

QUANTITATIVE DETERMINATION OF ASCORBIC ACID LEVELS IN CITRUS FRUITS;
REVIEW

By

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**THIS RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF
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OF SCIENCE DEGREE WITH EDUCATION.**

APPROVAL

This undergraduate research report has been submitted for examination with my/our approval as research supervisor(s).

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DECLARATION

I declare that the work has been collected by personally in different sources of information and submitted for the attainment of a degree or professional qualification. I confirm that the output of this work is mine and the contributions of the other authors to this work have been explicitly clearly quoted. I confirm that appropriate credit has been given within this thesis where reference has been made to the creation of others.

NAME:

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DATE:

DEDICATION

I greatly dedicate this work to my supervisor Dr Kigozi Moses who has supported me throughout the process. I will always appreciate all his tiresome efforts towards achieving this output through his guidance that helped me develop my creative, technological, innovational and cognitive skills.

I take this opportunity to dedicate this work to my two beloved brothers **Kassim Rajab** and **Saidi Rajab** who filled my mind with quality concept of citrus fruits in our community, positive attitude and all kinds of effort that I required to achieve my goals in this course.

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ABSTRACT

Humans are one of the known species lacking the enzyme (L- gluconolactone oxidase, GLO) to convert glucose to vitamin C hence causing low levels of vitamin C in their bodies. These, later on, cause several deficiencies in the body such as scurvy, vision loss, weak immunity, being tired and cranky, dry and wrinkled skin, weight gain, bleeding gums, nose bleed, bruises, slow wound healing. However, there are high rates of cases that are caused due to deficiency of ascorbic acid in the human body across the world.(Rowe & Carr, 2008) The daily requirement of ascorbic acid in the body is set at about 100 mg. Citrus fruit extracts are also found to have antioxidant, anti-inflammatory, anti-tumour, anti-fungal, and blood clot inhibition activities. The overall review focuses on vitamin C deficiencies in human bodies, its sources, methods of extracting the ascorbic acid from various fruits, methods used to determine the concentration of vitamin C in different citrus fruits and crystallise ascorbic acid with high concentration. Several techniques that assess the vitamin C concentration are discussed which include; UV-Vis, spectrophotometry, electrophoresis, titration, and high-performance liquid chromatography (HPLC)(Gazdik et al., 2008). The nature and concentration of the organic acids in fruits are of interest because of their significant influence on the fruit juices' organoleptic properties and stability. This study compares vitamin C content and concentration of citrus fruits (oranges and lemons).(Nojavan et al., 2008)

Keywords: *Vitamin C status; hypovitaminosis C; vitamin C deficiency; dietary intake; Citrus fruit.*

1.0 INTRODUCTION

1.1. BACKGROUND

Vitamin C is an organic compound that consists of carbon, hydrogen, and oxygen. Vitamin C is used for ascorbic acids, but it includes all compounds exhibiting biological activity, such as oxidised, ester, and synthetic forms. The main natural form of vitamin C is L-ascorbic acid, and it can reversibly change to an oxidised form called dehydroascorbic acid. Dietary sources of vitamin C include citrus fruits, tomatoes, potatoes, broccoli, strawberries, and sweet peppers. Vitamin C is essential in cellular metabolism for the maintenance of oxidation-reduction balance. Vitamin C is an essential nutrient that must be obtained through the diet in adequate amounts to prevent hypovitaminosis C, deficiency, and its consequences, including the potentially fatal deficiency disease scurvy. (Reactions, 2019)

Vitamin C = Ascorbic Acid

Empirical formula: $C_6H_8O_6$

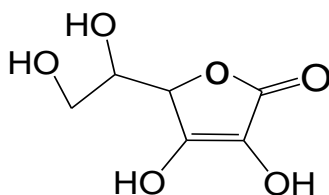


Figure 1.0 Showing the structure of vitamin C(Reactions, 2019)

Molecular weight: 176.1

Melting point: about 190 °C (with decomposition)

Appearance: Vitamin C appears white to slightly yellowish crystalline powder, practically odourless, and has a strong acidic taste.

Global vitamin C status and prevalence of deficiency have not previously been reported, despite vitamin C's pleiotropic roles in non-communicable and communicable diseases; hence Vitamin C is one of the essential vitamins for human and animal health. Vitamin C body pool maintenance

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