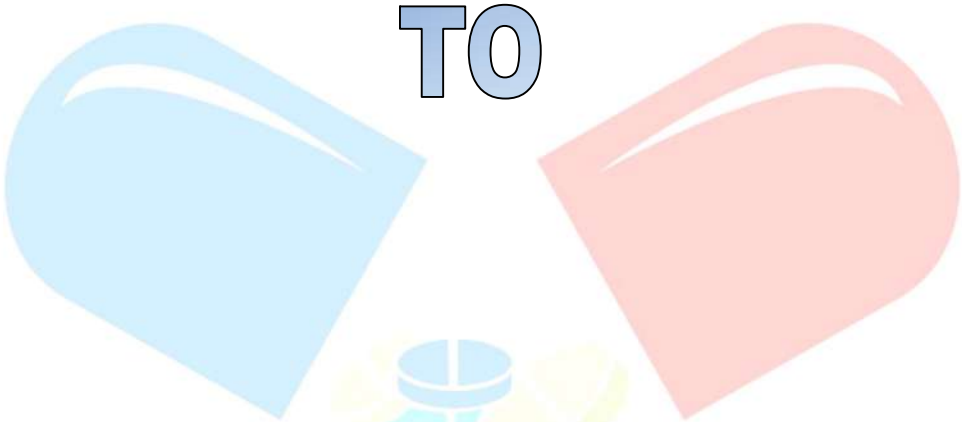
WELCOME

TO



This is an Education Platform

We Provide PDF Notes for Pharmacy Students

Web Site http://www.fdspharmacy.in/

You tube https://www.youtube.com/c/FDSpharmacy

Telegram https://t.me/Fdspharmacy

App https://play.google.com/store/apps/details?id=com.FDSPharmacyMedia.FDSPharmacy

E-mail fdspharmacyinfo@gmail.com

PHARMACEUTICAL INORGANIC CHEMISTRY

UNIT 4

TOPIC :

- **Miscellaneous compounds**
- **Expectorants :** Potassium iodide, Ammonium chloride*

EXPECTORANTS

→ Expectorants are the drugs that help in the removal of sputum (mucus) from the respiratory tract.

→ They are commonly used in the treatment of cough, especially when the cough is productive (accompanied by mucus).

→ Cough is a protective reflex that helps to clear the respiratory passages of mucus, irritants, or foreign substances.

→ Types of Cough :

- **Dry Cough** – No mucus or sputum is produced
- **Productive Cough** – Mucus or sputum is discharged

Classification of Expectorants

Expectorants act through two main mechanisms:

- By increasing fluidity of mucus (reducing viscosity)
- By increasing the volume of secretions

Based on these mechanisms, expectorants are classified into:

1. Sedative Expectorants

- Also called stomach irritant expectorants
- They act by irritating the gastric mucosa, which in turn stimulates vagal reflexes, increasing the secretion in the respiratory tract.
- They increase the volume of sputum, making it easier to expel.
- May cause mild sedation in patients.

Examples :

- Ammonium chloride
- Potassium iodide
- Sodium citrate
- Ipecacuanha

2. Stimulant Expectorants

- These act directly or indirectly on the secretory cells of the respiratory tract.
- They stimulate mucus production, making sputum more watery and less sticky.
- They help in reducing the viscosity (thickness) of sputum → making it easier to cough out.

Examples :

- Guaifenesin
- Terpin hydrate
- Vasaka (Adhatoda vasica)
- Bromhexine
- Ambroxol

Uses of Expectorants

- ✓ To relieve productive cough
- ✓ In conditions like bronchitis, asthma, common cold, respiratory tract infections
- ✓ To clear mucus from bronchi and lungs
- ✓ Helps in better breathing and reduced chest congestion

POTASSIUM IODIDE

- Chemical Formula: KI
- Molecular Weight: 166 g/mol
- Synonym: Kalii Iodidum

Method of Preparation

Potassium iodide is prepared by reacting hydrogen iodide (HI) with potassium bicarbonate ($KHCO_3$):

$$KHCO3 + HI \rightarrow KI + H2O + CO2\uparrow$$

Physical Properties

- Appears as colourless transparent crystals or white granular powder
- Odourless
- Has a bitter taste
- Hygroscopic in nature (absorbs moisture from air)
- Soluble in water and also soluble in alcohol

Chemical Properties

- Stable in dry air but may turn yellow in moist air due to liberation of free iodine
- Acts as a source of iodide ion (I^-)
- Can react with oxidizing agents to release elemental iodine (I_2)

Uses

✓ Expectorant

→ Used in the treatment of chronic bronchitis and productive cough by stimulating the secretion of mucus in the respiratory tract.

✓ Antifungal agent

→ Used in the treatment of fungal infections such as sporotrichosis.

✓ Iodine supplement

→ Used for preventing and treating iodine deficiency and goiter.

✓ Saline diuretic

→ Promotes urine production by altering electrolyte balance.

✓ Used in the preparation of iodine solutions like Lugol's iodine.

AMMONIUM CHLORIDE

- Chemical Formula: NH_4Cl
- Molecular Weight: 53.49 g/mol
- Synonym: Sal Ammoniac

Method of Preparation

Ammonium chloride is prepared by the neutralization reaction between ammonia (NH_3) and hydrochloric acid (HCl):

$$NH3+HCl \rightarrow NH4Cl$$

Physical Properties

- Appears as a white crystalline powder
- Odourless
- Has a cooling, saline taste
- Highly soluble in water
- Slightly soluble in alcohol
- Hygroscopic (absorbs moisture from air)

Chemical Properties

- On heating, it sublimes (converts directly from solid to gas)
- Slightly acidic in aqueous solution
- Compatible with many drugs and salts

Uses

✓ Expectorant

→ Used in cough syrups to promote removal of mucus by increasing bronchial secretions.

✓ Diuretic (Saline diuretic)

→ Helps in promoting urine output in some cases.

✓ Acidifier

→ Used to acidify urine in urinary tract infections and to treat alkalosis.

✓ Used in buffer solutions

→ Especially in acid-base balance systems.

✓ Used in fertilizers and in textile printing and metalwork industries