



COMPARATIVE STUDY OF THE CONCENTRATION OF SOME SELECTED FRUITS IN OUR ENVIRONMENT.

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Abstract

Ascorbic acid (vitamin C) is a naturally occurring beneficial organic acid found in fruits. The concentration of vitamin C in five fruits (Guava, Orange, Banana and Cucumber) obtained from fruits garden market in Port Harcourt were determined by using Redox titration method. The results showed that the concentration of ascorbic acid in guava, orange, water melon, banana and cucumber were found to be 0.20, 0.05, 0.01 and 0.0125mg/L respectively. From the values obtained, guava has the highest concentration of ascorbic acid, hence can be used as a better source of vitamin C for humans. Ascorbic acid is an essential vitamin which helps in our immune system and collagen synthesis that give strength to our connective tissues. The vitamin also facilitates healing of wounds in humans.

Keyword. Ascorbic Acid, orange, guava, cucumber etc

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Introduction

During the first quarter of the twentieth century, a major focus of research in physiological chemistry was the identification of vitamins and compounds that are essential to the health of humans and other vertebrates but cannot be synthesized by these animals and must therefore be obtained from the diet (Achinehu, 2003). Recent nutritional studies identified two general classes of such compounds. Those that are soluble in nonpolar or organic solvents (fats soluble vitamins) and those that could be extracted from foods with aqueous solvents (water, soluble), vitamins such as niacin and vitamin D can be synthesized by the body under certain conditions. Vitamin K and biotin are synthesized the same extent by bacteria in the intestinal track (Earl, 2008). In order to obtain vitamins, the substance must be organic, must carry out one or more biochemical or physiological reaction in the body and must be required in the diet in very small quantities. If the vitamins intake is insufficient to meet the needs, a deficiency is not too far advanced, the symptoms disappear when the vitamin is restored to the body. Vitamin supplements can be in form of capsule, tablet, powder or liquid which can also come from foods.

Although, many of the vitamins can be synthesized, most are extracted from natural sources. Ascorbic acid (Vitamin C or L-ascorbic acid or L ascorbic) is an essential nutrient for humans and certain other animal species, (such as Apes and Guinea pigs) which must be obtained from dietary source. Most other animals produce ascorbic acid in the liver from glucose in much higher amount than we can get from diets today. (Achinehu, S.C., 2003). Vitamin C is found mostly in fruits and vegetables where the highest

concentration are in fresh raw foods, while whole grains, seeds or beans contain very little vitamin C except when they are sprouted, which raises the ascorbic acid content. Fruits are seasonal and generally perishable in nature due to their high moisture content.

Vitamin C is a water soluble vitamins, meaning that the body cannot store it but only derive it from diets by living organisms. Ascorbate (anion of ascorbic acid) is an antioxidant, since it protects the body against oxidative stress. It is also a factor in at least eight enzymatic reactions including several collagen synthesis reactions that cause the most severe symptoms of scurvy when they are dysfunctional. In animals, these reactions are especially important in wounds healing and in preventing bleeding from capillaries. (Aletor,2005). Vitamin C is present in high concentration in the eyes possibly to protect against photolytically generated free radicals and also in white blood cells for protection against free radicals produced during immune functions (Packer and Colman C, 2009). The importance of ascorbic acid in the sustenance of life in humans and higher animals cannot be overemphasized, hence, the need to identify the types of fruits that are better sources of ascorbic acid.

MATERIALS AND METHODS

Sample Collection

Five different samples of guava, orange, banana, water melon and cucumber were obtained from Fruits garden market in Port Harcourt Local Government Area, Port Harcourt, Rivers State.

Apparatus and Equipment

Apparatus:

- Burette
- Rector stand
- Volumetric flask
- Pipette
- Measuring cylinder
- Conical flasks

Equipment:

- Digital precision scale
- Pistol and mortar

Reagents

- Iodine solution
- Starch solution
- Potassium iodide solution

Sample Preparation

Five samples of each of the fruits were washed with distilled water. The washed samples were weighed before meshing in a mortar. The meshed samples were transferred to a clean beaker and 150ml of distilled water were added into the beaker for dissolution of the

meshed sample. The mixture of sample and water was filtered into another clean conical flask. The filtrates obtained from the fruits samples were labeled properly for the analysis of ascorbic acid content of each sample.

Method of Analysis

The concentration of ascorbic acid in the fruits samples (Guava, orange, banana, water melon and cucumber) was analyzed in the laboratory by using redox titration. A mixture of iodine and potassium iodide solutions were used as the titrants and starch solution as the indicator. The titrant was run into a measured volume of the filtrates of the each fruits sample in a conical flask in which few drops of starch solution had been added until blue-black colour point was reached. The titration was repeated two more times for each sample and the average volume of the titrant of each fruits sample was obtained. Using the average volume of the samples and the stoichiometric relationship between iodine and ascorbic acid, the concentration of ascorbic acid in each sample was determined.

Result

Sample	Concentration of Vitamin C. (Ascorbic acid) in Mg/L
Cucumber	0.0125
Guava	0.25
Water Melon	0.02

Orange	0.05
Banana	0.01

Discussion

The table shows the results of the titration records of the concentration of ascorbic acid in five different fruits samples. The concentrations of cucumber, Guava, water melon, orange and banana were 0.0125, 0.20, 0.02, 0.05 and banana 0.01 respectively.

The values obtained showed that guava has the highest concentration of ascorbic acid. This means that guava may probably be a better source of ascorbic acid for human among the fruits samples analyzed.

Conclusion

Ascorbic acid is an essential nutrient for the survival of humans and animals which can be obtained from fruits especially from guava as shown by the result of the analysis. Deficiency of ascorbic acid in our diet may lead to several unhealthy conditions which can lead to death.

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