

SHORT COMMUNICATION REPORT

QUANTITATIVE ESTIMATION OF VITAMIN C IN SOME LOCAL FRUITS

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INTRODUCTION

Vitamins are organic compounds that are required for growth and maintenance of life. They are regulatory substances, each performing specific functions. In general the body cannot synthesise them at least in large amount to meet its need. However, vitamin D is an exception as its precursor is present in the skin and its synthesis is affected by exposure to ultraviolet rays (Wilson *et al.* 1975).

Vitamin C or ascorbic acid is a water soluble vitamin found virtually in every living tissue of plants and animals. Most plants and animals can synthesise vitamin C from glucose with the exception of man, primates, guinea pigs, Indian fruit eating bats and red vented bulbuls (birds native to Indian) due to lack of the enzyme L-glulonolactone oxidase needed for the synthesis (Wilson *et al.* 1975).

Fresh fruits are the richest sources of vitamin C. Citrus fruit, black currants and guavas are particularly rich sources of vitamin C while green leafy vegetables are also good sources (Davidson *et al.* 1972). The aim of this work is to estimate the quantity of vitamin C in some fruits commonly found in Nigeria.

All the reagents used were of analytical grade. The plant materials used were purchased from Sabon Gari market, Zaria. The plant materials were authenticated at the Herbarium of the Department of Biological Sciences, Ahmadu Bello University, Zaria. The plant samples used were the dried fruits pulps of *Adansonia digitata* L. (A), *Ziziphus jujuba* L. (B), *Dialium guineense* W. (C) and *Hibiscus sabdariffa* L. (D).

Preparation of extracting solution: Metaphosphoric acid – acetic acid (HPO₃ – HOAC) was prepared by weighing 15g of HPO₃ sticks and dissolving in 40ml of HOAC and 200ml of distilled water. The resulting solution was diluted to 500ml with distilled water, filtered and stored in the dark for use.

Preparation of Indophenols Solution: 50mg of 2, 6-dichlorophenol indophenols powder was dissolved in 50 ml of distilled water containing 42 mg of NaHCO₃. The resulting solution was then diluted to 200 ml with distilled water, filtered and stored in the dark for use.

Preparation of standard ascorbic acid solution: 1 mg/ml of standard ascorbic acid solution was prepared by dissolving 50mg of ascorbic acid in 40 ml of HPO₃ – HOAC solution and made up to 50ml in a volumetric flask.

Standardization of indophenols solution with standard ascorbic acid solution: Three 2 ml aliquots ascorbic acid solution was transferred into three 50 ml conical flasks each. The content of each of the conical flask was titrated against indophenols from the burette until a distinct rose color persisted for about 5 seconds. Blank titrations were also carried out using 7 ml of PHO₃ – HOAC solution against indophenols.

Extraction of ascorbic acid from the samples: 5g of each of the powdered samples (A, B, C, D) were weighed and transferred into conical flasks. 50 ml of the extracting solution was added to each sample and triturated to form a suspension and then allowed to stand for 30 minutes. The volume obtained was noted and designated as V ml. Warm extracting solution (50°C) was used for sample A as it froths in cold extracting solution. Sample aliquots (7ml each) were obtained by filtering the suspension. The filtrate obtained from sample D was decolorized with activated charcoal.

Titration of extracted solution against indophenols: 7ml of sample aliquots (A, B, C and D) were measured into conical flasks and titrated against indophenols from the burette until a distinct pink to rose color persisted for 5 seconds. The titration was repeated three times for each sample aliquot and average titre values obtained.

Calculation: The concentration of ascorbic acid in each sample (Zmg/g of powdered sample) was calculated using the following formula.

$$Zmg / g = (X - B) \times \frac{F}{E} \times \frac{V}{Y} \text{ (AOAC methods 1980)}$$

Where:

X = Average titre value obtained from sample titration

B = Average titre value obtained from blank titration.

F = Mg of ascorbic acid equivalent to 1ml of indophenols solution.

E = No. of grams of powdered fruit sample assayed.

V = Volume of initial assay solution

Y = Volume of sample aliquot titrated

The fruit pulp of *Dialium guineense* W. was found to contain the highest amount (49.50mg/100g) of ascorbic acid while the fruit pulp of *Adansonia digitata* L. contained the lowest amount (39.50mg/100g) of ascorbic acid. *Ziziphus jujuba* L. and *Hibiscus sabdariffa* L. contained 44.60 and 43.20mg/100g of ascorbic acid respectively.

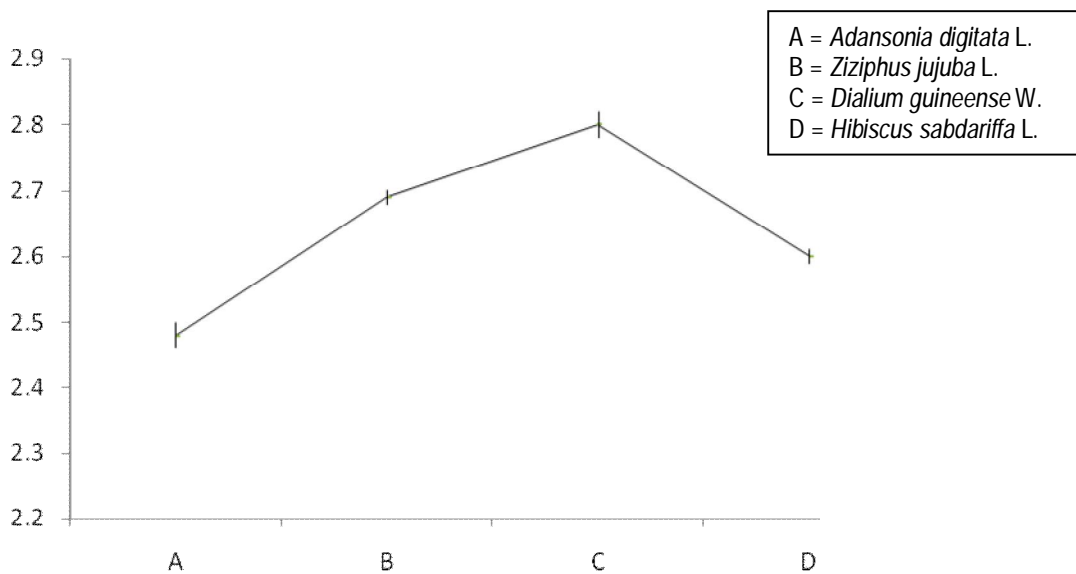


FIG 1. AVERAGE TITRE VALUES OBTAINED FROM THE TITRATION OF SAMPLES AND THEIR STANDARD DEVIATION

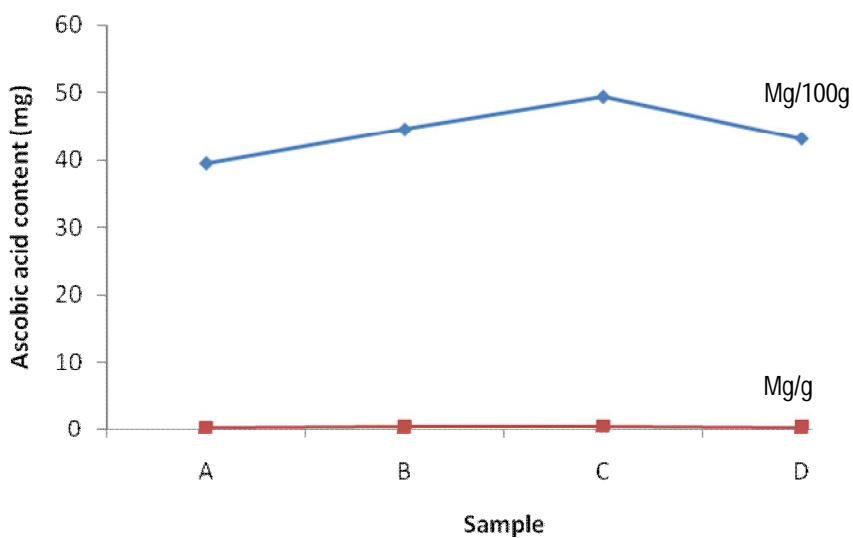


FIG. 2. VALUES OF ASCORBIC ACID PRESENT IN EACH SAMPLE

The result obtained is comparable to the results of other studies carried out on the estimation of vitamin C from some local fruits and vegetables (Achinewhu 1983). Since these fruits are always available in local markets and they are also not expensive, the considerable amount of vitamin C present in these fruits showed that when they are consumed in relative large amount, they will certainly contribute to the daily human dietary intake of the vitamin. It is to be noted that the requirement of vitamin C increases during pregnancy, lactation, adolescence, hyperthyroidism, infection and after surgery (Davidson *et al.* 1972).

Maintenance of daily dietary intake of vitamin C leads to the prevention of scurvy which is the deficiency disease state of vitamin C. This disease state has been shown to be high in children and the elderly (Abubakar *et al.* 1990).

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