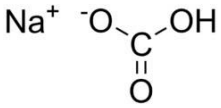


Sodium bicarbonate ($NaHCo_3$):

Molecular weight: 84.01g/mol
Synonyms: Baking soda, cooking soda, bicarbonates of soda.

Properties:

- **Appearance:** White crystalline powder or granules
- **Odor:** Odourless
- **Taste:** Saline taste
- **Density :** 1.1 to 1.3 g/cm3
- **Melting point:** Decomposes to sodium carbonate starting at 50^0C
- **Solubility** in water: Freely soluble in water: 69 g/L (0^0C); 96 g/L (20^0C); 165 g/L (60^0C); 236 g/L (100^0C)
- **Refractive index:** 1.583

Preparation: NaHCO3 may be obtained by the reaction of carbon dioxide with an aqueous solution of sodium hydroxide. The initial reaction produces sodium carbonate. Further addition of carbon dioxide produces sodium bicarbonate

$$\underset{\text{(Sodium Hydroxide)}}{CO_2 + 2\ NaOH} \rightarrow \underset{\text{(Sodium carbonate)}}{Na_2CO_3} + H_2O$$

$$Na_2CO_3 + CO_2 + H_2O \rightarrow \underset{\text{(Sodium bicarbonate)}}{2\ NaHCO_3}$$

Assay:

- Weigh accurately 1gm of Sodium bicarbonate and dissolve in 20 ml of water
- Titrate the solution with 0.5N sulphuric acid using methyl orange as indicator.
- Each ml of 0.5N sulphuric acid ≡ 0.0425gm of $NaHCO_3$

Uses:

- It is used as Systemic antacid and in electrolyte replacement.
- It is used as systemic alkalinising agent used in the treatment of metabolic acidosis (increase in acidity). Bicarbonate of soda can also be useful in removing splinters from the skin.
- Sodium bicarbonate can be added to local anaesthetics, to speed up the onset of their effects and make their injection less painful.
- Sodium bicarbonate may be used as a buffering agent, combined with table salt, when creating a solution for nasal irrigation.
- 0.1% to 1% Sodium bicarbonate solution used as eye lotion.
- Used removed ear wax and lubricating fluid for contact lenses.
- 5% to 10% Sodium bicarbonate solution used as local applicants for burn, insect bites etc.

- Used in preparation of effervescent formulation.

Side effects:

- High doses may cause headache, nausea or irritability.
- Sodium bicarbonate side effects can include metabolic alkalosis, edema due to sodium overload, congestive heart failure, hyperosmolar syndrome, hypernatremia and hypertension due to increased sodium.

Dose: 300 mg to 2 g per day in divided dose.

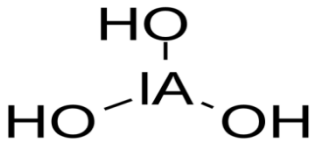
Storage: Store in air tight container.

Aluminium hydroxide gel: Al (OH) $_3$

Molecular weight: 78.00 g/mol

Synonyms: Hydrated alumina, Ortho Aluminic acid, Aluminic acid

Properties:



- **Appearance:** White amorphous powder
- **Odor:** Odourless
- **Taste:** Tasteless
- **Density :** 2.42 g/cm3
- **Melting point:** 300^0C
- **Solubility**: Practically insoluble in water and alcohol; Soluble in in dilute mineral acid and in solution of alkali hydroxide.
- **Isoelectric point:** 7.7

Preparation: Aluminum hydroxide is amphoteric in nature, i.e, it has both basic and acidic properties.

It is prepared by hot solution of potash alum slowly with constant stirring to a hot solution of sodium carbonate.

$$3Na_2CO_3 + 2KAl(SO_4)_2 + 3H_2O \longrightarrow 3Na_2SO_4 + K_2SO_4 + 2Al(OH)_3 + 3CO_2$$

(Sodium Carbonate) (Potassium alum) hot solution (Sodium sulphate) (Potassium Sulphate) (Aluminum hydroxide)

Uses:

- Aluminum salts remain in the stomach for long periods and slowly react with stomach acid to form aluminum chloride.
- Aluminum hydroxide may inhibit the action of pepsin and stimulate stomach mucus secretion.
- Aluminum hydroxide used as gastric antacid.
- Aluminum hydroxide used in treatment of Gastro esophageal reflux disorder

- Aluminum hydroxide of sulfated sucrose is known as Sucralfate, which is used as protective **Sucralfate** is minimally absorbed after oral administration; action is entirely local. It promotes healing of both duodenal and gastric ulcers. (Sucralfate must be taken before meals)
- In treatment of Zollinger-Ellison Syndrome

Side effects:

- Constipation
- Osteomalacia (bone softening in adults due to vitamin D or calcium deficiency)
- Decreased absorption of some drugs (e.g., Tetracyclines and other antibiotics)

Dose: Gastro Esophageal Reflux Disease, Duodenal and Gastric Ulcer: 500 to 1500 mg orally 4 to 6 times a day as needed, between meals and at bedtime.

Storage: Store in well-closed containers and should not be allowed to freeze.