



MOHANLAL
SUKHADIA
UNIVERSITY
UDAIPUR



DEPARTMENT
OF
ZOOLOGY

Topic

Biochemical test of Protein and Carbohydrates

B.Sc. 3rd
Practical of Zoology

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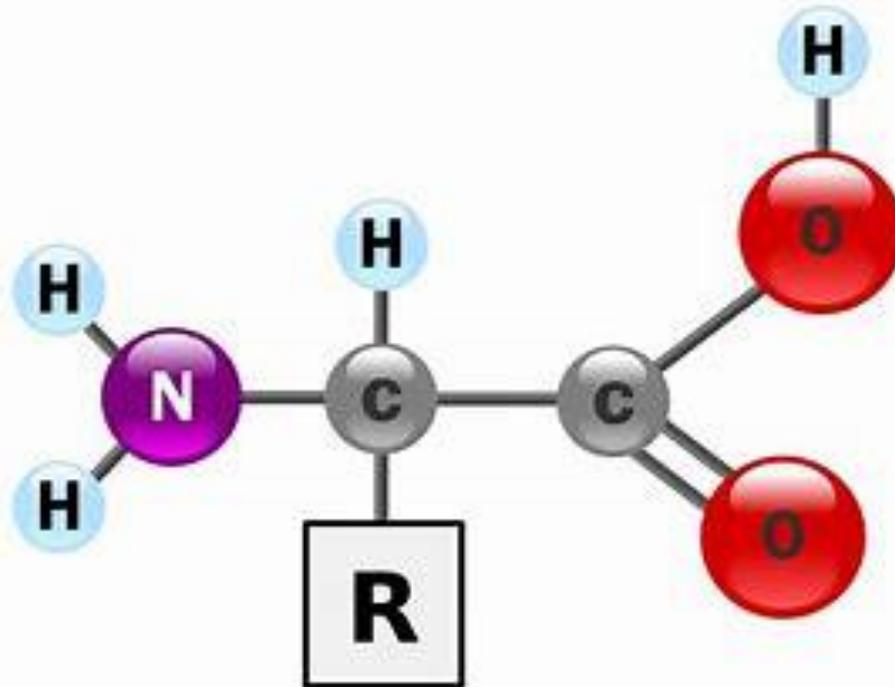
What is Protein →

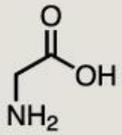
→ **Proteins** are large molecules consisting of amino acids which our bodies and the cells in our bodies need to function properly.

→ Our body structures, functions, the regulation of the body's cells, tissues and organs cannot exist without proteins.

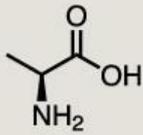
→ Our muscles, skin, bones and many other parts of the body contain significant amounts of protein. Protein accounts for 20% of total body Weight.

Amino Acids:

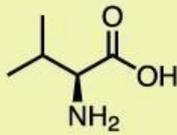




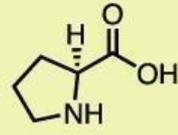
Glycine



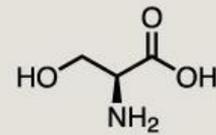
Alanine



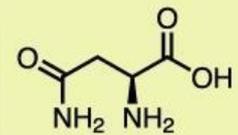
Valine



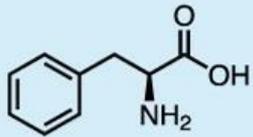
Proline



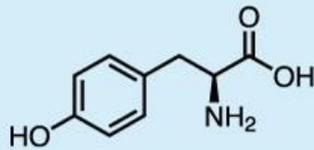
Serine



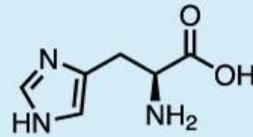
Asparagine



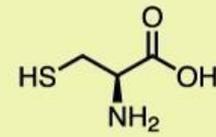
Phenylalanine



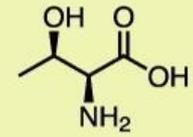
Tyrosine



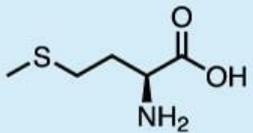
Histidine



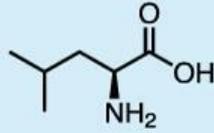
Cysteine



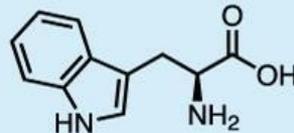
Threonine



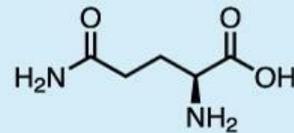
Methionine



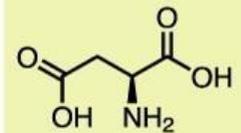
Leucine



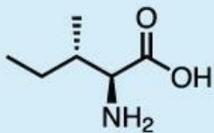
Tryptophan



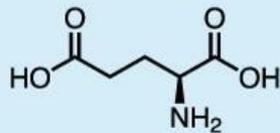
Glutamine



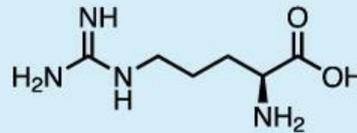
Aspartate



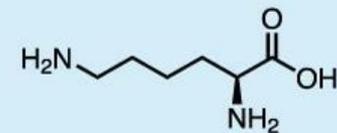
Isoleucine



Glutamate



Arginine



Lysine

Large

Small

Medium

S. No.	Test Name	Procedure	Observation	Result
1..	Biuret Test	<ol style="list-style-type: none"> 1. Take 2 ml. of the solution to be tested in a test tube 2. Add 2 ml. of 5% sodium hydroxide solution 3. Mix the solutions 4. Add two drops of 1% copper sulfate solution 	The solution will turn violet or purple	Violet –purple color indicate presence of peptide linkage means Protein is present.
2.	Ninhydrin test	<ol style="list-style-type: none"> 1. Take 1 ml. of test solution in a test tube 2. Add 10 drops of Ninhydrin solution in the above test tube 3. Hold the test tube on flame 4. Boil the solution 	Bluish-purple color formed in the solution.	bluish-purple color indicates the presence of free alpha amino acids

S. No.	Test Name	Procedure	Observation	Result
3.	Solubility test	<ol style="list-style-type: none">1. Take 10 ml. distilled water in a test tube.2. Add the given powder into the water3. Shake the test tube	The given powder is insoluble in water.	The insoluble protein is keratin.
4.	Isoelectric pH test	<ol style="list-style-type: none">1. Take 3 ml. test solution in a test tube2. Add 3 drops of indicator (bromocresol green)3. Add 1% acetic acid solution to the above test tube drop by drop4. Keep adding acetic acid until a light green color appears indicating isoelectric pH5. Allow it to stand	A curdy green precipitate is formed at the top of the test tube.	The protein present in the solution is Casein

Carbohydrates:

- **A carbohydrates are a biomolecule consisting of carbon (C), hydrogen (H) and oxygen (O) atoms, usually with a hydrogen–oxygen atom ratio of 1:2:1**
- **Thus with the empirical formula $C_n(H_2O)_n$**
- **not all carbohydrates conform to this precise stoichiometric definition (e.g. deoxy-sugars such as fucose), nor are all chemicals that do conform to this definition automatically classified as carbohydrates (e.g. formaldehyde)**



Carbohydrates Classification

Carbohydrates

Monosaccharide

Glucose
Fructose
Galactose



Single sugar
molecule

Oligosaccharide

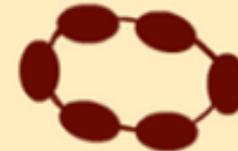
Maltose
Sucrose
Lactose



2-10 sugar molecule

Polysaccharide

Starch
Glycogen
Cellulose



Many sugar
molecules linked

Classification and Nomenclature

Carbohydrates

Monosaccharide

Oligosaccharide

Polysaccharide

Functional group	Number of carbon atoms	Di-saccharide	Tri-saccharide	Tetra-saccharide	Homopoly-saccharide	Heteropoly-saccharide
Aldoses e.g Glucose	Trioses	Maltose	Raffinose	Stachyose	Starch	Hyaluronic acid
Ketoses e.g Fructose	Tetroses	Lactose			Dextrin	Heparin
	Pentoses	Sucrose			Glycogen	Chondroitin sulfate
	Hexoses				Cellulose	Dermatan Sulfate
	Heptoses				Inulin	Keratan Sulfate

S. No.	Test Name	Procedure	Observation	Result
1.	Molisch test	<ol style="list-style-type: none"> 1. Take 2 ml. of the solution to be tested in a test tube 2. Add 2 drop of Ethanolic alpha Naphthol in solution 3. Mix the solutions and Add 2 ml of Conc. H₂SO₄ along the side of the test tube 	Reddish violet or purple colored ring form at junction of 2 liquid	Carbohydrate in present
2.	Benedict's test	<ol style="list-style-type: none"> 1. Take 5 ml. of of Benedict's reagent (copper sulfate, sodium citrate, and sodium carbonate) in a test tube 2. Add 10 drops of sugar solution in the above test tube 3. Hold the test tube on flame to boil the solution for 2 minute and let the solution cool down 	Different color appear Green color Green Precipitate Yellow pre. Orange pre. Brick red Pre.	Carbohydrate present (<0.5%) (0.5-1.0%) (1-1.5%) (1.5-2.0%) (>2%)

S. No.	Test Name	Procedure	Observation	Result
3.	Iodine test	<ol style="list-style-type: none"> 1. Take 2 ml of the given solution in a test tube 2. Add 2-3 drops of iodine reagent in the above test tube 3. Wait for some time 	<p>Blue Reddish-purple Reddish-brown colored appear</p>	<p>If blue color appears, amylase or starch is present in the solution If reddish-purple color appears, dextrin is present If reddish-brown color appears, glycogen is present</p>



Thank You