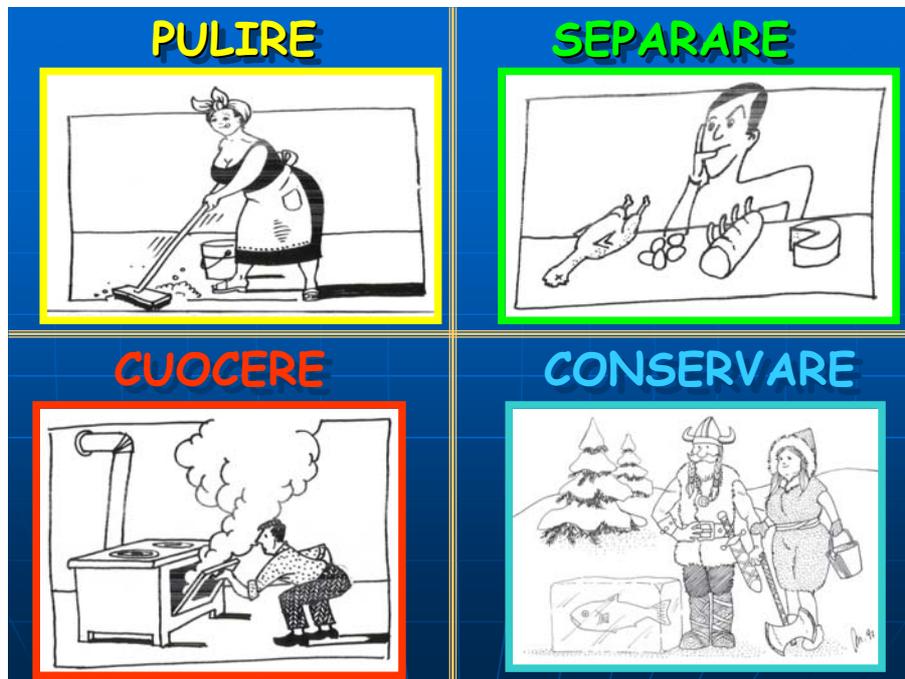


SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
LOCAL HEALTH UNIT OF MODENA



PULIRE = CLEAN
SEPARARE = SEPARATE
CUOCERE = COOK
CONSERVARE = PRESERVE

Training course for food handling operators

by

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In part, from material prepared by the regional nutritionist training group

May 2004

During production, processing, transportation, preparation, conservation, and distribution of food products, any type of food or beverage can be contaminated by toxic substances or microorganisms.

Food contaminants can be classified as follows:

CHEMICAL

These can be substances that are naturally present in foods (poisons in mushrooms), or chemical substances used in farming or agriculture: medication, hormones, pesticides, or industrial pollutants (mercury, lead, cadmium), or also processing residues (disinfectants and detergents).

PHYSICAL

These can be solid fragments from the same elements (hairs, bones, sand) or from the processing environment (wood, glass, metal, rubber, plastic).

BIOLOGICAL

These are the most frequently found and are represented by small sized living organisms (**bacteria, molds, yeasts, viruses, and parasites**).

Bacteria

These are organisms that are invisible to the naked eye and are comprised of a single cell. These organisms are self-sufficient and, when in an environment that is favorable, due to the presence of nutrients, correct temperature, and sufficient moisture, rapidly reproduce themselves (vegetative form): the mother cell divides into two daughter cells, which in turn divide to develop 4 daughter cells, then 8, then 16, and so on (at each reproductive cycle their number doubles). Several types of bacteria, when found in a hostile environment (especially when lacking water), surround themselves with a kind of "shell" (the spore, which allows them to resist for a long period of time, even years (ex. Clostridium botulinum). Other bacteria are capable of producing toxins (Staphylococcus aureus and Clostridium botulinum).

Molds

Molds are visible fungus on foods. These develop easily in very moist environments, require oxygen, and are spread through the air. Even though molds multiply more slowly than bacteria, they are responsible for many alterations in foods, and several species produce potent poisons (mycotoxins). Molds may also grow at refrigerator temperatures.

Yeasts

Yeasts are microorganisms invisible to the naked eye. These develop in foods that are rich in sugars (bread, wine), and when present in large quantities, can alter the food in which they are found.

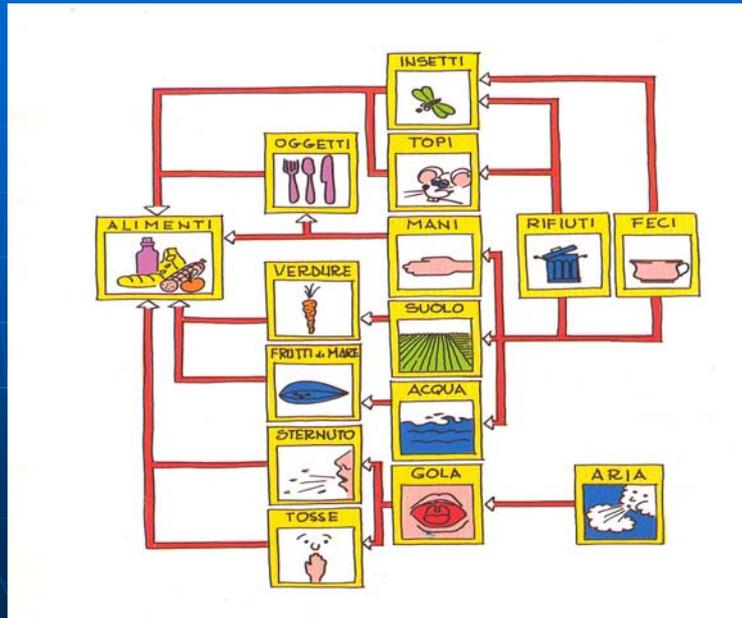
Viruses

Viruses are extremely small and multiply only inside other living cells. For example, the Hepatitis A virus is transmitted by eating raw shellfish or non-potable water, and is diffuse in tropical countries and in Southern Italy.

Parasites

Parasites are larger organisms with a worm-like shape, visible to the naked eye, and can be transmitted by eating food deriving from infected animals. For example, Trichinosis from horses and pigs, and Tapeworm from cows and pigs.

Contaminazione



HOW ARE FOODS CONTAMINATED?

Bacteria are largely diffused in:

- environment: water, air, soil, facilities, and tools
- animals and vegetables
- humans

The contamination of foods can occur at any time and throughout any stage of the production chain.

Water

Used as both an ingredient in the preparation of food, as well as to wash the equipment utilized and the environment; it must be potable, that is, void of bacteria and harmful substances.

Air and Dust

Various types of bacteria, molds, and, rarely, also yeasts, are transported through the dust present in the air.

Since air is a means of contamination, its circulation must be kept under control: currents and vortices must be avoided and, when necessary, forced air passages must be created from clean air zones leading to polluted air zones.

Work environment

The organic material that accumulates during the working process, if not periodically removed, is an ideal environment for the growth of various microorganisms that may contaminate the foods being processed. It is for this reason that the equipment and facilities utilized must be regularly cleaned, so that the least possible number of microorganisms are present.

Animals and Vegetables

Animal skin and inners (internal organs), fruit and vegetable skins, and egg shells constitute a natural barrier to the penetration of microorganisms normally present in the environment. However, these barriers, in various circumstances, such as during slaughtering, milking, mechanical harvesting of fruit and vegetables, and cleaning eggs, are damaged, permitting the microorganisms to penetrate and contaminate foods.

Processing operators

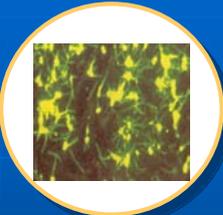
Those who handle and process food are an important cause of illnesses originating from foods. Numerous microorganisms are normally present on skin, hair, in the nose, throat, and intestine, and several of these can be pathogenic for example, *Salmonella*, *Staphylococcus aureus*, *Listeria monocytogenes*, *Escherichia coli*, *Shigella*, *Campylobacter jejuni*, *Yersinia enterocolitica*, Hepatitis A virus, etc. Many of these microorganisms originate from skin lesions (ex. boils/acne), from oral infections, or from the respiratory tract (tonsillitis, bronchitis), as well as from gastrointestinal illnesses. One must remember that humans can be carriers of these microorganisms without any symptoms.

Furthermore, those who handle food can frequently contaminate it passively, transporting bacteria from one food product to another, for example, by handling cooked food after having worked on raw food without having followed all proper personal hygiene habits, such as hand washing.

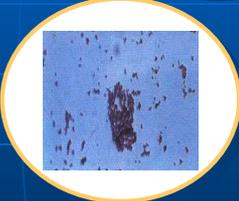
THE CONSEQUENCES OF FOOD CONTAMINATION

I microrganismi responsabili di M.T.A. sono:

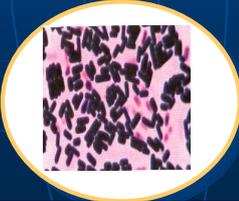
Salmonella spp



Staphylococcus aureus



Clostridium perfringens



The contamination of food products can cause, in those who eat these foods, illnesses known as Food Transmitted Infections (F.T.I.), the principal ones being **Food Toxic Infections**.

Food toxic infections are unpleasant incidents, not only for those unfortunate consumers of contaminated foods, but also for labs and businesses from which these incriminated food products derive, risking serious authoritative consequences (suspension of licenses), which can be civil (claim for damages), but also criminal.

The germs that can cause toxic infections from foods are varied. Those most frequently implicated are the following:

Salmonella, *Staphylococcus aureus*, *Clostridium perfringens* e *Clostridium botulinum*.

SALMONELLA

LOCATION: intestines of those affected or infected by this toxin, eggs, animal intestines and meat, seafood, vegetables contaminated by sewage.

CONTAMINATION OF FOODS BY HUMANS: through hands soiled by feces.

RISK: multiplies, determining food toxic infections after 12-24 hours after food ingestion, with abdominal pain, diarrhea, general malaise, fever, and headache.

HAZARDOUS FOODS: eggs, meat-based raw foods (especially pork and chicken), seafood, milk, milk products, dairy products, as well as cooked food contaminated after being cooked.

TEMPERATURES IMPEDING THE MULTIPLICATION OF SALMONELLA IN FOODS: below +4°C, above +60°C.

PREVENTION:

- 1) Thoroughly wash hands after going to the bathroom;
- 2) preserve foods to be consumed raw, and those already cooked, at ideal temperatures;
- 3) separate areas where raw foods are handled from areas where cooked foods are handled, in order to prevent contamination of the latter;
- 4) keep the working surface distinct from the food washing areas and areas of food preservation, so that foods contaminated from the origin (egg shells soiled with excrement, chicken meat) do not contaminate other foods.

STAPHYLOCOCCUS AUREUS

LOCATION: nasal, throat, and intestinal mucous membranes, pimples or boils on face, forearms, hands, and fingers.

CONTAMINATION OF FOODS BY HUMANS: through sneezing, coughing, handling (hands with postulated lesions).

RISK: multiplies in foods and produces a toxin (resistant to heat) that, once ingested with the food product, triggers a gastrointestinal type of acute syndrome in a brief period of time (1-7 hours).

HAZARDOUS FOODS: meat-based, fish-based, milk-based, dairy products, egg-based, egg cream (both raw and cooked).

TEMPERATURES IMPEDING THE MULTIPLICATION OF STAPHYLOCOCCUS IN FOODS: below +4°C; above +60°C

PREVENTION:

- 1) Scrupulous personal hygiene for food handlers/processors;
- 2) do not directly handle food when affected by inflammation of the nose or throat (cold or sore throat), boils/acne, and/or hand whitlow. If absolutely required to work, cover nose and throat with a mask and use disposable gloves;
- 3) preserve both raw and cooked foods at temperatures, which do not allow for the multiplication of germs.

CLOSTRIDIUM BOTULINUM

LOCATION: ground/soil and water, human and animal intestines, and vegetables.

CONTAMINATION OF FOODS: presence of spores at the origin and due to improper handling.

RISK: in the absence of oxygen, especially in foods with low acidity, the spores germinate with the multiplication of bacteria and the production of toxins. The incubation period from ingestion to the onset of symptoms lasts 12-36 hours (or several days if the toxin ingested is scarce). Can lead to death due to respiratory paralysis or cardiac arrest.

HAZARDOUS FOODS: preserves, sausages/salami, prosciutto ham, cheeses, smoked fish prepared at home or not properly prepared.

PREVENTION:

- 1) Preserve foods from possible contamination;
- 2) apply techniques and methods of preservation capable of destroying spores and impeding the production of the toxin;
- 3) destroy preserves that seem, in any way, altered, swelled boxes and jars with raised lids;
- 4) boiling 15 minutes destroys this toxin, but not the spores.

CLOSTRIDIUM PERFRINGENS

LOCATION: infected human and animal intestines, ground/soil.

RISK: in contaminated meats kept at temperatures that favor the multiplication of germs; the spores mutate to a vegetative form, which causes the food toxic infections after 9-24 hours from ingestion of the food, manifesting itself with diarrhea and abdominal pain.

HAZARDOUS FOODS: cooked meats (especially rolls prepared a few days before and not correctly refrigerated).

TEMPERATURES IMPEDING THE MULTIPLICATION OF CLOSTRIDIUM IN FOODS:
below +4°C; above +60°C

PREVENTION:

- 1) Thoroughly wash hands after using the bathroom;
- 2) keep cooked meats to be consumed hot at temperatures above +60°C;
- 3) keep cooked meats to be consumed cold, or to be heated before consumption, at a temperature at or below +4°C, making sure to cut into small pieces cooked, rolled meats, so as to also allow for rapid cooling of the internal parts, which are the most hazardous in terms of toxic infections.

HOW TO PREVENT FOOD CONTAMINATION

- ◆ Bacteria cannot be seen by the naked eye, however, the specific course they take to spread are well known. Therefore, we can take action during these courses.

Several examples

SALMONELLA

<u>Origin</u>	<u>Course</u>		
Chicken ovary	⇒ yolk and whites	⇒ food	⇒ humans
Chicken excrement	⇒ soiled egg shells	⇒ food	⇒ humans
Human feces with diarrhea from salmonella	⇒ unwashed hands	⇒ food	⇒ humans

STAPHYLOCOCCOUS

<u>Origin</u>	<u>Course</u>		
Oral cavity of healthy human	⇒ coughing	⇒ food	⇒ humans
Skin abscess	⇒ direct hand contact	⇒ food	⇒ humans
Oral cavity of human affected by pharyngitis (sore throat)	⇒ coughing	⇒ food	⇒ humans

- ◆ It is important to know the factors that condition the growth of microorganisms in food products, since interventions can be carried out on these to produce safe food products.

GROWTH FACTORS OF MICROORGANISMS



In order to grow and multiply, microorganisms required a favorable environment.

✓ Oxygen

Some bacteria are only capable of surviving in the presence of oxygen (aerobic bacteria) and, generally, the presence of oxygen (open cans, unprotected, unpacked foods, etc.) accelerate the deterioration process of food products. Others, instead, are capable of developing toxins, in the absence of oxygen, that are deadly.

✓ **Nutriments**

Food products can be generally considered an optimum vehicle for the development of bacteria, but are not similar in this regard. Particularly favorable are meat-based and egg-based foods.

✓ **Moisture**

Bacteria require water to live and multiply. Foods containing greater amounts of water, therefore, favor the growth of a bacteria.

The water contained in foods must, however, be available to bacteria. It must not be held by other substances present in solution, such as salt or sugar.

✓ **Degree of acidity**

Most bacteria grow better in foods that are not very acid, nor very alkaline. In general, an acidic food with a pH inferior to 4.2 is capable of impeding the multiplication of bacteria.

✓ **Temperature**

Temperature decisively influence the rate of bacterial growth.

Pathogen bacteria mostly (but not all) develop at a temperature close to the usual body temperature. Temperatures greater than +60-65°C are not capable of killing all microorganisms.

Higher temperatures, such as +75°C, in the core of the product, and kept at this level for 10 minutes (considered an adequate time), are capable of killing bacteria, and also allow for foods, such as chopped meat, chicken, and other staples, particularly subject to bacterial contamination, to be considered hygienically safe.

✓ **Time**

In order to multiply, microorganisms need time. In favorable conditions, they multiply every 20 minutes. For example, from a single bacterium, 57 million microorganisms are developed in 9 hours and 20 minutes, a number equal to the Italian population.

*In order to control the risk of multiplication, the following is necessary:

- 1) Preserve, at temperatures below +4°C, perishable food products containing milk and dairy products, egg-based creams, various types of yogurt, meats and fish, non-sterilized milk-based drinks, and gastronomic foods with gelatin covering;
- 2) regularly verify that the refrigerating equipment functions correctly, and that the preservation temperature of both raw materials and final products is correct;
- 3) maintain the cold chain, until the product is consumed;
- 4) cook foods so that the core of the product reaches a temperature of +75°C for 10 minutes;
- 5) maintain ready-to-eat dishes, to be consumed hot, at a temperature of +65°C.

PROPER WORKING HABITS

PULIRE



A) CLEAN

SANITIZATION

The objective of sanitizing is to destroy pathogen bacteria that may be present and reduce generic bacterial contamination to a minimum.

Facilities (floors, walls, ceilings), plants, equipment, and utensils must be kept in adequately clean conditions.



It is important to know that **sanitization** is the result of a correct succession of **deterging** and **disinfection**.

Deterging

Required to remove dirt, which is a nutriment for microorganisms, and is, in turn, constituted by:

- mechanical removal of crude dirt;
- initial rinsing with hot water at a temperature above +45°C, in order to melt fats/grease and favor their removal, but below +60°C, to prevent “cooking” proteins, sugars, or grease, making them stick more tenaciously to the surfaces that need cleaning;
- use of detergents: since most food residues (protein and fat) do not melt in water, in order to completely eliminate them, detergent must be used that detaches dirt from surfaces and allows it to be removed by rinsing;
- final rinsing with water, at tap water temperature, for at least 5 minutes if immersed.

Remember:



- a detergent solution must be prepared at the concentration recommended by the manufacturer (see label or technical form), since a solution that is overly diluted is inefficient, while a solution that is overly concentrated is useless and can corrode metal;
- an optimal temperature is approximately 45-55°C; at lower temperatures, fats/grease do not melt;
- contact time is usually 5-20 minutes (see label or technical form);
- it might be necessary to associate a mechanical intervention using a brush (“elbow grease”);

- if detergent residues are not rinsed, these might deactivate the properties of the disinfectant, which will be applied during the second phase and, however, detergent residues can alter the taste of the food products that will be produced successively;
- at the end of the production cycle, the cleaning process must not be postponed for more than one hour, in order to prevent dirt from drying, becoming tougher and stickier;
- removable parts of equipment must be removed before being cleaned;
- before beginning the cleaning process, all foods must be put in the refrigerator or storage;
- the cleaning procedures must be carried out from top to bottom, concluding with the floor;
- jets of water at high pressure (vapor cleaner) must not be used, since drops of moisture remain suspended in the air for a long period of time (up to 8 hours) and recontamination can occur on the surfaces that have been sanitized.

Disinfection

However, bacteria still remain attached to clean surfaces, which can multiply and reach a hazardous level for the foods that have to then be processed. To virtually reduce this risk to zero, a disinfection process must follow the deterging process.

Common disinfectants

Heat: (dishwashers, utensil sterilizers) rather inexpensive, hot water at +82°C for 2 minutes allows to destroy most microorganisms and does not leave residues.

N.B: bars, restaurants, lunchrooms must be equipped with automatic dishwashers, which guarantee that utensils and dishes be properly washed and disinfected.

Active chlorine products: (bleach) inexpensive and very active at +4°C (suitable in refrigerators) and for every increase of 10°C, their efficiency increases 50%, but above +35°C, they corrode metals; these must be left to take effect for 10-30 minutes (max); the presence of dirt deactivates these products.

Ammonia quaternary salts:(benzalkonium, benzoxonium) are active up to 100°C; these are not deactivated by dirt, in fact, they also possess a deterging action (these are so called “sanitizers”, since they deterge and disinfect simultaneously); these are difficult to rinse, and must be left to take effect for 15-30 minutes, in relation to the concentration of the active ingredient.

Remember:



- dilution is carried out according to the instructions of the manufacturer, since saving on disinfectants might cause the survival of bacteria at a hazardous level, yet, exaggerating with the main ingredient does not improve its efficiency and costs more;
- the disinfectant must be left to take action for the contact time required; if too short (to “finish quickly”) may make the disinfection process inefficient;
- it is recommended that the type of disinfectant be changed every three months, in order to prevent the selection of resistant bacteria;
- after applying the disinfectant, residues must be removed with a final rinse;
- if ventilation, temperature, and characteristics of the materials do not permit for a spontaneous rapid drying process, the surfaces must be dried in another manner, in order to prevent the multiplication of bacteria that favor a moist/humid environment;
- ammonium quaternary salts are not efficient on rubber;
- the label must be carefully read, particularly verifying if the following are indicated:
 - Disinfectant, Surgical Medical Presidium
 - Ministry of Health Registration N°
 - for use in food industries
 - amount and time of use
 - composition, manufacturer, lot, date of manufacturer
 - warnings on safety procedures for use

Sanitization of the following is recommended:

- ❖ All surfaces that come into contact with raw food (meat, fish, and eggs) ➤ At the end of each production cycle (6-8 hours)
- ❖ Floors, bathrooms, sinks, wastebaskets ➤ Every day
- ❖ Refrigerators, kitchen hoods, walls ➤ Every week
- ❖ Windows, doors ➤ Every month

EXTERMINATION (Pest control)

This practice eliminates insects and animals (mice and rats), which infest places lived by humans, particularly kitchens.

The most harmful among pests are:

- rodents (mice, rats, etc.)
- crawling insects (roaches, ants, etc.)
- flying insects (flies, wasp, beetles, etc.)
- birds
- other domestic animals (dogs, cats, etc.)

Roaches avoid light and prefer hot-humid places; they are active during the night and move in a zig-zag pattern, contaminating foods with their excrements and saliva, which they continuously emit due to a reflex regurgitation. Roaches can host pathogenic bacteria in their intestines.

Rodents search for food especially at night; they continuously drip urine, in order to trace a path of return to their dens and also leave excrements and hairs on foods and in the environment (hairs must be looked for along walls, since rodents never cross a room, but run along walls). Rodents can cause various illnesses through contact with their excrements and their parasites.

There are **ten signs indicating the presence of rodents**, which can be detected during an inspection:

- 1) fecal residues (different for each species)
- 2) prints (on dust, etc.)
signs of gnawing on packaging, packages, foods, electrical cables, etc. (their incisors grow continuously, therefore, they must file them by gnawing)
- 3) dens/nests (rare)
- 4) signs of passage (strips without grass, especially outdoors)
- 5) traces of grease
- 6) traces of urine (detectable also with fluorescent lamps)
- 7) dead or live mice
- 8) typical noises made by these rodents
- 9) smells (typical odor, especially that of domestic mice)

Preventing infestation (outside edifices)

Edifices must be kept in good maintenance conditions, so as to prevent access to animals and eliminate any potential places of reproduction. Holes, ducts, and other passages, to which animals can have access, must be properly sealed; windows that face outside must be equipped with a removable protective net (mosquito net), in order to prevent insects from entering.

Eliminating dens (inside edifices)

Inside edifices, all potential hiding places for animals must be eliminated, such as cracks and holes in walls and floors, and/or unused equipment. Other elements, such as electrical panels, passage points for pipes and cables and wires from one room to another, must be sealed.

In the event of false ceilings, these must, if possible, be hermetically joined to the walls and rooms, in order to facilitate cleaning procedures and prevent the risk of nests and dens. The space between a false ceiling and a real ceiling must be suitable for inspection and accessible, in order to eliminate any possible infestation.

PERSONAL HYGIENE



Human beings are natural vehicles for microorganisms, therefore, prevention must be taken so that these are not transmitted to foods.

Operators who work with food products must respect all norms regarding both management of work clothes, as well as those regarding personal hygiene

Work clothes

Lockers: work clothes must never come into contact with personal clothes, in order to prevent contamination of the latter with microorganisms from outdoors, therefore, the lockers must be double compartment lockers and must be kept clean, in order, and contain only indispensable items.

Shirts, jackets, pants: these must be light colored, in order to facilitate detecting dirt; they must be easily washable at high temperatures for a greater guarantee of cleanliness, therefore, they must be clean, in good condition, and kept closed in the lockers; objects that can accidentally fall on foods must not be kept in pockets (pens, clips, screwdrivers, etc.), and buttons must be sewed on properly. Models which are most suitable have snaps and internal pockets. Smocks must be the right size; if too big, they can be dangerous when working near moving machines (conveyor belts, pulleys, etc.).

Head cover: caps must be clean and must completely hold under all hair;

Gloves: must be kept intact, clean, and must be replaced and/or washed frequently (working with clean bare hands is better than working with dirty gloves);

Footwear: must only be used for work, in order to prevent introducing microorganisms from outside; must be integral and in clean condition.

Personnel

Skin, and particularly, all those body parts that remain necessarily uncovered, are surfaces that are naturally “inhabited” by microorganisms. Therefore, in order to reduce the risk of contamination, care must be given to hands, face, and hair.

One must:



Wash hands with liquid soap, hot running water, and must dry them with a disposable towel:

- Before beginning a work phase
- After having used the bathroom
- After having touched objects (telephone, light switches, handles, etc.)
- After nose blowing, sneezing, coughing, or having touched a boil/pimple
- After having touched or used a tissue
- After having touched body parts such as nose, eyes, mouth, ears, and hair
- After having touched egg shells or other raw foods
- After having touched packaging and any other non-food material
- In passing to different working stages
- After sanitization procedures
- After having touched waste/garbage

Never:



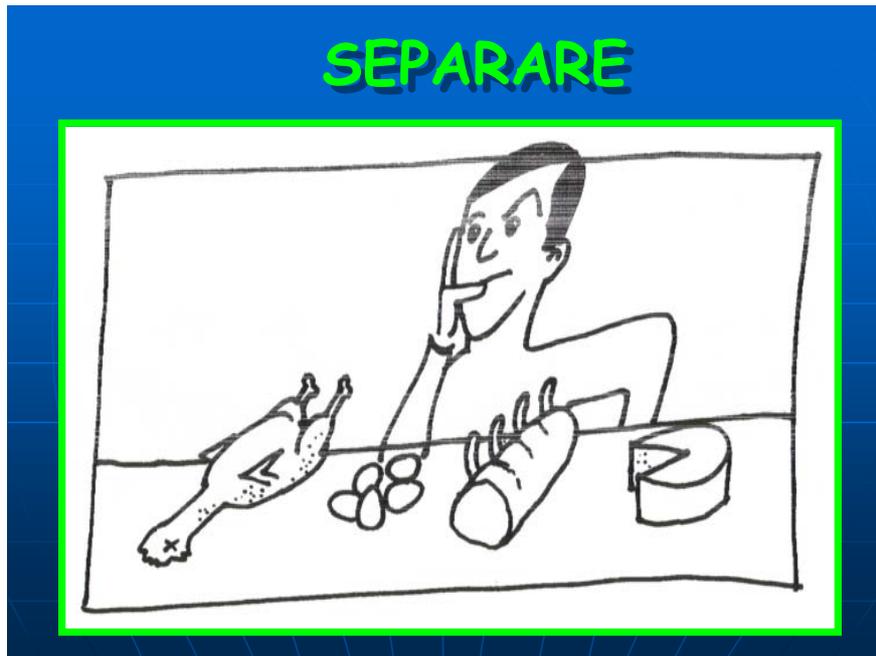
- Smoke
- Wear rings, bracelets, watches, earrings, and hair clips (these can be sources of contamination and/or fall in the food)
- Clean hands on smocks
- Eat or drink during the working stages
- Use toothpicks
- Taste food using fingers
- Touch ready-to-eat foods with hands
- Chew gum and eat candy

Furthermore, remember:



- Nails must be kept: short, clean, and without nail polish
- Wounds must be medicated and protected with integral water-proof gloves
- To remove labels or other similar material, do not moisten fingers with saliva
- Always notify the manager of any problems regarding infectious and contagious diseases (diarrhea, vomit, fever)

ORGANIZING WORKPLACES



B) SEPARATE

ORGANIZING WORKPLACES AND EQUIPMENT (LAY OUT)

This must be based on the "all forward" principle, that is, movement of the food products must proceed forward, from the raw material receiving sector, to the finished product delivery sector, without returning or crossing-over, since this can be a probable source of contamination.

Products must be kept in distinct or in sectors for each type or homogenous sector groups. The areas or sectors destined to non-food products must be kept distant and separate from food sectors. The same criteria must be followed when organizing refrigerator cells or closets. Refrigerator cells and freezers must always be kept perfectly efficient, periodically cleaned and disinfected, and properly equipped, in order to prevent mixing incompatible foods (vegetables, meats, poultry, etc. kept separate).

Spaces where raw products are handled must be divided from those where cooked foods are present. The working surfaces and product washing areas must be separated, in order to prevent foods contaminated at origin (egg shells soiled with excrements, vegetables, fruit from soil, and pesticides) from contaminating already "clean" food.

CUOCERE



C) COOK

Health safety is guaranteed when a food product reaches $+75^{\circ}\text{C}$ in the core of the product (that is, the most unfavorable point, since more difficult to reach with heat) for 10 minutes:

- Frying, boiling, stewing, grilling (as long as the food product is not excessively thick): these are cooking methods that automatically guarantee reaching a safe temperature.
- Instead, when oven cooking, the cooking programs must be selected, in relation to the recipe and the experience of the operator, verifying with a thermometer the core of the food product, or better, in an unfavorable point (this usually corresponds with the geometric center).
- Boiling stuffed pasta: special care must be taken regarding the length of time it remains in water, which begins to boil again after the food has been immersed in it, especially, when the food is frozen. In this case, the temperature in the core of the product must be checked at the end of the cooking time, and then standardize the cooking times. For other food products (ex. ragu, sauces, etc.), the cooking time (never less than 2 hours), is evaluated by observing the boiling time. The temperature must, however, reach the safety limit throughout the entire mass.

Reheating food: in an oven or over a flame, must consist in reaching the same parameters provided for by the cooking process, that is, $+75^{\circ}\text{C}$ in the core of the food product.

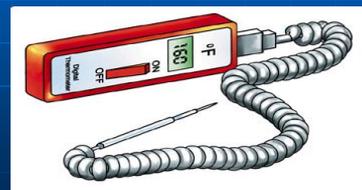
... senza possibilità d'errore per garantire una adeguata cottura ...



è necessario che il calore penetri fino al cuore dell'alimento



raggiungendo una temperatura uguale o superiore a 75°C al cuore del prodotto per almeno 10 min



CONSERVARE



D) PRESERVE

STORING NON-PERISHABLE FOODS

These can be stored at room temperature, lifted from the ground, however, always separate from areas or sectors destined to non-food products, such as detergents. In fact, the latter must be stored in special closed lockers/closets.

STORING PERISHABLE FOODS

Gli alimenti deperibili devono essere conservati mediante:

REFRIGERAZIONE

CONGELAZIONE

per evitare la moltiplicazione di microrganismi

• Preserving refrigerated foods

All perishable products must be constantly maintained in special refrigerating equipment (refrigerators or cells), and must be removed only the time required for the working process. Other types of food products must not be mixed together inside the refrigerators or cells.

Criteria: suitable refrigerating equipment is represented by:

- one for cooked products (indicative temperature = 0 - 4° C)
- one for meats (t = 0 - 4° C)
- one for vegetables (t = 5 - 10° C)
- one for cold cuts and dairy products (t = 0 - 4° C)

If the equipment does not meet these criteria, the separation of food products must absolutely be respected: inside a refrigerator, cooked foods are usually stored on the highest shelf, vegetables on the lowest shelf, without the possibility of reciprocal contamination.

In a refrigerator where food products are kept, which pertain to more than one of the four categories above listed, the temperature must be maintained at the level indicated for the category requiring the lowest temperature, making sure to evaluate the difference in temperature among the various shelves.

Cooked foods must always be stored in a refrigerator after being covered (even with plastic wrap) and must never be piled, that is, avoid any contact of food with the bottom of a container above it.

All refrigerator equipment must be maintained constantly efficient and ensure the required temperature.

Criteria: the following must be periodically checked:

- temperature;
- efficiency of defrosting functions;
- seal conditions.

The temperature must be checked (reading the special thermometers located on or in the refrigerators and cells) on a daily basis and, usually, at the same hour.

(N.B. a daily temperature inspection consists in a simple reading of the thermometer located outside or inside the refrigerating equipment. If not available, a thermometer must, however, be kept inside the refrigerator or cell.)

• Preserving frozen – deep frozen foods

Freezers must be maintained constantly efficient and ensure the required temperature, usually, -18° C.

The same criteria described for refrigerators are the same for freezers, in relation to checking daily temperatures, seals, and annual or select maintenance in the event of a malfunction, with relevant documents.

Specifically regarding freezers used for storing frozen or deep-frozen foods, the temperature must reach -18°C, in compliance with Law D.M. 15/06/71. If not storing particularly large quantities of products, more than 1 freezer is not required, although it is best to have another freezer for emergencies. Food products must, however, be kept in order and must not come into contact with each other.

- **Cooling food foods**



This must be carried out in the least time possible, and the parameter to respect is that of reaching a core temperature lower than +10°C in a maximum time of 2 hours.

The cooling process can be correctly performed using a **temperature reducer**.

- **Maintaining hot temperatures**

Until served or consumed, foods must maintain a temperature above +60°C. The methods used are:

- a. on an oven at a minimum temperature
- b. over a low flame
- c. in a dish-warming cart
- d. in a counter, in a double saucepan (bain-marie) nel banco a bagnomaria (self-service type);
- e. in isotherm containers

- **Cold production**

This includes the preparation of food products, such as cold cuts, dairy products, vegetables, and preserves. These dishes are usually prepared right before serving. If the kitchen requires advanced preparation, dishes must be stored in a refrigerator at +4°C while waiting to be served.

- **Freezing**

Already refrigerated food products, in small portions, arranged in thin layers, not overlapping nor piled together, must be frozen using a temperature reducer or a freezer, using the “rapid freeze” method, in which no other food products are preserved. After having labeled the products, specifying the product type and date they were frozen, they can be preserved in a cell or in a freezer along with other food products. During the freezing process, new food products that require freezing cannot be introduced in the cell or freezer, therefore, the food products that were previously frozen must first be transferred to storage before introducing these new food products. Foods that are defrosted, in part or in whole, must never be frozen again. Mushrooms must be frozen after being cooked, since several types of mushrooms contain toxic substances that become more stable if the product is frozen when still raw. Freezing fresh meats and fish with equipment normally used in ordinary kitchens is not recommended.

TEMPERATURE DI CONSERVAZIONE DI ALCUNI ALIMENTI DPR 327 / 80

ALIMENTO	T C°
Deperibili con copertura e farcitura con derivati di latte e uova (creme)	0 - +4°C
Prodotti cotti (creme)	0 - +4°C
Burro	0 - +4°C
Latte fresco pastorizzato	0 - +4°C
Uova fresche	0 - +4°C
Salumi	0 - +6°C
Verdure fresche	+6 - +8°C
Vegetali surgelati	<-18°C
Scatolame - Zucchero - Farina	Luogo fresco
Prodotti surgelati	<-18°C
Prodotti congelati	<-15°C
Ovoprodotti surgelati	<-18°C
Ovoprodotti congelati	<-12°C
Ovoprodotti refrigerati	0 - +4°C
Gelati semifreddi	<-18°C