**Lab Tests for Biological Molecules**

|  |  |  |
| --- | --- | --- |
| **Molecule** | **Test Procedures** | **Result for positive test (and explanation)** |
| **starch** | Using a pipette, place a drop of sample solution in a depression in a spotting tile. Add a drop of iodine solution. | ***A blue-black colour is formed.***A coloured polyiodide complex is formed with starch. |
| **reducing sugar (glucose)** | Place about 10cm3 of sample solution in a test tube. Add a few drops of Benedict’s solution. Stand the tube in the water bath and heat for five minutes. | ***A brick-red/orange-red precipitate is formed.*** The reducing sugar reduces the copper(ii) ions in the Benedict’s to copper(i) oxide.*(If a lower concentration of reducing sugar is used, the colour may be green, yellow or orange.)* |
| **non-reducing sugar (sucrose)** | Place about 10cm3 of sample solution in a test tube. Add three drops of dilute hydrochloric acid and shake.Place test tube in the water bath at 100°C for 5 minutes. Remove the tube and allow it to cool. Add three drops of a dilute base to the test tube, to neutralize the acid. Repeat the reducing sugar test as above. | ***A brick-red precipitate is formed.*** The acid hydrolyses the sucrose into glucose and fructose, which both give a positive Benedict’s test. |
| **protein** | Place about 5cm3 of sample solution in a test tube. Add an equal volume of biuret reagent.  | ***A lilac (purple) solution is formed.***Nitrogen atoms in the peptide bonds of the protein form a lilac complex with copper(ii) ions in the biuret reagent. |
| **lipid** | Place one drop of sample solution in a clean, dry test tube. Add about 5cm3 of ethanol and shake thoroughly to dissolve. Pour the mixture into a test tube three-quarters filled with cold water. | ***A cloudy white emulsion is formed on the surface of the water.*** The alcohol mixes with the water, leaving the lipid to form an emulsion of microscopic droplets suspended at the surface. |