Practical General Chemistry

Lecture notes

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tenth Lecture: proteins and Testes

Proteins are large, complex molecules that play many critical roles in the body. They do most of the work in cells and are required for the structure, function, and regulation of the body's tissues and organs.

Proteins are made up of hundreds or thousands of smaller units called amino acids, which are attached to one another in long chains. There are 20 different types of amino acids that can be combined to make a protein. The sequence of amino acids determines each protein's unique 3-dimensional structure and its specific function.

Four levels of structure determine the shape of proteins

- ✓ **1-Primary:** the linear sequence of amino acids (peptide bonds).
- ✓ **2-Secondary:** the localized organization of parts of a polypeptide chain. (backbone hydrogen bonds)
- ✓ **3- Tertiary:** the overall, threedimensional arrangement of the
- ✓ polypeptide chain.
- ✓ 4-**Quaternary:** the association of two or more polypeptides into a multisubunit complex.

Testes of proteins :-

1-The Biuret test, is a chemical test used for detecting the presence of peptide bonds. In the presence of peptides, a copper (II) ion forms mauve-colored coordination complexes in an alkaline solution.

Despite its name, the reagent does not in fact contain biuret ($(H_2N\text{-}CO\text{-})_2NH$). The test is named so because it also gives a positive reaction to the peptide-like bonds in the biuret molecule.

Biuret reagent

The Burite reagent (Burite detector) consists of:

1-NaOH (sodium hydroxide)

2-Aqueous copper sulfate (copper(II) sulfate)

3-Potassium and sodium tartrate

Sodium and potassium tartrate salt is added to the complex to fix copper ions and proteins by returning copper from the binary to mono, with the presence of sodium hydrate that

makes the medium alkaline. This results in a color shift, which is measured by the photometer.

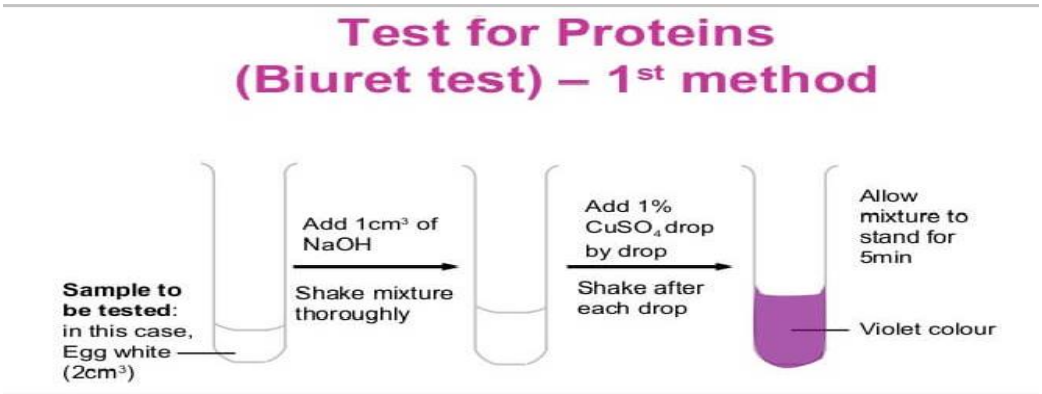
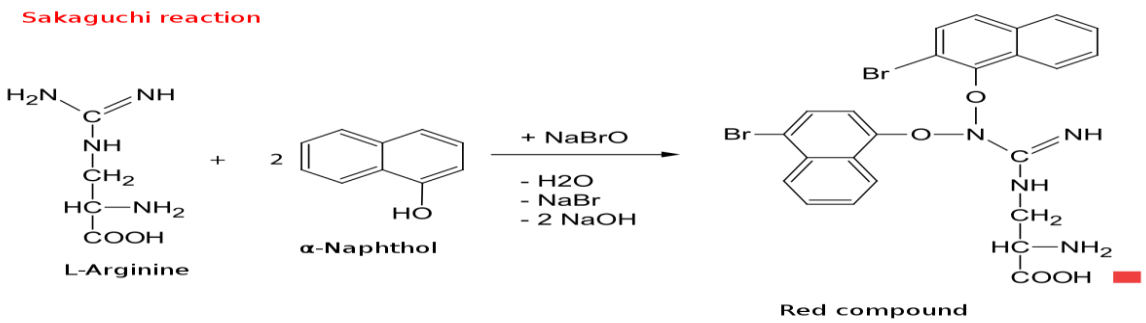


Figure1 :The Biuret test

2-The Sakaguchi test is a chemical test used for detecting the presence of arginine in proteins.

Sakaguchi reagent consists of:-

1-Naphthol and a drop of sodium hypobromite. The guanidine group in arginine reacts with Sakaguchi reagent to form a red-colored complex.



3-The Sullivan reaction is a chemical test used for detecting the presence of cysteine or cystine in proteins. A red colour appears when a protein with cysteine or cystine is heated with sodium 1,2-naphthoquinone-4-sulfonate (Folin's Reagent) and sodium dithionite under alkaline conditions.