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○○○○○○○○**Topic:****Food Additives**

According to World Health Organization

A food additive is any substance added to food to maintain or improve its safety, freshness, taste and texture."

These substances are used to maintain nutritive quality, enhance its keeping quality and to make it attractive or to aid its packaging and storage.

Examples:

1. Preservatives e.g. Sodium Benzoate, Potassium Sorbate in cheese, Sulphur Dioxide in wines etc.
2. Colour Additives; to enhance color of food like Tetrazine, a yellow colour in candies, Annatto; a natural colour in butter.
3. Flavour Enhancers; boost the taste of food without adding their own flavour e.g. Monosodium Glutamate (MSG) in soups, snacks etc, Disodium Mesinate in instant noodles.
4. Sweetners; to add sweetness without sugar.

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- e.g. Aspartame in diet cola, Saccharin in sugar free candies.
5. Emulsifiers and Thickeners; to improve texture and consistency. e.g. Lecithin in chocolate, Guar Gum in ice cream & sauces.
6. Anti-Oxidants; to prevent spoilage of fats. e.g. Ascorbic acid in jams & juices, BHA in cereals.

Under Pakistan Food and drug Regulations, food additives do not include vitamins, minerals, amino acids, salt, sugar, starch, spices, veterinary drugs and food packaging material.

Food Preservatives

According to World Health organization

"Food Preservatives are substances that are added to food to prevent spoilage from microbial growth or undesirable chemical change."

These preservatives extend the shelf life of food by inhibiting the growth

of bacteria, yeast, molds etc. Some of these microorganisms secrete poisonous substances i.e. toxins, which are dangerous for human health.

Examples:

Examples of common food preservatives are Sodium Benzoate, Potassium Sorbate, Sulphur dioxide, Ascorbic acid.

Food Preservation Methods

Preservation is defined as the method used to maintain an existing condition to prevent damage likely to be brought about by chemical, physical or biological factors.

Methods:

World Health Organization along with FAO (Food & Agriculture Organization) emphasize science-based and hygienic food preservation methods to prevent food waste & food-borne illnesses. Following are some methods for food preservation.

1. Refrigeration:

It slows down the growth of

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bacteria, molds etc. by keeping temperature low, usually between $0-4^{\circ}\text{C}$. Freezing stops microbial activity by lowering temperature below -18°C .

It is used for dairy, meat, fruits, vegetables, cooked leftovers.

2. Dehydration or Drying:

Moisture is removed from the food which prevents growth of microbial organisms. It can be done using sun, air or machines like ovens or dehydrators.

It is used for fruits, vegetables, grains, meats & fish. It is lightweight and gives long shelf life.

3. Canning:

Food is sealed in airtight containers and heated to kill harmful microorganisms. Proper sealing creates a vacuum that prevents recontamination.

It is used for vegetables, beans, soups, sauces & meat.

4. Pasteurization

In Pasteurization, food is heated to a specific temperature for the removal of pathogens and extension of shelf life.

Pasteurization either ~~destroys~~ or deactivates microorganisms and enzymes that contribute to the spoilage of food.

Commonly pasteurized foods include milk, juice, beer, wine, some meats & eggs.

5. Fermentation.

It is a technique that uses micro-organisms like yeast or bacteria to convert carbohydrates into other products like acids, gases or alcohol; often under anaerobic conditions. These products act as natural preservatives.

It is ~~used~~ for yogurt, cheese, pickles, soy sauce etc. This process improves shelf-life, flavour & sometimes nutritional content of food.

6. Salting and Curing.

It refers to preserving food using salt (edible salt). It is related to pickling in general and is one of the

oldest methods of preserving food.

Most bacteria, fungi and other pathogenic organisms ~~can~~ survive in highly salty environment due to hypertonic nature of ~~the~~ salt.

Fish, meat, some vegetables like beans and cabbage are protected through this method.

7- Vacuum Sealing.

In this method, air is removed from packaging which prevents oxidation and microbial growth.

It is used for meat, coffee, cheese dry goods etc. This process is often combined with Refrigeration and Freezing because it prevents freezer burn, extends freshness and saves space.

All these methods are used to enhance shelf life of food without causing harm to its nutritional importance.

Food Adulteration and Food Contamination

Food Adulteration

Food Contamination

1 Definition:

- The intentional addition or removal of substances in food to increase quantity or improve appearance for profit.
- The unintentional presence of harmful substances like bacteria, chemicals or toxins in food.

2 Purpose

- It is for personal gain and profit.
- It occurs due to poor hygienic handling or environmental factors.

3 Examples:

- Mixing water in milk.
- Using artificial colour in turmeric.
- Bacterial contamination from dirty water.
- Metal shards from machinery.

4 Effects

- Cause long-term health problem like cancer etc.
- May cause food poisoning and allergies.

5 Status:

- Illegal and punishable under food safety laws.
- Also illegal but considered an accident due to negligence.