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Exploring Potassium in Tomatoes and Cucumis Melo through Atomic Absorption Spectroscopy: A Scientific Insight

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Abstract

Objective: Among the numerous plant mineral supplements, potassium (K) projects as a cation showing the most grounded impact on quality properties that discourage- mine natural product attractiveness, customer inclination, and the concentration of fundamentally imperative human-health related phytonutrients. Be that as it may, numerous plant, soil, and natural variables frequently restrain satisfactory take-up of K from the soil in adequate sums to fulfill natural product K necessities amid advancement to optimize the previously mentioned quality traits.

Methods: In this study, the atomic absorption method was used to check the total amount of potassium in tomatoes and melons. First, the plant sample was collected in spring (2021-2022) in Ilam city and dried in the shade, then it was prepared and the amount of potassium was measured by an atomic absorption device.

Results: The results showed that the amount of potassium in tomatoes and Cucumis melo were about 330 and 352 mg/100gr, respectively.

Conclusion: Atomic Absorption Spectroscopy opens a scientific window into the potassium content of tomatoes and Cucumis melo, offering precise measurements and valuable insights. By bridging the gap between scientific analysis and nutritional awareness, this exploration enhances our appreciation for tomatoes and Cucumis melo not only a culinary delight but also a rich source of essential minerals.

Introduction

Natural products and vegetables constitute an imperative portion of human count calories since they contain carbohydrates, proteins, vitamins, minerals and follow components [1]. Within the later a long time, due to expanded mindfulness on the nourishment esteem of natural products and vegetables, their utilization is continuously expanding, especially among the urban community. In spite of the fact that natural products and vegetables contain both basic as well as non-essential components, however among these a few overwhelming metals such as: lead, cadmium, mercury, zinc and nickel are total harm posturing a around

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the world danger [2]. The sum of contaminating harmful overwhelming metals, with dynamic industrialization, is presently expanding at a disturbing rate. The presence of overwhelming metals within the environment decreases biomass, bacterial development and differences. Harmful overwhelming metals can disturb ordinary physiological capacities of human body by uprooting the fundamental metal particles, altering the compliance of proteins and blocking the dynamic locales of chemicals [3]. Over certain limits, these metals can too cause cardiovascular, apprehensive, kidney and bone infections [4].

Cucumis melo (Melon) might be a portion of the family Cucurbitaceae. Melon seeds are a dietary source of unsaturated vegetable oil and protein and may be carefully broiled and eaten like nuts [5].

Tomato (*Lycopersicum esculentum L.*) is among the major vegetable crops on around the world scale [6]. Tomatoes, also harbor a wealth of essential nutrients [7]. Ready tomatoes contain (normal values per 100 g of consumable parcel) water (94.1%), vitality (23 calories), calcium (1.0 g), magnesium (7.0 mg), vitamin A, ascorbic corrosive (22 mg), thiamin (0.09 mg), riboflavin (0.03 mg), and niacin (0.8 mg) [8].

Potassium (K) is one of the preeminent in-demand cationic minerals for vegetative improvement [9], and it is closely related to characteristic item yield and quality [10]. On the one hand, K progresses the transportation and alter of sucrose in plants and moves forward the productivity of sugar transportation inside the phloem [11, 12].

Considering that tomatoes and melons are highly consumed foods in Ilam, the purpose of this study is to measure the concentration of potassium in local tomatoes and melons in Ilam.

Materials and Methods

This article delves into the scientific analysis of potassium in tomatoes and melons (Ilam, spring 2021-2022), specifically employing the precise technique of Atomic Absorption Spectroscopy. Atomic Absorption Spectroscopy could be a capable explanatory procedure utilized to decide the concentration of components in a test. Within the case of tomatoes, AAS gives a exact strategy for measuring potassium levels.

Sample Preparation: Transforming Tomatoes and cucumis melo into Analytical Samples:

Before analysis, Tomatoes and cucumis melo must undergo meticulous preparation. This involves homogenizing the sample to ensure a representative composition for accurate potassium measurement [13].

Atomic Absorption Spectroscopy in Action: Determining Potassium Levels:

AAS involves exposing the tomato sample to light at a specific wavelength that corresponds to potassium absorption. The intensity of absorbed light allows for the quantification of potassium concentration, providing a detailed understanding of this essential mineral in tomatoes.

Variability Across Tomato Varieties: Insights from Atomic Absorption Spectroscopy (AAS)

Different tomato varieties may exhibit variations in their potassium content. AAS allows researchers to compare and contrast the potassium levels in diverse tomato cultivars, contributing to a more nuanced understanding of the nutritional composition.

Environmental Factors Impacting Potassium Absorption

AAS enables scientists to investigate how environmental factors, such as soil composition and cultivation practices, influence the potassium content in tomatoes. This insight is crucial for optimizing agricultural practices to enhance potassium levels in tomatoes.

Health Implications: Connecting AAS Results to Nutritional Benefits

By correlating AAS data with established nutritional guidelines, researchers can elucidate the health implications of varying potassium concentrations in tomatoes. This information aids in promoting the consumption of tomatoes for optimal health benefits.

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Beyond Potassium: AAS and Multielement Analysis

AAS is not limited to potassium analysis alone. Researchers can extend their investigations to explore the presence of other elements in tomatoes, providing a comprehensive profile of the nutritional composition.

Future Directions: Advancements in Analytical Techniques:

As technology evolves, so do analytical techniques. The article explores potential advancements in analytical methods, such as the integration of spectroscopic methods, to further refine our understanding of potassium and other elements in tomatoes.

Statistical analysis

Information extricated utilizing computer program Analyzed by SPSS 21. As a critical level, ($P < 0.05$) were taken. The comes about of 3 reiterations were analyzed by ANOVA by utilizing SPSS insights parcel programming.

Results

Ilam is bordered by Iraq and near to the nations of Saudi Arabia and Kuwait, which are the most sources of tidy occasions within the Center East. According to Table 1, Potassium in tomato and Cucumis melo were about 330 and 352 mg /100gr, respectively. Potassium was measured in all samples. Table 1 shows the range and means values of concentrations (ng/m3) for the selected heavy metals analyzed at sampling stations.

Table 1. *Total amount of potassium (mg) in tomatoes and cucumis melo*

Potassium in tomato/100gr	Potassium in Cucumis melo/100gr
330	352
336	362
326	349

Discussion

Tomatoes are a good source of potassium. A medium-sized tomato contains around 290-400 mg of potassium, depending on its size and variety. Potassium is an basic mineral that plays a key part in directing blood weight, muscle work, and electrolyte adjust [14].

Melons, including cantaloupe and honeydew, are also a good source of potassium. A typical serving of melon, such as one cup diced, contains approximately 300-400 mg of potassium. This mineral is crucial for various bodily functions, including nerve transmission and muscle contractions [15].

It has been shown that there is no need to apply higher rates of potassium in terms of total melon yield. However, the results show that fruit quality can be improved by applying 600 mg/L additional potassium to plants without reducing yield [16]. In this study, melons have 352 mg/kg potassium. Also, the results have shown that the optimal dose of potassium in melon is more than 11 mM [17]. It has been shown that A cup of tomato juice contains 534 milligrams of potassium [18]. In this study tomatoes showed 330 mg/kg potassium.

Conclusion

Atomic Absorption Spectroscopy opens a scientific window into the potassium content of tomatoes, offering precise measurements and valuable insights. By bridging the gap between scientific analysis and nutritional awareness, this exploration enhances our appreciation for tomatoes as not only a culinary delight but also a rich source of essential minerals.

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Conflict of interest

The authors declare that they have no conflicts of interest.

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