

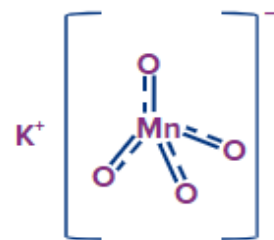
PHARMACEUTICAL INORGANIC CHEMISTRY- BP104T

UNIT: 3 (GASTROINTESTINAL AGENTS)

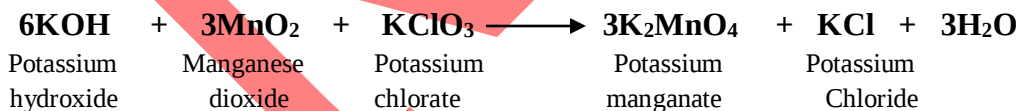
CLASS: 8

TOPIC: **ANTI-MICROBIAL AGENTS: POTASSIUM PERMANAGANATE, BORIC ACID****POTASSIUM PERMANGANATE: (KMnO₄)****Synonyms:** Condy's crystals, Permanganic acid, permanganate of potash,**Molecular weight:** 158.03 g/mol**Standards:** It contains not less than 99% and not more than 100.5% of KMnO₄**Properties:**

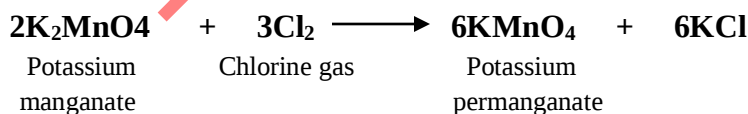
- **Appearance:** Dark purple prismatic crystals with metallic luster
- **Odor:** Odourless
- **Taste:** metallic taste
- **Melting point:** 240°C
- **Solubility:** Soluble in water and alcohol.
- **Density:** 2.703 g/cm³

**Preparation:**

1. KMnO₄ is prepared by mixing a solution of KMnO₄ with powdered manganese dioxide and potassium chlorate. The mixture is boiled and evaporated to yield the residue.



2. By passing chlorine gas through potassium manganate solution



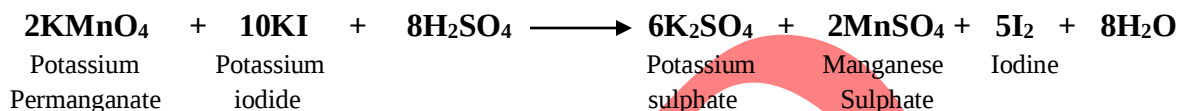
3. When carbon dioxide is passed in place of chlorine gas, then two-third of the managanate gets converted to potassium permanganate.



Mode of action: KMnO_4 releases the nascent oxygen i.e, $[\text{O}]$, which by oxidative mechanism inhibits the action of micro organism and their growth.

Assay: This assay is based on iodometric type of redox titrations.

0.3gm of the KMnO_4 is dissolved in 100mL of water. Take 20mL of this solution, add 1gm of KI and 10mL of 2N HCl and titrate the liberated iodine with 0.1 M $\text{Na}_2\text{S}_2\text{O}_3$ using starch solution as an indicator.



Each 1mL of 0.1 M $\text{Na}_2\text{S}_2\text{O}_3$ is equivalent to 0.003160gm of KMnO_4

Storage: It should be stored in air tight container to avoid contact with organic matter

Uses:

- It is a topical anti-infective
- Its solution is used as antiseptic in mouth washes and in cleaning of ulcers
- It is used in the treatment of Urethritis
- It has good oxidizing property.
- Its solution is used in bath of eczema and acute dermatosis patients
- It is commonly used as an antiseptic in veterinary practices.

BORIC ACID: (H_3BO_3)

Synonyms: Acidus Boricum, Boracic acid, Orthoboric acid, Hydrogen borate

Molecular weight: 61.83 g/mol

Standards: It contains not less than 99.5% and not more than 100.5% of boric acid with reference to the dried substance.

Properties: Appearance: Colorless white crystalline powder

Odor: Odourless

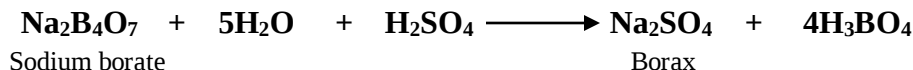
Taste: Slightly acidic or bitter in taste

Melting point: 171°C and stable in atmospheric oxygen

Solubility: Soluble in water and alcohol.

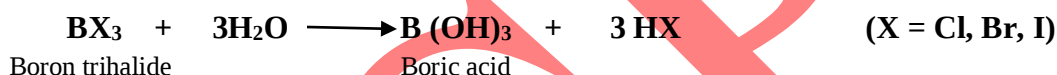
Preparation:

1. In laboratory boric acid is obtained, by adding a mixture of conc. sulphuric acid and water to a boiling solution of borax



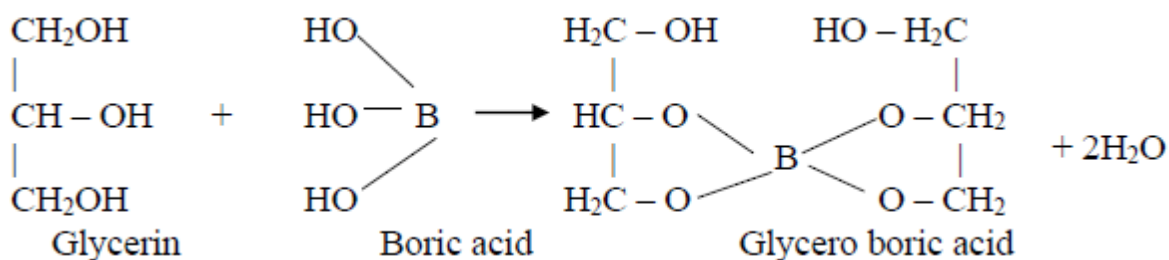
The solution is filtered and the crystals of boric acid are separated and washed until they get free from sulphate ions.

2. Boric acid is also formed as a byproduct of hydrolysis of diborane and boron trihalides



Assay: This assay is based upon acid-base titration. Accurately weigh about 2gm of boric acid and dissolve in 50mL of water and 10mL of glycerol previously neutralized with phenolphthalein. The solution is titrated against 1N NaOH solution using phenolphthalein solution as an indicator. The end point color changes to red.

Each mL of 1N NaOH is equivalent to 0.06183gm of boric acid.

**Uses:**

- Boric acid can be used as an antiseptic for minor burns or cuts. It is also used as weak bacteriostatic, fungistatic and astringents.
- Boric acid is applied in a very dilute solution as an eye wash.
- Dilute boric acid can be used as a vaginal douche to treat bacterial vaginosis due to excessive alkalinity.
- It is also used as mouth washes, skin lotion for local anti-infective action.
- Its use as an insecticide.
- The boric acid-borate system can be useful as a primary buffer system.
- Boric acid is used in some nuclear power plants as a neutron poison.

- The boron in boric acid reduces the probability of thermal fission by absorbing some thermal neutrons.
- It is also used in preservation of grains such as rice and wheat.
- 2.5% to 4.5% of aqueous solution is used in mouth washes and skin lotions.

Storage: Store in well closed container and kept in a cool place.

Adverse effect: Vomiting, abdominal cramps

2 MARKS QUESTIONS

1. Write the synonyms and uses of potassium permanganate
2. Write the synonyms and uses of boric acid

5 MARKS QUESTIONS

1. Write a note on potassium permanganate
2. Write a note on boric acid

10 MARKS QUESTIONS

1. Write the method of preparation, uses, properties and assay of potassium permanganate
2. Write the method of preparation, uses, properties and assay of boric acid