

Expectorants

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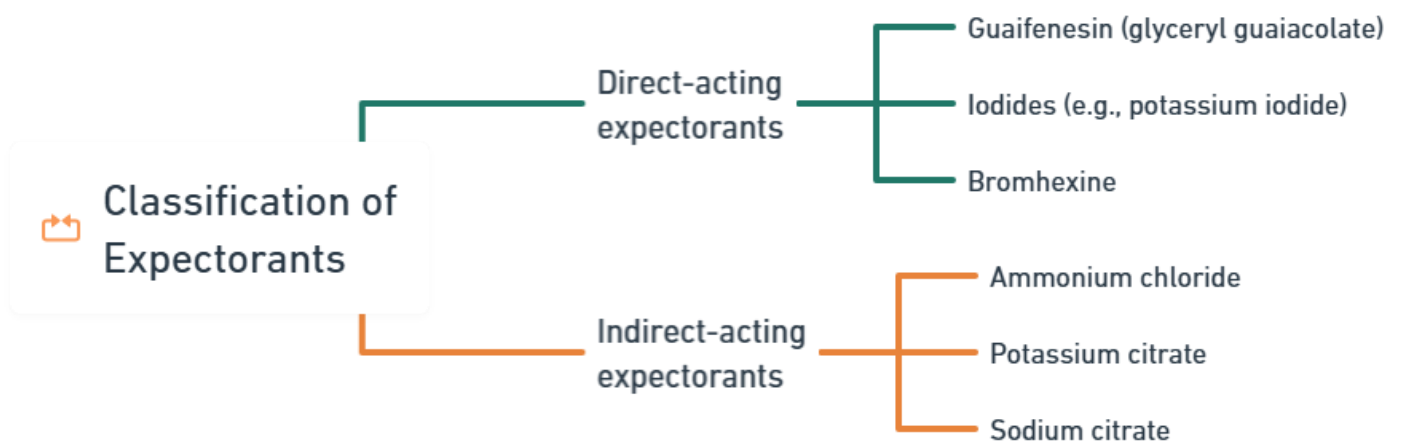
Introduction

- Expectorants are drugs that facilitate the expulsion of mucus from the respiratory tract by increasing mucus production and/or reducing its viscosity.
- They are used to treat coughs and congestion associated with common colds, bronchitis, and other respiratory illnesses.



Classification of Expectorants

Expectorants can be classified into **two** main categories:



1. Direct-acting expectorants:

- These agents act directly on the secretory cells of the respiratory tract, increasing the secretion of mucus and/or decreasing its viscosity.
- The increased mucus production and thinning of mucus help facilitate its removal from the respiratory tract, making it easier to cough up.

Examples:

- Guaifenesin (glyceryl guaiacolate)
- Iodides (e.g., potassium iodide)
- Bromhexine

2. Indirect-acting expectorants:

- These agents work by irritating the gastric mucosa, which stimulates a reflex increase in respiratory tract secretions.
- The increased secretions help to loosen and thin the mucus in the respiratory tract, making it easier to cough up.

Examples:

- Ammonium chloride
- Potassium citrate
- Sodium citrate

Cough and Its Types

- Cough is a reflex action that helps clear the respiratory tract of mucus, irritants, and foreign particles.
- It is a vital protective mechanism that helps keep the airways clear and maintain proper respiratory function.
- Coughs can be classified into several types based on their duration, nature, and underlying cause:

1. Acute cough:

- Lasts less than 3 weeks.
- Often due to viral infections or irritants.

2. Subacute cough:

- Lasts between 3 and 8 weeks.
- May result from lingering infections or other causes.

3. Chronic cough:

- Lasts more than 8 weeks.
- Caused by various underlying conditions.

4. Productive cough:

- Produces mucus or phlegm.
- Common in respiratory infections or conditions with increased mucus production.

5. Dry (non-productive) cough:

- No mucus production.
- Can be caused by viral infections, allergies, irritants, or medications.

6. Nocturnal cough:

- Occurs predominantly at night.
- Caused by factors like asthma, postnasal drip, or GERD.

7. Whooping cough (pertussis):

- Severe, uncontrollable coughing caused by Bordetella pertussis infection.
- Dangerous for infants and young children.

Potassium iodide (KI)

Preparation

- Potassium iodide can be prepared through the reaction of potassium hydroxide (KOH) with iodine (I₂).
- The chemical reaction is as follows:



Properties

- **Physical Appearance:** White crystalline solid.
- **Solubility:** Soluble in water, with a slightly bitter, saline taste.
- **Nature:** Ionic compound.
- **Melting Point:** 681°C (1258°F).
- **Stability:** Relatively stable but can undergo oxidation in the presence of air and moisture, turning yellow due to the liberation of iodine.

Uses

1. **Nutritional Supplement:** Used to prevent iodine deficiency and associated conditions, such as goitre and hypothyroidism.
2. **Medical Use:** Acts as a protective agent against radioactive iodine exposure, particularly in the case of nuclear accidents.
3. **Skin Treatment:** Used in the treatment of certain skin conditions, such as sporotrichosis and erythema nodosum.
4. **Photographic Industry:** Serves as a component of some photographic chemicals and developers.

Storage

- **Conditions:** Should be stored in a cool, dry place, away from heat and direct sunlight.

- **Container:** Keep in a tightly closed container to minimize exposure to air and moisture.
- **Avoid Contact:** Store away from strong oxidizing agents and acids to prevent chemical reactions.

Ammonium chloride (NH₄Cl)

Preparation

- Ammonium chloride can be prepared by the reaction of ammonia (NH₃) with hydrochloric acid (HCl).
- The chemical reaction is as follows:



Properties

- **Physical Appearance:** White crystalline solid.
- **Solubility:** Soluble in water and has a cooling, salty taste.
- **Nature:** Ionic compound.
- **Melting Point:** 338°C (640°F).
- **Chemical Nature:** Weak acid, capable of undergoing reactions with bases.

Uses

1. **Expectorant:** Used in cough medicines to help clear mucus from the respiratory tract.
2. **Buffering Agent:** Employed in the pharmaceutical industry to maintain the pH of solutions.
3. **Fertilizer Production:** Used in the production of fertilizers, particularly for rice and wheat cultivation.
4. **Industrial Applications:** Utilized in electroplating, soldering flux, and metal recovery processes.

Storage

- **Conditions:** Should be stored in a cool, dry place, away from heat and direct sunlight.
- **Container:** Keep in a tightly closed container to minimize exposure to air and moisture.
- **Avoid Contact:** Store away from strong acids, bases, and oxidizing agents to prevent chemical reactions.

Emetics

Emetics

Overview

- Emetics are agents used to induce vomiting, primarily to remove toxic substances from the stomach before absorption into the bloodstream.
- They work by activating the body's natural vomiting reflex, involving both the central nervous system and the gastrointestinal tract.



Mechanism of Action

- Vomiting, or emesis, is regulated by the brain's vomiting center in the medulla oblongata.
- **This center can be activated by:**
 - Direct irritation of the stomach or intestines.
 - Activation of the chemoreceptor trigger zone (CTZ), which detects toxins in the blood.
 - Sensory inputs such as sights, smells, or emotions.
- When activated, the vomiting center coordinates muscle contractions to expel stomach contents.

Common Emetics

1. Ipecac Syrup

- Derived from the ipecacuanha plant, it induces vomiting by irritating the stomach lining and stimulating the CTZ.
- Historically used in poisoning cases, but its use has decreased due to safety concerns and potential for abuse.

2. Apomorphine



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