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Estimation of the Quantity of Carbohydrate content in Potato (*Solanum tuberosum*)

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Abstract : The utilization of locally available vegetable is limited due to the lack of information and knowledge on the amount of energy obtain. The carbohydrate content in the potato was investigated. The result revealed that the carbohydrate content of potato is *70gm%* respectively. The value obtained was found to be equal to the recommended daily intake. The analysis reveals that potato contains higher proportion of starch in it. Thus it is recommended that vegetables should be cooked fresh so to retain the starchy(carbohydrate) content.

Keywords: Carbohydrate, Potato, Vegetables, Starch

INTRODUCTION

Carbohydrates are very essential and are very commonly available to our body. Approximately 97% of our body is replaced each year by the food we eat. Our body needs approximately 50 or more nutrients in order to maintain good health. These include carbohydrate also. A carbohydrate is an organic compound that consist only of carbon, hydrogen and oxygen. The term is most common in Biochemistry where it is a synonym of *saccharide.* The carbohydrate (*saccharide*) are divided into four (4) chemical groupings: *Monosaccharides, Disaccharides, Oligosaccharides* and *Polysaccharides.*

In general, the Monosaccharides and Disaccharides, which are smaller(lower molecular weight) carbohydrate, are commonly referred to as *sugar.* The word *saccharide* comes from the greek word "*Sa'kkharon*", meaning *sugars*[1] . While the scientific nomenclature of carbohydrate is *complex*. The name of *Monosaccharides and Disaccharides* very often end in the suffix ***-ose.***

Example-Blood sugar's Monosaccharide-Glucose. Table sugar is Disaccharide-Sucrose.and Milk sugar is Disaccharide-Lactose.

Carbohydrate perform numerous roles in living organisms. *Polysaccharides* serve for the storage of energy (*starch* and *glycogen)* and as the structural components (cellulose in plants and chitin in arthropods).In food science and many informal contexts, in term carbohydrate often means any food that is particularly rich in the complex carbohydrate starch (such as cereals, bread etc) or simple carbohydrates such as sugar (found in candy, jams etc).carbohydrates are often found in many energy bars and isotonic due to the energy that is contained.

Monosaccharides are the simplest carbohydrate in that they cannot be hydrolyzed to smaller carbohydrates. They are aldehydes or ketones with two or more hydroxyl groups. The general chemical formula of an unmodified monosaccharide is $C_nH_{2n}O_n$**.** *Monosaccharides* are important fuel molecules as well as building blocks for nucleic acids. *Monosaccharides* with three(3) carbon called as *trioses*,with four(4) are *Tetroses*, with five(5) are *pentoses*, six(6) are *hexose* and so on *Monosaccharides* are the major source of fuel for metabolism, being used both as an energy source (glucose being the most important in nature)and in biosynthesis[2]. When *monosaccharides* are not immediately needed by many cells[3] . They often converted to more space efficient forms, often *Polysaccharides.* In many animals(include humans),this storage form *Glycogen*, especially in liver and muscle cells. In plants, starch is used for the same purpose[4].

Disaccharides-two joined *Monosaccharides* are called as *Disaccharides* and this are the simplest *polysaccharides*(e.g., Sucrose and Lactose).They are composed of two *monosaccharide* units bound together by a covalent bond known as a glycosidic linkage formed via a dehydration reaction, resulting in the loss of hydrogen atom from one *monosaccharide* and a hydroxyl group from the other. The formula of unmodified *disaccharides* is $C_{12}H_{22}O_{11}$.Sucrose is the most abundant disaccharides and is the main form of carbohydrates and transported in plants[5]. Lactose is also a *disaccharides*, occurs naturally in mammalian milk. Foods high in carbohydrate include fruits, sweets, soft drinks, breads, pastas, beans, potatoes, bran, rice, cereals etc.

Carbohydrates are a common source of energy in living organisms; however, no carbohydrate is an essential nutrient in humans[6]. Carbohydrate are not necessary building blocks of other molecules, and the body can obtain all its energy from protien and fats. Carbohydrate contains 4 kilocalorie per gram energy. Organisms typically cannot metabolize all types of carbohydrate to yield energy. Glucose is a nearly universal and accessible source of calorie[7]. Some simple carbohydrate (e.g., fructose) are digested very slowly, while some complex carbohydrates (starches), especially if processed, raised blood sugar rapidly.

MATERIAL USED

Sample Collection: The potato sample was purchased directly from the vegetable market at Shahibaug, Ahmedabad and were stored at low temperature. The experiment was performed on the same day i.e on 5th of December 2012. All the reagents and standards used in this work were analytical grades. The methods used in this work for the various determinations of samples are the standard methods.

Carbohydrate Estimation: 20 gram of sample (potato) was extracted and thus was grinded properly. To make it up to the known volume the "*homogenate"* was prepared which was of 100ml by taking out the potato sample by filteration in distilled water. After this, from the 100ml "*homogenate"* various tests were performed. *Iodine test, Barfoed test, Salwinoff test, Benedict test, Cobaltous*

chloride test,Phenyl hydrazine test etc. From such above tests, the result obtained as *Monosaccharides, polysaccharides* and *disaccharides* were present in the sample.

While performing *Iodine test*, we came to know that it cannot gives blue color (positive result) and thus it was quite shocking because as Potato is the richest source of starch, as it is a starchy crop so starch should be present in highest concentration but it was prove to be *Negative.*

So on heating the *homogenate* sample for 10-15 minutes in BWB at a high temperature and after this on performing *Iodine test*, it finally gave blue colored precipitates (positive result). Then we came to know that Starch is more absorbable at higher temperature(around normal temperature).On the other hand, temperature below *4 degree celcious* or *39* degree Fereday converts potato's starch into sugar which alters their taste and cookig qualities, leads to higher *acrylamide level* in cooking products.

Estimation by Folin-Wu Method: In this estimation, two different samples were taken in a special type of Folin-Wu tube for the experiment *1.0ml* pure potato sample(homogenate) while in other their was *0.1ml* sample with *0.9ml* distilled water. The result was obtained after performing the Folin-Wu test for the sample.

RESULT AND DISCUSSION

The amount (quantity) of Carbohydrate were estimated in potato through this experiment[8]. The results reveal that the potato contains appreciable quantity of Carbohydrate (energy source).Potato is a starchy, tuberous crop which contains *321KJ*(*77Kilo calorie*)energy. Potato contains *15gram* of starch per *20gram* of Carbohydrate. It is quantified as *70gm%* in the *20gm* in *100ml* of homogenate. Thus due to lack of such sugars (carbohydrates) many disorders occurs to our body. Weakness is the major disorder due to the lack of energy. The patient may feel restless and weak.

CONCLUSION

Based on this experiment, it is concluded that the potatoes must be stored in dry condition at normal and at high temperature. The results prove that Potato are very rich in Starch *15gram per 20 gram* (carbohydrate) content and should be consumed in case of the deficiency. As below 4 degree celcious the starch present in the potatoes get converted to sugar and thus it spoils the vegetable due to which the *acrylamide* may lack the source. The destruction of *Glucose* occurs on long exposure of the vegetable after being cut or cooked. The result shows that the widely edible vegetable, Potato is found to contain good energy source i.e Carbohydrate (Sugar).

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RECOMMENDATION

It is suggested that further research work should be carried on this particular crop to find more about it and since has negative effect on lower temperature may effect on its energy source giving carbohydrate. It is suggested that potato should be freshly used. It is also suggested that these vegetables should be adequtely included in our daily diet. It should be consumed regularly in order to maintain proper health.

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