Acidifiers

- These are inorganic chemicals which produce or become acid.
- They increase the level of gastric acid in the stomach when ingested and hence decrease in the pH of the stomach.
- Achlorhydria- patient have deficient secretion of HCl in stomach.
- Systemic acidifier given via injection reduces the alkali reserve in the body and useful in reducing metabolic alkalosis.

Types of acidifier

- Gastric
- Urinary
- systemic

Gastric acidifier

- **USED IN CONTROLLING PH OF STOMACH**

Urinary acidifier

- **USED IN CONTROLLING PH OF URINE**

Systemic acidifier

- **USED IN CONTROLLING PH OF ALL PARTS OF BODY.**

Dilute hydrochloric acid

Preparation

- It is prepared by adding 274 g of concentrated HCl slowly into 726 g of purified water.
- Pungent odour
- Fuming
- It react with metals and releases hydrogen gas.

Assay

- Acidimetry-alkalimetry
- Substance dissolved in water and titrated against sodium hydroxide using methyl red as indicator.
- Neutralization reaction takes place.
- Methyl red indicator is yellow in alkali medium and it changes to red in acid medium

SODIUM PHOSPHATE
DISODIUM HYDROGEN PHOSPHATE
DISODIUM HYDROGEN ORTHO PHOSPHATE DECA HYDRATE

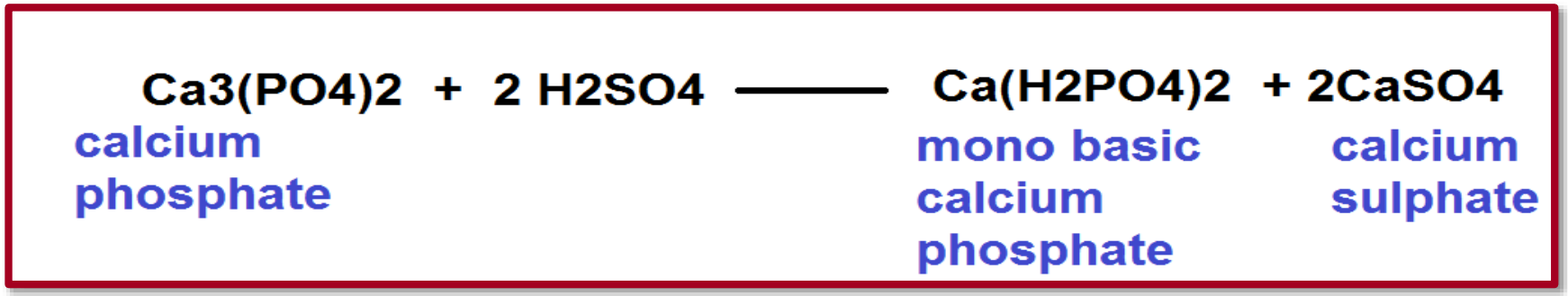
Preparation

- From sodium carbonate
- Sodium carbonate is added to the hot solution of phosphoric acid, it gives disodium hydrogen phosphate solution.
- The solution is neutralized concentrated and crystals are separated by centrifugation washed and dried.

$$Na_2CO_3 + H_3PO_4 \longrightarrow Na_2HPO_4 + H_2O + CO_2$$

From calcium phosphate

- The correct proportions of calcium phosphate and sulphuric acid are reacted to yield mono basic calcium phosphate and calcium sulphate.



- Add boiling water and filtered

- To the filterate add sodium carbonate to yield the sodium phosphate solution and the dibasic calcium phosphate gets deposited.
- The solution is filtered off and sodium phosphate crystal obtained by concentrating it.

$$Ca(H_2PO_4)_2 + Na_2CO_3 \longrightarrow CaHPO_4 + H_2o$$
$$Na_2HPO_4 + CO_2$$

Assay

- Acidimetry-alkalimetry
- Substance dissolved in water and titrated against 0.5 N sulphuric acid using bromo cresol green as an indicator.
- The end point is appearance of yellow colour.
- For better end point bromocresol green and methy red mixture is used.
- It gives greenish grey colour.

- It is neutralisation reaction.
- The indicator is blue in alkali and changes to yellow in acidic medium

$$Na_2HPO_4 + H_2SO_4 \longrightarrow Na_2SO_4 + H_3PO_4$$

Use

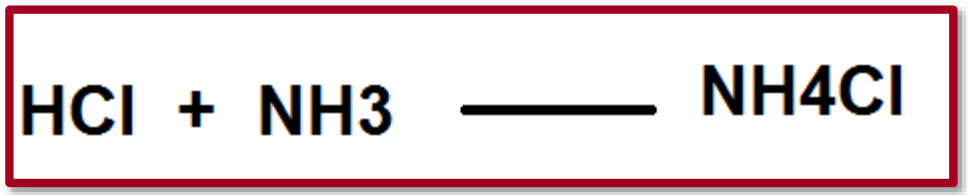
- Laxative
- Cathartic
- Buffering agent
- Pharmaceutical aid

Sal Ammoniac

Ammonium chloride

Preparation

- Commercial
- Neutralisation of Ammonia with HCl yields Ammonium chloride.
- The purification is done by sublimation from iron pan.



From ammonium sulphate

- By heating ammonium sulphate with sodium chloride

$$(NH_4)_2SO_4 + NaCl \longrightarrow 2NH_3 + 2HCl + Na_2SO_4$$

$$HCl + NH_3 \longrightarrow NH_4Cl$$

Preparation of crude Ammonium chloride

- Ammonical gas liquors are treated with lime.
- During this process ammonia gas is liberated which is passed into HCl
- The crude product is commercially known as Sal ammoniac.

$$HCl + NH_3 \longrightarrow NH_4Cl$$

Assay

- Substance dissolved in water and to it previously neutralised formaldehyde is added.
- Reason: Formaldehyde may have small amount of formic acid , which must be neutralised before the sodium hydroxide using phenolphthalein.
- Titrated against Sodium hydroxide using phenolphthalein as an indicator

- End point is the appearance of pale permanent pink color.
- In this ammonium chloride undergoes hydrolysis and yield ammonium hydroxide and HCl.
- This reaction is faciliated by formaldehyde by fixing ammonia as hexamine.
- The acid formed is titrated against sodium hydroxide.
- Indicator is colorless in acid and pink in alkaline medium.

It is acidimetry –alkalimetry method – neutralisation takes place

Ammonium chloride

Ammonium hydroxide

$$NH_4Cl + H_2O \longrightarrow NH_4OH + HCl$$

Formaldehyde

$$4NH_4OH + 6\,HCHO \longrightarrow \text{Hexamine} + 10\,H_2O$$

$$HCl + NaOH \longrightarrow NaCl + H_2O$$

use

- 0.8% w/v solution is isotonic with serum.
- Systemic acidifier
- Diuretic
- Expectorant
- Diaphoretic
- It increases the local irritation which leads to increase the respiratory tract secretions and makes the less viscous mucus.So ammonium chloride and carbonate are used in cough preparation.