Iron sucrose: (Liquid API)

Pride is holding WHO GMP certification for iron sucrose liquid API.(Cert No19101770)

Iron sucrose is used to formulate iron sucrose injectable formulations and is administered intravenously in the treatment of iron deficiency anaemia. It is frequently used in patients undergoing haemodialysis, those undergoing erythropoietin therapy, and/or patients who have chronic kidney disease. At the same time when Haemoglobin level are extremely low in the patients and having limitations in administering oral iron supplements.

Iron sucrose liquid API is considered better than the solid API because it has salient advantages over Iron sucrose powder API(Solid) for formulators. Some of the advantages are described under in a tabulated form.

Iron Sucrose Solid API v/s Liquid API.

Solid API	Liquid API
1. Solid dispensing leads to dusting in classified area.	1. No problem of dusting in case of liquid API.
2. In case of Solid API, maturation is required. Heating of solution for at least 12 to 15 hrs is required to get stability of desired pH, turbidity and alkalinity.	2. In case of liquid API, no maturation is required. It's an inherent part of the manufacturing process of liquid API.
3. pH needs to be adjusted multiple times to attain pH stability, alkalinity and turbidity. As pH of a solution made from solid API has a tendency to shift frequently. Each sample needs autoclaving before testing and consumes more time and cost.	3. pH needs to be adjusted once only (and that too if required), turbidity and alkalinity remains stable during the course of manufacturing process. No multiple sampling and testing is required.
4. At times Filtration is difficult and demands to use multiple filtration element usages during formulations.	4. The liquid API is passed through 0.2-micron filter and then concentrated. The final filtration is very fast and effective.
5. Polymorph is changed to liquid from solid.	5. There is no question of polymorph change as the API is liquid.
6. Terminal sterilization is required. And there is always a chance that pH of the finished dosage may shift during heating of sterilization process.	6. It's a cold process. No terminal sterilization is recommended. Hence there is no shift in pH and alkalinity of finished dosage.
7. Many a times terminal steaming (80celcius-30 minutes) is required to take care of shift in pH of final formulation. It becomes an additional step in manufacturing process consuming more time.	7. There is no need to terminal steaming of solution. hence there is no pH shift of the solution. The terminal steaming is completely eliminated if liquid API is used.
8. As per our knowledge the innovator is using liquid API and not solid.	8. Seeing above points the liquid API should be preferred API.

Specification:

Sr. No.	Test	Specification
01	***Description**	Brown to dark brown coloured solution
02	**Identification**	
	A) Iron (ferric ion)	It responds to test for ferric ion.
	B) Sucrose (by HPLC)	The retention time of the major peak in the chromatogram of the Assay preparation corresponds to that in the chromatogram of the standard preparation, as obtained in the Assay for sucrose.
03	***Specific gravity at 20°C** (2.0 % W/V of Iron solution)	Not less than 1.135 and not more than 1.165.
04	**Alkalinity** (2.0%W/V of Iron solution)	Not less than 0.5 mL and not more than 0.8 mL of 0.1 N hydrochloric acid is consumed per ml
05	***pH at 20°C** (2.0 % W/V of Iron solution)	Between 10.0 and 11.1
06	**Osmolarity** (2.0 %W/V of Iron solution	Between 1150 mOsmol / L and 1350 mOsmol / L
07	***Absence of low molecular weight Fe (II) and Fe (III) complexes by Polarography** (2.0 %W/V of Iron solution)	No additional peak should be found other than Fe (II) and Fe (III) complexes.
08	***Turbidity** (2.0 % W/V of Iron solution)	Turbidity should develop between pH 4.4 and 5.3.
09	**Limit test for iron (II)** (2.0 %W/V of Iron solution)	Not more than 0.4%w/v
10	**Content of Chloride** (2.0 % W/V of Iron solution)	Not less than 0.012% W/W and not more than 0.025% W/W.
11	***Assay for Iron (by UV)**	Not less than 3.0 % w/w
12	***Molecular weight determination**	
	A) Weight average molecular weight (M_W) by GPC	Between 34,000 to 60,000 Da
	B) Number average molecular weight (Mn) by GPC	Not less than 24,000 Da
	C) Polydispersity index Mw/Mn	Not more than 1.7
13	***Assay for sucrose by HPLC** (2.0 % W/V of Iron solution)	Not less than 260 mg and not more than 340 mg of sucrose per ml
14	***Bacterial endotoxin test**	Not more than 3.7 EU/mg of iron
15	***Microbiological examination:** **(a) Microbial Enumeration Tests:** **i) Total aerobic microbial count** **ii) Total combined yeasts and molds count**	 Not more than 100 cfu/mL Not more than 10 cfu/mL
	(b)Test for Specified Microorganisms: **i) Bile Tolerant Gram Negative Bacteria** **ii) Escherichia Coli** **iii) Salmonella spp.** **iv) Pseudomonas aeruginosa** **v) Staphylococcus aureus** **vi) Clostridium sporogenes** **vii) Candida albicans**	 Should be absent Should be absent Should be absent Should be absent Should be absent Should be absent Should be absent