

McMush Lab

Introduction: Carbohydrates include sugars and their polymers. The simplest carbohydrates are the monosaccharides; single sugars also known as simple sugars. Disaccharides are double sugars, consisting of two monosaccharides joined by condensation synthesis. The most prevalent disaccharide is sucrose, better known as table sugar. Its two monomers are glucose and fructose.

Proteins account for more than 50% of the dry weight of cells, and they are instrumental in almost everything cells do. When two amino acids are arranged so that the carboxyl group of one is adjacent to the amino group of the other, an enzyme can join the amino acids by means of condensation synthesis, forming a covalent linkage called a peptide bond. A polymer of many amino acids linked by peptide bonds is a polypeptide chain.

Lipids are a chemically diverse group of compounds that share one important trait: they have little or no attraction for water. This hydrophobic behavior of lipids is based on their molecular structure. Although they may have some polar bonds associated with oxygen, lipids consist mostly of hydrocarbon regions with nonpolar bonds. Fats or triglycerides are large molecules constructed from two kinds of smaller molecules: glycerol and fatty acids. An unsaturated fatty acid has one or more double bonds, formed by the removal of hydrogen atoms from the carbon skeleton. Animal fats, in general, are saturated and solidify at room temperature. Plant fats are usually unsaturated at room temperature.

Purpose: In this lab, you will test for specific compounds and then determine if those compounds are present in ordinary foods.

Procedure:

Part I: Testing for known substances

1. **Protein test:** Place 1 ml of the McMush solution into one test tube and 1 ml of water to another test tube. Add 5 drops of Biuret solution to each test tube. Record your results
2. **Glucose test:** Place 1 ml of the McMush solution into one test tube 1 ml of water to another test tube. Add 5 drops of Benedict's solution to each test tube. Place the tube in a beaker of boiling water and boil for five minutes. Use test tube clamps to hold hot test tubes. Record your results.
3. **Starch test:** Place 1 ml of the McMush solution into one test tube 1 ml of water to another test tube. Add 5 drops of Lugol's iodine solution to each test tube. Record your results.
4. **Fat Test:** Place three drops of the McMush solution onto a brown paper bag and three drops of water onto another section of the brown paper bag. Allow the solution to dry. Record your results.

Tested Substance	Reagent test	Results
McMush	Biuret solution	
McMush	Benedict's solution	
McMush	Lugol's iodine solution	
McMush	Brown Paper Bag	
Water	Biuret solution	
Water	Benedict's solution	
Water	Lugol's iodine solution	
Water	Brown Paper Bag	

Part II: Testing the McMush

1. Test each food item for protein, glucose, starch, and fat using the methods as described.
2. Create a data table to illustrate the information that you have collected.

Questions for Discussion:

1. A certain sugar has no change in color when tested with Benedict's solution. Can you tell what type of sugar it is? Explain.
2. Name the functional groups present in amino acids and what type of reaction that bonds two amino acids together.
3. Name the number and type of molecules necessary to form a fat or triglyceride.
4. If you spill grease on your clothing, can you get it out with cold water? Why or why not?