International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

Estimation of Ascorbic Acid Content in Some Selected Fruits Grown in Mandya District, Karnataka.

Nagendra P[1], Srinivasa B.M[2]

[1]Associate Professor, Department of Chemistry, Bharathi College, Bharathinagara, Mandya District.
[2]Assistant Professor, Department of Chemistry, Rural College, Kanakapura, Bangalore District.

ABSTRACT
The ascorbic acid content of selected fruits was collected from a local market of Mandya and Maddur ascorbic acid content in these fruits were determined by volumetric method by using 2,6-dichlorophenol indophenol. The results obtained confirms the presence of ascorbic acid in these fruits. The highest yield was found in Guava and lowest different fruits tested. These results suggest that a wide variety of fruits can be consumed to meet the daily requirements of vitamin C in a cost-effective manner.

Keywords: Ascorbic acid, 2,6-dichlorophenol indophenol fruits.

Introduction

Ascorbic acid is a water-soluble vitamin used as a dietary supplement and for treatment of deficiency syndromes. It is essential for the formation of collagen, skin, tendons, ligaments, and blood vessels as well as wound repair, and the repair and maintenance of cartilage, bones, and teeth. Ascorbic acid is an antioxidant (Padayatty *et al*, 2003) which means that it quenches free radicals that can damage organs, tissues, and cells. Vitamin C finds important in the normal functioning of the immune system[1]. Hodges reported that deficiency of ascorbic acid in the body precipitates preosteal bleeding, loosening of teeth tissues and weak bones[2]. According to kinsman and Hood[3] Ascorbutic patients experience fatigue weakness and vasomotor instability. Nicol suggested that ascorbic acid plays a role in detoxification reactions[4].

Hulme reported that animals that do not require ascorbic acid in their diet have ability to synthesize it in their liver and kidney using carbohydrate as base[5].

Low levels of vitamin C have been associated with a number of conditions, including high blood pressure, gallbladder disease, stroke, some cancers, and atherosclerosis, the build-up of plaque in blood vessels that can lead to heart attack and stroke. More vitamin C from diet may help reduce the risk of developing some of these conditions. There is no conclusive evidence that taking vitamin C supplements will help or prevent any of these conditions.

Cosmetics and other personal care products may include less acidic forms of ascorbic acid, which can act as antioxidants to slow product deterioration. In industrial applications, ascorbic acid is used as a developing agent and preservative in photo production, water purification, and fluorescence microscopy,a

tool for understanding cell biology. Ascorbic acid helps bring about the chemical reaction that makes plastic.

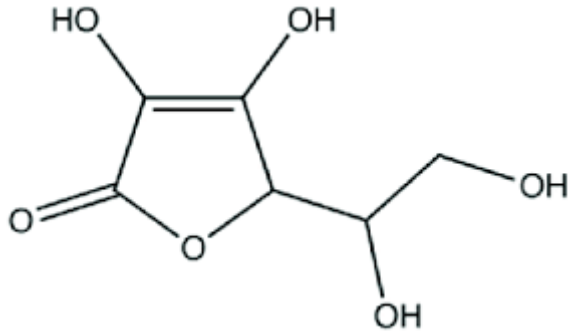

Fig. 1. Structure of Vitamin C

Ascorbic acid content of locally available fruits like Guava, Papaya, Watermelon, Jack fruit, Mango, Banana was determined. The work is extremely important to understand the relationship of dietary ascorbic acid intake and human health[6]

The method adopted was redox titration using 2, 6 dichlorophenol indophenol[7] Percentage yield of ascorbic and was also calculated for each fruit.

Experimental

Materials and Reagents

All the chemicals used for the experimental purposes were of analytical grade and used without further purification

2% (w/v) Oxalic acid: 5g of oxalic acid in 250cm^3 of distilled water.

Dye solution: 52.5mg of sodium bicarbonate and 65mg of 2, 6- dichlorophenol indophenol in 250 cm^3 of distilled water.

Ascorbic acid stock standard: (1mg/cm^3): 100mg in 100 cm^3 of 2% oxalic acid.

Ascorbic acid working standard: (100µg/mL): 10 mL of the ascorbic acid stock standard diluted to 100 cm^3 with 2% oxalic acid.

Procedure: Some selected fruits namely Guava, Watermelon, Banana, Mango, Papaya, Jackfruit were purchase in a local market in Mandya and Maddur. They were thoroughly cleaned using distilled water to remove adhering impurities. A sizeable quantity of the fruit sample was peeled and the edible portion was grounded. 5g of the pulp was weighed out and the juice extracted with the aid of a muslin cloth into a 25 cm^3 volumetric flask was diluted using 2% oxalic acid solution. Extraction of the juice was repeated twice using 10 cm^3 of distilled water each time bringing the total volume of oxalic acid in the volumetric flask to 100 cm^3. The procedure was repeated for all the fruit samples analyzed.

Determination of ascorbic acid content

Ascorbic acid content of some fruits was determined by 2, 6-dichlorophenol indophenol (DCPIP) titration method described.

5 cm^3 of the ascorbic acid working standard and 10 cm^3 of 2% oxalic acid were pipetted out into a 250cm^3 conical flask. The contents in the flask were titrated against the dye solution (V_1) until the appearance of a pale pink colour. 5 cm^3 of the sample was similarly titrated against the dye solution (V_2). Ascorbic acid content present in the samples were determined using the formula

Amount of ascorbic content (mg/100g) = 500 x V_2 x V_t x 100 / V_1 x w x a
Where; 500 = µg of standard Ascorbic acid pipetted
V_1 = Volume of dye consumed by 500µg of standard ascorbic acid
V_2 = Volume of dye consumed by 5 cm^3 of sample
Vt=total volume of the extract
100 = Ascorbic acid content/100g of the sample
w = Weight of sample taken for extraction
a = Volume of the test sample taken for titration

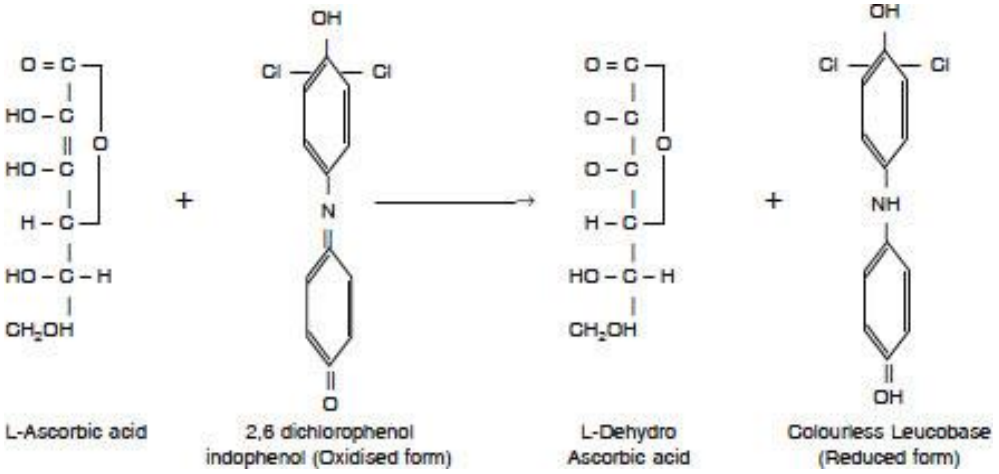

Fig. 2. Reaction scheme

Results and Discussion

Ascorbic acid content of some Indian spices was determined by DCPIP titration method. Ascorbic acid is a strong reducing agent because of which it reduces the dye 2,6 dichlorophenolindophenol and itself gets converted to dehydro ascorbic acid. After equivalence point is reached a pink coloured solution obtained indicating end-point The dye in this titration is coloured in the oxidised form and colourless in the reduced form.

The results obtained from analysis carried out confirmed the presence of ascorbic acid in the fruit samples analysed. The highest percentage yield was obtained from Guava and Mango, lowest in the remaining fruits. Ascorbic acid content varied significantly among the different spices evaluated. The relative amount of ascorbic acid content of the six fruit samples analysed proved the use of 2, 6-dichlorophenolindophenol solution in the estimation of ascorbic acid in liquid diet as a satisfactory analytical method.

Ascorbic acid value from all the six fruits thereby proving its current use in the preparation of vitamin C containing preparations. Low ascorbic acid value was obtained could be attributed to the presence of coloured pigments as its dilute solution was heavily coloured and may due to the improper cultivation, deficiency of manure and climate condition etc. The results are shown in Table 1.

Conclusion

From the results it can be concluded that the ascorbic acid content of fruits juice was determined by DichlorophenolIndophenol titration. Vitamin C or ascorbic acid is important for the human body. It is clear that the use of the dye-titration method is simple to carry out with the use of available laboratory apparatus and chemicals

Acknowledgement
I gratefully acknowledge Department of Chemistry, Bharathi College for its unreserved help and encouraging me by providing necessary materials.

Table 1. Ascorbic content of the six fruit samples in mg/10g and percentage yield

Sl.No.	Sample	Amount of Ascorbic acid mg/10g	Percentage yield/10g
1	Guava	2846.05	28.46
2	Papaya	75.62	0.756
3	Watermelon	38.75	0.3875
4	Mango	232.05	2.3205
5	Jack fruit	12.52	0.1252
6	Banana	14.86	0.1486

References

1. Carr AC, Maggini S, Vitamin C. and immune function. *Nutrients* (2017) 9:1211.
2. Hodges M. Experimental scurvy in man. AM J Clin Nutr. 1969; 22:535.
3. Kinsman RA, Hood J. Some behavioural effects of ascorbic acid deficiency. AM J Clin Nutr. 1971; 24:455.
4. Nicol BM (1950) The metabolism of folic acid. proc soc expt biol and med. 1950;24:72.
5. Hulme AC. The biochemistry of fruits and their products. London: Academy Press. 1970;42-7.
6. Marti et al., 2009; Chakraborthy et al., 2014; Rekha et al., 2012
7. Plummer DT. An introduction to practical, bio-chemistry. Maidenhepid, Berkshire, England: McGraw-Hill Book Comply Limited; 1978.
8. Rao, B. and Deshpande, V (Rao, B. and Deshpande, V., 2006.