Food Additives

Introduction to Food Additives

Basic Idea

- Food additives are substances intentionally added to foods to improve their quality, safety, appearance, taste, texture, or shelf life.
- Food additives may be natural, nature-identical, or synthetic substances.
- They are used in very small quantities and must be approved by regulatory authorities before use.

Objectives of Using Food Additives

- To preserve food quality during storage and distribution.
- To improve the sensory characteristics of food.
- To enhance nutritional value.
- To maintain consistency and stability of food products.
- To facilitate food processing and packaging.

Classification of Food Additives

1. Preservatives

➢ Preservatives prevent microbial growth and delay spoilage.

Examples:

- Sodium benzoate.
- Potassium sorbate.
- Sulfur dioxide.

2. Antioxidants

➢ Antioxidants prevent oxidation and rancidity in foods.

Examples:

- Butylated hydroxyanisole (BHA).
- Butylated hydroxytoluene (BHT).
- Ascorbic acid.

3. Artificial Sweeteners

➢ Artificial sweeteners provide sweetness with little or no calories.

Examples:

- Saccharin.

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- Aspartame.
- Sucralose.

4. Flavors and Flavor Enhancers

- These additives improve the taste and aroma of foods.

Examples:

- Vanillin.
- Monosodium glutamate (MSG).

5. Stabilizers, Thickening Agents, and Jelling Agents

- These additives improve texture and consistency.

Examples:

- Pectin.
- Gelatin.
- Carrageenan.
- Xanthan gum.

Sources of Food Additives



A. Natural Additives

- Natural additives are obtained from plant, animal, or microbial sources.

Examples:

- Pectin
- Lecithin
- Curcumin

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B. Synthetic Additives

- Synthetic additives are produced through chemical processes.

Examples:

- Saccharin
- Sodium benzoate
- Butylated hydroxyanisole

Regulatory Control

- Food additives must be evaluated for safety before approval.
- Regulatory organizations establish acceptable daily intake levels and permissible limits for use.

Examples of Regulatory Agencies

- Food and Drug Administration (FDA)
- European Food Safety Authority (EFSA)
- Food Safety and Standards Authority of India (FSSAI)
- Codex Alimentarius Commission

Importance of Food Additives

- Food additives help reduce food wastage.
- Food additives improve the convenience and availability of processed foods.
- Food additives enhance food safety and consumer acceptance.

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Analysis of Preservatives

Basic Idea

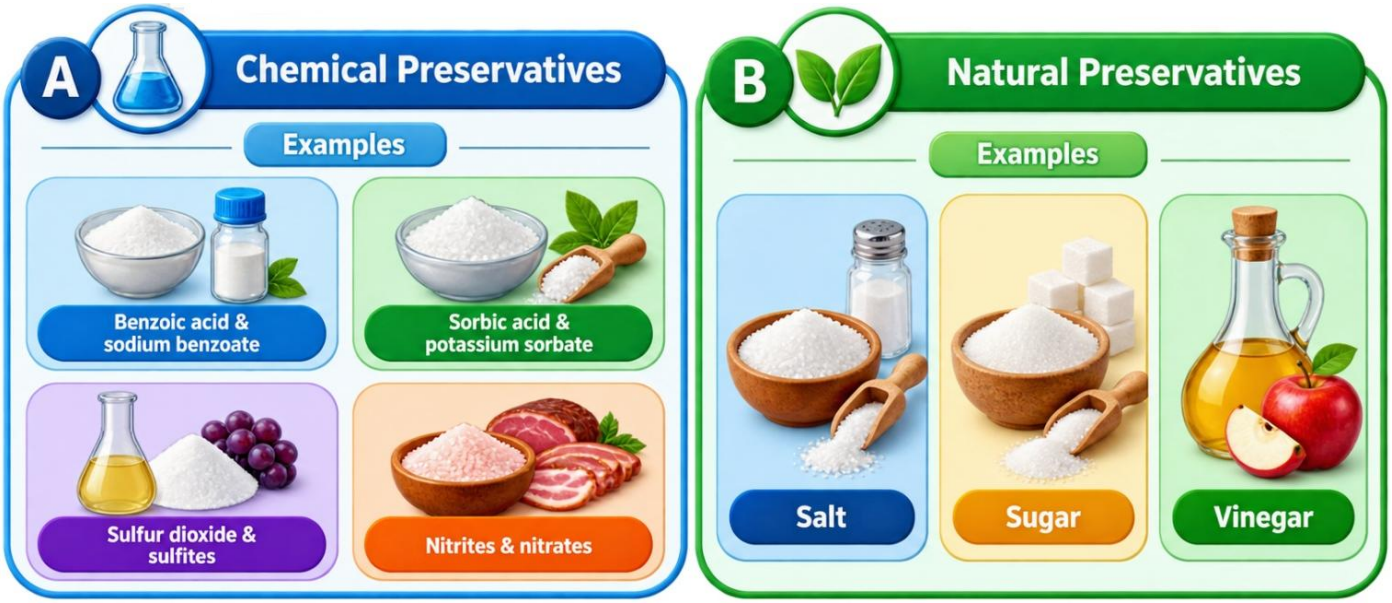
- Preservatives are substances added to foods to inhibit the growth of microorganisms and prevent spoilage.
- Analysis of preservatives is necessary to ensure that their levels remain within legal limits.

Objectives

- To identify the type of preservative present in food.
- To determine the concentration of preservatives.
- To ensure compliance with food regulations.
- To protect consumer health.

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Common Food Preservatives



A. Chemical Preservatives

Examples

- Benzoic acid and sodium benzoate
- Sorbic acid and potassium sorbate
- Sulfur dioxide and sulfites
- Nitrites and nitrates

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B. Natural Preservatives

Examples

- Salt
- Sugar
- Vinegar

General Steps in Analysis

1. Sample Preparation

- The food sample is homogenized to obtain a representative portion.
- Interfering substances are removed before analysis.

2. Extraction

- Appropriate solvents are used to extract preservatives from the food matrix.

3. Separation

- Preservatives are separated from other food components.

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4. Quantification

- Analytical techniques are used to determine the concentration of preservatives.

Methods of Analysis

1. Titrimetric Methods

- Titration methods are used for the determination of preservatives such as sulfur dioxide.

2. Spectrophotometric Methods

- Spectrophotometric methods measure the absorbance of colored compounds formed during chemical reactions.

3. Chromatographic Methods

A. High-Performance Liquid Chromatography (HPLC)

- HPLC is widely used for the accurate analysis of benzoates and sorbates.

B. Gas Chromatography (GC)

- GC is useful for volatile preservatives.

C. Thin-Layer Chromatography (TLC)

- TLC is mainly used for qualitative identification.

4. Enzymatic Methods

- Enzymatic methods use specific enzymes for the analysis of certain preservatives.

Importance

- Preservative analysis ensures food safety.
- It helps maintain product quality and shelf life.
- It supports compliance with legal standards.

Analysis of Antioxidants

Basic Idea

- Antioxidants are substances added to foods to delay or prevent oxidation.
- Oxidation causes rancidity, discoloration, nutrient loss, and off-flavors in foods.
- Analysis of antioxidants helps determine their effectiveness and concentration in food products.

Objectives

- To identify antioxidants, present in food.
- To determine antioxidant concentration.

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