

Chapter 19

Introduction

Chemicals play an important role in modern life — from the food we eat, to the way we clean, preserve, and grow crops. However, their improper use can lead to health hazards and environmental issues. Understanding their types, uses, and safety measures is essential for responsible usage.

Food Preservatives

Definition

Food preservatives are **natural or synthetic substances** added to food to prevent **spoilage, bacterial growth, and oxidation**, thereby **extending shelf life**.

Some Common Examples

- Salt
- Sugar
- Vinegar
- Citric acid
- Sodium benzoate

Advantages of Food Preservatives

- Prolong shelf life
- Maintain food flavor and texture
- Prevent microbial contamination
- Reduce food wastage

Classification of Food Preservatives

i. First-Class Preservatives (Natural)

- Naturally occurring and generally safe.
- Examples: **Salt, sugar, vinegar, lemon juice**

ii. Second-Class Preservatives (Chemical)

- Man-made and used in processed foods.
- Examples: **Sodium benzoate, potassium metabisulfite, sodium nitrite**

Precautions While Using Preservatives

- Use only in recommended amounts.
- Avoid in foods for infants or sensitive individuals.
- Store preservatives in properly labeled containers.
- Avoid prolonged use of second-class preservatives.

Types of Food Preservatives

1. Natural Food Preservatives

- Derived from plants or animals.
- Examples: Salt, sugar, lemon juice, vinegar, honey

2. Chemical Food Preservatives

- Synthesized artificially.
- Examples: Sodium benzoate, sulphur dioxide, propionates

3. Induced Ripening Agents (Artificial Ripening)

- Used to artificially ripen fruits.
- Examples: **Calcium carbide, ethylene gas**

⚠ Note: Calcium carbide is **hazardous and banned in many countries**.

Harmful Effects of Overuse

- Allergic reactions
- Hormonal imbalance
- Potential carcinogenic effects
- Liver and kidney damage over time

Chemicals Used in Cleansing

Cleansing agents help in removing dirt, grease, and microbes. These can be **natural or chemical-based**.

Natural Materials Used in Cleansing

Name	Description & Use
Ritha (Soapnut)	Contains natural saponins . Used as shampoo , natural detergent , and dish cleaner . Effective in removing oil and dirt.
Pina (Mustard cake)	A by-product of mustard oil extraction . Used as a mild abrasive to help scrub away dirt and grime in traditional cleaning practices.
Kharani (Ash)	A natural alkaline substance (mainly from burned firewood). Used for cleaning metal utensils and as a fertilizer due to its potassium content.
Sajiban	A multipurpose plant : <ul style="list-style-type: none">• Young shoots are used to clean teeth (natural toothbrush)• Used as traditional medicine• Ash is used as natural fertilizer
Lemon Juice	Rich in citric acid ; acts as a natural bleach , helps remove stains , and has antibacterial properties.

Chemical Cleansing Agents

a. Soap

- Made by heating **fats or oils** with **alkalis** like **sodium hydroxide (NaOH)**.
- Used in washing, bathing, and cleaning.

b. Detergents

- Synthetic cleansing agents.
- Work well in **hard water**.
- Common in **laundry detergents**, **dishwashing liquids**, **floor cleaners**.

Chemical Pesticides

Used to protect crops and storage items from pests and diseases.

Types of Pesticides

a. On the Basis of Environmental Effect

- **Biodegradable (Non-persistent)**: Break down quickly (e.g., pyrethrin)
- **Non-biodegradable (Persistent)**: Stay in the environment for long (e.g., DDT)

b. On the Basis of Pest Target

- **Insecticides** – Kill insects
- **Herbicides** – Kill weeds
- **Fungicides** – Kill fungi
- **Miticides** – Kill mites
- **Rodenticides** – Kill rodents

c. On the Basis of Mode of Action

- **Contact pesticides** – Kill pests on contact
- **Fumigants** – Inhaled by pests
- **Internal pesticides** – Absorbed by plants
- **Systemic pesticides** – Circulate through plant tissues

Precautions for Using and Storing Pesticides

- Store away from food and water
- Wear protective gear during application
- Do not overuse
- Follow manufacturer instructions
- Keep out of children's reach

Chemical Pollution

Causes

- Industrial waste discharge
- Excessive pesticide and fertilizer use
- Improper disposal of chemicals
- Oil spills and mining

Effects

- Water and air pollution
- Health issues in humans and animals
- Soil degradation
- Destruction of aquatic life

Measures to Minimize Chemical Pollution

- Use **eco-friendly** products
- Follow **proper disposal** techniques
- Promote **biodegradable pesticides**
- Implement **waste treatment plants**
- Practice **organic farming**

Proper Management of Industrial Chemicals

- Regular training for workers
- Proper **labeling and storage**
- Use of **protective gear**
- Regular **inspection and maintenance** of storage tanks
- Strict **government regulations and waste management protocols**

Quick Chapter Summary

Topic	Key Points
Food Preservatives	Natural & chemical; classified into first & second class
Cleansing Agents	Ritha, Pina, Kharani, Sajiban, soap, detergents
Pesticides	Classified by environment, target pest, and action
Pollution	Caused by chemicals from factories, farms, households
Prevention	Eco-friendly products, education, regulation
Industrial Chemical Safety	Labeling, storage, training, protective measures