

# DETERMINATION OF VITAMIN C FROM SOME NATURAL PRODUCTS PRESERVED UNDER DIFFERENT STORAGE CONDITIONS

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**abstract:** Ascorbic acid (Vitamin C) is an essential Vitamin which participates in many different biological processes. The ascorbic acid content in vegetables and fruits is a maturity index and its determination in such samples is of special interest in quality control. In this paper we present a titrimetric method with potassium bromide for the determination of ascorbic acid in walnut, cabbage and some herbs. For determination of ascorbic acid we used titrimetric method with potassium bromat-bromide solution in the acid medium. Ascorbic acid,  $C_6H_8O_6$  is cleanly oxidized to dehydroascorbic acid by bromine. Ascorbic acid is instable and his preservation depends on the way and on the time duration of the storage. The different ways of storage of the vegetable products leads to the different preservation of ascorbic acid into the samples.

## Introduction

Ascorbic acid (AA), also referred to as L-ascorbic acid or Vitamin C, is a water soluble Vitamin and it is largely used in therapy as an anti-infections of cells. Vitamin C was first known to prevent scurvy, disease which is a rare clinical finding today, but interest in ascorbic acid persists [1].

Hence, ascorbic acid has to be supplemented mainly through fruits, vegetables and tablets. The current US recommended daily allowance (RDA) for ascorbic acid ranges between 100-120mg/ per day for adults. Many health benefits have been attributed to ascorbic acid such as antioxidant, anti-atherogenic, anti-carcinogenic, immunomodulator and prevent cold etc. Thus, though ascorbic acid was discovered in 17<sup>th</sup> century, the exact role of this vitamin/nutraceutical in human biology and health is still a mystery in view of many beneficial claims and controversies [2].

Ascorbic acid is a labile molecule; it may be lost from foods during cooking/processing even though it has the ability to preserve foods by virtue of its reducing property.

As is evident from the structural formula, ascorbic acid possesses a relatively high reducing power. It is easily and reversibly oxidized to dehydroascorbic acid, which is still physiologically active, though much less stable. Further conversion beyond the

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dehydroascorbic acid stage results in the irreversible formation of physiologically inactive diketogluconic acid [3-5].

Vitamin C is extremely unstable in neutral or alkaline solution in oxygen. It must be acidified with metaphosphoric acid, thiourea or sodium metabisulfite [6-8].

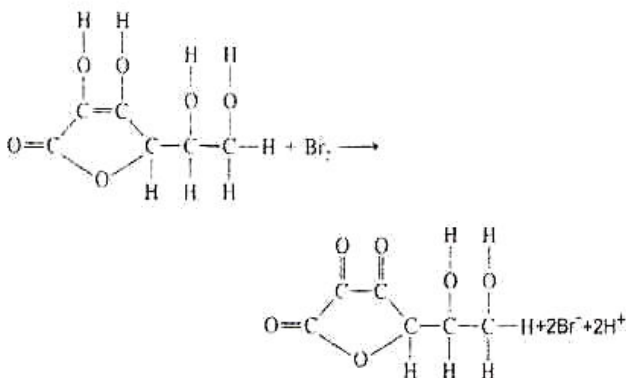
Though the literature is replete with the different types of methods for the analysis of such diversified products, efforts continue in the search of better methods. Such attempts to quantify ascorbic acid in these samples have resulted in a large number of methods: titrimetry, voltammetry, fluorometry, potentiometry, kinetic-based chemiluminescence (CL), flow injection analyses and chromatography. [9-11]

In this paper we present a titrimetric method for determination of Vitamin C from herbs, cabbage and walnut.

## Experimental

For determination of ascorbic acid we used titrimetric method with potassium bromat-bromide solution in the acid medium [12].

Ascorbic acid,  $C_6H_8O_6$  is cleanly oxidized to dehydroascorbic acid by bromine:



An unmeasured excess of potassium bromide is added to an acidified solution of the sample. The solution is titrated with standard potassium bromide to the first permanent appearance of excess bromine: this excess is then determined iodometrically with standard sodium thiosulfate. The entire titration must be performed without delay to prevent air-oxidation of the ascorbic acid [13-15].

All reagents were of analytical-reagent grade and all solutions were prepared using distilled-deionized water.

The reagents used have been:  $\text{Na}_2\text{S}_2\text{O}_3$  0.1N,  $\text{KBrO}_3$ - $\text{KBr}$  0.05N,  $\text{K}_2\text{Cr}_2\text{O}_7$  0.1N,  $\text{H}_2\text{SO}_4$  1N,  $\text{H}_2\text{SO}_4$  1:2, KI, starch indicator 1%.

For ascorbic acid determination has been used different vegetable products in different ways of storage: walnut, parsley, dill and cabbage. To observe how easy it's losing Vitamin

C once with high temperature, we determine Vitamin C concentration from: fresh, dry, frozen and boiled herbs.

The samples were weighed, crushed, dissolved in water and transferred into a 100mL volumetric flask. After that, was filtered and from analysis we take a portion of this filtrate. From juice of pickle cabbage we take an amount of these products directly in analysis.

## Results and Discussions

L-ascorbic acid was determined from Vitamin C tablets with orange taste. The analytical results are given in Table 1 and suggest that the results obtained with titrimetric method are good and the ascorbic acid amount determined was 0.3% more than the tablet's original content.

**Table 1.** Ascorbic acid concentrations in pharmaceutical products by the proposed procedure.

Sample	L-ascorbic acid content of tablets(mg/tablet)	Found L-ascorbic acid contents(mg/tablet)	Recovery (%)
Vitamin C tablet with orange taste	100	103.09	97

The contents of L-ascorbic acid in herbs and cabbage were determined by titrimetric method and the results are given in Table 2 and respectively in Table 3.

**Table 2.** Determination of ascorbic acid from parsley and dill by the titrimetric method.

Products	L-ascorbic acid contents (mgAA/g product)	Loss (%)
Fresh parsley	175.53	
Frozen parsley	152.33	13.31
Boiled parsley	169.50	3.43
Dry parsley	170.14	3.07
Fresh dill	141.76	
Frozen dill	123.13	13.14
Boiled dill	136.22	3.9

We observe one variation of Vitamin C concentration depending on time, temperature and light, the big losing of Vitamin concentration being after we frozen the parsley (13.21%) and respectively the dill (13.14%).

**Table 3.** Vitamin C concentration from cabbage

Products	L-ascorbic acid contents (mgAA/g product)	Loss (%)
Fresh cabbage	56.53	
Pickle cabbage	36.25	15.54
Juice of pickle cabbage	11.49	

In conclusion, drying herbs is a good way for Vitamin C preservation.

In cabbage it's a big Vitamin C quantity per 100g products. After cabbage preservation, a portion of Vitamin is finding in juice of pickle cabbage. The losing of this Vitamin is just 15.54%.

We determined the ascorbic acid from walnut; it is a very big source of this one. In walnut exist 11600mg Vitamin C per 100g green products and approximately 2500mg per 100g dry products, so the Vitamin C concentration is diminished with 78%.

## Conclusions

As a result of this work, the titrimetric method was found to be advantageous comparatively to other methods reported in the literature: it is sensitive, economic, practical and less time-consuming.

In the dry, boiled and frozen products the active form of Vitamin C oxidizes at diketogluconic acid, which doesn't have vitaminic action.

The method has been used for ascorbic acid determination on different type of vegetables: cabbage, parsley, dill and walnut

After results obtain, we observe that in fact the fresh products has important vitamin C amount necessary human body.

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