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Analysis Of Fruits And Vegetables From Local Farmhouse And Local Markets Of S.N. Puram Locality Of Cherthala, Kerala, India In Terms Of Ascorbic Acid Content

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Abstract: L-Ascorbic acid commonly known as Vitamin C is an essential antioxidant needed by human body. Deficiency of ascorbic acid or Vitamin C in diet will also lead to disease known as scurvy. Fresh fruits and vegetables are the major source of vitamin C. The work was carried out by collecting fresh fruits and vegetables from local farm houses and local markets in the nearby area of Sree Narayana college Cherthala. By comparing the ascorbic acid content of various sample gave an idea about the fruits and vegetable samples that should be included in our diet. Iodometric method of titration was adopted for this study.

Index terms: **Ascorbic acid, Vitamin C, Fruits, Vegetables, Iodometric titration**

I INTRODUCTION

L-Ascorbic acid commonly known as vitamin C is an antioxidant and free radical scavenger found in fruits and vegetables such as citrus fruits, watermelon, tomatoes, green leafy vegetables like spinach. Since it affects the increase of white cell production and also helps in maintaining proper level of interferon, a protein that plays an important role in multiplication of viruses, it is very important for protection of organisms. Vitamin C can increase the level of antioxidants [1]in blood. Ascorbic acid being a water-soluble vitamin cannot be stored in our body [2-3] but has to be taken daily through food or supplement [4-7]. It is also involved in cancer prevention [8-9]. The main deficiency disease is scurvy, resulting in loss of collagen, hair loss, swelling or bleeding of gums, skin wounds etc. [10-12]. It has been studied that vitamin C can prevent common cold [13]. During the outbreak of SARS-Cov-1 in 2003 vitamin C was suggested for treatment of respiratory infection [14-20]. For the recently identified coronavirus 2 causing fatal Covid 19 administering high dose of vitamin C is found to be beneficial [18]. During covid -19 pandemic more importance was given for consuming vitamin C, because it can enhance body's natural defense mechanism. Studies also shows the beneficial effect of vitamin C against heavy metal toxicity. [21]. Due to its potential health implication, it is of much significance to estimate Vitamin C content in biological samples.

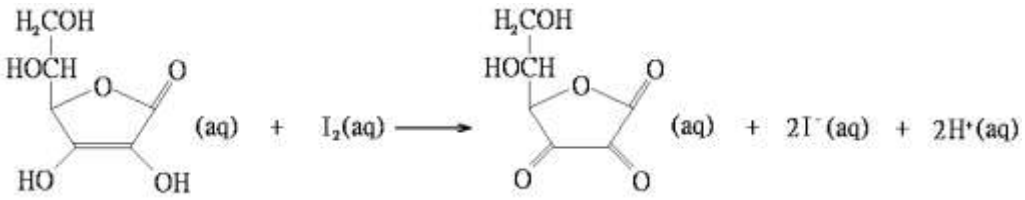
II MATERIALS AND METHODS

Samples for the study were collected from local farms and also purchased from local market in S.L Puram Cherthala Kerala. All the samples were thoroughly cleaned using deionised water to remove the adhering contaminants. For the analysis of vitamin C in the samples, determination was done on the same day of collection/purchasing.

2.1. Chemicals

All chemicals were of analytical grade and were used without further purification Potassium Iodide (A.R.grade,Merck), Iodine (A.R.Grade Merck), Starch (A.R.Grade, Merck), Arsenic oxide (A.R.Grade Merck) Concentrated Hydrochloric acid (Nice Chemicals) , Sodium Hydroxide (A.R.Grade Merck)

The amount of ascorbic acid can be estimated using redox titration involving iodometry [22]. In this redox reaction ascorbic acid is oxidised and iodine is reduced. Vitamin C (ascorbic acid) is rapidly and quantitatively oxidized by iodine in acid solution according to the following equation:



Iodometric titration was used for determination of ascorbic acid content.20ml of the sample was diluted and acidified with 1ml of 15% HCl and titrated against iodine using starch as indicator (1 ml). The end point is the appearance of blue colour. Iodine solution was standardised using standard As_2O_3. Iodine solution was prepared by dissolving 0.325g of pure iodine and 0.5g of pure KI in distilled water. The mixture is stirred well until the iodine is dissolved and made up to 250ml.The amount of vitamin C in different samples was determined using the equation

Mass of Vitamin C in the sample = (Molarity of the sample x Volume of the sample x Molecular Weight of vitamin C (176g). (1)

Since reaction between ascorbic acid and iodine is a 1:1 stochiometric reaction molarity of the sample is obtained from $M_1V_1=M_2V_2$

III RESULTS AND DISCUSSION

The amount of vitamin C in five different fruits i.e. orange, lemon, papaya, sapota and water melon were analysed. Among them papaya was found to have the greatest amount of vitamin C (51.89gm in 100ml) and watermelon the least (3.459gm in 100ml). The amount of vitamin C content in other samples are orange (33.44gm in100ml), lemon (21.53gm in 100ml), and sapota (6.95 gm in 100ml). Five different vegetables were also analysed i.e. beans, cabbage, carrot potato and tomatoes. Among them tomatoes have the greatest amount and cabbage the least. The vitamin C content in beans, carrot and potato are shown in the table below. Fruits were found to have more vitamin C content than vegetables.

Table1. Amount of Vitamin C in Fruits

Fruits	Papaya	Orange	Lemon	Sapota	Water Melon
Amount of Vitamin C in g/100ml	51.89gm	33.44gm	21.53gm	6.95gm	3.459gm

Table 2. Amount of Vitamin C in Vegetables

Vegetables	Tomato	Carrot	Potato	Beans	Cabbage
Amount of Vitamin C in g /100ml	15.76gm	11.53gm	10.76 gm	7.30gm	1.92gm

Amount of vitamin C in fruits and vegetables were determined by redox titration involving iodometric titration. The experiment was conducted in 10 samples. In this papaya is the most vitamin rich sample and cabbage is the least vitamin C containing sample.

IV CONCLUSION

Analysis of ascorbic acid content of five different fruits available from the locality Papaya, orange. lemon, sapota, watermelon and also five different vegetables tomato, carrot, potato, beans, cabbage were carried out by iodometric titration method. Among the five fruits papaya was found to have the highest content of vitamin C. Orange was found to have the next higher value, then lemon and then sapota. watermelon was found to have the least value. Among the five vegetables tomato has the highest value and cabbage the least. Since these fruits and vegetables are easily available inclusion of these in our diet can meet the daily dietary requirement and can increase our immunity and protect us from negative health issues.

REFERENCES

[1] Frei, B.; England, L.; Ames, B.N. 1989. "Ascorbate is an outstanding antioxidant in human blood plasma". Proc Natl Acad Sci., (86, 6377-81, https://doi.org/10.1073/pnas.86.16.6377.

[2] Valdés, F. Vitamina C. 2006. Actas dermo-sifiliográficas. 97(9): 557-568.

[3] Sauberlich, H. E.;1994, Pharmacology of vitamin C. Annual review of nutrition, 14 (1): 371-391.

[4] Rekha C., Poornima.G., Manasa M., Abhipsa V., Pavithra devi J., Vijay kumar H.T. and Prashith Kekuda T. R. 2012, "Ascorbic Acid, Total Phenol Content and Antioxidant Activity of Fresh Juices of Four Ripe and Unripe Citrus Fruits". Chem Sci Trans, 1(2): 303-310

[5] Choi Y., Jeong H.S. and Lee J. 2007. Food Chem, (103): 130-138.

[6] Kaviarasan S., Naik G H., Gangabagirathi R., Anuradha C.V. and Priyadarshini K.I. 2007. Food Chem, (103): 31-37

[7] Yen G. C., Duh P. D. and Su H.J. 2005. Food Chem, (89): 379-385.

[8] Chambial, S.; Dwivedi, S.; Shukla, K.K.; John, P.J.; Sharma, P. 2013. "Vitamin C in disease prevention and cure: an overview". Indian J Clin Biochem. 28: 314-328, https://doi.org/10.1007/s12291-013-0375-3.

[9] Jacob, R.A.; Sotoudeh, G. 2002." Vitamin C function and status in chronic disease". Nutr Clin Care, 5: 66-74.

[10] Wang, A.H.; Still, C. 2007. Old world meets modern: a case report of scurvy. Nutr Clin Pract, 22: 445-8.

[11] Institute of Medicine (US) Panel on Dietary Antioxidants and Related Compounds. In: Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids. 2000. National Academies Press (US), https://doi.org/10.17226/9810.

[12] Stephen, R.; Utecht, T. 2001." Scurvy identified in the emergency department: a case report". J Emerg Med, 21: 235-7.

[13] Pauling, L. 1973. "Ascorbic Acid and the Common Cold". Scottish Medical Journal, 18: 1-2.

[14] Arabi, Y M.; Fowler, R.; Hayden, F.G. 2020." Critical care management of adults with community-acquired severe respiratory viral infection". Intensive care medicine, 46: 315-328.

[15] Hemilä, H. 2003."Vitamin C and SARS coronavirus.". Journal of Antimicrobial Chemotherapy, 52: 1049-1050, https://doi.org/10.1093/jac/dkh002.

[16] Hemilä, H. 1997." Vitamin C intake and susceptibility to pneumonia". The Paediatric infectious disease journal, 16: 836-837.

[17] Hemilä, H. (1997). "Vitamin C intake and susceptibility to the common cold." British Journal of Nutrition, 77: 59-72. https://doi.org/10.1017/S0007114500002889. Organ.

[18] Feyaerts, A.F.; Luyten, W. 2020. "Vitamin C as prophylaxis and adjunctive medical treatment for COVID-19". Nutrition, 79, https://doi.org/10.1016/j.nut.2020.110948.

[19] Hemilä, H. 2003." Vitamin C, respiratory infections and the immune system." Trends Immunol. 24:.579-580. https://doi.org/10.1016/j.it.2003.09.004.

[20] Chambial, S.; Dwivedi, S.; Shukla, K.K.; John, P.J.; Sharma, P. 2013. "Vitamin C in disease prevention and cure: an overview". Indian J Clin Biochem. 28: 314-328.https://doi.org/10.1007/s12291-013-0375-3.

[21] Shaban El-Neweshy, M.; Said El-Sayed, Y. (2011)." Influence of vitamin C supplementation on lead-induced histopathological alterations in male rats". Exp Toxicol Pathol, 63: 221–227.

[22] C.J.Ikewuchi,C.C.Ikewuchi ."Iodometric determination of the Ascorbic Acid (Vitamin C) content of some fruits consumed in a University Community in Nigeria,Global ". journal of Pure and Applied Sciences, Vol 17 No1: 47-49 ISSN 118-0579.