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Nursing Q-Bank Series

For BSc Nursing Students

Applied Nutrition, Dietetics & Biochemistry

As per the Revised INC Syllabus



HIGHLIGHTS

- Various University Examination Question Papers
- Learning Pearls
- Image-based Questions

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UNIT 10: COOKERY RULES AND PRESERVATION OF NUTRIENTS

Note: *In this Unit we have covered following questions. These questions are taken after detailed analysis from the questions bank of various universities.*

LONG QUESTIONS

Sl. No.	Question	Marks
Q1.	Explain the principles and various methods of cooking. And also discuss its effects on cooking.	6 + 4 = 10
Q2.	Define food adulteration. Discuss its types of adulterants and legislative measures to control it.	2 + 4 + 4 = 10
Q3.	Describe personal hygiene of food handlers. Explain the signs of good meat hygiene and hygiene of slaughterhouses.	2 + 4 + 4 = 10

SHORT QUESTIONS

Sl. No.	Question	Marks
Q1.	Effect of cooking on food.	5
Q2.	Food hygiene.	5
Q3.	Food additives and safety standards.	5
Q4.	Golden rules to prevent loss of vitamins.	5
Q5.	Food preservation.	5
Q6.	Canning procedure.	5

VERY SHORT QUESTIONS

Sl. No.	Question	Marks
Q1.	List down the factors to be considered while selecting cooking method.	2
Q2.	4'Cs of safe food handling.	2
Q3.	Objectives of cooking.	2
Q4.	Central Food Technological Research Institute (CFTRI).	2
Q5.	AGMARK standard.	2
Q6.	Consumer Protection Act.	2
Q7.	Name some household methods of food preservation.	2
Q8.	FAO.	2

MULTIPLE CHOICE QUESTIONS

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UNIT 10

COOKERY RULES AND PRESERVATION OF NUTRIENTS

LONG QUESTIONS

Q1 Explain the principles and various methods of cooking. And also discuss its effects on cooking.

Ans: Cooking is a process of making food edible. It also helps in improving the taste, texture, color and health benefit of the food.

Principles of Cooking

- **Cooking sterilize the food:** In cooking, we apply heat more than 40° C to the food items that help in destroying the pathogenic organism and make it safe for consumption.
- **Cooking soften the connective tissue:** Food items like meat, coarse fibers of cereals, pulses, and vegetables get soften with heating which make it more palatable.
- **Improve the quality of food:** Cooking improve the appearance, texture, taste, and palatability of the food items.
- **Introduce variety:** Different dishes can be prepared with same ingredients, for example, rice can be used to make fried rice, pulao, biryani, etc.
- **Increase food consumption:** Cooking improve the taste and make it easy to digest thus help in increasing the digestibility of the food.
- **Increase availability of nutrients:** For example, the protein in cooked eggs is 180% more digestible than that of raw eggs.

Cooking Methods

- **Steaming:** In this method, pressure cooker or a steamer is used to cook food in steam. For example, pulses and rice.
- **Baking:** It is a method in which food is cooked by dry heat in hot oven cooking temperature is 250–500°F. For example, biscuits.
- **Roasting:** In this method, open flame is used to cook food. For example, potato, brinjal, meat, etc.
- **Grilling:** In this method, food is cooked by direct heat. For example, tandoor, paneer tikka, etc.
- **Boiling:** In this process, food is immersed in hot water and then cooked. For example, boiling eggs, pulses and vegetables.
- **Stewing:** It is somewhat similar to the boiling method with little difference that is, in stewing very little water is added in the food along with application of low heat for extended period of time.

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- **Frying:** It is of two types shallow frying and deep frying.
  - *Shallow frying:* In this method, little oil is added to cook the food. For example, omelet, dosa.
  - *Deep frying:* In deep frying, food items are completely immersed in oil and then it is cooked which absorb lot of oil. For example, making puri, pakoras, etc.
- **Grilling:** In ancient time, people used to cook food over hot charcoal on an open fire. The food is placed on top of the burning charcoal. Slowly people improvise by using wire mesh and place it over the open fire to grill fish or vegetables. The other method is using grills that are inbuilt in stoves.

Effect of Cooking

Sl. No.	Method of cooking	Explanation	Nutritional changes
1.	Baking	Uses indirect heat to cook food from all sides in an enclosed space. This method is typically used for desserts, breads, and layered dishes	Most of the vitamins and minerals get lost except vitamin B
2.	Broiling	Cooks food by absorbing heat from above	Most of the vitamins and minerals get lost except vitamin B
3.	Grilling	Uses radiant heat to cook food quickly directly over a heat source	Vitamin B get denatured and lost
4.	Roasting	Uses indirect heat to cook food from all sides for even browning	Most of the vitamins and minerals get lost except vitamin B
5.	Sauteing	Uses a small amount of oil or fat to coat food for even browning	Cooking for a short time without water prevents loss of vitamin B
6.	Frying	Involves immersing food in hot oil or fat	• Preserve vitamin B and C • Increase the amount of fiber in potatoes • Degrades omega 3 fatty acid content
7.	Braising	Involves searing meat and then transferring it to a larger pot to cook in hot liquid	Retains nutritive value, braising can make meat stews very tender and rich in taste. Comforting dish, perfect dish for cold places. Stress free cooking
8.	Stewing	Involves completely submerging food in hot liquid	Retain nutritive value of food. Make food palatable. Water-soluble vitamins like vitamin C get lost
9.	Boiling	Involves immersing raw ingredients in water until it reaches boiling point	Destroy vitamin C as it is water-soluble and sensitive to heat
10,	Poaching	Helps to tenderize the fibrous structure of the food	Poaching allows the protein in food to denature slowly without squeezing out moisture
11.	Microwaving	A more recent innovation	Preserve most nutrients. Short cooking time

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Q2 Define food adulteration. Discuss its types of adulterants and legislative measures to control it.

Ans:

Food adulteration means adding some nonedible substances to the food that make its unhealthy and unsafe. These substances are called adulterants.

Adulterants are the substance or poor quality products added to food items for economic and technical benefits. Addition of these adulterants reduces the value of nutrients in food and also contaminates the food, which is not fit for consumption. These adulterants can be available in all food products which we consume daily, including dairy products, cereals, pulses, grains, meat, vegetables, fruits, oils, beverages, etc.

Example: Milk can be diluted by adding water to increase its quantity and starch powder is often added to increase its solid content.

Main Reasons for Food Adulteration

- Practiced as a part of the business strategy.
- An imitation of some other food substance.
- Lack of knowledge of proper food consumption.
- To increase the quantity of food production and sales.
- Increased food demand for a rapidly growing population.
- To make maximum profit from food items by fewer investments.

Types of Food Adulteration

- **Intentional adulteration:** The adulterants are added as a deliberate act with intention to increase profit. *Example:* Sand, marble chips, stones, chalk powder, etc.
- **Incidental adulteration:** Adulterants are found in food due to negligence, ignorance or lack of proper facilities. *Example:* Packaging hazards like larvae of insects, droppings, pesticide residues, etc.
- **Metallic adulteration:** When the metallic substances are added intentionally or accidentally. *Example:* Arsenic, pesticides, lead from water, mercury from effluents, tins from cans, etc.

Prevention of Food Adulteration Act

The Prevention of Food Adulteration Act, 1954 extends to the entire country of India and it came into effect on June 15th, 1955. The Act defines adulteration or deems an item to be adulterated when:

- If the item sold by the vendor does not meet the standards of the customer or the standards the article purports to be.
- If the item contains any element that lowers the quality of the article.
- If the article has been manufactured or stored in unhygienic conditions.
- If the item contains any element that is unfit for human consumption, such as putrid, decomposed or rotten plant or animal substances.
- If the article contains an element taken from a diseased animal.
- If the article contains any poisonous or injurious substances.
- If the container of the article is made up from any injurious substance.
- If any coloring agent other than the prescribed ones are added in the article.

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- If the article consists of any prohibited preservative or preservative quantity above the prescribed limit.
- If the quality and purity of the article does not meet the standards set by the committee whether it is injurious or noninjurious to health.

Legislative Measure to Control Food Adulteration

1. Strengthening Regulations and Enforcement

- Develop and enforce stringent food safety regulations with clear guidelines and standards.
- Establish a robust regulatory framework to monitor the entire food supply chain, including inspections, testing, and audits.
- Increase penalties and punishments for offenders involved in food adulteration, including fines, imprisonment, and license revocation.
- Enhance cooperation between regulatory authorities, law enforcement agencies, and judicial systems to ensure swift and effective enforcement of regulations.
- Implement regular inspections and audits of food production and processing facilities to ensure compliance with safety standards.

2. Enhancing Testing and Quality Control

- Establish well-equipped and accredited laboratories to conduct regular and comprehensive testing of food samples for adulteration.
- Implement strict quality control measures throughout the food supply chain, including raw material sourcing, processing, packaging, and distribution.
- Encourage the use of advanced technology, such as DNA testing and spectroscopy, to detect adulterants accurately and efficiently.
- Develop robust surveillance systems to monitor the prevalence of food adulteration, identify high-risk areas, and take prompt corrective actions.

3. Promoting Public Awareness and Consumer Education

- Launch public awareness campaigns to educate consumers about the risks associated with food adulteration and ways to identify adulterated products.
- Empower consumers to make informed choices by providing accessible information about food safety, labeling requirements, and reputable brands.
- Encourage consumers to report suspected cases of food adulteration to the relevant authorities, fostering a culture of accountability and vigilance.

4. Strengthening Supply Chain Management

- Promote transparency and traceability in the food supply chain by implementing mechanisms, such as batch tracking, barcoding, and electronic documentation.
- Encourage the adoption of Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP), and Hazard Analysis and Critical Control Points (HACCP) systems to ensure the integrity of food production and processing.
- Facilitate partnerships and collaboration between producers, suppliers, distributors, and retailers to share best practices and ensure compliance with quality standards.
- Conduct regular training and capacity-building programs for stakeholders involved in the food supply chain, emphasizing the importance of food safety and quality.

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5. Strengthening International Cooperation

- Foster international collaboration to address the global challenge of food adulteration, including information sharing, best practice exchange, and harmonization of standards.
- Promote cooperation between countries in sharing technologies, expertise, and resources to enhance food safety and combat cross-border adulteration.

6. Encouraging Responsible Business Practices

- Promote ethical business practices by recognizing and rewarding companies that prioritize food safety and quality.
- Encourage industry self-regulation and voluntary initiatives to ensure the integrity of food products.
- Foster partnerships between the private sector, government, and civil society to develop and implement industry-wide codes of conduct and best practice guidelines.

7. Collaborative Development of Codes of Conduct

Engaging various stakeholders in the development of codes of conduct ensures inclusivity and a comprehensive approach. Private sector entities, industry associations, and enforceable standards that address key areas of concern in the food industry. These codes of conduct should outline guidelines for ingredient sourcing, manufacturing processes, labeling requirements, and quality assurance procedures. They should also emphasize the importance of transparency, accountability, and compliance with relevant regulations.

8. Implementation of Best Practice Guidelines

Once industry-wide codes of conduct are established, it is essential to provide practical guidance to businesses on implementing these standards effectively. Best practice guidelines can offer specific recommendations and processes to ensure compliance with the codes of conduct.

These guidelines may include measures, such as regular internal audits, employee training programs, quality control protocols, and supplier verification procedures. Emphasizing the importance of traceability and record-keeping can also contribute to the prevention and detection of food adulteration.

9. Monitoring and Compliance Mechanisms

To ensure the effectiveness of industry-wide codes of conduct and best practice guidelines, robust monitoring and compliance mechanisms should be put in place. Independent auditing bodies or regulatory agencies can oversee the implementation of these standards and conduct regular inspections of food businesses to assess their compliance.

Noncompliance with the codes of conduct should be met with appropriate consequences, such as warnings, fines, or suspension of licenses. Transparent reporting mechanisms that allow stakeholders and consumers to report suspected noncompliance can also help maintain accountability.

10. Recognition and Incentives

Recognizing and rewarding businesses that demonstrate exemplary adherence to industry-wide codes of conduct and best practice guidelines can serve as a strong incentive for responsible behavior. Certifications, awards, or labels indicating compliance with high standards of food safety and quality can enhance a company's reputation and consumer trust.

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11. Public-Private Partnerships and Consumer Engagement

Public-private partnerships play a crucial role in encouraging responsible business practices. Collaboration between government entities, private sector organizations, and civil society can strengthen the implementation and monitoring of industry-wide codes of conduct.

These partnerships can facilitate information sharing, joint initiatives, and coordinated actions to address food adulteration effectively. Consumer engagement is also vital, as informed and empowered consumers can drive demand for responsibly produced and transparently labeled food products.

12. Research and Development

Encouraging responsible business practices in the food industry requires ongoing research and development efforts. Collaborative research initiatives involving public and private entities can focus on developing innovative technologies, methodologies, and strategies to prevent and detect food adulteration. This can include advancements in testing methods, traceability systems, and quality control measures.

13. Cross-sector Collaboration

Responsible business practices can be fostered through cross-sector collaboration among different industries and sectors.

Q3 Describe personal hygiene of food handlers. Explain the signs of good meat hygiene and hygiene of slaughterhouses.

Ans: Good personal hygiene of the food handler plays an important role in preventing food contamination that majority of times results in food poisoning. The main aim is to ensure food safety, prevent food contamination, and maintain the quality of food products.

Principles of Food Handling

- **Personal hygiene:** Maintain proper personal hygiene by washing hands frequently with soap and water, wearing clean clothing, and using appropriate protective gear like gloves and hairnets.
- **Cross-contamination prevention:** Store separately raw meats, poultry, and seafood to avoid cross-contamination. Use separate cutting boards, utensils, and work areas for different food types.
- **Temperature control:** Cook food to the appropriate internal temperature to kill harmful bacteria. Keep hot foods hot (above 140°F or 60°C) and cold foods cold (below 40°F or 4°C).
- **Safe food storage:** Store perishable foods in the refrigerator to slow down bacterial growth. Use proper storage containers to prevent moisture and odor transmission.
- **Thawing practices:** Thaw frozen foods safely in the refrigerator, under cold running water, or using the microwaves defrost setting. Avoid thawing food at room temperature.
- **Cleaning and sanitizing:** Maintain a clean and sanitized environment by regularly cleaning and sanitizing cutting boards, utensils, and surfaces. Use food-safe cleaning agents.
- **Allergen management:** Prevent cross-contact with allergenic ingredients by using separate equipment, utensils, and storage areas. Clearly label allergenic ingredients.

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- **Avoiding time-temperature abuse:** Minimize the time perishable foods spend in the "danger zone" (40°F–140°F or 4°C–60°C) where bacteria can multiply rapidly.
- **Cooking and reheating:** Ensure that food is cooked thoroughly and evenly. Reheat cooked food to at least 165°F (73.9°C) to eliminate any bacteria that may have developed.
- **Labeling and dating:** Clearly label foods with their contents and date of preparation or storage to track their freshness and prevent using expired items.

Signs of Good Meat

- The color of the meat should neither be of pale pink nor a deep purple tint.
- Pale pink color indicates that the animal was suffering from a wasting disease.
- On the other hand deep purple tinge would mean that the animal had died with the blood in it and had suffered from acute fever because of which the flesh becomes febrile.
- It should emit little or no odor and the odor should not be offensive. Diseased meat gives a sickly cadaverous (like a corpse) smell.
- It should be firm and elastic to touch and should moisten the fingers. Bad meat is wet, sodden (soaked with liquid or moisture) soaking and flabby.
- The bone marrow should be firm, solid and light rosy red. Soft or brownish marrow or marrow with black spots indicates that animal was sick or else putrefaction has set in.
- Putrefaction makes the meat pale, moist soft and emits sickly and offensive odor. Due to all these, the meat gradually becomes greenish.

Hygiene of Slaughterhouse

- **Location:** It should be made preferably away from the residential areas.
- The floors and walls of slaughterhouses should be up to **3 feet**. Wall should be impervious and easy to clean.
- Water supply should be continuous, independent and adequate.
- Proper antemortem and postmortem should be arranged by qualified veterinary staff.
- Meat should be stored in fly proof and rat proof rooms.
- **Environmental hygiene:** Environmental hygiene practices will depend on the area where the slaughter house/meat plant is situated. The main principles of environmental hygiene will consist of:
  - *Proper fencing (public, dogs, etc.):* To prevent access of unauthorized persons, the public, dogs and other animals fencing must be erected around the slaughterhouse area. The fencing should have contact with the ground at the lower edge and should be high enough to prevent access to the grounds.
  - *Pest control (rodents, insects):* It should be controlled to prevent their access to slaughterhouses, production areas and storage departments. This is best achieved by the construction of buildings and working places where access of insects, rodents and birds is hindered, but it will be almost impossible to secure buildings totally against pests.
  - *Insect control:* Burning and sticky adhesives are examples.
  - *Liquid and solid waste disposal:* Handling of liquid and solid waste influences both hygiene in processing and of the environment, the later depending on the precautions taken to avoid contamination with liquid and solid waste.
  - *Meat shall be transported in fly proof covered van.*

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SHORT QUESTIONS

Q1 Effect of cooking on food.

Ans: Cooking has a significant impact on the nutritional value, safety, taste, texture, and digestibility of food. Here are some of the key effects of cooking on food:

1. Nutrient Changes

- **Loss of heat-sensitive nutrients:** Vitamins, such as vitamin C, B vitamins (like thiamine and folate), and some antioxidants are sensitive to heat and can be destroyed or reduced during cooking.
- **Enhanced nutrient absorption:** Cooking can improve the bioavailability of certain nutrients, such as lycopene in tomatoes and beta-carotene in carrots, making them easier for the body to absorb.
- **Mineral retention:** Minerals like iron, calcium, and zinc are generally less affected by cooking, though their content can decrease with prolonged cooking or water-based methods.

2. Food Safety

- **Reduction of harmful bacteria:** Cooking at high temperatures helps kill harmful pathogens like bacteria, viruses, and parasites, making food safe to consume.
- **Elimination of toxins:** Certain foods contain natural toxins (like lectins in beans) that can be neutralized through proper cooking.

3. Digestibility and Palatability

- **Improved digestibility:** Cooking breaks down tough fibers and proteins in foods, making them easier to chew, digest, and absorb.
- **Enhanced flavor and texture:** Cooking develops complex flavors, aromas, and textures that make food more enjoyable. Methods like roasting, grilling, and sautéing bring out the natural sweetness and savory qualities of foods.

4. Loss of Water-soluble Nutrients

Nutrient leaching in water: Cooking methods like boiling can cause water-soluble vitamins (vitamin C and B) to leach into the cooking water, leading to nutrient loss. To minimize this, steaming or using the cooking liquid in soups can be beneficial.

5. Changes in Fat Content

Fat addition or reduction: Frying can increase the fat content of food, while methods like grilling.

Q2 Food hygiene.

Ans:

Definition

Food hygiene is defined as all conditions and measures necessary for maintaining the safety and suitability of food at all stages of the food chain. Hygienically prepared food not only makes it safe to eat but also prolong its life.

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Following are the techniques one should follow for good food hygiene:

- Food handlers have excellent personal hygiene and that unconscious body habits are strictly monitored.
- **Hand washing:** Always wash hands with soap and water before handling food. This is the most important thing to prevent the spread of germs and bacteria.
- Tasting food is done in a hygienic manner, i.e., tasting spoons should be used and thoroughly washed between samples. Never use fingers for tasting.
- Unnecessary human contact with food is avoided.
- Tongs, scoops, spoons, disposable gloves should be used whenever possible.
- Raw and cooked foods should be kept separate.
- Hands, utensils and equipment are thoroughly cleaned between tasks to minimize the risk of contamination.
- Thoroughly wash fruits and vegetables before use with plain water; never use bleach or soap or any commercial product for washing. Also rinse fruits and vegetable before peeling.
- Always use separate cutting boards and plates for meat, poultry, seafood, and eggs.
- Use separate plates and utensils for cooked and raw foods.

Q3 Food additives and safety standards.

Ans: Food additives are the substances which when added to the food help to maintain or improve its safety, freshness, taste, texture, or appearance. It can be added as flavorants, nutrients, preservatives, emulsifiers or colorants.

In addition, foods may contain residues of chemicals used during the production of plant and animal crops, including pesticides, growth hormone and antibiotics. The most important advantage is it improves the nutritive value of food and also increases the life of food items.

Purposes

- To improve the quality of food items by improving its taste, appearance, life, etc.
- Additives are added during the processing, packaging or storing of food items.
- Preservatives are additives that inhibit the growth of bacteria, yeast, and moulds in food.
- To fortify or enrich the food.

Type of Additives

1. Flavors and sweeteners
2. Antioxidant
3. Preservatives
4. Food colors
5. Fat emulsifiers and stabilizing agents
6. Flour bleaching agent
7. Nutritional supplements, such as vitamins, minerals, and amino acids

Function of Food Additive

- Food gives a smooth and consistent texture.
- Food emulsifiers prevents liquid food items from separating.
- Stabilizers and thickeners provide an even texture to the food, also prevent sediments in liquids.

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- Anticaking agents allow substances to flow freely.
- Flavoring agents add taste or fragrance to the food and make it more edible.
- Coloring agents improve the appearance of food and make it more attractive.
- Antioxidants slow down the oxidation of fat in food.
- Preservatives slow down the growth of bacteria of fungi.

Disadvantages

Some food additives can cause health issues, such as:

Digestive disorders	Diarrhea and colicky pains
Nervous disorders	• Hyperactivity, insomnia, and irritability • Headaches and migraines
Respiratory problems	Asthma, rhinitis, and sinusitis
Skin problems	Hives, itching, rashes, and swelling
Hormonal interference	Impact growth and development
Mental health disorders	Attention deficit hyperactivity disorder (ADHD), behavior changes
Cardiovascular disease	Heart attack, coronary artery disease (CAD)

Safety and Public Health Significance

- The toxicity of food additives is generally low. The major food safety concern of food additives is in fact due to their chronic exposure at levels above the safety reference.
- **Codex Alimentarius:** Principal organ of the joint FAO/WHO food standard programme for international market.
- **Prevention of Food Adulteration (1954):** PFA aims to prevent **adulteration** and sets **food** standards. The document defines **food adulteration** and standards under the **act**.
- **The Joint Food Agriculture Organization/World Health Organization Expert Committee on Food Additives (JECFA)** is the international food safety authority responsible for collecting and evaluating scientific data on food additives and allocate a safety reference [i.e., acceptable daily intake (ADI)] to the food additives evaluated. JECFA also makes recommendations on safe levels of use.

Q4 Golden rules to prevent loss of vitamins.

Ans: Following are golden rules to prevent loss of vitamins:

- Wash vegetables before cutting them so that minerals and vitamins are not destroyed.
- When peeling the skin of vegetables, do peel as thinly as possible. Nutrients in fruits and vegetables are concentrated just below the skin, so peeling before boiling increases the loss of vitamin C, folic acid and other B-vitamins. The peels of carrots, radish and ginger can be scraped instead of peeling. Peel only when absolutely necessary.
- Do not cut vegetables into very small cubes as each small part comes in contact with oxygen destroying vitamins.
- Do not soak vegetables in water for long time to prevent discoloration. Almost 40% of the water-soluble vitamins and minerals are lost in the soaking water. If you must soak, use up the soaking water to knead dough, prepare soups and gravies.
- Root vegetables should be boiled with skins on and then peeled after boiling. This helps the nutrients to migrate in the center of the vegetables helping better retention of its nutrients.
- Salads should be prepared just before serving and should be served in closed dishes to avoid excessive exposure to air.

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- Do not throw away the excess water drained after boiling foods. When preparing cottage cheese, the leftover water after curdling is called whey. It is extremely rich in good quality proteins and vitamins and should be used up in preparing gravies, kneading or simply can be had as a refreshing drink after flavoring with lemon juice, salt and pepper.
- Do not keep milk open or exposed to light as considerable destruction of riboflavin can occur.
- Baking soda makes cooking water alkaline and thus helps retain the color of the vegetables as well as speeds up the cooking process but it destroys thiamin and vitamin C and hence should not be used.
- Cooking vegetables when exposed to atmosphere before serving may also result in loss of vitamin C. It is preferable to cook vegetables in minimum amount of water, keeping the vessel covered and to consume it as soon as possible. Reheating cooked food further destroys vitamins.
- Do not use copper utensils for cooking. Copper destroys vitamin C.
- Cook food for the minimum required time because longer we cook the foods, more are the nutrients lost.
- Use of acid foods, such as lime juices, tomatoes, vinegar or yoghurt as dressings in salads prevents loss of vitamin C as it is stable in acid medium.
- Use lids while cooking foods as it saves fuel as well as volatile flavors and nutrients.
- Cut the foods, e.g., potatoes after boiling as less portions of the foods will be exposed to heat and water.
- When cooking meat, poultry and fish, use shortest cooking time needed. Cooking proteins at high temperature or for a longer time can cause decrease in digestibility of proteins and denaturation.
- During barbequing, add back the juices that drip from the meats as these juices often contain a lot of vitamin B.
- Try to finish cooked foods within a day or two because nutrient content like vitamin C may continue to destroy when the cooked food is exposed to air. Ultimately, it can be said that there is no perfect method of cooking that retains all the nutrients. Each has its own pros and cons.

Q5 Food preservation.

Ans: Food preservation is the technique to prevent food from spoilage, food poisoning, and microbial contamination in food. Food preservation, on the other hand, is done to preserve food for a longer time.

Principles of Food Preservation

- **Prevention or delay of microbial decomposition**: This is done by removing air, moisture, lowering or increasing temperature, increasing the concentration of salt or sugar or acid in foods. For example, if you want to preserve green leafy vegetables, you have to remove the water by drying from the leaves so that micro-organisms cannot survive.
- **Preservation or delay of self-decomposition of food***:* This is done by destroying or inactivating the enzymes present in the food items. For example, boiling the fruits and vegetables inactivate the enzymes present in it.
- **Preservation by radiation***:* The food irradiation process is called cold sterilization or pasteurization because this process does not produce significant heat; therefore, nutritional and organoleptic properties are preserved compared to other thermal techniques.
- **Removal of insects, worms and rats:** This is done by storing food in dry, airtight containers the insects, worms or rats are prevented from destroying it.

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Objectives of Food Preservation

- To prevent microbial contamination
- To kill pathogens
- To minimize food spoilage and food poisoning

Methods of Food Preservation

1. Physical Methods

a. Preservation by low temperature

- **Refrigerator:** Refrigerators have very low temperature (0–5°C). Since microbes do not get optimum temperature they need for growth, their growth is inhibited. Pasteurization developed by Louis Pasteur is used until today to preserve milk.
- **Freezing:** The temperature of freezer is -18 to -40°C. Microbial growth is prevented completely and the action of food enzymes greatly reduced. Foods like poultry, meat, fish, peas, vegetables, juice concentrates can be preserved for several months by this method.

b. Preservation by high temperature

- **Pasteurization:** Pasteurization involves heating liquids at high temperatures for short amounts of time.
- **Canning:** It is the process in which the foods are heated in hermetically sealed (airtight) jars or cans to a temperature that destroys microorganisms and inactivates enzymes that can cause food spoilage. The food contents are sealed in an airtight container at high temperatures. Meat, fish and fruits are preserved by canning.

c. Preservation by Drying

Food preservation by drying is one of the oldest methods practiced from ancient times. Sun drying, drying by mechanical driers and freeze drying are the various methods of drying.

d. Preservation by Irradiation

It is also known as cold sterilization in which food are bombarded with high energy gamma rays to kill bacteria, fungi and insects.

2. Chemical Methods

- **High concentration of salt:** Reservation by salt is known as salting. Salting helps to preserve fruits for a long term. Meats and fishes can also be preserved by salting.
- **High concentration of sugar:** Sugar is another common preservative used in jams and jellies. Sugar is good moisture absorbent. By reducing moisture content, it restrains the microbial growth.
- **Using chemical preservatives:** Other preservatives include vinegar, sodium benzoate, sodium metabisulfite, etc.

Q6 Canning procedure.

Ans: Canning is a preservation method that involves keeping food in a jar or similar container and heating them to a temperature that destroys microorganism which causes food to spoil. During this heating process air taken out and an airtight seal is formed which prevents its spoiling and increases its life span too. It is suitable for both high and low calories food items.

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The General Steps to be Adopted for Canning Foods

1. **Cleaning:** It is the first step in canning. Thorough cleaning of the product to be canned helps to remove most of the spoilage organisms.
2. **Blanching:** This process serves as an additional hot water wash. It inactivates the food enzymes and fixes the natural color of the product. It also softens the fibrous plant tissues and facilitates removal of skin. In this process the raw food material is immersed in hot water or exposed to live steam for 2–5 minutes and immediately dipped into cold water to prevent further exposure to heat.
3. **Filling:** Either manually or by using machinery the contents can be filled in the cans. A headspace of 6–9 mm depth above the level of food in the can must be left.
4. **Exhausting:** Gases are expelled by passing the open can containing the food through an exhaust box in which hot water or steam is used. It expands the food and expels air and other gases from contents and also from the head space area of the can.
5. **Sealing:** The exhausted containers are immediately sealed to avoid recontamination.
6. **Sterilization:** To bring about complete sterilization, thermal process is carried out. This ensures the destruction of spoilage microorganisms. This is usually done by the application of steam under pressure.
7. **Cooling:** The containers are cooled rapidly to check the action of cooling prevent unnecessary softening of the food or change in the color of the contents. It can be done by means of air or water.
8. **Labeling:** The containers are labeled with nutritional characteristics of the food inside.

VERY SHORT QUESTIONS

Q1 List down the factors to be considered while selecting cooking method.

Ans: Factors to be considered while selecting cooking method are as follows:

- The type of fuel
- The type of food
- Personal taste and preferences
- Cost
- Culture and religion
- Dietary needs
- Quantity
- Temperature
- Shelf-life
- Desired effect
- Number of people to serve

Q2 4' Cs of safe food handling.

Ans: The 4' Cs of safe food handling are:

1. **Clean:** Regular and thorough cleaning helps remove dirt, bacteria, and contaminants from surfaces that come into contact with food.
2. **Cook:** Proper cooking is essential to kill harmful bacteria and pathogens that may be present in raw food.
3. **Chill:** Chilling, is crucial to slow down the growth of harmful bacteria. Perishable foods should be promptly refrigerated at 40°F (4°C) or below to prevent bacterial multiplication.

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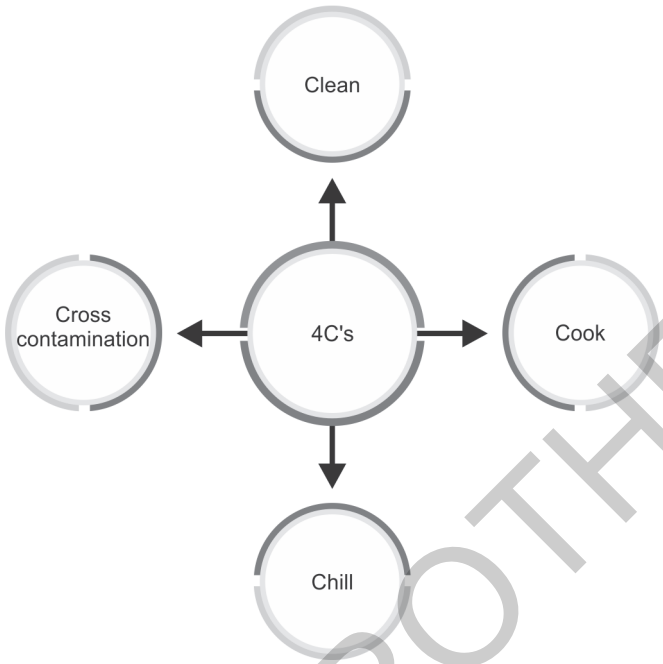


Fig. 10.1: 4' Cs of safe food handling.

4. **Cross-contamination prevention:** Avoid cross-contamination by keeping raw meats, poultry, seafood, and produce separate during storage, preparation, and serving.

Q3 Objectives of cooking.

Ans: The main objectives of cooking are:

- To make the food digestible
- To improve the taste and flavor of the food
- To retain the nutritive value of the food to the maximum
- To make the food safe healthy

Q4 Central Food Technological Research Institute (CFTRI).

Ans: CSIR–Central Food Technological Research Institute (CFTRI), its headquarter is in Mysuru, was established in 1950. Its main objective is to maintain the food safety standers by mean of various projects they conduct periodically. Research focus of CSIR-CFTRI has been revolved around broadly into the following areas:

- Engineering Sciences
- Technology Development
- Translational Research
- Food Protection and Safety

Food technology being interdisciplinary in nature the mandate or vision of the institute is fulfilled through various R&D Departments and Support Departments along with its Resource Centers at Hyderabad, Lucknow and Mumbai.

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Q5 AGMARK standard.

Ans: AGMARK is a certification label seen on the package of food items which certifies its safety standards approved by the Directorate of Marketing and Inspection an attached Office of the Department of Agriculture, Cooperation and Farmers Welfare under Ministry of Agricultural and Farmers Welfare.

Objective

The main objective is to provide the consumers a safe and good quality food item which is free from any form of adulteration. This label is used for both domestic and export purpose.

Q6 Consumer Protection Act.

Ans: The Consumer Protection Act is a comprehensive law designed to safeguard the rights of consumers and ensure fair trade practices in the marketplace. It provides a legal framework for addressing consumer grievances and holding businesses accountable for substandard products, unfair practices, and misleading advertisements.

Features of the Consumer Protection Act

1. **Consumer rights:** The Act recognizes six fundamental consumer rights: the right to safety, information, choice, grievance redressal, consumer education, and protection against unfair practices.
2. **Consumer dispute redressal mechanism:** It establishes a three-tier system for dispute resolution:
   - District Consumer Disputes Redressal Commission (District Forum)
   - State Consumer Disputes Redressal Commission (State Commission)
   - National Consumer Disputes Redressal Commission (National Commission)

   These bodies offer a platform for consumers to seek compensation and justice for grievances efficiently and transparently.
3. **Penalties for unfair practices:** The Act imposes strict penalties on businesses involved in misleading advertisements, defective goods, or deficient services.
4. **E-commerce protection:** It includes provisions to regulate e-commerce platforms, ensuring consumers receive accurate information and protection while shopping online.

Q7 Name some household methods of food preservation.

Ans:

- Preservation in salt or sugar
- Refrigeration
- Sun drying
- Preservation in vinegar
- Heating
- Storing in airtight containers

Q8 FAO.

Ans: The Food and Agriculture Organization (FAO) is a specialized agency of the United Nations dedicated to achieving food security and eradicating hunger worldwide. Established

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in 1945, FAO leads international efforts to fight hunger by promoting sustainable agricultural practices, improving nutrition, and ensuring that everyone has access to sufficient, safe, and nutritious food.

Key Objectives of FAO

- **Food security and nutrition:** FAO works to eliminate hunger, food insecurity, and malnutrition by supporting policies and practices that promote balanced diets and sustainable food production.
- **Sustainable agriculture:** It promotes sustainable agricultural development, focusing on increasing productivity while protecting natural resources like soil, water, and biodiversity.
- **Rural development:** FAO supports rural communities by enhancing livelihoods, reducing poverty, and encouraging equitable access to resources and technologies.
- **Data and knowledge sharing:** The organization acts as a global knowledge hub, providing reliable data, guidelines, and expertise to help countries develop effective food and agricultural policies.

Role of FAO

Food and Agriculture Organization plays a critical role in addressing global challenges like climate change, water scarcity, and food waste. It supports countries in building resilient agricultural systems and adapting to changing conditions to ensure long-term food security.

Q9 Food allergy.

Ans: Food allergy is an adverse immune response that occurs when the body's immune system mistakenly identifies certain proteins in food as harmful. This reaction can range from mild to severe, potentially leading to life-threatening conditions. Common food allergens include peanuts, tree nuts, milk, eggs, wheat, soy, fish, and shellfish.

Symptoms of Food Allergies

Symptoms can vary but often include hives, itching, swelling, stomach pain, nausea, vomiting, diarrhea, and difficulty breathing. In severe cases, food allergies can cause anaphylaxis, a rapid and potentially fatal reaction that requires immediate medical attention.

Causes and Risk Factors

Food allergies can develop at any age but are more common in children. Risk factors include family history of allergies, other existing allergies (such as asthma or eczema), and early exposure to allergenic foods. Some food allergies can be outgrown, particularly those to milk, eggs, and wheat.

Management and Prevention

There is no cure for food allergies, so strict avoidance of the allergenic food is the primary method of management. Reading food labels, avoiding cross-contamination, and carrying emergency medications like antihistamines or epinephrine autoinjectors are essential steps.

MULTIPLE CHOICE QUESTIONS

Q1 Which of the following food items are used as preservatives?

a. Vinegar, ginger, apple, banana
b. Garlic, lemon, vinegar, sugar

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c. Garlic, salt, tamarind, apple
d. Ginger, garlic, tamarind, banana

Q2 Which is the most common method of food preservation?

a. Freezing
b. Heating
c. Fermentation
d. Drying

Q3 Organic acid used as a food preservative is:

a. Sulfuric acid
b. Boric acid
c. Hydrochloric acid
d. Sorbic acid

Q4 Which of the following group represents the correct method of cooking?

a. Boiling, kneading, frying
b. Frying, rolling, baking
c. Baking, boiling, steaming
d. Steaming, roasting, soaking

Q5 What happen when we cook food in pressure cooker?

a. Nutrients get destroyed
b. Food cook fast
c. Less labor
d. All of these

Q6 Fermentation increases _____

a. Taste
b. Vitamin A
c. Digestibility of food
d. Calcium

Q7 Which of the following is a coffee powder adulterant?

a. Water and starch powder
b. Artificial coloring agents
c. Dyes, chemical and lead chromate
d. Chicory, tamarind seeds powder

Q8 PFA is abbreviated as:

a. Prevention of Food Act
b. Protection of Food Act
c. Prevention of Food Adulteration Act
d. None of the above

Q9 Which of these is a honey adulterant?

a. Washing soda, chalk powder
b. Molasses, dextrose, sugar and corn syrups
c. Pumpkin pulp, nonedible artificial colors, and flavors.
d. Cassia bark

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Q 10 When does the PFA Act say that food is adulterated?

a. If it is obtained from a diseased animal
b. If spices are sold without their essence
c. If any ingredient is injurious to health
d. All of the above

Q 11 What is an example of a biological hazard?

a. Salmonella
b. Antibiotics
c. Cleaners
d. Dirt

Q 12 Adulterants are substances or low-quality goods that are intentionally added to food for economic or technical reasons.

a. Can be true or false
b. Cannot say
c. True
d. False

Q 13 According to Section 3 of the Food Safety & Standards Act 2006, if a food item offered in the market contains any inferior or cheaper components, whether entirely or partially, that are harmful to one's health, such products are referred to as "food articles."

a. Substandard
b. Misbranded
c. Partly substandard
d. Unsafe

Q 14 Adulterant detection methods include:

a. Visual tests
b. Chemical tests
c. Physical tests
d. All of the mentioned above

Q 15 Which of the following act is not under FSSAI Act?

a. Prevention of Food Preservation Act 1954
b. Milk and Milk Product Order, 1992
c. AGMARK
d. Fruit Product Order, 1952

ANSWER KEY

1. b	2. b	3. d	4. c	5. d	6. c	7. d	8. c
9. b	10. d	11. a	12. a	13. d	14. d	15. c	

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