

**University of Baghdad**  
**College of Science for Women**  
**Department of Chemistry**



# BIOCHEMISTRY LAB

(For Biology students/First class)

**Prepared and Design by**  
Dr. Noor Ulhuda Ghazi Mohammed

**Supervised by**  
Assist Professor Dr. Ahmed Younus      Assist Professor Dr. Israa Fadhil Ascar

**2023-2024**

---

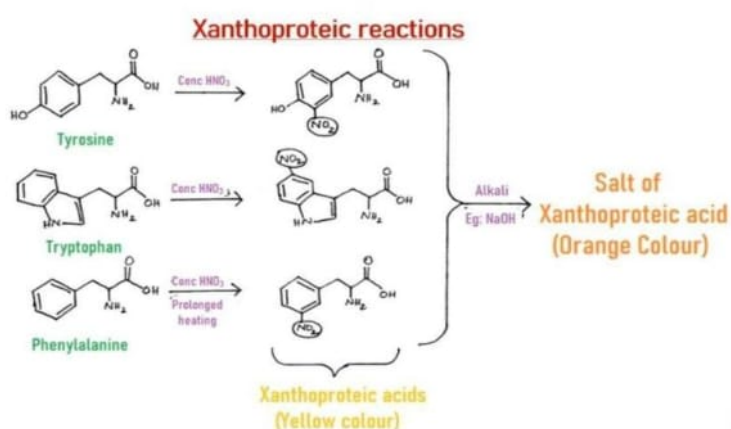
---

#### 4- Xanthoproteic Test

General test for those amino acids and proteins that contain aromatic groups (Benzene ring). Some amino acids contain aromatic groups that are derivatives of benzene. These aromatic groups can undergo some reactions. One of these reactions is the nitration of a benzene ring with nitric acid. The amino acids tyrosine and tryptophan contain activated benzene rings and readily undergo nitration.

The amino acid phenylalanine also contains a benzene ring, but the ring is not activated and therefore does not readily undergo nitration. This nitration reaction, when used to identify the presence of an activated benzene ring, is commonly known as the **xanthoproteic test, because the product is yellow**. The intensity of the yellow colour deepens when the reaction occurs in basic solution.

This reaction is one of the reactions that occurs if you spill a concentrated solution of nitric acid onto your skin. The proteins in skin contain tyrosine and tryptophan, which become nitrated and turn yellow.



**Note:** concentrated nitric acid—toxic, corrosive, and strong oxidant.

#### Method:

1. Label 4 clean, test tubes with the names of the following solutions: 1% tyrosine, 2% albumin, 2% gelatine and Tryptophan.

2. Add 10 drops of concentrated nitric acid to the 1 ml of solution.
3. Place the test tube into the boiling-water bath. The contents gently for 1–2 min.
4. Remove the test tube from the boiling-water bath. Place it into a test tube rack and allow it to cool.
5. Add little of (40%) of NaOH
6. Record your observations.

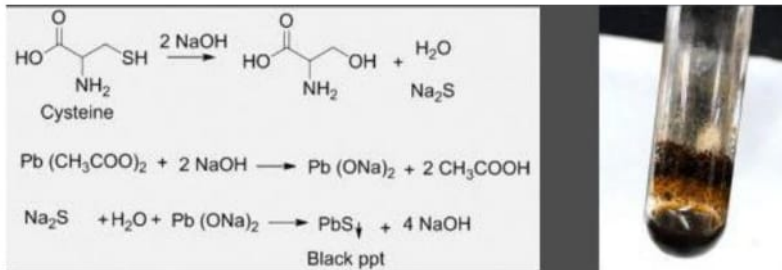


## 5- Lead Acetate Reaction:

Principle:

This reaction is specifically given by sulphur group as in cysteine and cystine, such group can be removed by treatment with alkali as sodium sulphide and if lead ions are present, lead sulphide will precipitate.

**Note:** strong alkali does not liberate sulphur group from methionine (unstable) thus giving negative result.



22

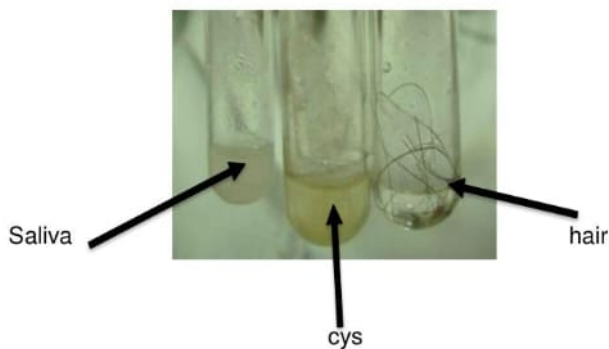
First class

### Lead acetate reaction:

- Liberates sulfur content to detect (cys.)
- Sulfur group of cysteine is liberated through heating with strong alkali.

Method:

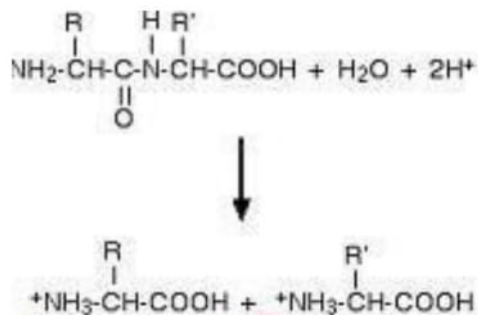
1. To 2 ml of test solution, add 2ml of 40% NaOH.
2. Heat the solution for 1 min. in a boiling water bath. And allow it to cool.
3. Add 3-5 drops of 10% lead acetate. gray, brown or black indicates cysteine (cys)



### Chemical properties of protein

1. **Hydrolysis:** protein hydrolysis is the reverse of peptide bond formation and the peptides are broken down to amino acids. Digestion is an example of protein hydrolysis.

**Note:** In the laboratory the protein can be hydrolyzed by heating with hydrochloric acid.



2. **Denaturation:** denaturation of proteins refers to the unfolded and rearrangement of the

23