

# SHREE H. N. SHUKLA INSTITUTE OF PHARMACEUTICAL EDUCATION AND RESEARCH



**B.PHARM**

**(SEMESTER -I)**

**SUBJECT NAME: PHARMACEUTICAL INORGANIC**

**CHEMISTRY**

**SUBJECT CODE: BP104TP**

**UNIT 4(c): Haematinics**

**Content: Introduction of Haematinics, Ferrous sulphate and Ferrous gluconate.****HAEMATINICS**

These are the agents which are required for the formation of blood cells and also used in the treatment of anemia. Eg. Ferrous sulphate, ferrous gluconate.

Anemia is decreased capacity of RBCs to carry oxygen to the tissues. It occurs when the balance between production and destruction of RBCs is disturbed. The disturbance can occur due to

- a. Blood cells
- b. Impaired red blood cell formation due to deficiency of essential factors i.e. Iron, vitamin B<sub>12</sub>, folic acid or bone marrow depression.
- c. Increased destruction of RBCs ( Haemolytic anemia )

**1.) Ferrous sulphate(FeSO<sub>4</sub>.7H<sub>2</sub>O)**

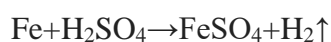
**Chemical formula:** FeSO<sub>4</sub>.7H<sub>2</sub>O

**Molecular weight:** 278.0g/mole

**Category:** Haematinics

**Synonym:** Green vitriol.

**Method of preparation**



**Physical properties:-**

It is odorless, bluish green crystal or powder, metallic taste and astringent. It is completely soluble in water and insoluble in alcohol.

**Chemical properties:-**

1. On heating it decomposes to ferric oxide, sulphur dioxide and sulphur trioxide.  
 $2\text{FeSO}_4 \rightarrow \text{Fe}_2\text{O}_3 + \text{SO}_2 + \text{SO}_3$

• It reduces to the salt of silver and gold to their corresponding metals.  
 $\text{Ag}^+ + \text{Fe}^{2+} \rightarrow \text{Ag} + \text{Fe}^{3+}$

$\text{Au}^{3+} + 3\text{Fe}^{2+} \rightarrow \text{Au} + 3\text{Fe}^{3+}$

**Storage:-** Air tight containers

**Assay:-** principle-Redox titration

An accurately weighted 1g powder is dissolved in 20ml of dilute HCL. Then this solution is titrated against 0.1NKMn



Here  $\text{KMnO}_4$  solution acting as self indicator.

Each 1ml of 0.1NKMnO<sub>4</sub> ≡ 0.0291gm of  $\text{FeSO}_4$

**Dose:-** It is given in a dose of 300-400 mg daily.

**Uses:** – 1. It is used as hematinic.

2. It is used in the treatment of anemia caused by iron deficiency.

3. It also possesses disinfectant property.

4. It is used as an insecticide in agriculture.

**Caution:**– 1.Excessive consumption by children may cause GIT irritation Or shock.

2. It may cause discoloration of teeth in contact.

## 2.) Ferrous Gluconate

**Chemical formula:**  $\text{C}_{12}\text{H}_{22}\text{FeO}_{14} \cdot 2\text{H}_2\text{O}$

**Molecular weight:** 482.2g/mole

**Category:** Haematinics.

**Method of Preparation:**

The preparation of Ferrous gluconate involves two steps:

**Step 1:** Preparation of gluconic acid

Gluconic acid is prepared by oxidation of glucose.



**Step 2:** Preparation of Ferrous gluconate:

In this step gluconic acid treated with barium chloride solution which is then treated with ferrous sulphate solution. Barium sulphate precipitates out and is removed by filtration.

Filtrate is evaporated and cooled, ferrous gluconate crystallises out from filtrate. Ferrous gluconate have two molecules of water of crystallization.



**Physical Properties:**

- 1.) It is fine yellowish- grey or pale greenish powder or granules having a slight odour resembling that a burnt sugar.
- 2.) It is soluble with slight heating in water and practically insoluble in ethanol.

**Identification:**

It gives reactions which are characteristics of ferrous ion and gluconic acid.

**Test of purity:**

It has to be tested for acidity, arsenic, barium, heavy metals, ferric, chloride, sulphates, oxalic acid, dextrose, sucrose and loss on drying.

**Note:** Ferrous gluconate has to be tested for ferric because a ferrous compound if kept open, t gets oxidized in to ferric by the oxygen or air.

**Storage:** It should be stored in a well closed container, which are protected from light.

**Uses:**

It is used as a haematinic; it is regarded to cause fewer side effects than other ferrous salt including ferrous sulphate.