



## Determination of vitamin C in some fruits and vegetables in Davanagere city, (Karnataka) - India

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### Abstract

The ascorbic acid content of some fruits and vegetables namely lemon, banana, Jack fruit, sapota, pomegranate, carrot, beans, cabbage, cauliflower and potato. The fruits were collected from local market and the pulp and seed free juices were collected. Ascorbic acid content and total phenolic content of fresh fruit juices and vegetables were determined by volumetric method. Ascorbic acid content was high in *lemon* and low in banana fruits. Ascorbic acid content was high in cauliflower and low in beans vegetables were found.

Key-Words: Vitamin C, Fruits, Davanagere

### Introduction

Vitamin C (Ascorbic acid) is the most important vitamin in fruits and vegetables. Except human and other primates, most of the phylogenetically higher animals can synthesize vitamin C (*L*-ascorbate). More than 90% of the vitamin C in human diets is supplied by fruits and vegetables (including potatoes). Vitamin C is defined as the generic term for all compounds exhibiting the biological activity of *L*-ascorbic acid. Ascorbic acid is the principal biologically active form but *L*-dehydroascorbic acid, an oxidation product, also exhibits biological activity. Vitamin C is required for the prevention of scurvy and maintenance of healthy skin, gums and blood vessels. It functions in collagen formation, absorption of inorganic iron, reduction of plasma cholesterol level, inhibition of nitrosoamine formation, enhancement of the immune system, and reaction with singlet oxygen and other free radicals. As an antioxidant, it reportedly reduces the risk of arteriosclerosis, cardiovascular diseases and some forms of cancer<sup>1-5</sup>.

The consumption of fruit juices and vegetables are beneficial and the health effects of fruits are ascribed, in part to ascorbic acid, a natural antioxidant which may inhibit the development of major clinical conditions including cardiovascular diseases and cancer<sup>6-8</sup>. Present study was to relate the content of ascorbic acid some local fruits and vegetables.

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### Material and Methods

Samples for the study were purchased in local market in Davanagere city, Karnataka state. All the samples were thoroughly cleaned using deionised water to remove adhering contaminants. For the analysis of vitamin C in the samples, determination was done on the same day of purchase to counteract the instability of vitamin C.

Vitamin C was determined by using the procedure as outlined by Food Analysis Laboratory Manual Chapter 7 Vitamin C Determination by Indophenol Method<sup>9</sup> and AOAC International Methods of Analysis vol 16 Method 967.21<sup>10</sup>. 10 g of each of the samples with the exception of fruits was accurately weighed and ground using mortar and pestle with an additional of 20 ml of metaphosphoric acid acetic acid. The mixture was further ground and strained through muslin and the extract was made up to 100 ml with the metaphosphoric-acetic acid mixture. 5 ml of the metaphosphoric acid-acetic acid solution was pipetted into three of the 50 ml Erlenmeyer flask followed by 2 ml of the samples extract. The samples were titrated separately with the indophenol dye solution until a light rose pink persisted for 5 s. The amount of dye used in the titration were determined and used in the calculation of vitamin C content. Determination of vitamin C in fruits was done by extracting the juice using juice extractor and 2 ml of the muslin-filtered juice was used in titration for the determination of vitamin C.

### Results and Discussion

The result of estimation of vitamin C in some local fruits and vegetables are show in table 1. 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<sup>11</sup>. The result shows in fruits lemon have maximum vitamin c content and banana have low vitamin c content and in vegetables cauliflower have maximum and beans have low vitamin c content. Since these fruits and vegetables are always available in local markets and they are also not expensive, the considerable amount of vitamin C presents in these fruits and vegetables 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<sup>12</sup>. 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<sup>13</sup>.

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**Table 1: Vitamin C content of some fruits and vegetables**

S/No.	Name	Vitamin C (mg/100g sample)
01	lemon	40.48±0.098
02	banana	18.65±0.07
03	Jack friut	20.76±0.05
04	sapota	34.49±0.08
05	pomegranate	34.14±0.02
06	carrot	29.92±0.04
07	beans	23.58±0.06
08	cabbage	35.55±0.09
09	cauliflower	39.42±0.05
10	potato	31.32±0.09

**The Following Figure Shows the Colour Changes for Indophenol methods:**

Left flask: Initial colour of the sample. Right flask: At the titration endpoint all the ascorbic acid reacted and the solution changes from blue to permanent pink.

Lemon



Cabbage



Banana



Cauliflower



Potato



Beans



Pomegranate



Carrot



Jack fruit

