

Presence and amount of protein in a food sample essay sample



**ASSIGN
BUSTER**

A protein is complex, high molecular-mass, organic compound that consist of amino acids joined by peptide bonds. Proteins are essential to the structure and function of all living cells and viruses. Millon test is given by any compound containing a phenolic hydroxyl group. Consequently, any protein containing tyrosine will give a positive test of a pink to dark-red color. The millon reagent is a solution of mercuric and mercurous ions in nitric and nitrous ions in nitric and nitrous acids. Caution, millon reagent is highly toxic and corrosive. The red colour is probably due to mercury salt of nitrated tyrosine. The ninhydrin reaction is used to detect the presence of α -amino acids and proteins containing free amino groups. When heated with ninhydrin, these molecules give characteristic deep blue colors. This reaction involved in this test are shown below

EXPERIMENT 1 : PROTEIN DETECTION TEST MILLON TEST

OBJECTIVE: To detect presence of protein containing amino acid tyrosine

MATERIAL:

1. Millon reagent
2. Casein
3. Albumin
4. Tyrosine

METHODS :

1. 1ml of casein, tyrosine, albumin and glycine was placed into separate labeled test tube.
2. 3 drops of millon reagent was added to the test tube.
3. The test tube was immersed in the water bath for 5 minutes.

4. The test tube was let cooled and the colour formed was observed and recorded.

RESULT:

TEST SOLUTION| OBSERVATION| POSITIVE/NEGATIVE|

Glycine| Clear solution| Negative|

Casein| Clear solution| Negative|

Albumin| Brick red precipitate form| Positive|

Tyrocine| Dark purple| Positive|

EXPERIMENT 2 : PROTEIN DETECTION TEST NINHYDRIN TEST

OBJECTIVE: To detect the presence of α -amino acids and proteins containing free amino acid

MATERIALS: 1. Casein

2. Albumin

3. Ninhydrin

4. glycine

METHODS:

1. 4 drops of ninhydrin was added to the test tube.

2. The test tube was immersed in water bath for 15-20 seconds.

3. The test tube was let cooled.

4. The colour changed was observed and recorded.

RESULT :

TEST SOLUTION	OBSERVATION	POSITIVE/NEGATIVE
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Glycine	White-purple	Positive
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Casein	No change	Negative
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Albumin	No change	Negative
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Tyrosine	No change	Negative
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EXPERIMENT: PROTEIN DETECTION TEST BIURET TEST:

OBJECTIVE: To detect the presence and amount of protein in a food sample

MATERIALS: 1. Casein

2. Albumin

3. Ninhydrin

4. Glycine

5. NaOH solution

METHODS:

1. 4 drops of ninhydrin was added to the test tube

2. The test tube was immersed in water bath for 15-20 seconds.

3. The test tube was let cooled

4. The colour changed was observed and recorded.

RESULT:

TEST SOLUTION	OBSERVATION	POSITIVE/NEGATIVE
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Glycine	Dark blue	Positive
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Casein	Light blue	Negative
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Albumin	Light blue	Negative
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Tyrosine| Light blue| Negative|

DISCUSSION:

Millon's test is given by any compound containing a phenolic hydroxy group. Consequently, any protein containing tyrosine will give a positive test of a pink to dark-red color. The Million reagent is a solution of mercuric and mercurous ions in nitric and nitrous acids. Ninhydrin test is the general test given by all the amino acids. One can identify the amino acids by performing this test. The amino group of amino acids reacts with the ninhydrin an oxidizing agent and the amino acid gets itself oxidatively decarboxylated and deaminated to an aldehyde.

Ninhydrin reacts with amino acids in two steps and two ninhydrin molecules react with one amino acid. In the first step ninhydrine reacts with amino acids it itself gets reduced and the amino acid forms the corresponding aldehyde and ammonia and carbon dioxide are released, in the next step the reduced ninhydrine and a fresh ninhydrin react with the ammonia and forms a colored complex is formed. Alpha amino acids react fast when compared to beta and gama. Imino amino acids give a different color. Biuret test, Peptides and proteins (long-chain polypeptides) react with Cu^{2+} in alkalinity to create a blueviolet colored chelate complex with an absorbance The peptide must have three peptide bonds at least. Amino acids and Cu^{2+} ions form a blue complex. The biuret test is used for the quantitative photometrical determination of total protein concentration. The intensity of the color produced in the biuret reaction is proportional to the number of peptide bonds participating in the reaction.

CONCLUSION:

The protein can be detected using the test, millon test, ninhydrin test, and biuret test. They have their own characteristic, chemical reaction and physical properties. The test can be done.