1.2 FOOD ADULTERATION (COMMON ADULTERANTS)

1. Adulterants in Milk and Dairy Products:

Water: Dilution of milk with water to increase volume.

Starch or Flour: Added to increase thickness or viscosity.

Urea: Used to increase the protein content on adulteration tests.

Vegetable oil: Added to milk to increase fat content.

2. Adulterants in Spices:

Artificial Colorants: Added to improve appearance.

Chalk Powder: Added to increase weight.

Brick Powder: Added to increase weight and bulk.

3. Adulterants in Edible Oils:

Argemone Oil: Added to mustard oil, posing serious health risks.

Palm Oil or Cottonseed Oil: Mixed with cheaper oils to increase volume.

Mineral Oil: Added to increase viscosity and weight.

4. Adulterants in Cereals and Grains:

Ergot: Fungus contaminant in grains, particularly rye, causing toxic effects.

Sand and Stones: Added to increase weight.

Insect Infestations: Insects and their residues found in stored grains.

5. Adulterants in Fruits and Vegetables:

Artificial Ripeners: Used to hasten ripening, such as calcium carbide.

Wax Coatings: Applied to fruits to enhance appearance.

6. Adulterants in Beverages:

Methanol: Added to alcoholic beverages, causing toxicity.

Non-Permitted Colorants and Flavors: Added to enhance appearance and taste.

7. Miscellaneous Adulterants:

Formalin: Added to fish and meat to prevent decomposition.

Lead Chromate: Added to turmeric powder to enhance color.

FOOD ADDITIVES (FUNCTIONAL ROLE, SAFETY ISSUES)

Functional Roles of Food Additives:

1.Preservatives:

Role: Extend shelf-life by inhibiting microbial growth, oxidation, or enzymatic reactions.

Examples: Sodium benzoate, sorbic acid, nitrites (used in cured meats).

Safety Issues: Some preservatives can cause allergic reactions or have potential carcinogenic effects in high doses.

2.Antioxidants:

Role: Prevent oxidation of fats and oils, thereby extending product shelf-life and maintaining flavor.

Examples: Vitamin C (ascorbic acid), tocopherols (vitamin E), BHA, BHT.

Safety Issues: BHA and BHT have been linked to potential carcinogenic effects, although considered safe in low doses by regulatory bodies.

3.Flavor Enhancers:

Role: Enhance or modify the flavor profile of foods.

Examples: Monosodium glutamate (MSG), disodium inosinate, disodium guanylate.

Safety Issues: MSG can cause adverse reactions such as headaches or nausea in sensitive individuals, though it's generally recognized as safe by regulatory agencies when used within recommended limits.

4.Colorants:

Role: Enhance or restore the color of food products.

Examples: Artificial colors (e.g., tartrazine, sunset yellow), natural colors (e.g., beta-carotene, beetroot extract).

Safety Issues: Some artificial colors have been associated with hyperactivity in children and allergic reactions in sensitive individuals. Natural colors are generally considered safer.

5.Emulsifiers and Stabilizers:

Role: Maintain uniformity of texture and prevent separation in food products.

Examples: Lecithin, carrageenan, xanthan gum.

Safety Issues: Generally considered safe, but high consumption of some emulsifiers may disrupt gut microbiota balance.

6.Sweeteners:

Role: Provide sweetness with fewer calories than sugar or enhance sweetness of foods.

Examples: Aspartame, sucralose, stevia.

Safety Issues: Controversies exist over artificial sweeteners like aspartame, with concerns about potential links to cancer and neurological effects, although regulatory agencies generally deem them safe in recommended doses.

Food Packaging & labeling

1.Importance of Food Packaging:

Protection: Packaging protects food from physical, chemical, and biological damage during storage, transportation, and distribution.

Preservation: It helps extend shelf-life by preventing spoilage, maintaining freshness, and controlling exposure to light, moisture, and air.

Convenience: Packaging facilitates handling, portioning, and storage for consumers, enhancing convenience and usability.

Information: Packaging provides essential information about the product, including ingredients, nutritional content, allergens, and storage instructions.

2.Components of Food Packaging:

Primary Packaging: Directly in contact with the food product (e.g., cans, bottles, pouches).

Secondary Packaging: Outer packaging that groups primary packages (e.g., cartons, boxes).

Tertiary Packaging: Bulk packaging used for transportation and handling (e.g., pallets, shipping containers).

3.Key Functions of Food Labeling:

Identification: Clearly identifies the product and brand.

Ingredients: Lists all ingredients used in the product, often in descending order by weight.

Nutrition Information: Provides nutritional content per serving size, including calories, fats, carbohydrates, proteins, vitamins, and minerals.

Allergens: Clearly identifies common allergens (e.g., nuts, dairy, gluten) present in the product.

Net Weight/Volume: Indicates the quantity of the product inside the package.

Storage Instructions: Advises on optimal storage conditions (e.g., refrigeration, ambient temperature).

Country of Origin: Indicates where the product was manufactured or sourced.

Expiration Date/Best Before Date: Provides guidance on the shelf-life and freshness of the product.

4.Regulations and Guidelines:

FDA (U.S. Food and Drug Administration): Regulates food labeling in the United States, ensuring compliance with the Food, Drug, and Cosmetic Act (FD&C Act) and Fair Packaging and Labeling Act (FPLA).

EU Regulations: Governed by the European Food Safety Authority (EFSA) and European Union regulations, ensuring food safety and accurate labeling across member states.

Codex Alimentarius: International food standards set by the Codex Alimentarius Commission, which provides guidelines on food labeling, additives, and packaging.

5.Considerations for Effective Packaging and Labeling:

Clear and Legible: Labels should be easy to read and understand, using appropriate font sizes and colors.

Accurate and Honest: Information should be truthful and not misleading, meeting regulatory standards for claims (e.g., "organic," "low fat").

Functionality: Packaging should be functional for the intended use (e.g., easy-open, resalable), and suitable for the product's characteristics (e.g., moisture barrier for dry goods, oxygen barrier for perishable items).

Safety: Packaging materials should be safe and suitable for contact with food, preventing contamination or transfer of harmful substances.

Environmental Impact: Consideration should be given to the environmental sustainability of packaging materials, promoting recyclability, biodegradability, or use of renewable resources where possible.

Innovation: Embrace innovation in packaging technologies to improve shelf-life, reduce food waste, and enhance consumer convenience.