

Fehling's Test

Fehling's solution, or Fehling's reagent, is a chemical reagent that is used to distinguish between an aldehyde and a ketone, other than α -hydroxy ketone. **Practically, it is used for the determination of reducing and non-reducing sugars that are present in carbohydrates.** The test employed for this purpose is known as Fehling's test.

Preparation of Fehling's Solution

Fehling's solution is prepared by combining two separate solutions: Fehling A and Fehling B.

Fehling A is a blue-colored aqueous solution of copper (II) sulfate (CuSO_4).

Fehling B is a colorless aqueous solution of potassium sodium tartrate ($\text{KNaC}_4\text{H}_4\text{O}_6 \cdot 4\text{H}_2\text{O}$, also known as Rochelle salt) in an alkaline base like sodium hydroxide (NaOH).

The two solutions are individually prepared and later mixed to give Fehling's solution, which is blue. In this final mixture, Fehling's solution contains blue alkaline cupric hydroxide solution, heated with reducing sugars gets reduced to red cuprous oxide and is precipitated.

Principle of Fehling's Test

In this test the presence of aldehydes **but not ketones** is detected by reduction of the deep blue solution of copper(II) to a red precipitate of insoluble copper oxide. The test is commonly used for reducing sugars but is known to be NOT specific for aldehydes. For example, fructose gives a positive test with Fehling's solution as does acetoin.

Procedure

- Mix 15 ml of solution-"A" with 15 ml of solution-"B"
- Add 2 ml of this mixture to an empty test tube.
- Add few drops of the test sample to the tube.
- Place the tube in a water-bath at 60°C .

Result

A positive test is indicated by the presence of red precipitate.

The test is sensitive enough that even 1 mg of glucose will produce the characteristic red colour of the compound.

Uses and Applications of Fehling's Solution

Fehling's solution is used to test for monosaccharides. The most important application is to detect reducing sugar like glucose. Excess of glucose in blood and urine can lead to diabetes.