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Determination of Vitamin C Contain in Various Fruit Available in Mansoon Season

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ABSTRACT

Vitamin c is also known as L- ascorbic acid has several important function These include: helping to protect cells and keeping them healthy maintaining healthy skin, blood vessels, bone and cartilage, Vitamin C is water soluble Vitamin found in citrus fruit that is naturally present in some foods like lemon, sweet lime, guava, pomegranate and pineapple etc. Many method were developed for determination of Vitamin c such as titration, spectrophotometry, electrophoresis and high performance liquid chromatography (HPLC). This study aims to compare Vitamin c contain citrus fruit. Using iodine /Iodophenol titrate method .the goal of this search is to determine the concentration of Vitamin C (ascorbic acid) in some of a commercial product, vegetable and fruit juices by redox titration .A redox titration involving an Iodomeric method has been used to the analysis .the sample classified by their Vitamin c contain. These result concluded that the concentration by Vitamin c was highest concentration found in Lemon and lowest concentration found in pineapple.
***Key words**: Ascorbic acid, Vitamin C, Titration Method*

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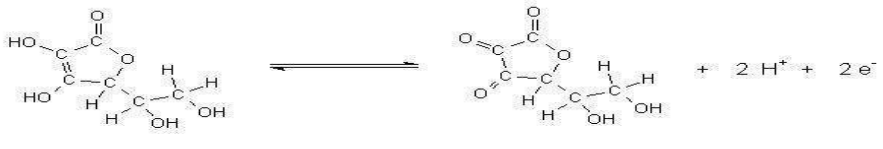
INTRODUCTION

Vitamin C is defined as the scientific term L-Ascorbic Acid. Vitamin C is one of the most important Vitamin in fruits and vegetables. Vitamin C is the major water soluble anti – oxidant within the body. Ascorbic Acid (Vitamin C) is the biologically active form but L-dehydroascorbic acid and product of oxidation.

Vitamin C is very useful in the prevention of scurvy and maintenance of healthy skin, gums and blood vessels. It helps in collagen formation, absorption of inorganic iron, reduction in level of plasma cholesterol, enhancement of the immune system and reaction with singlet oxygen and other free radicals (1). Work as an antioxidant and it also reduces the risk of atherosclerosis and some forms of cancer. Biological Recommendation of 75 mg/day for adult women and 90 mg/day for men respectively, in children it is 45 mg/day (2). Vitamins are a group of small molecular compounds that are essential for the physiological need in many multi-cellular organisms, and humans in particular. Vitamin C (L-Ascorbic acid) was first isolated as a pure substance by Albert Azent-Gyorgi and Charles Kingin 1928 [4] , it is an anti-oxidant and free radical scavenger, is found ubiquitously in fruit and vegetables such as citrus fruits (oranges, lemons, limes, tangerines etc.), melons, tomatoes, peppers, broccoli, green leafy vegetables such as spinach, potatoes and turnips, quantitative determination of Vitamin C especially important in the production of wine, beer, milk, soft drinks and fruit juices, where it can be a quality indicator [5] . Given the important role played in the human diet and necessary to growth and repair of tissues in all parts of human body. It is necessary to form collagen an important skin proteins, scar tissue, tendons, ligaments, and blood vessels. Vitamin C is essential for the healing of wounds of skin, and for the repair and maintenance of cartilage, bones and teeth [6]. Vitamin C is easy to oxidized, storage and cooking. Eventual oxidation of Vitamin C by oxygen in the atmosphere. In addition, ascorbic acid is water-solubility Vitamin means that a significant amount of Vitamin C present in a food cans be lost by boiling and then discarding the cooking water [6]. Chemical composition for ascorbic acid is $C_6H_8O_6$, its form is white or slightly yellow crystal or powder form with a slight acidic test, Ascorbic Acid is freely soluble in water; sparingly soluble in alcohol; insoluble in chloroform, ether, and benzene [7]. The structures for the reduced (ascorbic acid) form and for the oxidized form (dehydroascorbic acid) are shown below:



Ascorbic acid Dehydroascorbic acid

The amount of Vitamin C can be determined by a redox titration with a standardized solution of iodine. The iodine is reduced by the ascorbic acid to form iodide. As shown in the other half of this redox equation.

$$I_2 + 2e^- \longrightarrow 2I^-$$

The end point of titration is reached when a slight excess of iodine is added in the ascorbic acid solution [8; 9; 10; 11]. Deficiency of Vitamin C leads to scurvy, a disease characterized by weakness, small hemorrhages throughout the body that cause gums and skin to bleed, and loosening of the teeth. Vitamin C cannot synthesized through neither do not body cells, nor does it store it. It is therefore important to include plenty of vitamin C-containing foods in daily diet. Vitamin C toxicity is very negligible, because the body cannot store the vitamin however, amounts greater than 2000 mg/day are not recommended because such high doses can lead to stomach upset and diarrhea .(3)

MATERIAL AND METHOD

1. Preparation of 0.005 mol L^{-1} Iodine Solution

Accurately weight one gm of potassium iodide and 1.65 gm of Iodine dissolved to a less amount of water, shake until dissolving. Transfer iodine solution to 500 ml volumetric flask, making sure to rinse all traces of solution in to the volumetric flask using distilled water. Completed the volume up to the mark.

2. Preparation of 0.5% Starch Indicator Solution

Soluble starch (0.25gm) to a 100 mL conical flask or beaker and 50 mL of distilled water was added. Solution heated with stirring for 5 Minutes, careful must be taken not to exceed the stated temperature. Allow solution to cool to room temperature.

3. Extraction of Vitamin C

Five citrus fruits were selected for the present investigation .Some fresh ripe fruits were collected from Kopargaon market.After removing the peels and cutting them into transversally, the juices were expressed from the lemon (*CitrusLimon)*, Sweet lime (*Citruslimetta*), Guava (*Psidium guajava*), Pomegranate (*Punica granatum*) and pineapple (*Ananas comosus*).Before carefully picking out the seeds from the juice. These fruits were blended into fine pastes with few ml distilled water.This were all stored for use in this study.

Ascorbic acid determination was carried out by iodine titration. When iodine is added to a starch solution, it reacts to produce a dark blue-black colour preventing the formation of the dark blue- black colour. Thus, the amount of vitamin c present in a solution may be measured by first adding a smallamount of

acidified starch and then adding iodine drop wise until the solution turns dark blue-black colour. The endpoint is the appearance of the blue starch-iodine colour.
The iodine reagent was standardized by titrating it against 10ml juice sample (to which 3 drop of 0.5% starch was added) until the appearance of the dark blue-black colour. 10ml of the sample were then treated with the same way.

RESULTS AND DISCUSSION

In this research estimating Vitamin C in fresh fruit juices (Lemon, Sweet Lime, Pomegranate, Pineapple, Guava) the vitamin contain in various fresh fruit.

$$\textbf{Formula:}\frac{\textbf{Volume of iodine} \times 100 \times 10 \times \textbf{iodine Normality}}{\textbf{Volume of juice}}$$

Table:1 Natural fruits Ascorbic Acid Content(mg/500ml)

Sr.no.	Fruit Name	Amount Calculated mg /500 mL
1	Lemon	570
2	Sweet lime	420
3	Guawa	322
4	Pomegranate	252
5	Pineapple	89

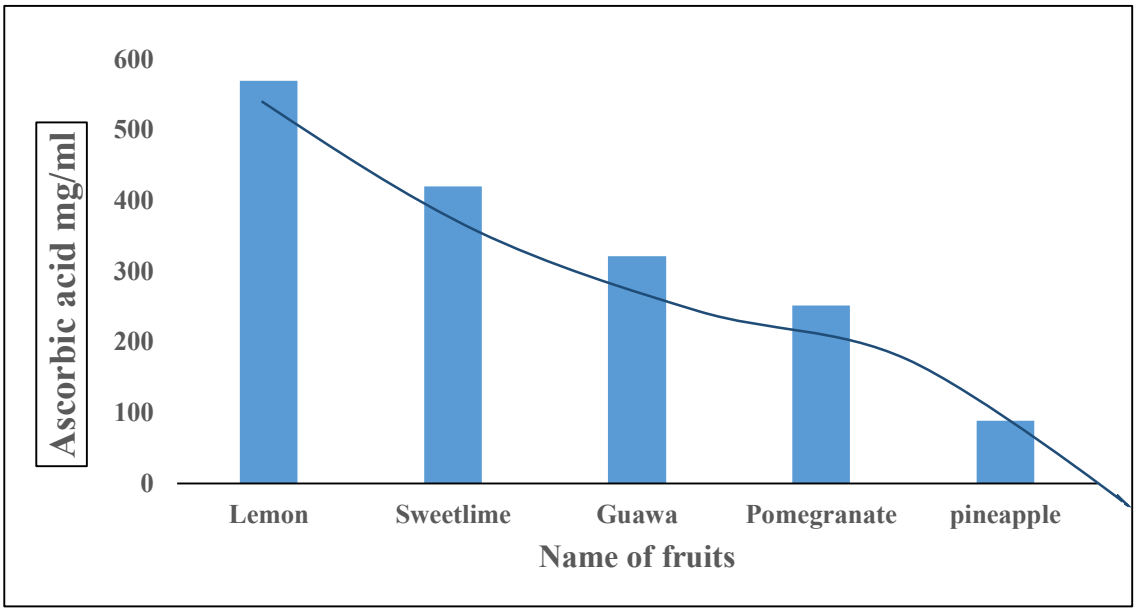


Fig 1: Amount of Vitamin C Obtained From Different Sources

The result show that all fruit studied in these work contain Vitamin C, but in different concentration. For fruits; Lemon has the maximum vitamin contain from (570 mg/500ml) indicating that it is a good source of median source of vitamin c that is guava is (322mg/500ml),Pomegranate(252mh/500ml) &Sweet lime (420mg/500ml)of vitamin C and the fruits of pineapple has the minimum vitamin contain from given sample (89 mg/500ml) and guava and pomegranate is a Ascorbic acid (Vitamin C)Ascorbic acid is an important vitamin for human health and also acts as co-factor for many enzymes. It is therefore needed for physiological functions in the body especially for the synthesis of important substances including collagen, and some neurotransmitters. Ascorbic acid accelerates hydroxylation reactions by increasing the activity of enzymes hydroxylase and oxygenase. Present study is focused to know the amount of vitamin C shown in Fresh Fruits. Vitamin C, also known as ascorbic acid, is necessary for the growth, development and repair of all body tissues. It's involved in many body functions, including formation of collagen, absorption of iron, the proper functioning of the immune system,wound healing, and the maintenance of carti;age,bones and teeth.

Fig 2. & Fig 3: Fruit Juice Colour Change during Titration

Vitamin C is easily absorbed both in food and in pill form, and it can enhance the absorption of iron when the two are eaten together. Deficiency of Vitamin C is relatively rare, and primarily seen in malnourished adults. In extreme cases, it can lead to scurvy -- characterized by weakness, anaemia. Aging. Vitamin C affects cells on the inside and outside of the body and its antioxidant properties can be beneficial when it comes to aging, between nutrient intakes and skin aging in 4,025 women aged 40-74. It found that higher Vitamin C intakes were associated with a lower likelihood of a wrinkled appearance, dryness of the skin, and a better skin-aging appearance. In addition, topical treatments with Vitamin C have been shown in some studies to reduce wrinkles (11)

CONCLUSION

From these study it is concluded that the valuable Vitamin C was obtained by the method of titration from various fruits that is Lemon, Sweet Lime, Pomegranate, Pineapple, and Guava. The graph was interoperated on the basis of values of Vitamin C. That Fresh Citrus Fruit has high source of Vitamin C is known to avoid infections and improve immune responses. With specific reference to the critical phase, Vitamin C plays a critical role. It downregulates the cytokine storm, protects the endothelium from oxidant injury, has an essential role in tissue repair, and improves immune responses against infections. Vitamin C shows promising results when administered to the critically ill.

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