

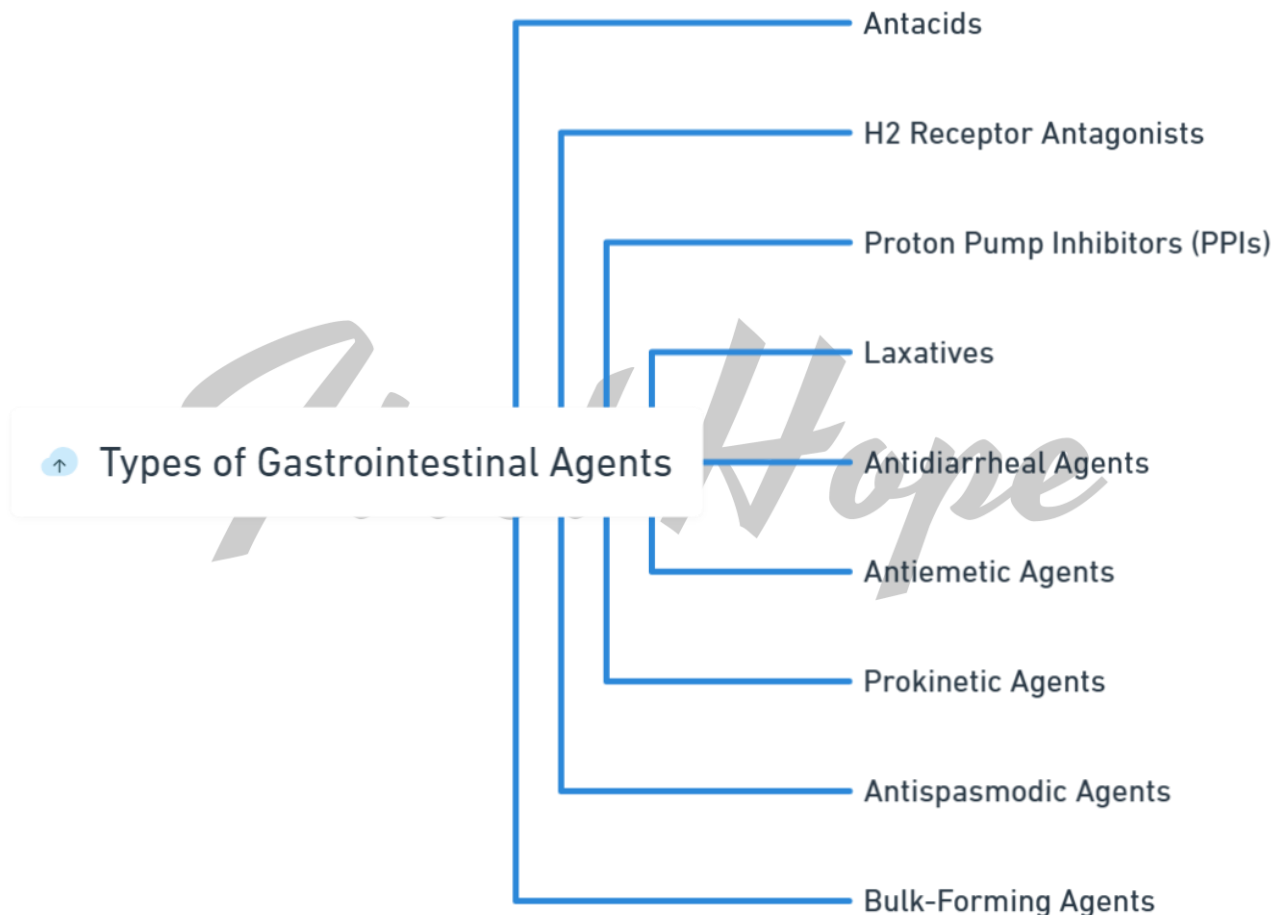
Gastrointestinal Agents

Introduction of Gastrointestinal agents

Introduction

- Gastrointestinal agents are medications or substances used to treat various conditions and symptoms affecting the gastrointestinal (GI) tract.
- They target different parts of the digestive system, from the esophagus to the colon, addressing issues such as indigestion, acid reflux, constipation, and diarrhea.

Types of Gastrointestinal Agents



1. Antacids

- **Function:** Neutralize stomach acid and provide relief from heartburn, acid reflux, and indigestion.
- **Common Examples:** Calcium carbonate, aluminum hydroxide, magnesium hydroxide.

2. H2 Receptor Antagonists

- **Function:** Decrease the production of stomach acid by blocking histamine H2 receptors on the acid-producing cells in the stomach lining.
- **Common Examples:** Ranitidine, cimetidine, famotidine.

3. Proton Pump Inhibitors (PPIs)

- **Function:** Reduce stomach acid production by inhibiting the proton pump in the stomach's acid-producing cells.
- **Common Examples:** Omeprazole, lansoprazole, pantoprazole.

4. Laxatives

- **Function:** Treat constipation by softening the stool, increasing stool volume, or stimulating bowel movements.

Types:

- A. **Bulk-forming:** Psyllium
- B. **Osmotic:** Polyethylene glycol
- C. **Stimulant:** Bisacodyl
- D. **Stool Softeners:** Docusate

5. Antidiarrheal Agents

- **Function:** Manage diarrhea by reducing stool frequency or consistency.
- **Common Examples:** Loperamide, diphenoxylate with atropine, bismuth subsalicylate.

6. Antiemetic Agents

- **Function:** Prevent and treat nausea and vomiting.

Types:

- A. **Serotonin 5-HT₃ Receptor Antagonists:** Ondansetron
- B. **Dopamine D₂ Receptor Antagonists:** Metoclopramide
- C. **Antihistamines:** Dimenhydrinate

7. Prokinetic Agents

- **Function:** Improve gastrointestinal motility by enhancing the coordinated contractions of the GI tract.
- **Common Examples:** Metoclopramide, erythromycin.

8. Antispasmodic Agents

- **Function:** Relieve abdominal pain and cramping by relaxing the smooth muscles of the GI tract.
- **Common Examples:** Dicyclomine, hyoscyamine.

9. Bulk-forming Agents

- **Function:** Normalize bowel movements by adding bulk and water to the stool, making it easier to pass.
- **Common Examples:** Psyllium, methylcellulose.

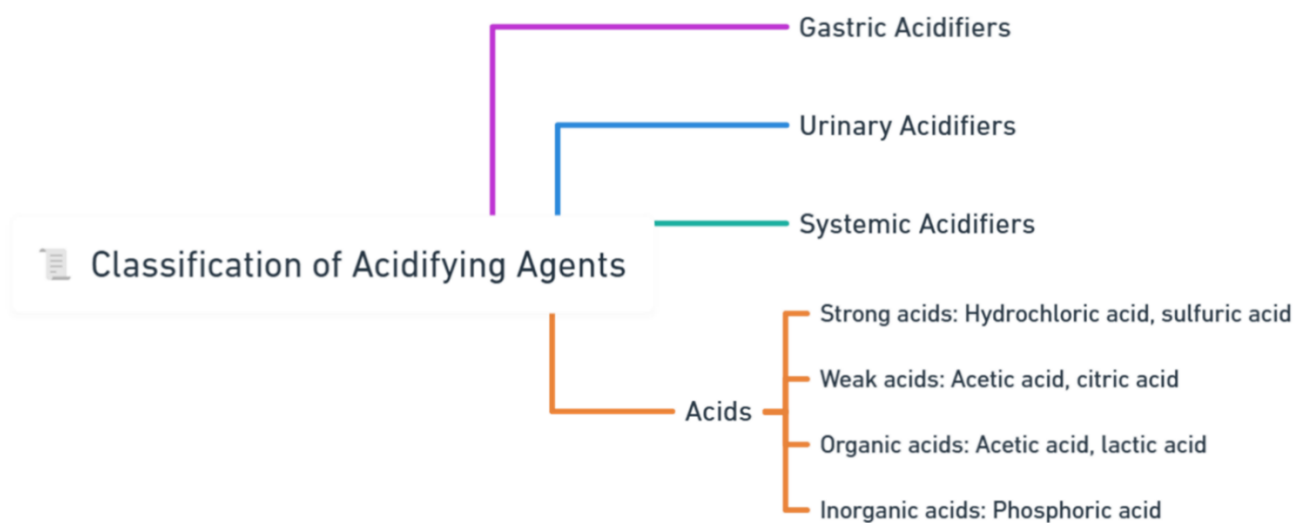
Acidifiers

Acidifiers

Introduction

- Acidifiers, also known as acidulants, are substances that lower the pH of a solution, making it more acidic.
- They are used in various industries, including food, pharmaceuticals, and agriculture, for purposes such as flavor enhancement, preservation, and pH adjustment.
- Acidifiers can be classified based on their origin, chemical nature, or function.

Classification



1. Gastric Acidifiers

- **Function:** Increase the production of hydrochloric acid in the stomach to improve digestion and create a more acidic environment.
- **Uses:** Treatment of conditions like hypochlorhydria (low stomach acid) or achlorhydria (absence of stomach acid).
- **Examples:** Betaine HCl, glutamic acid HCl.

2. Urinary Acidifiers

- **Function:** Lower the pH of urine, making it more acidic.
- **Uses:** Treatment of urinary tract infections, kidney stones, or to enhance the effectiveness of certain antibiotics.
- **Examples:** Ascorbic acid (vitamin C), ammonium chloride, methenamine.

3. Systemic Acidifiers

- **Function:** Lower the pH of body fluids, promoting a more acidic environment.
- **Usage:** Rarely used in modern medicine due to potential risks, historically used for treating alkalosis (high blood pH).

- **Examples:** Hydrochloric acid, sulfuric acid.

4. Acids

- **Definition:** Broad category of substances that can donate a proton (H⁺) and lower the pH of a solution.

Types:

- A. Strong acids (e.g., hydrochloric acid, sulfuric acid)
- B. Weak acids (e.g., acetic acid, citric acid)
- C. Organic acids (e.g., acetic acid, lactic acid)
- D. Inorganic acids (e.g., phosphoric acid)

Sodium acid phosphate

Preparation:

- Sodium acid phosphate is prepared by the partial neutralization of **phosphoric acid (H₃PO₄)** with **sodium hydroxide (NaOH)**.



- It can also be prepared by reacting **phosphoric acid** with **sodium carbonate (Na₂CO₃)** in the required proportion.

Properties:

- White crystalline powder or colorless crystals.
- Odorless with a slightly acidic taste.
- Freely soluble in water.
- Practically insoluble in alcohol.
- The aqueous solution is acidic.

Storage:

- Store in a well-closed container in a cool and dry place.
- Protect from moisture and contamination.

Uses:

1. **Pharmaceuticals:** Used as a saline laxative and as a buffering agent in pharmaceutical preparations.
2. **Buffer Solutions:** Used in preparing phosphate buffer solutions to maintain pH.
3. **Food Industry:** Used as an acidity regulator and food additive.
4. **Laboratories:** Used as a reagent in analytical and biochemical laboratories.

5. **Water Treatment:** Used for pH control and water conditioning.

Assay (Determination of Concentration/Purity): Common Method – Acid-Base Titration

1. Prepare a Standard Solution:

- Prepare a standard sodium hydroxide (NaOH) solution of known concentration.

2. Take the Sample:

- Accurately weigh a known amount of sodium acid phosphate and dissolve it in water.

3. Add an Indicator:

- Add **phenolphthalein** or use a suitable pH meter to detect the end point.

4. Titrate:

- Slowly add the standard NaOH solution until the end point is reached.
- Sodium acid phosphate reacts with sodium hydroxide to form disodium hydrogen phosphate and water.



5. Calculate the Concentration:

- Record the volume of NaOH used.
- Calculate the purity or concentration of sodium acid phosphate using the titration data and reaction stoichiometry.

Dilute Hydrochloric Acid (Dil. HCl)

Preparation

- Dilute hydrochloric acid is prepared by carefully diluting **concentrated hydrochloric acid** with purified water.
- The acid should always be **added slowly to water** with continuous stirring to prevent excessive heat and splashing.



Properties

- Colorless, clear liquid with a pungent odor.
- Strong acidic solution.
- Completely miscible with water.
- Corrosive in nature.
- Turns blue litmus paper red.

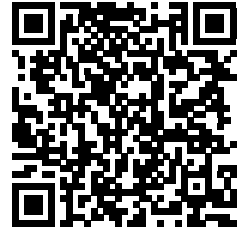


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