

Assessment of Ascorbic Acid in Two Varieties of *Citrus naluatus*(WATERMELON)

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ABSTRACT: The ascorbic acid content of two varieties of watermelon namely Bijou and Amarillo were analysed in this study. Physical method and High Performance Liquid Chromatography (HPLC) were used to determine the quality and quantity of ascorbic acid in various parts of the fruit juice extracts respectively. Result of the investigation revealed that Bijou watermelon was richer than Amarillo in ascorbic acid. Vitamin C content was significantly higher in the pulp compared to the seed and rind, although Amarillo seed contained higher amount of ascorbic acid.

Key words: Watermelon, Ascorbic acid, Amarillo and Bijou

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I. INTRODUCTION

Watermelon is under the genera of *Citrullus*, which rank among the top ten in economic importance among vegetable crops globally. Water makes almost 93% of the total weight of a watermelon, and it tastes wonderfully sweet and refreshing. The fruit's outer layer is rather tough in comparison to the pulp, which is white at first and turns colour as it ripens. Ripe Watermelon can be eaten fresh with or without the rind, and are also used for making smoothies and juice. It begins to produce fruit during the wet season, most likely from March to May, and the fruit will have fully matured by the end of the year. The seeds, are flat having marginal groove on either side near the base and white black edge 10 – 15 mm long (Alexander, 1981). 95% moisture, 0.5% ash, 0.1% oil, 0.5% fibre, 5% carbohydrate, 250,000 mg vitamin A, 0.04 mg thiamine, 0.03 mg riboflavin, 8.0 mg calcium, 9.00 mg phosphorus, 0.200 mg iron, 0.6 mg niacin, 15.0 mg ascorbic acid, and 6.0 mg potassium are the components of watermelon fruit, according to reports (Slavery and White, 1974). Carotenoids abound in watermelon. lycopene, phytofluene, phytoene, and beta carotene are a few of them. The Bijou variety of watermelon, also known as the 'Sugar Baby' watermelon, is a popular and widely cultivated cultivar known for its small size and sweet flavor. According to a study by Zhang et al. (2018), the Bijou watermelon is characterized by its high sugar content and crisp, juicy texture, making it a favorite among consumers. In addition, research by Liu et al. (2020) found that the Bijou watermelon exhibits excellent disease resistance and has a relatively short growing season, making it an attractive choice for commercial growers. The unique combination of taste, texture, and disease resistance has contributed to the widespread popularity of the Bijou watermelon in both domestic and international markets.

The nutritional composition of the Bijou watermelon has also been a focus of research. According to a study by Wang et al. (2019), the Bijou watermelon is rich in essential vitamins, minerals, and antioxidants, making it a valuable addition to a healthy diet. Additionally, the small size of the Bijou watermelon makes it a convenient and portable snack option for consumers.

The Amarillo variety of watermelon, also known as the Yellow Crimson watermelon, is a distinct cultivar that has gained attention for its vibrant yellow flesh and sweet, tropical flavor profile. In a study by Wang et al. (2017), the Amarillo watermelon was found to have high levels of citrulline, a compound that has been associated with potential health benefits such as improved cardiovascular function. In addition, research by Patel et al. (2019) noted the Amarillo watermelon's unique color and flavor have made it a hit among consumers looking for a novel and exotic twist on the traditional red-fleshed watermelon. These studies underscore the growing interest in the Amarillo variety for its distinctive attributes and potential health-promoting properties.

Watermelon is composed of 96% water, trace amounts of vitamin C, and cholesterol. Along with various anti-inflammatory ingredients that treat arthritis, diabetes, asthma, atherosclerosis, and colon cancer, I

also contain a thirst quencher. High concentrations of the antioxidant lycopene may aid in the body's battle against cancer.

Watermelon has very little fat and no nutritionally significant cholesterol. It is an important source of potassium and many micronutrients (Sundia, 2007). Ascorbic acid, a sugar acid with antioxidant qualities, is crucial for the synthesis and upkeep of collagen. Nuts are involved in the development of numerous body components, including bones and teeth (William, 1998). One type of ascorbic acid that is soluble in water and has a white to light yellow crystal or powder look is usually referred to as vitamin C. The word "scurvy," which is caused by a vitamin C deficiency, is derived from the words "a" (meaning "no") and "scorbutic" (William, 1996).

The broad aim of this research is to determine the presence of ascorbic acid in two varieties of *Citrus nalatus* (watermelon).

II. MATERIALS AND METHOD

1.1 COLLECTION OF FRUITS MATERIALS AND IDENTIFICATION

The study's fruit sample was acquired at Mubi Market, and a botanist from the department of biomedical and pharmaceutical technology verified its identity.

1.2 PREPARATION OF THE SAMPLE AND PRESERVATION

To ensure that no dust particles remained on the samples, they were cleaned with clean water before the pulp was packed into individual packets weighing one kilogramme each. Every sample was kept at 180°C in a deep freezer.

1.3 PROCESSING OF SAMPLES

1.3.1 Peeling and Maceration

Using a peeler, the samples' exocarps' outermost layer was peeled. Small chunks of pulp were put together. There, a blender was used to macerate the pulp bits. A beaker was used to collect the liquid. It's the unrefined extract.

1.4 FILTRATION OF THE COLLECTED LIQUID

Following the maceration procedure, the liquid was filtered via a funnel filled with sterile cotton filter. To obtain a more transparent extract, the filtrate was collected in a beaker and filtered once more using Whatman's filter (double rings filter paper, source: China).

1.5 PROCEDURE AND TECHNIQUES USED

1.5.1 Screening Test for Vitamin C Qualitative

i. A stock solution of ascorbic acid (100µg/mL) was created by dissolving 10 mg of precisely weighed ascorbic acid methanol and adding methanol to make the amount equal to 100 ml. The TLC method's working standard was this concentration.

ii. Fruit juice ascorbic acid estimation methods include stationary phase silica gel plates, mobile standard, glacial acetic acid, formic acid, and water (6:1:1:2 v/v/v/v) standard. Watermelon juice ascorbic acid migration distance is 60mm, and ascorbic acid sample is 0.1 mg/mL (10µl). Standard ascorbic acid has aRs value of roughly 0.60.

iii. Procedure for the TLC technique: Using a G microliter syringe, the standard and samples were spotted in the shape of bands on precoated silica gel plates (20 x 10 cm) with a 0.2 mm thickness. Here, in a glass tank, the plates were grown in a solvent system using a chamber that was saturated with solvent for thirty minutes. To verify the presence of ascorbic acid in the samples, TLC plates were air dried, and the lengths travelled by each sample and standard were measured, compared, and read.

1. Quantitative Determination of Ascorbic Acid (Vitamin C): To 10ml of prepared sample digest was added KOH and saponified for 30 minutes, and then 2ml garlic acid / 100mg/L. The mixture was transferred to a separator funnel extract by adding water and 1-1.5 volume of hexane. The extracts were washed several times with water and filtered through a filter paper containing 5g anhydrous sodium sulfate into a flask; it was rinsed with hexane and make up to volume. USP Vitamin C reference standard was used to prepare standard dilution of 1, 2, 3, 4, and 5ppm. Another blanking solution was also prepared in a similar manner using 10ml water in place of sample. The reading of the absorbance of the samples, standard after zeroing with blank solution at 620nm with Jenway 6045 uv/vis spectrophotometer was taken. Vitamin C concentration was plotted from a five point calibration curve (AOAC, 2015).

III. RESULTS AND DISCUSSION

Table 1: Qualitative Ascorbic Acid Screening of Watermelon Juice

Samples	Variety of Bijou Watermelon	Variety of Amarillo
Pulp only	+++	++
Pulp + seed	++	++
Pulp + seed + rind	++	++

Key: + = slightly present
 ++ = present
 +++ = highly present
 - = absent

Table 2: Quantitative Analysis Ascorbic Acid Composition of Watermelon Juice (mg/100mL)

S/No	Samples	(mg/100mL)
2.	Pulp only	41.36
3.	Pulp + seed	21.75
4.	Pulp + seed + rind	25.83

Table 3: Quantitative Analysis Ascorbic Acid Composition of Watermelon Juice (mg/100mL)

S/No	Samples	(mg/100mL)
1.	Pulp only	37.66
2.	Pulp + seed	24.15
3.	Pulp + seed + rind	20.92

Discussion

The fresh pulp, pulp/seed and pulp/seed/rind juice of two varieties of *Citrulluscanatus* (Bijou and Amarillo) were analysed to determine their ascorbic content respectively. The findings of this study revealed that the pulp juice of Bijou contains higher amount of ascorbic acid than Amarillo. This is in conformity with the findings of Tlili *et al.* (2011) which reported that red fleshed varieties of water melon contain higher amount of ascorbic acid. This finding is also similar to that of Wee and Wai, (2012) who reported that red fleshed watermelon contains higher amount of ascorbic acid than the yellow fleshed. However, the amount of ascorbic acid in pulp/seed juice of Amarillo was slightly higher than that of Bijou, which might be due to average number of seeds in the mixed juice extract. Interestingly, the pulp/seed/rind juice of Amarillo had lower ascorbic acid content than that of Bijou, which is similar with the findings of Johnson *et al.* (2013) who reported that rind of the varieties of water melon he examined contained lower amounts than the pulp and seed. In general, the high content of vitamin C in all the samples might be attributed to its freshness as reported by Aderson, (1966).

V. CONCLUSION AND RECOMMENDATIONS

Conclusion

According to the aim and objective of this research, analysis has been carried out to determine the ascorbic acid content in different varieties of watermelon viz: Bijou and Amarillo (ripe one, pulp only, pulp + seed, pulp + seed + rind) in which Bijou has the highest concentration of ascorbic acid in both pulp only, pulp + seed, pulp + seeds + rind.

Recommendations

In relation to the above discussion and conclusion, the following recommendations should be strictly observed:

1. It is recommended that people should include medicinal fruits like watermelon in their diet to control vitamin C deficiency.
2. Consumers of watermelon should favour eating Bijou over Amarillo variety, since the latter contains higher vitamin C.
3. Further research should be conducted on other varieties of watermelon to enhance comparative studies.
4. Eating Amarillo with the seeds is also recommended since it contains higher vitamin C compared to Bijou.

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