Identification of unknown carbohydrates | lab report

INTRODUCTION

One of the main types of nutrients is the carbohydrates. Carbohydrates are the most vital foundation of energy for your body. Our digestive system has a capacity to change carbohydrates into glucose or most commonly known as blood sugar. Our body gets energy used by our cells, tissues and organs from this sugar. Carbohydrates also stores additional sugar in our liver and muscles.

Carbohydrates may be simple or complex depending on its chemical structure. Simple carbohydrates are also known as simple sugars. They are commonly established in refined sugar such as white sugar. Complex carbohydrates of starches includes grain products like bread, crackers, pasta and rice.

MATERIALS AND METHODS

A. Identification of Unknown Carbohydrate Samples

Approximately 1. 00 ml of the known carbohydrate samples and the two unknown samples were transferred on separate labelled test tubes. About 1. 00 ml of Molisch reagent then 1. 00 ml of concentrated H2SO4 was added to each sample. The test was observed for any change and was recorded. With the use of new batch of samples each time, the remaining tests were conducted:

(a) Iodine test – 1. 00 ml of iodine reagent was added to each sample.

(b) Benedict’s test – 1. 00 ml of Benedict reagent was added to each sample then heated using water bath.

(c) Barfoed’s test – 1. 00 ml of Barfoed’s reagent was added to each sample then heated using water bath.

(d) Seliwanoff’s test – 1. 00 ml of Seliwanoff reagent was added to each sample then heated using water bath.

(e) 2, 4-DNP test – 1. 00 ml of 2, 4-DNP was added to each sample then heated using water bath.

The identity of the unknown samples was determined by comparing it to the known carbohydrate samples.

B. Hydrolysis of Starch

Exactly 50. 0 ml of 5% starch solution was transferred in a 100-ml beaker. Precisely 5. 00 ml of concentrated sulfuric acid or hydrochloric acid was added. The sample was covered with aluminium foil and was heated using water bath. Two 1. 00 ml volume of the sample were transferred in a test tube. Exactly 1. 00 ml of iodine reagent was added to one tube and 1. 00 ml of Benedict’s reagent was added to the other. The reaction was observed. The sample was heated continuously. Two 1. 00 ml volume of the sample was transferred between every 5 minute interval and tested with iodine and Benedict’s reagent as above until formation of blue-black complex in iodine stops and formation of brick red colour in Benedict’s reagent ensues.

RESULTS AND DISCUSSION

In Molisch test, the result turned out to be positive or slow reaction. It is because of the formation of the reaction with alpha-naphthol in the

occurrence of sulfuric acid. In this test, all type of carbohydrates will give a positive result.

Benedict’s solution is a deep-blue alkaline solution used in testing the existence of the aldehyde functional group, -CHO. Benedict; s reagent consists of blue copper (II) ions which are condensed to copper (I). These ions will then be precipitated as red copper (I) oxide which is not soluble in water. In Benedict’s test, monosaccharides and disaccharides except for sucrose give a positive result. It is when the result is a brick red precipitate.

In Barfoed’s test, the copper ion in solution oxidizes reducing monosaccharides. This is for the formation of a carboxylic acid and red precipitate of copper (I) oxide in 3 minutes.

In Seliwanoff’s test, the reagent dehydrates ketohexoses to form 5-hydroxymethylfurfural which will further react with resorcinol, that is present in the reagent, to produce a red product in 2 minutes.

In Iodine test, all polysaccharides such as glycogen and starch give positive result. The sample turns to blue-black color.