MDC-1

Chapter 1 : Food Additives

Food flavour, food colour and food preservatives :

Food flavour, food colour, and food preservatives are food additives added to improve taste, appearance, and shelf life of foods.

1. Food Flavour

Definition:

Substances added to food to give a pleasant smell and taste.

Types

Type	Examples
Natural flavours	Vanilla, lemon, mint, cardamom
Artificial flavours	Vanillin, ethyl butyrate, artificial strawberry flavour

Functions

- Enhance taste and aroma
- Restore flavour lost during processing
- Make food more appealing

Examples

- Vanilla flavour in ice cream
- Orange flavour in soft drinks
- Masala flavour in snacks

2. Food Colour

Definition:

Substances added to give or restore colour to food.

Types

Type	Examples
Natural colours	Turmeric (yellow), beetroot (red), chlorophyll (green)
Synthetic colours	Tartrazine, Sunset Yellow, Brilliant Blue

Functions

- Improve appearance
- Replace colour lost during cooking or storage
- Make products attractive

Examples

- Yellow colour in sweets from turmeric
- Red colour in candies from beetroot extract
- Green colour in mint-flavoured products

3. Food Preservatives

Definition:

Substances added to food to prevent spoilage caused by microorganisms, oxidation, or chemical changes.

Types

Type	Examples
Natural preservatives	Salt, sugar, vinegar, oil
Chemical preservatives	Sodium benzoate, potassium metabisulphite, sorbic acid

Functions

- Increase shelf life
- Prevent growth of bacteria, yeast, and moulds
- Maintain food quality

Examples

- Sodium benzoate in fruit juices

- Vinegar in pickles
- Salt in dried fish and meat

Artificial sweetness

Artificial sweeteners are substances that taste sweet like sugar but contain very little or no calories. They are used as sugar substitutes in foods and drinks.

Definition

Artificial sweeteners are synthetic chemicals added to food to provide sweetness without the high energy content of sugar.

Common artificial sweeteners

Sweetener	Sweetness compared with sugar
Saccharin	About 300–500 times sweeter
Aspartame	About 200 times sweeter
Sucralose	About 600 times sweeter
Acesulfame K	About 200 times sweeter
Cyclamate	About 30–50 times sweeter

Uses

- Diet soft drinks
- Sugar-free chewing gum
- Diabetic foods
- Low-calorie desserts
- Medicines and syrups

Advantages

- Provide sweetness with few or no calories.
- Useful for people with diabetes.
- Help reduce sugar intake.
- Do not usually cause tooth decay.

Disadvantages

- Some people may dislike the aftertaste.
- Excessive consumption is not recommended.
- Certain sweeteners are unsuitable for specific medical conditions (for example, people with phenylketonuria should avoid aspartame).
- **Example**

- **Artificial sweetener in a soft drink**
- Example
- A sugar-free soft drink may contain Aspartame instead of ordinary sugar.
- Acidulants and alkalies are food additives used to control the acidity (pH) of foods.
- **1. Acidulants**
- Definition:
- Acidulants are substances added to food to increase acidity (lower the pH) and give a sour taste.
- **Common acidulants**

Acidulant	Used in
Citric acid	Soft drinks, candies
Acetic acid	Pickles, sauces
Lactic acid	Yogurt, fermented foods
Tartaric acid	Bakery products
Phosphoric acid	Cola drinks

Functions

- Provide sour taste
- Improve flavour
- Preserve food by inhibiting microorganisms
- Control pH

Examples

- Lemon juice contains citric acid.
- Vinegar contains acetic acid.
- **2. Alkalies**
- Definition:
- Alkalies are substances added to food to reduce acidity (raise the pH).
- **Common food alkalies**

Alkali	Used in
Sodium bicarbonate	Cakes, biscuits
Potassium bicarbonate	Baked products
Sodium carbonate	Noodles
Calcium hydroxide	Corn processing

- **Functions**

- Neutralize excess acid

- Improve texture
- Help dough rise (with acids)
- Modify colour and flavour

Examples

- Baking soda in cakes.
- Alkaline noodles made with sodium carbonate.

Difference Between Acidulants and Alkalies

Feature	Acidulants	Alkalies
Effect on pH	Decrease pH	Increase pH
Taste	Sour	Less acidic / alkaline
Example	Citric acid	Sodium bicarbonate
Main use	Flavour and preservation	Texture and leavening

edible emulsifiers and edible foaming agents ,sequestrants-uses and abuses of these substances in food beverages

These are all food additives used to improve the texture, stability, appearance, and shelf life of foods and beverages.

1. Edible Emulsifiers

Definition:

Emulsifiers help mix two liquids that normally do not mix, such as oil and water.

Examples

- Lecithin
- Mono- and diglycerides
- Polysorbate 80

Uses

- Mayonnaise
- Ice cream
- Chocolate
- Salad dressings

- Milk beverages

Benefits

- Prevent separation of oil and water.
- Improve smoothness and texture.
- Increase product stability.

Possible abuses

- Excess use may alter natural texture.
- Some synthetic emulsifiers may cause digestive discomfort in sensitive people.

2. Edible Foaming Agents

Definition:

Foaming agents help produce and stabilize foam in foods and beverages.

Examples

- Egg albumin
- Gelatin
- Soy protein
- Saponins

Uses

- Whipped cream
- Meringues
- Milk shakes
- Frothy coffee drinks
- Beer foam stabilization

Benefits

- Create light and airy texture.
- Improve appearance and mouthfeel.

Possible abuses

- Excessive foaming may give a false impression of product quality.
- Some artificial foaming agents may cause irritation in sensitive individuals.

3. Sequestrants (Chelating Agents)

Definition:

Sequestrants bind metal ions such as Fe^{2+}, Cu^{2+}, and Ca^{2+} to prevent undesirable reactions.

Examples

- EDTA
- Citric acid
- Sodium hexametaphosphate

Uses

- Soft drinks
- Canned foods
- Processed cheese
- Fruit juices
- Seafood products

Benefits

- Prevent oxidation and rancidity.
- Maintain colour and flavour.
- Increase shelf life.

Possible abuses

- Excess intake may interfere with absorption of essential minerals.
- Overuse can affect nutritional quality.

Summary Table

Additive	Main Function	Common Use
Emulsifier	Mix oil and water	Mayonnaise, ice cream
Foaming agent	Create/stabilize foam	Whipped cream, coffee
Sequestrant	Bind metal ions	Soft drinks, canned foods

Uses in Food and Beverages

Useful effects

- Better texture and consistency
- Improved flavour and appearance
- Longer shelf life
- Reduced spoilage

- Enhanced consumer acceptability

Abuses / Risks

Problems from excessive or improper use

- Masking poor-quality ingredients
- Misleading appearance (excess foam or creaminess)
- Digestive irritation in sensitive individuals
- Possible interference with mineral absorption
- Reduced nutritional value when overused

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Some Model questions on Food Additives :

1. Which of the following is used as a food preservative?

- A. Glucose
- B. Sodium benzoate
- C. Starch
- D. Cellulose

Answer: B. Sodium benzoate

2. The main function of food colours is to:

- A. Increase nutrition
- B. Prevent spoilage
- C. Improve appearance
- D. Increase acidity

Answer: C. Improve appearance

3. Which is a natural food colour?

- A. Tartrazine
- B. Sunset Yellow
- C. Caramel
- D. Brilliant Blue

Answer: C. Caramel

4. Aspartame is a:

- A. Preservative

- B. Sweetener
- C. Emulsifier
- D. Acidulant

Answer: B. Sweetener

5. Which acid is naturally present in vinegar?

- A. Citric acid
- B. Acetic acid
- C. Lactic acid
- D. Tartaric acid

Answer: B. Acetic acid

6. Baking powder acts as a:

- A. Colouring agent
- B. Sweetener
- C. Leavening agent
- D. Preservative

Answer: C. Leavening agent

7. Lecithin is commonly used as a:

- A. Preservative
- B. Emulsifier
- C. Sweetener
- D. Acidulant

Answer: B. Emulsifier

8. Which additive helps in maintaining foam in beverages?

- A. Sequestrant
- B. Foaming agent
- C. Antioxidant
- D. Buffer

Answer: B. Foaming agent

9. EDTA is used in foods mainly as a:

- A. Colour
- B. Sweetener

- C. Sequestrant
- D. Thickener

Answer: C. Sequestrant

10. Sequestrants prevent food deterioration by:

- A. Adding flavour
- B. Binding metal ions
- C. Increasing sweetness
- D. Reducing water

Answer: B. Binding metal ions

11. Which of the following is an artificial sweetener?

- A. Honey
- B. Sucrose
- C. Saccharin
- D. Fructose

Answer: C. Saccharin

12. Potassium metabisulphite is used as a:

- A. Preservative
- B. Emulsifier
- C. Colour
- D. Thickener

Answer: A. Preservative

13. Citric acid added to soft drinks acts as a:

- A. Sweetener
- B. Acidulant
- C. Preservative
- D. Foaming agent

Answer: B. Acidulant

14. Which additive improves texture and stability of ice cream?

- A. Emulsifier
- B. Colour
- C. Acidulant

- D. Preservative

Answer: A. Emulsifier

15. Excessive intake of some artificial colours may lead to:

- A. Better digestion
- B. Increased protein content
- C. Health concerns
- D. Vitamin synthesis

Answer: C. Health concerns

16. Sugar is considered a high-calorie food because it:

- A. Contains protein
- B. Provides about 4 kcal/g
- C. Contains minerals
- D. Has no energy value

Answer: B. Provides about 4 kcal/g

17. Which additive is used to increase the shelf life of jams?

- A. Sodium benzoate
- B. Lecithin
- C. Aspartame
- D. Citric acid

Answer: A. Sodium benzoate

18. The gas released by baking soda during baking is:

- A. Oxygen
- B. Nitrogen
- C. Carbon dioxide
- D. Hydrogen

Answer: C. Carbon dioxide

19. Which of the following is NOT a food additive category?

- A. Preservative
- B. Emulsifier
- C. Catalyst
- D. Sweetener

Answer: C. Catalyst

20. The primary purpose of food additives is to:

- A. Replace food completely
- B. Improve quality, safety, or appearance
- C. Reduce nutritional value
- D. Increase moisture only

Answer: B. Improve quality, safety, or appearance