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Experiment - 10

Aim ⇒ To test for starch in the given sample.

Requirements ⇒

Chemicals :- starch solution, Lugol's solution (1.3 grams of iodine and 2 grams potassium iodide dissolved in 100 ml of water)

Glass ware :- Pipette, test tube

Principle ⇒ Lugol's solution has polyiodide ions

$I_2 + I^- \longrightarrow [I_3]^-$ (Tri iodide ion)

$I_2 + [I_3]^- \longrightarrow [I_5]^-$ (Penta iodide ion)

Amylose reacts with polyiodide ions to produce a deep blue black colour. Poly iodide ion and amylose molecules complexes combine with iodine to form $[I_9]^-$ and $[I_{15}]^-$ complexes. The blue colour is produced by exchange of electrons between water and poly iodide ions

Procedure ⇒

1. Take 2ml of iodine solution in a test tube.

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2. Add 0.5 ml of starch solution to it.

Observation ⇒
A blue black colour is obtained.

Conclusion ⇒
Blue black colour indicates the presence of starch.

Precautions ⇒
Do not use excesive quantity of iodine solution.

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Experiment - 11

Aim ⇒ To test for the presence of reducing sugars

Requirements ⇒ Fehling's solution A and B, glucose test solution, pipettes, test tubes, test tube holder and spirit lamp.

Principle ⇒ The basic principle of Fehling's test is similar to that of Benedict's test. Fehling's solution contains copper tartarate. It is blue in colour. Fehling's test is based on the reduction of copper tartarate to red coloured cuprous oxide by reducing sugars.

Procedure ⇒

1. Take 2 ml each of Fehling's solution A and B in a test tube and boil it. If a precipitate is formed the solution is rejected and fresh solution is used.
2. Take 2.5 ml each of Fehling's solution A and Fehling's solution B in a test tube
3. Add 1 ml of glucose solution to the test tube.

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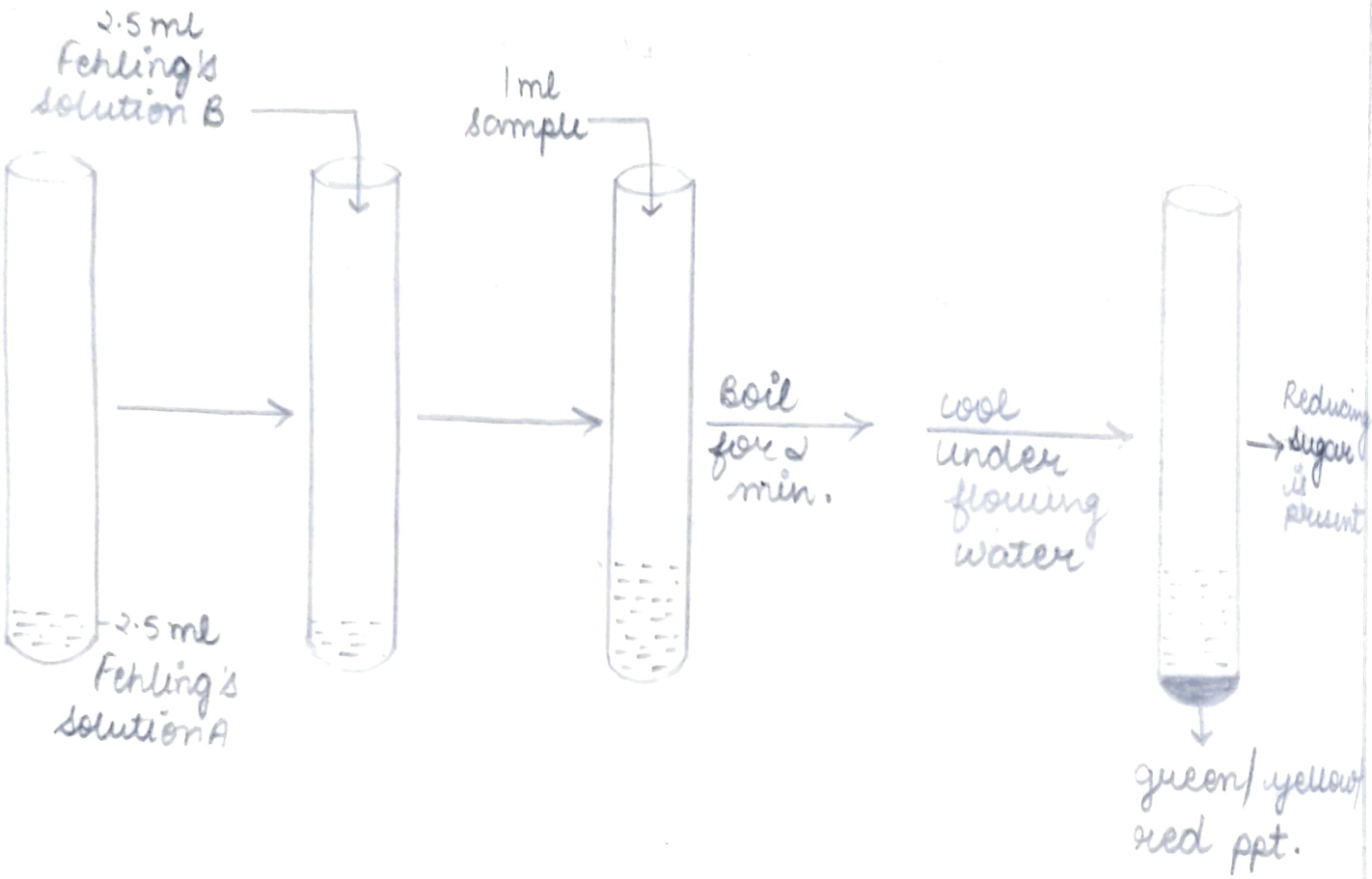

Fehling's test

4. Boil the solution for two minutes
5. When the expriment is complete cool the test tube under flowing water.

Observation ⇒ A greenish, yellow or brick red precipitate is obtained.

Conclusion ⇒ Formation of green, yellow or brick red precipitate indicates the presence of reducing sugars.

Precaution ⇒ Care should be taken while heating the solution to prevent spillage.

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Experiment - 12

Aim ⇒ To test for α-amino acids by using ninhydrin

Requirements ⇒

1. water bath, spirit lamp, test tube, test tube holder, pipette, dropper.
2. Ninhydrin solution ⇒ dissolve in 0.2g ninhydrin in 10ml ethanol (or acetone)
3. Amino acid solution (1%) in distilled water

Procedure ⇒

1. Take 1 ml of amino acid solution in a test tube
2. Take 1ml distilled water in another test tube marked as control
3. Add 3-4 drops of ninhydrin solution to both test tubes
4. Keep the test tubes in a warm water bath for 5-10 minutes.

Results ⇒

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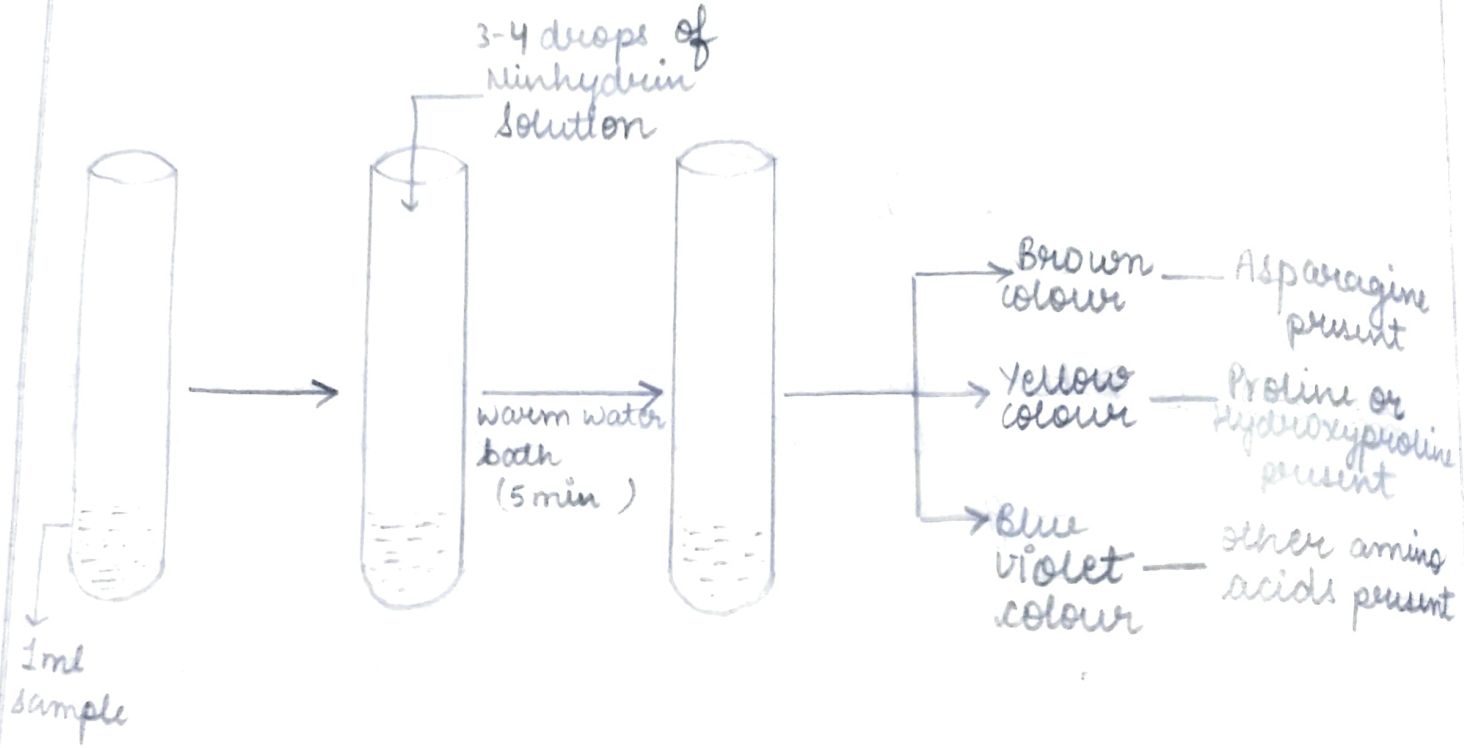

Ninhydrin Test

1. A blue-violet colour appears in the test tube with all amino acids except proline and asparagine.
2. A yellow colour develops when proline or hydroxy-proline is used.
3. A brown colour develops when asparagine is used.
4. There is no change in the distilled water containing control tube.
5. The ninhydrin test is a test for the presence of a free amino group. Besides amino acids, amines and ammonia also give a positive ninhydrin test.

Precautions ⇒

1. Ninhydrin is reported to cause irritation to the eyes and respiratory tract.
2. Ninhydrin test may not necessarily indicate the presence of amino acids because ninhydrin reacts with ammonia and free amines also.
3. The glassware and other equipments used for the test should be clean and free from any residues.
4. Heat the experimental and control test tubes for the same duration and avoid excess heating of test tubes.

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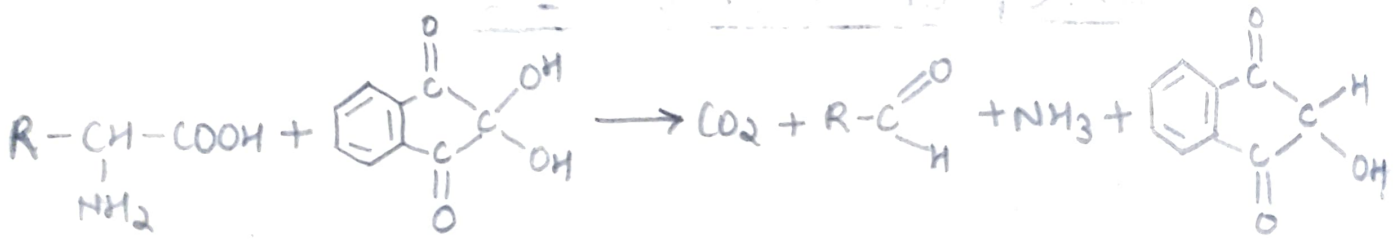
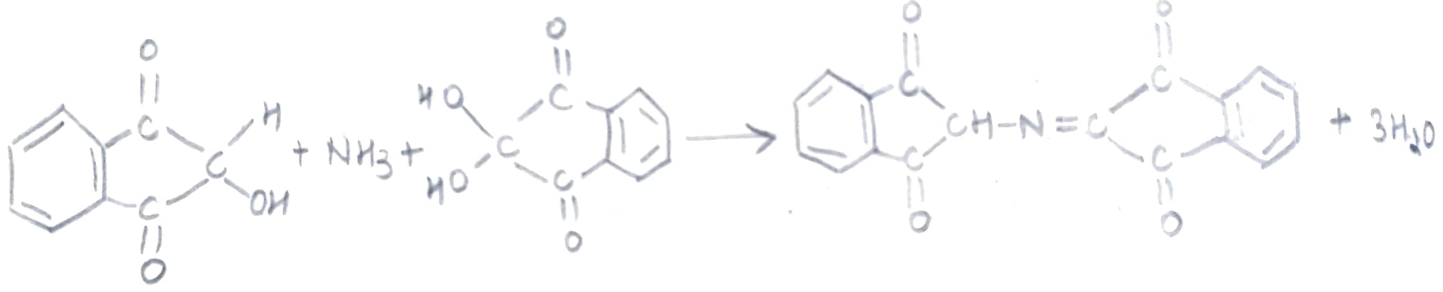


Amino acid Ninhydrin Reduced Ninhydrin



Reduced ninhydrin Ninhydrin violet-blue condensation product