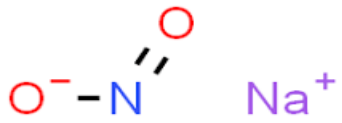
Sodium nitrite: ($NaNO_2$)

Synonyms: Nitrous acid sodium salt, Etinitrit
Molecular weight: 69 gm/mol
Standards: It contains not less than 97% and not more than 101% of sodium nitrite on dried basis.

Properties:

- **Appearance:** It is yellow or white crystalline powder
- **Taste:** It has saline taste
- **Odor:** It is odorless in nature
- **Solubility:** It is freely soluble in water but less soluble in alcohol.
- When exposed to air, it readily forms sodium nitrate.



Preparation:

1. It is prepared by the reaction between nitrogen oxide gas and oxygen in sodium carbonate solution. The solution is concentrated and the crystalline product is collected.

$$\underset{\text{(Sodium Carbonate)}}{Na_2CO_3} + \underset{\text{(Nitrous oxide)}}{4NO} + O_2 \longrightarrow \underset{\text{(Sodium nitrite)}}{4NaNO_2} + 2CO_2$$

2. It is prepared by strongly heating sodium nitrate.

$$\underset{\text{(Sodium nitrate)}}{2NaNO_3} \longrightarrow \underset{\text{(Sodium nitrite)}}{2\,NaNO_2} + O_2$$

3. It can also be prepared by heating sodium nitrate with lead.

$$\underset{\text{(Sodium nitrate)}}{NaNO_3} + \underset{\text{(Lead)}}{Pb} \longrightarrow \underset{\text{(Sodium nitrite)}}{NaNO_2} + \underset{\text{(lead oxide)}}{PbO}$$

Assay:

- 1gm of sodium nitrite is dissolved in 100mL of water
- Pipette out 10mL of the solution and transfer to another solution containing $KMnO_4$, 100mL of water and 5mL of sulphuric acid.
- The solution is warmed to 40^0C and allowed to stand for 5 minutes.
- To this 25ml of 0.1N oxalic acid is added and again heated to 80^0C.
- The excess oxalic acid is titrated with 0.1N potassium permanganate.
- At the end point, color changes from colorless to pink.

$$\underset{\text{(Sodium nitrite)}}{NaNO_2} + \underset{\text{(Sulphuric acid)}}{H_2SO_4} \longrightarrow \underset{\text{(Nitrous acid)}}{HNO_2} + \underset{\text{(Sodium hydrogen sulfate)}}{NaHSO_4}$$

$$\underset{\text{(Nitrous acid)}}{HNO_2} + [O] \longrightarrow \underset{\text{(Nitric acid)}}{HNO_3}$$

Each mL of 0.1 N $KMnO_4$ is equivalent to 3.450gm of sodium nitrite.

Mechanism of action: In cyanide poisoning, the injection of sodium nitrite is given primarily, which causes the oxidation of ferrous ions (Fe^{2+}) of haemoglobin to ferric ion (Fe^{3+}) of methhaemoglobin.
The methhaemoglobin then combines with the serum cyanide and produces cyanometh haemoglobin and protect the enzyme from harmful cyanide ions.

Uses:

- Nitrite ions release the smooth muscle of blood vessels and give the vasodilator action.
- It is mainly used in cyanide poisoning
- It is also used in anti-rust solution to prevent the rusting of surgical instruments.
- It is used as food additives used in processed meats as preservative.
- Chemically, it is used as a reducing agent.

Dose: 10-15mL of 3% solution I.V

Storage: Stored in a tightly closed container.

ACTIVATED CHARCOAL:

Charcoal is a dark grey residue consisting of carbon and any remaining ash obtained by removing water and other volatile constituents from animal and vegetable substances.

Properties:

- **Appearance:** It is a black color powder, smooth when touched and free from gritt particles.
- **Odor:** Odor less
- **Taste:** Tasteless
- **Solubility:** insoluble in water and organic solvents.

Method of preparation:

1. It is prepared by burning wood in absence of air. The residue obtained consists of nearly pure carbon. The core material is crushed and powdered.

2. **Activation of charcoal:**

   - The absorption power of charcoal could be tremendously increased by treating it with various substances such as steam, air, carbon dioxide, oxygen, zinc chloride, sulphuric acid, phosphoric acid or combination of these substances, at temperature ranging from 500^0C to 9000^0C
   - In this process, the activating substances presumably removes substances previously absorbed on charcoal and in some instances at least, breaking down the granules of carbon into smaller ones having a greater total surface of approximately 100 m^2

3. **Other sources:** Sucrose, lactose, rice, starch, coconut, pericarp, bone, blood and various industrial wastes can be used for preparing charcoal.

Uses:

- It is used as an emergency antidote in heavy metal poisoning
- Used in the treatment of diarrhea
- It is used as protective and adsorbent
- It is also used as burning fuel
- Due to its high surface are, it is also used as a filter aid.
- It is also a constituent of gum powder
- It is used as disinfectant in wounds
- It is used to filter toxins from blood and kidney diseases.
- It is used to purify blood transfusions
- It is used in overdose of aspirin
- Its antidote activity is also reported in case of snake, spider and insect bite.

Storage: Store the charcoal container out of direct sunlight and in an area that is cool but not wet.