poisoning. The prevention of food poisoning cannot be achieved through any single step so in order to ensure food safety and hygiene, it's necessary to understand the potential hazards to prevent their occurrence.

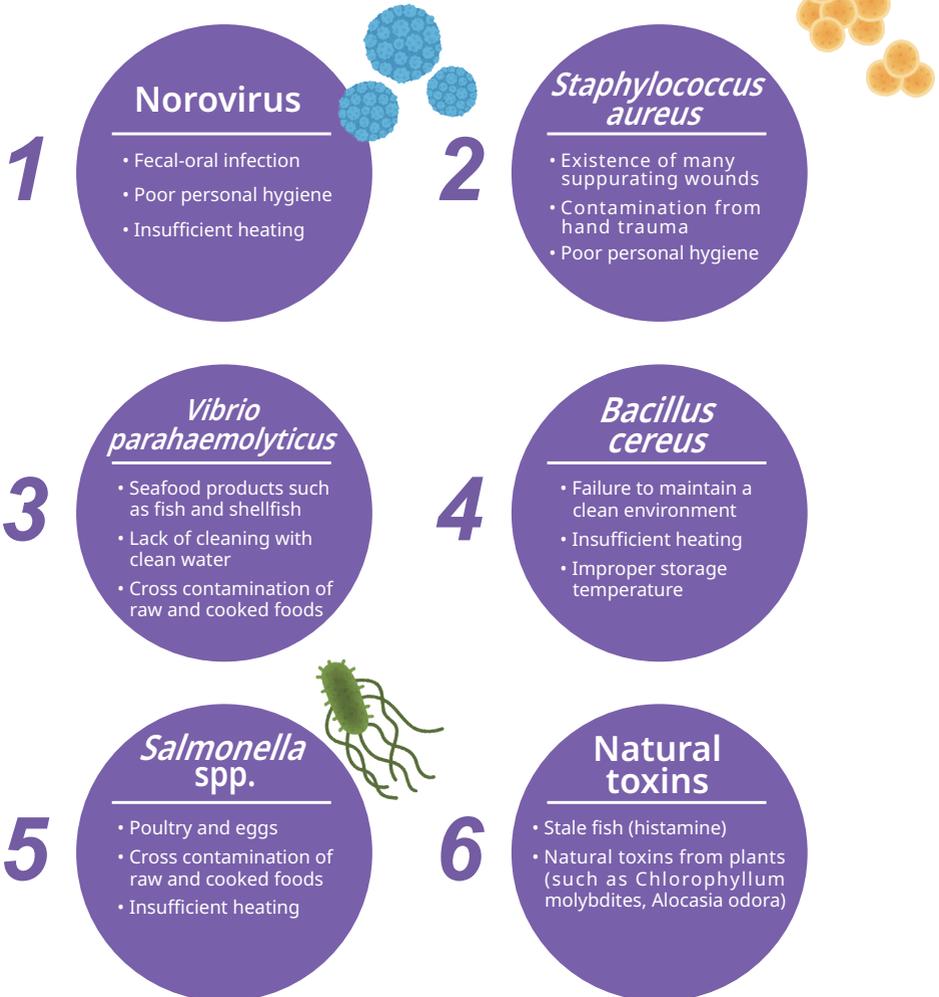
Introduction to food poisoning

If 2 or more people consume identical foods and suffer from similar symptoms, it is defined as a single case of food poisoning; symptoms caused by botulinum toxin that have verified the existence of botulinum toxin via testing, similar types of pathogenic bacteria or toxins found in the testing of suspicious food products, or acute food poisoning (poisoning by chemical substances or natural toxins) due to the ingestion of food are viewed as a single case of food poisoning even if only one person is affected.

The key goal of self-management in food businesses is to prevent the occurrence of food poisoning and harm to consumer health. Substances that cause food poisoning are mostly bacteria, viruses, or natural toxins; let's take a look at some of the common substances that cause food poisoning.

Common factors that cause food poisoning

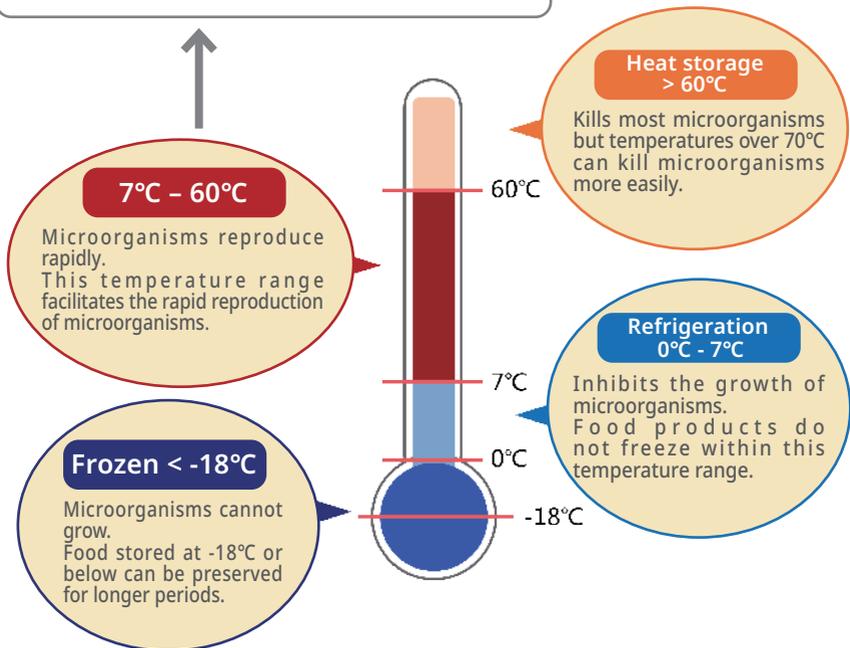
Each year, the Food and Drug Administration (FDA) tracks statistics such as the month, causative substance, number of cases, causative food products, and place of consumption in cases of food poisoning. The following is a ranking of substances that cause food poisoning as well as the frequent causes or pathways of contamination.



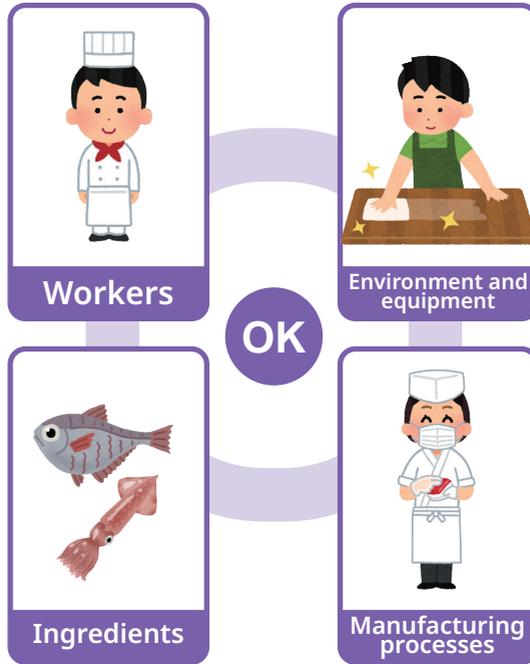
Manage storage temperature by understanding the “danger zone”

The growth of pathogenic microorganisms that cause food poisoning is highly correlated to temperature. The growth of most pathogenic microorganisms is inhibited below 7°C or above 60°C. As such, it's extremely important to manage the temperature of refrigerated, frozen, or heat stored food as a measure to prevent food poisoning.

Many pathogenic microorganisms can quickly reproduce or produce toxins in this temperature range. Storing food products for excessive periods within the danger zone should be avoided.



When preparing food, businesses should avoid extended exposure to the danger zone during processes such as refrigeration, defrosting, or temporary storage to avoid the growth of pathogenic microorganisms that impact food hygiene and safety.



In this chapter, we will focus on the 4 aspects of “workers”, “environment and equipment”, “ingredients”, and “manufacturing processes” of the food industry by analyzing the potential dangers that may occur in the entire process of food production. Key management points will be provided to food businesses to prevent the occurrence of these hazards; it is recommended that businesses practice the key management points proposed in this chapter to ensure food hygiene and safety.



Food businesses must pay attention to the personal hygiene of workers and utilize high quality ingredients in good work environments; food products should ultimately be completed through multiple processes that eliminate the doubt of cross contamination!

1 Managing worker's hygiene



Workers come in direct contact with ingredients and food products. If they suffer from poor physical health, hygiene, or operate improperly, these can cause concerns in food safety.



✗ Working in improper clothing

Failure to wear clean work uniforms, hats, and masks may cause dirt, hair, dandruff, and mouth foam to contaminate food.



✗ Carrying diseases that can be transmitted through food

Example: Workers with hepatitis A and typhoid fever engaging in food related work and spreading these diseases.



✗ Workers with poor hygiene and habits

Workers who neglect to wash their hands before working, after going to the bathroom, or when their hands are contaminated; actions such as eating, drinking, or smoking can all potentially contaminate food.

[Causes of Hazards 1]: Working in improper clothing

- If the clothes (including clothing, hats, and shoes) of workers who come into direct contact with food are unclean or not maintained clean, they may contaminate food.
- Workers without hats or hair nets may contaminate food through their hair or dandruff.
- Workers who do not wear face masks in catering areas may contaminate food through the foam or spray from their mouths.



[Causes of Hazards 2]: Carrying diseases that can be transmitted through food

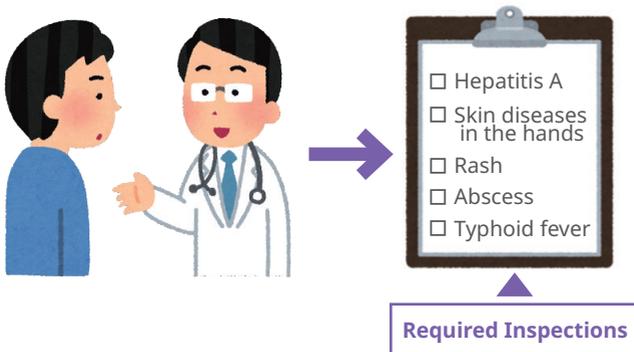
- If workers who come in direct contact with food are carrying pathogenic microorganisms that can be transmitted through food, there is a high likelihood of food contamination that will result in food poisoning.
- If food business workers are carrying second category notifiable infectious diseases such as hepatitis A and typhoid fever, they can easily contaminate food products through direct contact.

[Causes of Hazards 3]: Workers with poor hygiene and habits

Workers do not maintain good hygiene such as: blowing their nose, touching work surfaces, equipment, and ingredients which may contaminate their hands, failing to wash hands thoroughly, and then causing cross contamination by touching food products.



To prevent the above hazard, food businesses (including employers and workers) must comply with GHP guidelines. Workers should receive proper health examinations and practice personal hygiene management.



Employers must ensure that all workers comply with GHP

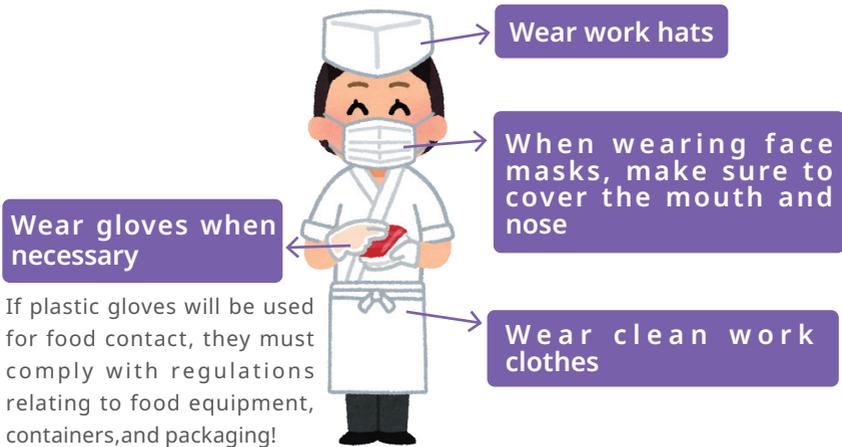
1. New hires are required to pass their health examinations; each year, businesses must actively provide workers with at least one health examination.
2. If it is discovered that workers are suffering from symptoms of discomfort, immediately suspend any work that involves direct handling of food.
3. Assign personnel to the management of hygiene by verifying and recording the hygiene management of workers.
4. Training should be administered to new workers to ensure their execution complies with the requirements of production, hygiene, and quality management; existing workers must also receive regular training related to food hygiene and safety management.

Implement inspections to track employee health status prior to shifts

1. Workers may not engage in food related work during the infectious or bacteria carrying periods of diseases stated by GHP.
2. Symptoms such as nausea, vomiting, diarrhea, or fever should be immediately reported to a supervisor; all food related work should be suspended.

Clean clothes/hats (shoes) worn during work

1. While working, clean clothes and hats must be worn to prevent hair, dandruff, and debris from falling into food.
2. Workers must wear face masks to prevent food contamination via mouth foam.



Pay attention to hand hygiene at all times

1. Do not grow out nails, apply nail polish, or wear accessories (rings, bracelets, watches).
2. Any wounds on the hand should be properly bandaged, disinfected, and covered with impermeable gloves before coming in contact with food.
3. Establish the habit of frequent and procedure compliant hand washing. Wash hands immediately after actions such as spitting, blowing your nose, or other acts that may potentially contaminate the hands.

4. When wearing gloves, pay attention and refrain from touching other objects before handling food to prevent cross contamination.



Establish good work habits

1. Worker's hands (regardless of whether gloves are worn) may not touch food after coming in contact with other objects (such as change) to prevent cross contamination.
2. Smoking, betel nuts, gum, eating, or drinking are prohibited while working as these actions may cause food contamination.
3. Personal items should not be carried into places of operation to prevent food contamination.



2

Hygiene management of environments and equipment



Maintaining a clean place of operations is the foundation of food businesses. Dirty, unhygienic environments may introduce contamination by pathogenic microorganisms.



Failure to maintain clean operating environments and equipment

If environments and equipment that comes in direct contact with food is not cleaned regularly, they are prone to food contamination.



Failure to implement vector control

Vectors may contain pathogenic microorganisms that contaminate food.

[Causes of Hazards 1]: Failure to maintain clean operating environments and equipment

- Dirty operating environments and equipment as well as poor hygiene conditions can hide grime that increase the probability for harmful microorganisms to grow. This can easily cause hazards such as contamination when producing food.



Unclean ovens



Unclean refrigerator doors



Peeling paint in places of operations

[Causes of Hazards 2]: Failure to implement vector control

- Dirty environments and lack of vector prevention measures may attract vectors (e.g.: rats, cockroaches, flies, etc.) that carry pathogenic microorganisms that contaminate food and cause food poisoning.



Failure to install screen windows



Lack of measures installed to prevent the invasion of vectors from drains

In order to prevent the above hazards, food businesses must maintain clean environments and equipment as well as implement vector prevention measures.

Operating environments

1. Maintain clean floors, walls, floor slabs, and ceilings to prevent scale, corrosion, mold, peeling, water accumulation, or condensation.
2. Drainage systems should be cleaned regularly to maintain their function and prevent odors.
3. Work surfaces must be kept clean and orderly.
4. Areas with varying cleanliness requirements should be effectively isolated and managed.



Maintain clean work surfaces



Maintain clean refrigeration units

Bathrooms

1. Maintain clean and implement in locations that prevent water source contamination.
2. May not open directly into places of food operations.
3. "Wash hands after use" should be labeled in a clear and prominent location.

Setup partitions to separate areas so they do not face the place of operations



Hand washing facilities

1. A sufficient number of hand washing and dry hand washing facilities should be placed in appropriate locations.
2. Easily understood instructions for hand washing should be placed in an obvious location.
3. They should be equipped with running water, cleaning solution, and hand dryers or paper towels.



- Provide paper towels
- Put up the correct hand washing instructions

Implement vector controls

1. Effective vector control measures (e.g.: screen windows, filters, air curtains) should be installed at entrances, exits, and drains.
2. Poultry and pets are not permitted in the workplace, or they must be controlled.



Drain filters should be installed



Equipment

1. Surfaces that come in contact with food should be smooth and free of dents or cracks; they should be maintained clean at all times.
2. Equipment should be confirmed to be clean before use and must be cleaned after their use.



Maintain cleanliness
of equipment and
instruments



Food businesses (employers) shall assign a hygiene management personal to verify and record the hygiene management of environments and equipment each day.

3 Ingredient use and management



The quality of ingredients determines the quality of products. Using problematic ingredients will affect food hygiene and safety! Let's take a look at risky actions that may cause businesses to utilize problematic ingredients.



[Causes of Hazards 1]: Improper selection when procuring ingredients



- If the ingredients used to produce food (especially food that does not require subsequent cooking) are prone to contamination, this can increase the risk of food poisoning. Example: Using unsterilized liquid egg to produce tiramisu may lead to food poisoning due to salmonella contamination.
- Using ingredients with poor quality, such as: Using frozen products that have lost their temperature, sticky fish, incorrectly labeled cans, damaged packaging...etc may result in poor product quality or other food safety concerns.
- Procuring ingredients from unreputable suppliers.

[Causes of Hazards 2]: Excessive procurement and extended storage periods



- Excessive procurement can lead to changes in quality for ingredients that have been stored for extended periods.
- Excessive storage of unfinished ingredients can be forgotten until after their expiry date, thereby increasing the risk of misusing expired ingredients.

[Causes of Hazards 3]: Failure to properly inspect ingredients upon delivery



- Failure to inspect ingredients according to standards upon delivery (e.g.: lack of verifying the amount and quality of ingredients) and retaining related documents can lead to the hazards caused by the misuse of ingredients.
- Example: Mistaking “Alocasia macrorrhiza” for “lotus leaf” and producing food with the ingredient can cause food poisoning.

[Causes of Hazards 4]: Improper storage conditions



- Improper storage of ingredients such as: placing ingredients at room temperature for extended periods can result in the rapid mass reproduction of microorganisms causing ingredients to deteriorate and spoil, sometimes even resulting in toxic substances.
- Placing ingredients directly on the floor instead of suspended from the ground allows vectors and contaminants to easily cause food contamination.

X Directly placing ingredients on the floor



[Causes of Hazards 5]: Lack of FIFO (first in first out)

Expiry date: January 1, 2026



Expiry date: January 1, 2027

- Poor management of received ingredients that do not comply with the FIFO principle. This causes ingredients that arrive earlier from being used first, leading to their extended storage and deterioration of quality, thereby affecting the quality and safety of ingredients; this also increases the probability of ingredients being stored until after their expiration.

To avoid the above hazard, food businesses should assess the appropriateness of ingredients during procurement, perform inspections to verify their high quality upon delivery, and store the ingredients in appropriate conditions; the FIFO principle along with proper management of ingredients should be adhered to.



Procurement inspection and acceptance:
A key action for verifying the quality of received ingredients

Select excellent suppliers to ensure quality ingredients

1. Select suppliers who are registered food businesses.
2. Prioritize the selection of ingredients with documentation such as certification badges, traceability (such as Chapter 3 1Q), or proof of origin and testing reports.
3. Select suppliers without a history of poor records.
4. Establish a list to keep track of qualified suppliers.



-Registered food business



-Documentation such as certification badges, traceability (such as Chapter 3 1Q), or proof of origin and testing reports.

Moderate procurement

1. Regularly perform inventory and establish methods to assess ingredient usage to estimate a suitable procurement amount.
2. Flavorings that are used less often should be tracked for their expiry period and procurement amount.

Perform inspections upon receiving deliveries

1. When performing inspections, check that product labeling is intact.
2. Verify that the products are correct and are within their expiry date.
3. Visually inspect whether the exterior packaging is intact, is without traces of vectors, and that contents are not obviously deteriorated or spoiled.
4. Refrigerated ingredients should be received at temperatures below 7°C (cooked or perishable foods are recommended to be below 5°C); frozen ingredients should be maintained at below 18°C.
5. Retain source documentation of all ingredients (preserve for a minimum of 5 years).



Inspection and acceptance standards

Good storage conditions

1. Inspection of refrigerated and frozen ingredients should be quickly completed within 30 minutes and refrigerated as soon as possible (below 7°C but above freezing point, or below 5°C for cooked or perishable foods) or stored in freezer (below 18°C) equipment.
2. Place in suitable locations to prevent cross contamination (e.g.: ingredients in refrigerators can be placed according to the following order from top-down, instant foods → seafood → whole pieces of livestock (beef, lamb, pork) meats → loose fish or livestock meat → poultry.)
3. Items placed in warehouses should be categorized and placed on pallets, racks, or other effective measures. Items should not be placed directly on the floor and environments should be kept clean and well ventilated.

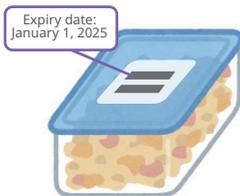


Place in padded baskets



Ingredients should be placed in an orderly fashion and covered effectively

FIFO principle



1. Ingredients should be packaged separately and labeled with expiry dates

Regularly take inventory of ingredients to confirm their best by or expiry date.

2. Placement according to expiry date

When storing ingredients into inventory, check the expiry date labeled on the external packaging of products and place food that will expire sooner (expiry date) in front of food that will expire later

Tip: Using ingredients effectively in restaurants

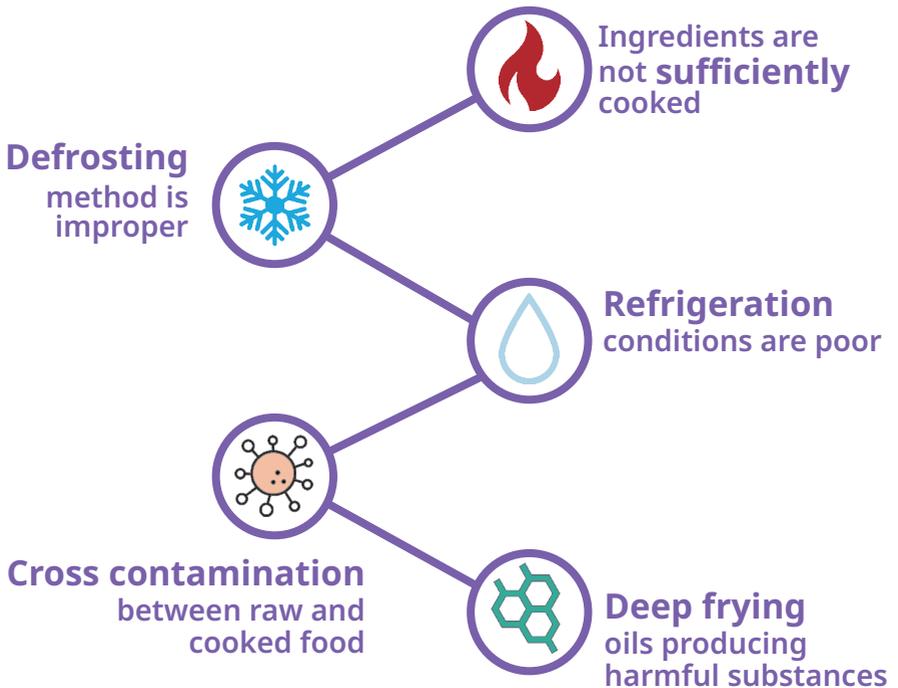
In recent years, the concepts of “avoiding waste”, “waste reduction”, and “eco-friendly consciousness” has been a concern for Taiwan’s general public. The 4 major points of execution are proposed as a reference point to encourage restaurant businesses towards measures that utilize ingredients effectively, thereby achieving reduction at the source and decreasing food waste.



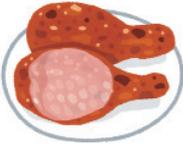
4 Manage the preparation process



There are many ways to prepare a diverse number of food products. Businesses that fail to grasp good operating conditions to prevent cross contamination will endanger food hygiene and safety. The following is an analysis of some improper actions in the preparation process that may lead to risk of hazards.



[Causes of Hazards 1]: Ingredients are not sufficiently cooked



- Pathogenic microorganisms can exist naturally in fresh ingredients. Insufficient cooking can result in residual pathogens that may reproduce or create toxins that cause food poisoning if ingested.
- Example: Seafood products are prone to being contaminated by vibrio enteritidis from water sources. As such, seafood ingredients that are not sufficiently cooked may cause vibrio enteritidis infections.

[Causes of Hazards 2]: Improper defrosting methods



- Excessive defrosting periods will cause ingredients to stay longer in the danger zone (7~60°C) and make it easier for microorganisms to reproduce and potentially resulting in spoiled or deteriorated ingredients.
- If ingredients are not appropriately packaged and sealed when defrosting with flowing water, it could result in cross contamination.

[Causes of Hazards 3]: Poor refrigeration conditions



- Excessive periods in the danger zone (7~60°C) during the refrigeration process can result in the mass reproduction of microorganisms.
- When ingredients are not completely wrapped or covered during the refrigeration process, the hazard of cross contamination can occur from workers, environments, or equipment.

[Causes of Hazards 4]: Cross contamination between raw and cooked food



- Fresh ingredients may contain existing pathogenic microorganisms. Cross contamination may occur if equipment used to process fresh ingredients comes in direct contact with cooked food or by improper operation of equipment.
- Improper management of any step in the preparation process such as: cleaning, cutting, cooking, defrosting, refrigeration, or storage can cause cross contamination by workers, ingredients, environments, or equipment and result in food poisoning.

[Causes of Hazards 5]: Harmful substances produced by deep frying oils



- Oils and fats are continuously hydrolyzed, oxidized, separated, and polymerized during deep frying; frying oil that has not been replaced after long periods can produce harmful substances that pose a consumer health risk.

To prevent the above hazard, food businesses should implement good measures to prevent cross contamination in the preparation process, prevent the growth of microorganisms, and ensure guarantee food hygiene and safety.

Cooking should be performed with sufficient heat



1. The core temperature of ingredients should exceed 70°C.
2. Ingredients such as pork, chicken, and seafood should be fully cooked to avoid cooked exteriors with raw interiors.
3. Food should be reheated thoroughly; decrease the portion size of each reheating to avoid food that is not thoroughly reheated.
4. The repeated cooling and heating of food can cause a change in quality or increase the probability of microorganism growth. It's recommended that food be reheated one time and disposed of if unfinished.

Attention to defrosting conditions

1. The defrosting of frozen ingredients should be conducted under conditions that prevent a deterioration of quality; ideally, the ingredients should be portioned for one-time cooking.
2. Common methods are as follow:
 - Place the ingredients in a refrigerator to defrost in advance (previous night).
 - Seal and package the ingredients and defrost with running water.
 - Defrost with a microwave.



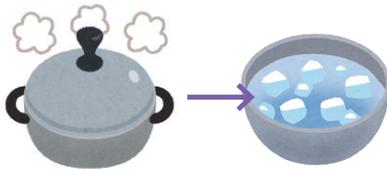
Defrosting with running water

Defrosting with a microwave



Prevent cross contamination during the refrigeration process

1. The temperature of food and semi-products should be reduced as soon as possible. Pay attention to the cleanliness of environments and equipment during the cooling process to prevent food contamination.
2. Common methods are as follow:
 - Simultaneously mix to quickly reduce temperature.
 - Quickly reduce temperature with ice cubes.
(Ice cubes must meet drinking water quality standards if they come in direct contact with food)
 - Place in a clean and dry refrigerator/freezer unit.



Quickly reduce temperature by placing ingredients in a container and cooling the container with ice cubes

Appropriately separate the preparation of raw and cooked foods

1. The operation and maintenance of all equipment and instruments used in the preparation process should be performed in a manner that prevents food contamination; equipment and instruments should be categorized by color based on their use to effectively prevent cross contamination.
2. Raw and cooked foods should be placed in separate areas; food should be packaged or covered before storage.



Equipment for raw and cooked food should be used and placed in separate areas

Regularly replace deep frying oil

1. Deep frying oil should be replaced regularly based on the amount of frying that is done.
2. Regularly test the content of total polar compounds of your deep frying oil; if it exceeds 25%, replace the oil.
3. Methods such as acid value or sensory characteristics can be recorded and used as supplementary methods to manage oil. (e.g.: replace your deep frying oil if the acid value exceeds 2.0mgKOH/g, the smoking point falls below 170°C, if a strong odor of oil is detected, and if the foaming surface exceeds half of the pot.)



Frying oil should be replaced in any of the following instances:

1. Total polar compounds exceeds 25% (basis for determining review)
2. Oil turns a dark brown color
3. Smoking point temperature falls below 170°C
4. Foaming surface exceeds half of the pot
5. Acid value exceeds 2.0mgKOH/g

2. Key points for managing food service

[Causes of Hazards 1]: Improper defrosting methods

- Once food preparation is completed, failure to properly cover or seal the packaging may cause environmental microorganisms to contaminate the food.
- Food is often subject to shaking and vibrations during the delivery process. If food is not properly sealed, it may leak or spill during delivery.
- If there are no identifiable seals in the external packaging of food, tampering may occur, resulting in contamination and other concerns in hygiene and safety.



✘ Food packaging is not properly sealed



✘ Food is not properly covered

[Causes of Hazards 2]: Poor temporary storage conditions of food

- After food is prepared and before it is consumed, placing it at room temperature for extended periods may cause the growth of pathogenic microorganisms and increase the risk of food poisoning.
- Temporary storage in unclean environments or inadequate temperatures can easily cause cross contamination, growth of microorganisms, or other deteriorations in quality.

Use sealed packaging and sealing strips

1. Prioritize the use of packaging that is sealable or provide complete coverage without easily coming apart.



Use stickers
to seal



Seal lids tightly
so they do not
come apart



Cup lids should be
designed with
strengthened seals



Utilize tape to
strengthen seals



Utilize rubber bands
to strengthen
coverage



External packaging
should provide full
coverage

- Place sticker seals or tape on food packaging to add identifiable seals that prevent tampering during delivery.



Utilize seal stickers on external product packaging



Utilizer seal stickers on bags



Using sealing tape provides additional identifiability

Pay attention to the time and environment of temporarily stored food

- Once food is prepared, serve as soon as possible as it is advised to place food at room temperature for no more than 2 hours; during summer (room temperature exceeds 32°C), it is advised to place food at room temperature for no more than 1 hour.
- It is recommended that food be made to order after receiving an order to prevent prepared foods from sitting at room temperature for extended periods.
- It is recommended that the external packaging of food should be labeled with text such as “finish as soon as possible” and “do not consume in a later meal” as a reminder to consumers.



- External packaging can include labels: text such as “finish as soon as possible” and “do not consume in a later meal”

4. Setup a pick-up area for food deliveries or place food on a shelf to provide ample space and maintain cleanliness.



Dedicated pick-up area for food deliveries



Place food deliveries in an insulated box

5. Temperature should be controlled if an insulated storage measure has been implemented: refrigeration temperature should be maintained at below 5°C; heat temperatures should be controlled at more than 60°C.