

PHARMACEUTICAL INORGANIC CHEMISTRY- BP104T

UNIT: 3 (GASTROINTESTINAL AGENTS)

CLASS: 5

TOPIC: CATHARTICS – MAGNESIUM SULPHATE, SODIUM ORTHO PHOSPHATE

Laxatives, purgatives, or cathartics are substances that loose stools and increase bowel movements. They are used to treat and prevent constipation.

Constipation is the difficult evacuation of the feces.

Cathartics are used:

- To ease defecation in patients with painful hemorrhoids or other rectal disorders.
- To avoid potentially hazardous rise in B.P during defecation in patients with hypertension.
- To relieve acute constipation.
- To remove solid material from intestinal tract prior to certain roentgenographic studies

Types:

1. **Laxative or apeirent** : Milder action, elimination of soft but formed stools
Onset of action: 12 – 7 hours
2. **Purgative:** Purgative are moderate laxative.
Onset of action: 6-8 hours.
3. **Cathartic:** Stronger action resulting in more fluid evacuation.
Onset of action: 0.5-3 hours (oral), 2-15 minutes (rectal)

Classification:

1. **Bulk forming:** Dietary fibre: Ispaghula (Plantago), Methylcellulose
2. **Stool softener:** Docusates (DOSS), Liquid paraffin
3. **Stimulant purgatives:** Senna, Sodium picosulfate, Castor oil
4. **Osmotic purgatives** [Saline (Osmotic) Cathartics]: Magnesium salts: sulfate, hydroxide; Sodium salts: sulfate, phosphate; Sod. Pot. tartrate; Lactulose

MAGNESIUM SULPHATE: (MgSO₄ .7H₂O)

Molecular weight: 120.36 g/mol

Synonyms: Epsom salt, bitter salt

Properties:

Appearance: White crystalline solid

Odor: Odourless

Taste: Bitter taste

Melting point: 150°C

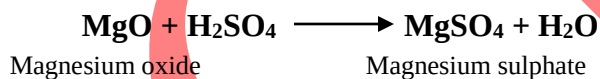
Solubility: 113g/100 ml at 20°C in water (Heptahydrate); Slightly soluble in alcohol

Preparation:

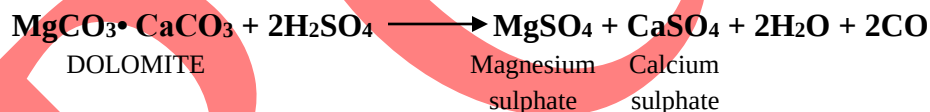
1. **Laboratory method:** A Magnesium sulphate is prepared from magnesium carbonate and dilutes sulphuric acid.



Magnesium sulphate is also prepared from magnesium oxide and sulphuric acid.



2. **Industrial Preparation:** Magnesium sulphate is prepared from DOLOMITE ($\text{MgCO}_3 \cdot \text{CaCO}_3$) by using dil. sulfuric acid.



Uses:

- It is used as osmotic laxative (Saline Cathartics)
- In treatment of electrolyte deficiency in wet dressing in boils
- In treatment of cholecystitis, sea sickness.

Dose: 10 – 15 g/day

SODIUM ORTHOPHOSPHATE: ($\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$)

Molecular weight: 358.14 g/mol

Synonym: dodecahydrate of disodium orthophosphate

Standards: It contains NLT 98.5% and NMT 101.0% sodium orthophosphate.

Properties:

Appearance: Colourless transparent crystals

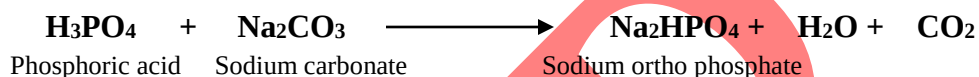
Taste: saline taste.

Odour: Odourless and effloresces in air.

Solubility: Soluble in water but insoluble in alcohol.

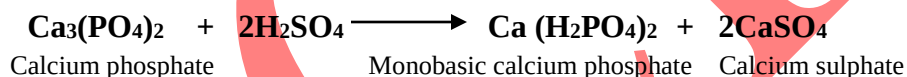
Preparation:

1. It is obtained by adding sodium carbonate to a hot solution of phosphoric acid.

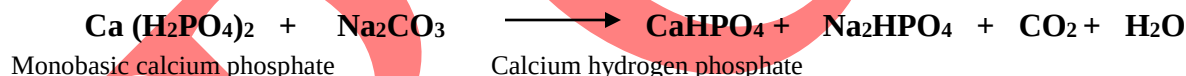


The solution is neutralized, concentrated and the crystals are separated out by centrifuging, washed and dried

2. It is also obtained from calcium phosphate which is treated with sulphuric acid, yields calcium sulphate and monobasic calcium phosphate.



Now the filtrate is treated with sodium carbonate when dibasic calcium phosphate gets deposited leaving sodium phosphate in solution.



The solution is filtered off. The crystals of sodium phosphate are obtained by concentrating the solution and crystallization.

Uses:

- It is used as a saline laxative.
- It is a cathartic and buffering agent.

Dose: 2 – 16 g/mol

2 MARKS QUESTIONS

1. Write the uses of sodium ortho phosphate and magnesium sulphate
2. What are cathartics? Classify with suitable examples

5 MARKS QUESTIONS

1. Write the method of preparation of sodium ortho phosphate
2. Define cathartics and write in detail about magnesium sulphate

10 MARKS QUESTIONS

1. What are cathartics? Write the method of preparation, properties and uses of sodium orthophosphate and magnesium hydroxide