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Practical Biochemistry Principles and Techniques Approach

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Introduction

Biochemistry studies the quality of biomaterials and estimates their quantity and position in the organism's biological systems. From the many information derived from the bio-studies, it was possible to determine the location and functioning of most of the vital compounds in the body and the specific information of each compound. Based on laboratory studies of compounds in the organism, biochemistry was divided into three main sections: Structural Biochemistry, Dynamic Biochemistry and Functional Biochemistry . Biochemistry possesses specialized methods of research and study. Accordingly, many biochemical compounds have been continuously discovered and their quantitative and biological properties, as well as their biological and physiological and energy transformations, have been estimated. A detailed study of the biological systems on the organism as a whole or certain organs or their tissues or extracts or leachate from these tissues. Electron microscopy was able to obtain new and important information concerning the study of the internal structure of the living cell [1].

Carbohydrates:

Carbohydrates are found in the plant and animal kingdoms. The general symbol of carbohydrates is (CnH2nOn) is a polyhydroxyl aldehydes or ketones, or compounds produced by the hydrolysis of polyhydroxyl aldehydes or ketones. Carbohydrates are divided into the following sections: Monosaccharide's, it is the simplest unit of carbohydrates and does not decompose into simpler units of which all reductive sugars such as arabinose, glucose, fructose, etc. Oligosaccharides, containing two to ten units of monosaccharide units, such as sucrose, maltose, and lactose, which are double sugars, raffinose (triple sugar). Polysaccharides, this group consists of the binding of a large number of monosaccharide units together with glycoside bonds, such as starch, cellulose, dextrin, and glycogen and is widely distributed in the plant and animal kingdoms, and is represented by the starch of various types, glycogen, dextrin, cellulose, etc. The microscopic shape of the starch granule varies depending on the plant source. For example, potato starch differs in shape and size from rice and wheat starch. The starch granule is composed of two substances, amylopectin, and the outer shell and contains amylose. Amylose is relatively soluble in water and gives a blue color with iodine - while amylopectin is insoluble in water but swells in hot water. Starch is formed in plants by carbon representation, and is abundant in grains such as rice, wheat, maize, barley, cucumber, chickpeas, beans, etc., in tubers such as potatoes, in roots such as potatoes, and in general almost no plant species [2].

Moore's test: Add to 2 milliliters of sugar solution (1%) equal amount of NaOH solution (40%) and heated to boil and notice the yellowish color of the solution and continuously heating turns brown - this test is positive with all sugars. Add to another part of the sugar solution a similar volume of NaOH (40%) and boil for a minute and then add 2 milliliters of Benedict's solution and boiling. It is observed that no yellow or red precipitate is present, which is evidence that glucose boiling with NaOH loses the reductive trait [3].

Benedict test: Why is the alkaline medium used in reductive tests? Because in the alkali medium, the ene-di-ol form is made easier in the reduction process, which is oxidized to the corresponding acid while copper is reduced to copper oxide [4].

Picric acid test: Add 5 ml of sugar solution to 2-3 ml of saturated picric acid + 1 ml of sodium hydroxide solution andheat it softly. Note that the solution turns yellow to red in the case of reduced sugars due to the reduction of picric acid to picramic acid

Rupener test: It is a special and unique test for glucose sugar only, which is a reduction of lead hydroxide to red lead oxide and test solution is a lead acetate added to the glucose sugar solution and then add the solution of NH4OH and then boiling until the color of the precipitate to red or leather. This test was performed on glucose and then another monosugar solution

Proteins

Proteins contain several elements in addition to carbon, hydrogen, oxygen, nitrogen including sulfur, phosphorus, chlorine, bromine as well as iodine. These elements cannot be detected directly by inorganic chemistry, as this method requires that these compounds have ionic bonds. In general, the bond is of the covalent type, so it is necessary to convert the elements in organic compounds to ionic compounds containing these elements. This can be heated by the organic compound with the element sodium at high temperature, thus forming sodium salts The elements of nitrogen, chlorine, sulfur, bromine, and iodine were present in the organic matter as cyanide - chloride - bromide – iodide [5].

Conclusion

The purpose of this research is to serve as a resource to enhance student learning of theories, techniques, and methodologies practiced in the biochemistry teaching and research lab. The extensive availability of laboratory experiments published in journals and the desire of instructors to design their projects and teaching styles have lessened the need for laboratory manuals. Laboratory instructors are especially eager to introduce new student-centered education methods such as Problem Based Learning (PBL), Research-Based Learning (RBL), Process Oriented Guided Inquiry Learning (POGIL), and other "active learning" styles into their labs. However, because published experiments and laboratory manuals usually contain only procedures, there is an increased need for a companion text like this one to explain the theories and principles that under pin laboratory activities.

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None

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