The Key to Food Safety

Study Guide





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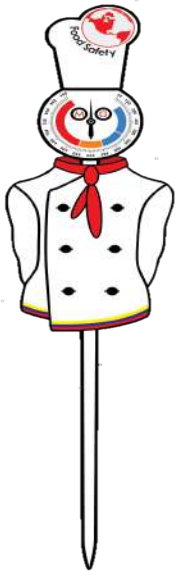


Advice by Chef OMG:

- The words highlighted in **bold** and **red** are not only important to memorize, but to understand fully!

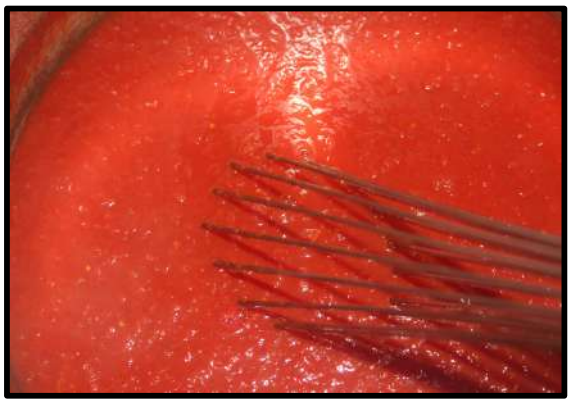
- Also, be sure to check out our video with food safety tips!

WHY IS FOOD SAFETY IMPORTANT?

- Food safety training is a necessity for everyone who cooks and handles food and who plays a part in its service and distribution. Food safety is essential in preventing the spread of a foodborne illness **outbreak**, which occurs when two (2) or more people become ill after consuming the same food from the same establishment.

- An outbreak could be a motive for the **local regulatory authority** (health departments and inspectors) to close a food service establishment. Other motives include **imminent hazards** like pest infestation, the absence of potable water, no electricity and backflow.

- To safeguard public health, the **Food and Drug Administration (FDA)** develops a **Food Code** of recommended provisions for the food service industry. However, these are only suggestions, and states adopt different regulations enforced by the local regulatory authority.



Food borne illnesses

The most common foodborne illnesses are caused by **pathogens**, which are microorganisms that cause human beings to get ill.

Bacteria: The most common symptoms of foodborne illnesses caused by bacteria are vomiting and diarrhea.

1. **Salmonella non-typhodial** – Present in poultry (chicken, duck, turkey, etc.) and eggs.
2. **E. coli** – *Escherichia coli*. Present in ground meats and vegetables.
3. **Shigella** – *Shigellosis*. Present in flies and human feces.

Viruses:

1. **Hepatitis A** – Present in ready-to-eat foods, shellfish and human feces. This illness causes **jaundice**, which is the yellow coloring of the skin.
2. **Norovirus** – Present in ready-to-eat foods, shellfish and human feces. This illness causes vomiting and diarrhea.

HOW IS FOOD CONTAMINATED?

Food can be contaminated very easily in any part of the food preparation process. The food can be contaminated accidently or intentionally (a deliberate act by a former employee, vendor, terrorist or competitor). In order to avoid accidental contamination, food safety training and awareness is key. To prevent intentional food contamination, the **FDA** recommends the implementation of a **food defense** system like **ALERT**. The program has five (5) key components:

A ssure that products are purchased from safe sources.

L ook at areas where food is present and that could be vulnerable.

E mployees and vendors must be supervised when around food.

R eports implemented for food defense must be filed.

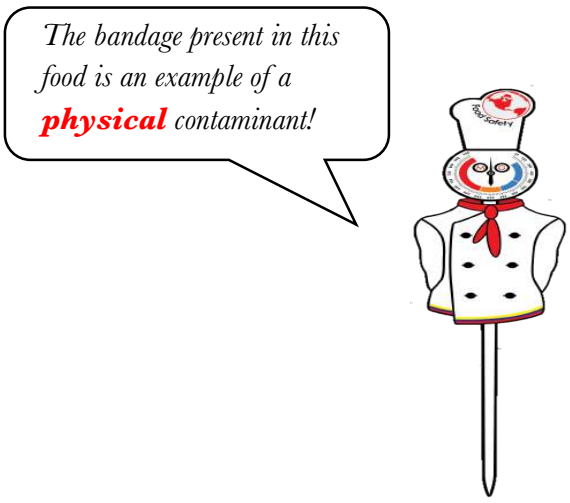
T hreats must be taken very seriously.

Types of contamination

There are three types of food contaminants: **physical**, **chemical** and **biological**.

1. **Physical contaminants:** Visible objects or elements present in food that do not belong there. *For example: hair, bandages, jewelry, iron filings, staples, glass or pieces of broken lamps, and natural elements like chicken bones, fish bones and fruit seeds.*

- To prevent physical contamination, food should always be covered and lights in the kitchen should have protectors. It is also essential that uniforms, caps and hairnets are properly used, and that employees have short finger nails.



2. **Chemical contaminants:** If a chemical—like detergent, degreaser, pesticide or a sanitizer such as chlorine—comes in contact with food, a chemical contamination occurs, posing a major hazard to the health of customers. Chemicals should be stored away from food in their original containers and with their original labels to follow their directions (on how to store them, prepare them and dispose of them). If chemicals are transferred to spray bottles, these should be labeled with a common name so everyone knows what they contain.

- **Toxic metals** such as copper, lead, zinc and galvanized zinc produce chemical reactions, or poisons, when coming in contact with acidic foods such as orange juice, lemons, vinegar, tomatoes and alcohol. It is for this reason that the only authorized food service metal is **stainless steel** and that all types of equipment must have an **(National Sanitation Foundation (NSF)** seal or stamp, ensuring that the equipment is safe for food.

- The label for chemicals is the **Safety Date Sheet (SDS)**. It contains the directions for use, the first aid procedures that should be applied and the protective equipment that should be used. The **Occupational Safety and Health Administration (OSHA)** requires the storage of this sheet by the establishment management.

3. **Biological contaminants:** These are pathogens—like bacteria, viruses, fungi and parasites—that cause food borne illness. Biological contamination can be prevented through effective **personal hygiene** and by avoiding **cross contamination**.

*When sneezing an employee must use his shoulders and not his hands in order to prevent **biological** contamination*

WHAT ARE THE TYPES OF PATHOGENS?

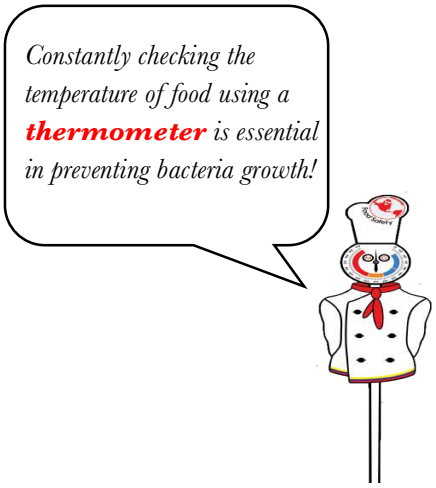
*The four types of **pathogens** (biological contaminants) are bacteria, viruses, parasites and fungi.*

1. Bacteria: The best way to prevent bacteria growth is by controlling the **time and temperature** of food. There are six conditions that favor bacteria growth and these can be illustrated through the acronym **FAT TOM**:

> **F**ood: **TCS foods**, or foods that require time and temperature control—such as chicken, alfalfa sprouts, melons and cut tomatoes. These foods are usually proteins and have high levels of moisture.
>
> **A**cidity: Bacteria grow between the **PH** levels of **4.6** and **7.5** (0 is acid, 14 is alkaline and 7 is neutral or water).
>
> **T**emperature: Bacteria grow in the **temperature danger zone**, which is between **41**˚ and **135**˚ Fahrenheit.
>
> **T**ime: Bacteria double in size every 20 minutes. After four (4) hours, they become large enough to cause foodborne illness.
>
> **O**xygen: Some bacteria require oxygen to survive (**aerobic**) and others don't (**anaerobic**).
>
> **M**oisture: Bacteria grow in foods that have between **0.8** and **1** Activity Water (AW).

Sometimes bacteria become toxins, or poisons. As a result, seafood and fungi must be purchased from an **approved and reputable supplier**.

Toxins include: **clostridium botulism**, which thrives in anaerobic bacteria (does not need oxygen to survive) common in canned foods and baked potatoes; **ciguatera**, a fish toxin common in reef fish like barracuda, grouper and seabass; and the **scombroid** toxin in contaminated fish—common in tuna, mackerel, bluefish, marlin and mahi-mahi.



2. **Viruses:** The most common viruses are **hepatitis A** and **norovirus**. They are present in human feces (a fecal-oral transmission). Viruses can also be found in ready-to-eat foods (fruits, vegetables and salads) and shellfish (oysters, shells, clams and mussels).

- Health inspectors require that the tags of live or fresh shellfish be stored for **90 days** from the date the last shellfish was sold.

*Shellfish tags or labels should be stored for **90 days***

- The best way to prevent the spread of viruses is by maintaining high levels of **personal hygiene** and more specifically, by frequent and proper hand washing (before and after handling food).

3. Parasites: Parasites live in foods, especially seafood, wild game animals and foods processed in contaminated water.

- To avoid parasites, it is necessary to purchase food from an **approved supplier** with a good reputation and to control the **time and temperature** of food (cooking foods to their respective minimal internal temperatures). If the food is to be served raw (like sushi), one must ensure that the supplier froze the product at the correct temperature and time.

4. Fungi: When fruits and vegetables are moldy or feel slimy (clear signs of fungi growth), they must be thrown out.

HOW DO YOU KEEP FOOD SAFE?

The seven (7) keys are:

1. Effective Personal Hygiene Practices
2. Time and Temperature Control
3. Avoiding Cross Contamination
4. Preventing Cross Contact
5. Effective Purchase and Maintenance of Equipment
6. Preventing Pest Infestation
7. Implementing H.A.C.C.P.

Personal hygiene:

- When all food service employees (chefs, managers, cooks, servers, dishwashers, etc.) work thoroughly and practice good personal hygiene, they avoid the spread of viruses and bacteria (biological contaminants)—and more importantly, they prevent customers from getting ill.

- **Hand care**: Nails should be short and clean. If nails are long, employees must wear clean gloves. Jewelry should not be allowed in the kitchen, as it may fall on the food (physical contamination) or collect dirt and allow for the growth of pathogens (biological contamination). Employees are only allowed to work with a smooth metal wedding ring.

- **Hand washing**: Hand washing should only occur in the hand washing stations. These should be conveniently located in the kitchen, preparation areas, bathrooms and bar.

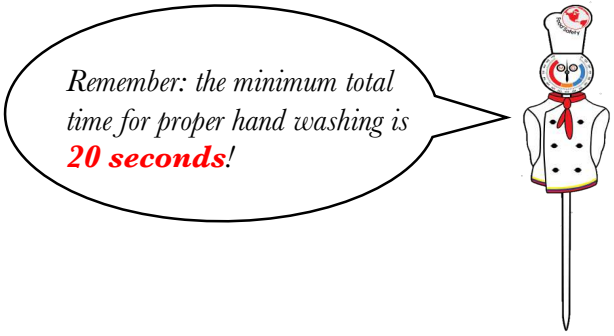
Each **hand washing station** should have the following five (5) essential components:

1. A sign that reminds employees to wash their hands properly and constantly.
2. Hot and cold running water.
3. Anti-bacterial soap.
4. Paper towels or an electronic hand dryer.
5. A trash can.

- A hand sanitizer, or hand antiseptic, approved by the **FDA** is optional. If your local health department requires it, it should only be used after proper hand washing. Using hand sanitizers does not replace hand washing.

*An adequate **hand washing station***

- The water temperature for hand washing should be at least **100° F**. Hands should be scrubbed with water and soap for a time period between 10 and 15 seconds, and the total hand washing process should take at least **20 seconds**.



WHEN SHOULD I WASH MY HANDS?

- Before starting to work.
- Before putting on gloves.
- After throwing dirty gloves out.
- Before and after handling raw foods.
- Every time you change tasks.
- After using the bathroom.
- After throwing out the trash/garbage.
- After a hand shake.
- After handling currency/money.
- After handling chemical products.
- After eating or smoking.
- After receiving a cell phone call.
- After mopping the floor.

- **Use of gloves**: Gloves must be used while handling food and they must be put on after proper hand washing. They do not replace hand washing and they must be changed every time an employee changes tasks or after **4 hours** of continuous use.

- **Wounds, cuts and burns**: Every wound must be covered with a bandage or Band-Aid. To prevent any of these from falling into the food, gloves must be used to cover them.

- **Uniform use**: All members of the kitchen (chefs, cooks, dishwashers, etc.) must use either a hat, hairnet or hair restraint. A proper and clean apron must be worn at all times, and if it becomes dirty, the apron must be changed for a clean one. Before leaving the kitchen to throw out the garbage or to use the restroom, employees must remove their apron. After finishing the day's shift, everyone must place their dirty aprons in a laundry basket or bag.

The use of an appropriate ***uniform*** *is essential in the maintenance of food safety*

- **Policies that must be implemented**: In the kitchen and areas of food preparation there should not be any smoking, gum or tobacco chewing or eating; as saliva may fall on the food (an example of biological contamination). Any beverages in the preparation area must have a lid and a straw and should be on the bottom shelf or at least six (6) inches off the floor.

- **Symptoms that should be reported**: Symptoms such as vomiting, diarrhea or jaundice (yellow coloring of the skin caused by Hepatitis A) should be reported to the manager. These conditions should exclude (**exclusion**) the employee from any activity in the establishment and he or she should be sent home and to the doctor. The employee may only return when 24 hours have passed without symptoms and with a note from the doctor. If the employee is diagnosed with an illness caused by food (salmonella, e-coli, norovirus, etc.), a doctor's note is required to return and the manager must notify the local regulatory authority or health inspector of the incident.

- Symptoms such as fever and sore throat (cold or flu) should also be reported. The manager must restrict (**restriction**) the employee with said symptoms from handling food (he or she can still work in the establishment, but without handling food). However, if the food establishment happens to serve **high-risk populations** (children and the elderly), the manager must exclude the employee with those symptoms.

Time and temperature control:

- To prevent bacteria growth, **TCS foods** (foods that require time and temperature control for safety) should be kept out of the **temperature danger zone** (between 41˚ F and 135˚ F). To accomplish this, a clean, sanitized and calibrated thermometer should be used at all times.

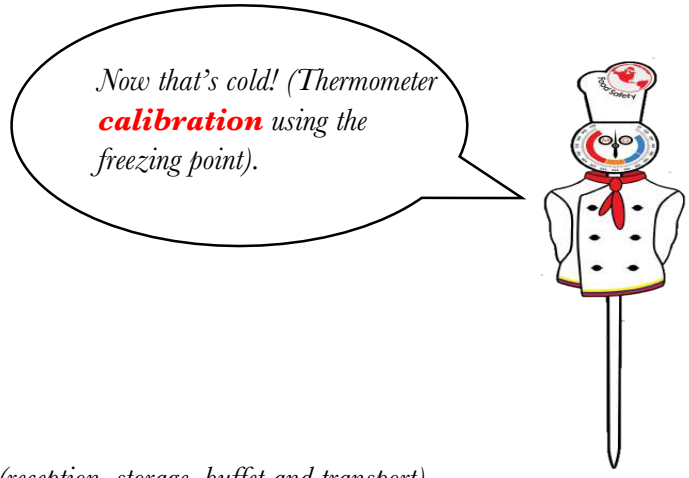
There are different types of food **thermometers**:

1. Bimetallic – Metal and manual.
2. Thermocouple – Digital.
3. Laser/infrared – Just for measuring the surface temperature of foods.
4. Time and temperature indicators.
5. Ambient thermometers - *In hot units (steam table), these should be placed in the coolest part of the unit. In cold units (refrigerator), these should be placed in the warmest part of the unit.*

Calibration: All food thermometers have to be calibrated at least once a day or after falling on the floor.

There are two (2) ways to calibrate a thermometer:

1. **Freezing or ice point**: A container or glass is filled with more ice than water and the thermometer is inserted without touching the bottom or the walls of the container. The thermometer must reach 32˚ F (the precision can minus or plus 2 degrees).
2. **Boiling point**: Insert the thermometer in boiling water until it reaches 212˚ F.



Maintenance and handling of food *(reception, storage, buffet and transport).*

- **Cold foods** should be received, maintained (buffet), stored and transported at a temperature of **41˚ F** or less (except for pasteurized foods, like milk, or foods with protective shells, like eggs and shellfish, which can be received at a temperature of **45˚ F**). Foods that are kept cold and exposed to the public—like salad bars or cold buffets—should have a protective barrier. These foods can be kept for up to six (6) hours, but the

temperature should never exceed 70˚ F. If this does happen, the food should be discarded.

- **Hot foods** should be maintained—in a steam table or buffet—and transported at a temperature of **135˚ F** or more. Hot food can be kept at that temperature for no more than **4 hours** and employees must monitor the food, using a calibrated and disinfected thermometer, at least every two (2) hours in order to have time to take any corrective measures.

- **Thawing:** Food should not be defrosted or thawed at room temperature (70˚ F) because it is ideal for bacteria growth.

There are four (4) proper methods to **thaw**:

1. Move food from the freezer to refrigerator 24 hours before cooking (the food must have a temperature of 41˚ F).
2. Move food from the freezer to a stream of cold running water. The water temperature should never exceed 70˚ F.
3. Move food from the freezer to the microwave (food must be cooked immediately for this option).
4. Move food from the freezer straight into the cooking process.

Cooking at correct temperatures: One of the most pivotal elements of food safety is cooking foods at their correct and respective minimal temperatures. This reduces the number of pathogens to safe levels.

Internal minimal temperatures:

- **135˚ F** - Rice, fruits and vegetables.
- **145˚ F** - Meat (beef, pork, lamb, etc.), seafood, shellfish, eggs to be served immediately and non-pasteurized eggs. Commercially raised wild game animals (alligator, ostrich, etc.)
- **155˚ F** - Ground beef (hamburgers, sausages, chorizos, etc.) and eggs to be held hot.
- **165˚ F** - Poultry (chicken, duck, turkey, etc.). All foods cooked in the **microwave** or reheated.

*Foods like **rice** must be cooked at a temperature of 135˚ F*

- **Microwave:** When using the microwave to cook, it is necessary to mix the respective food halfway through the cooking process. After it has finished cooking, the food has to be let to rest for two (2) minutes.

- **Cooling through stages**: Cooked foods that will not be served immediately must be cooled through the following temperature stages:
    1. From **135˚ F** to **70˚ F** in a time span less than two (2) hours.
    2. From **70˚ F** to **41˚ F** in a time span less than four (4) hours.

- Once food has been cooled to 41˚ F or less, it can be safely stored for **7 days** in the refrigerator (including the day of preparation). All foods that are stored for more than 24 hours should have a label with their name, major allergen (if any) and the date of preparation.
- If possible, food should reach 41˚ F within 6 hours. Food should never be left to cool at room temperature or be put when it is very hot in the refrigerator, as the internal temperature of the refrigerator could increase and put all of the foods present in the temperature danger zone.

Different methods to cool food safely:

1. Place hot liquid foods in metal containers inside a bigger container with ice (ice bath).
2. Utilize ice paddles for hot liquid foods (soups, sauces, etc.).
3. Add ice to the food for a rapid cooling.
4. Cut or divide foods into smaller portions.
5. The best way to cool down foods like rice is by placing them in shallow metal trays.
6. Place foods in blast chillers.

Ice Bath cooling

Ice paddle cooling

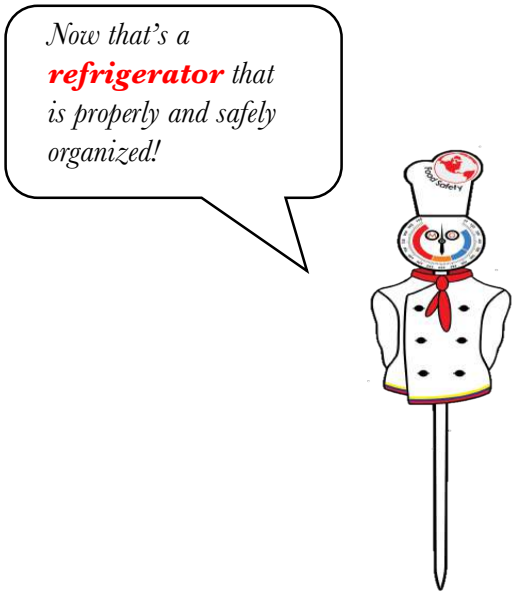
Preventing cross contamination

- **Cross contamination** occurs when pathogens are transmitted from one surface or equipment to another. *Examples: Cutting chicken and vegetables on the same cutting board and with the same knife, storing raw chicken with vegetables on the same container and using the same tongs to put raw chicken on the grill and then to serve cooked or ready-to-eat chicken.*

Ways to prevent cross contamination:

1. Frequent and proper hand wash and glove use.
2. Using different colored cutting boards and tongs. *For example: yellow cutting boards and tongs can be used for chicken, the red ones for meat and the green ones for vegetables.*
3. Separating preparation areas. *For example: one table to prepare chicken and another just for vegetables.*
4. Foods must be organized properly in the **refrigerator:** (Order is from top to bottom)

1. Ready-to-eat foods (cheese, fruits, vegetables and cooked foods).
2. Seafood and shellfish.
3. Red meats (beef, pork, lamb, goat, etc.).
4. Ground meats (hamburgers, chorizos, sausages, etc.).
5. Poultry (chicken, duck, turkey, etc.).



5. Surfaces, equipment and utensils that come in contact with food must be frequently cleaned and sanitized.

- **The cleaning and sanitizing** of surfaces, equipment and utensils that come in contact with foods should occur frequently. This includes every time an employee changes tasks or if the equipment has been used for the same task for more than four (4) hours.

Five (5) steps to clean and sanitize equipment and silverware:

1. Pre-rinse, scrub and dispose of leftovers.
2. Wash thoroughly with clean water and soap.
3. Rinse with clean water.
4. Sanitize with chemicals.
5. Let to air dry.

Methods to sanitize:

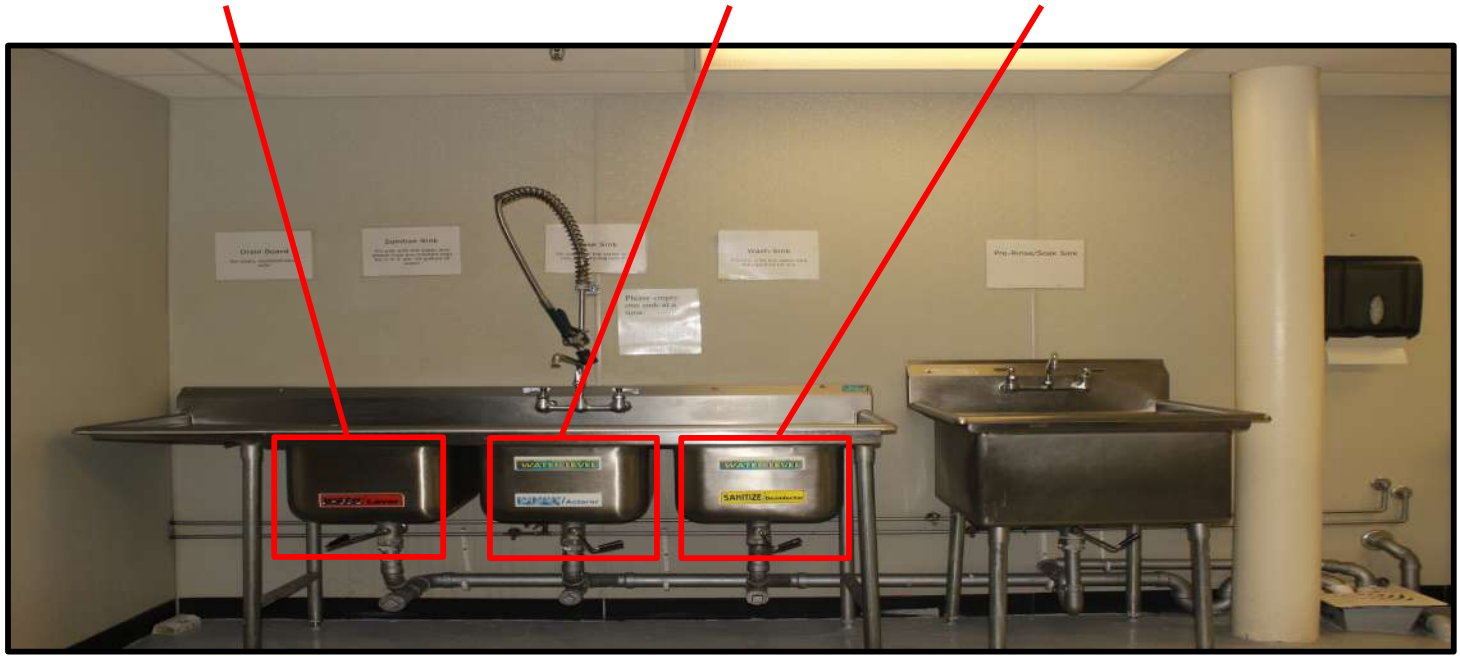
1. Disinfecting through heat and a temperature between **171˚ F** and **180˚ F** (washing machines).
2. Chemical sanitizers:

	Concentration	**Contact time**
- **Chlorine** (bleach)	50 to 100 ppm	7 seconds
- **Iodine**	12.5 to 25 ppm	30 seconds
- **Quaternary Ammonium** (Quats)	Depends on the provider	30 seconds

- The effectiveness of the chemicals in disinfecting depends on the concentration (using PH strips), contact time and the hardness of the water.

Cleaning and sanitizing using the three sink compartments:

1. **Wash** (water should be 110˚ F) 2. **Rinse** 3. **Sanitize**

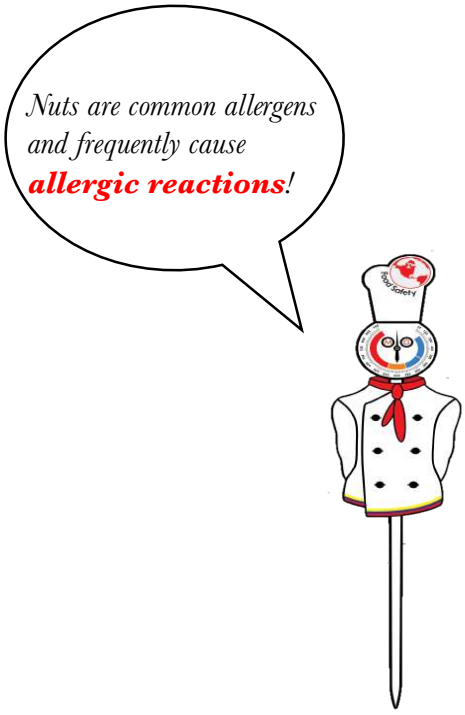


Preventing allergic reactions

Cross contact occurs when an **allergen** (food that produces allergic reactions), comes in contact with other foods or equipment and surfaces.

Most common **allergens**:

1. Milk and milk derivatives (cheese)
2. Eggs and egg products
3. Seafood and shellfish (clams)
4. Wheat
5. Flour (gluten)
6. Soy (tofu)
7. Nuts



Most common symptoms of **allergic reactions**:

- Hives
- Swelling
- Throat choking
- Lost of consciousness
- Even death

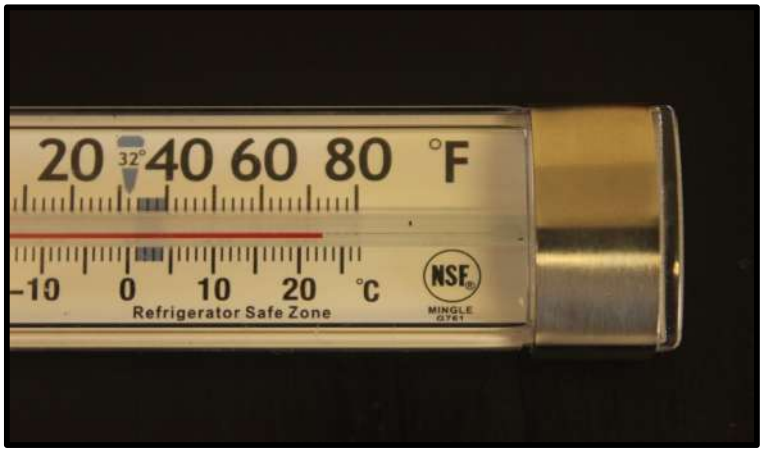
Ways to avoid allergic reactions:

1. Knowing precisely the ingredients on all the items served, an on the menu, to properly inform guests. If an employee happens to not know if an item contains an allergen, he or she must ask the chef or manager before making a decision.

2. Preventing **cross contact**:
    - Cleaning and sanitizing equipment, surfaces, silverware, cutlery and plates.
    - Frequent and proper hand washing.
    - Not utilizing the same oil in the deep fryer for two different types of food. *For example: the oil used to fry seafood should not be used later to fry French fries.*

Purchase and maintenance of equipment

- All equipment must have a **NSF** or **UL** stamp or seal, which guarantee that the equipment is safe to come in contact with food. The labels also ensure that the equipment is easy to clean and sanitize and that it is non-absorbent and durable.



*An equipment certified by the **NSF** is safe to come in contact with food*

- All surfaces, including the floor, must be designed for heavy duty work and be easy to clean and sanitize.
- All lights and lamps must have protectors in order to prevent physical contamination. The major and most intense lighting should be in the preparation areas.
- All equipment must be at least six (6) inches off the floor or at least four (4) inches off tabletops.

The service / mop sink should only be used to wash the mop, which should be cleaned constantly and hanged to dry (not touching any surface).

Ways to prevent the **backflow** of contaminated waters (a motive for the health inspector to close an establishment):

- Not having **cross connections**, or a physical connection between a source of clean water and contaminated water. *For example: A hose connected to the faucet and extended to a bucket can cause contaminated water from the bucket to backflow and contaminate the portable and clean water.*
- Having **air gaps**. One between the faucet and the sink and the other between the pipe and the drainage.
- Installing **vacuum breakers**.

Pest control and prevention

- A **pest infestation** (cockroaches, mice, rats, etc.) is a motive for a local health regulator and/or inspector to close an establishment.

How to prevent pest infestation:

1. Checking all food delivery effectively; especially fruit and vegetable deliveries.
2. Ensuring that the lids on dumpsters are properly and tightly adjusted.
3. Installing plastic air curtains in walk-in refrigerators and freezers.
4. Installing bug screens on windows.
5. Filling the area around the drainage with concrete.
6. Having trash cans that are plastic, easy to clean and that do not leak.
7. Frequently cleaning the establishment.
8. Working closely with a **PCO** (pest control operator).

H.A.C.C.P – Hazard Analysis Critical Control Point

A variance or written plan to ensure food safety required by local health departments when establishments…

- Smoke foods such as ham.
- Cure foods like beef jerky.
- Vacuum seal foods like those cooked through the sous-vide method. **ROP**: Reduced Oxygen Packing.
- Have live exhibition and **molluscan** shellfish like lobsters that will later be cooked.
- Harvest bean sprouts.
- Bottle raw juices without pasteurizing.

The **HACCP** program consists of seven (7) steps:

1. Conducting a hazard analysis and identifying possible dangers.
2. Determining critical points (purchase, reception, storage, cooking).
3. Establishing critical limits of control (temperature, time, PH levels). *Ex: cooking all chicken to the set temperature of 170° F.*
4. Frequently checking and monitoring critical limits of control. *Ex: checking the temperature of the chicken on the grill.*
5. If applicable, taking corrective measures and actions. *Ex: placing the chicken back on the grill if the right temperature has not been reached.*
6. Establishing procedures to ensure the HACCP system is working as intended.
7. Establishing record keeping procedures.

MG Food Safety

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***"Real Training"** that motivates sincere change*

MG Food Safety, conscious of the imperative of cementing a safe and effective food service industry, offers more than just paper certifications—we deliver specialized, interactive and flexible training. Training that transcends the boundaries of the classroom because our priority is augmenting your awareness of food safety and offering you the tools to protect the food you serve—not simply having you memorize abstract course material.

We recognize the cultural and linguistic differences, as well as the diverse points of views that exist in our food service family. Our training—offered in both English and Spanish—is designed to correct unsafe food handling and cooking habits, and to encourage sincere change. This is not only the key to upkeep your establishment's reputation and revenue, but also to safeguard the integrity of the food that we serve. We are arguably in charge of the most crucial job in our society!