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Characterization of Guayaba Paujiza (*Eugenia cf. cribrata Mcvaugh*), Native Fruit of the Colombian Orinoquia

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Abstract

In this study, some physicochemical characteristics of Guayaba Paujiza, Paujia Guava or Guayabo Pauji (*Eugenia cf. cribrata McVaugh*) fruit pulp, collected in Arauca, Colombia were determined. Soluble solids, pH, titratable acidity, humidity, total ash, total fat and proteins, were determined with the Official AOAC Methods (932.12, 981.12, 942.15, 20.013, 923.03, 963.15 and 990.03 respectively). A yield for pulp fruit of 68% was found; and a contribution of 7.49% protein, 4.03% fat and 3.15% ash. The pulp of this fruit can be used to make jams, jellies, juices and many products, based on its contribution of carbohydrates and its acid-fruity flavor.

Keywords: *Physicochemical Characterization; Paujiza Guayaba; Colombian Orinoquia*

Introduction

E. cibrata was registered for the first time in Venezuela, but its origin is not well understood. In 1969, McVaugh described it for the first time. In the Amazon region, the local population uses the pulp of the fruit, alone and in mixtures with other fruits, in the preparation of juices, pasta, and jellies. In Brazil, this fruit is reported between 1,034 species and 23 genera [1]. Currently, the presence of this plant has been reported in Venezuela [2,3], Brazil [1] and Colombia, but there is little information on this particular fruit.

This fruit is popularly known as Paujia Guava (PG), Paujiza Guava or Guayabo Pauji and is commonly confused with the Camu Camu (*Myrciaria dubia*), the Pitanga (*Eugenia uniflora*), and the "Water Apple" (*Syzygium malaccense*). In fact, the fruit under study differs from that reported by Diniz., *et al*. [1], because they report green coloration and smooth texture, but the *Eugenia cibrata* fruits presented in this study are red and yellow and have a smooth and rough texture. It is mainly acidic and has an intense acid-fruity flavor.

According to Diniz., *et al*. [1], G. Paujia can present a composition of 80% in moisture, 1% in protein, 0.5% in fat, 13% in carbohydrates and 5.5% in fiber, with a calorie intake between 30 and 40 kcal per 100 mg. This fruit contains more than twice as much vitamin C than orange. Depending on the variety and the ripeness of the fruit, the vitamin C content can vary between 55.04 mg and 99.34 mg of Ascorbic Acid per 100g of fresh G. Paujia fruits; a nutrient that gives it a significant antioxidant property. It also contains vitamin A, iron, calcium and phosphorus. It has a high content of carotenoids, the concentration of which is higher in the shell [1].

Regarding the content of vitamin C, the Paujia guava is found with values comparable to other varieties of guava, how it is shown below (Table 1).

Paujia g. [1] *(E. cibrata)* unripe fruit	Paujia g. [1] *(E. cibrata)* maturity fruit	White g. [4] (*Psidium g.*)	Red g. [5] (*Psidium g.*)	"Paluma" g. [6] (*Psidium g.*)
99.34	77.05	76.80	80.60	110.00

Table 1: *Ascorbic acid content in different varieties of guava (mg of ascorbic acid per 100g of fruit pulp).*

The high consumption of ultra-processed foods, the low consumption of fruits and vegetables and the low level of physical activity, among others, have been widely classified as risk factors associated with the development of cardiovascular diseases, cancer and diabetes; to such an extent that these diseases are among the main causes of death for human beings [7].

The characterization of tropical and autochthonous fruits of the Colombian Orinoquia region, such as G. Paujiza, has the objective of evaluating the functional potential (e.g. antioxidant), based on the determination of the chemical composition. The above, could contribute to the inclusion of this typical fruit in a balanced and healthy diet, simultaneously promoting demand in the market, boosting the regional economy, based on the sustainable use of biodiversity.

Materials and Methods

Guayaba paujiza or guayabo pauji (*Eugenia cf. cribrata McVaugh*)

The Guayaba Paujiza is a tree belonging to the Myrtaceae family, which is distributed in the Orinoquia region between Colombia and Venezuela [2]. This tree was registered for the first time in 1969, by Rogers Mc Vaugh, with a botanical sample from Bolivar state, Venezuela and it was published in the Memoirs of the New York Botanical Garden, under No. 18 (2): 174.1969 [3].

This tree has a maximum height of 4m, has simple, intense green leaves, white and small flowers, and once a year (between March and June), it produces fruits 3 to 6 cm long, red-orange and yellow, and rough and smooth textures (See figure 1).

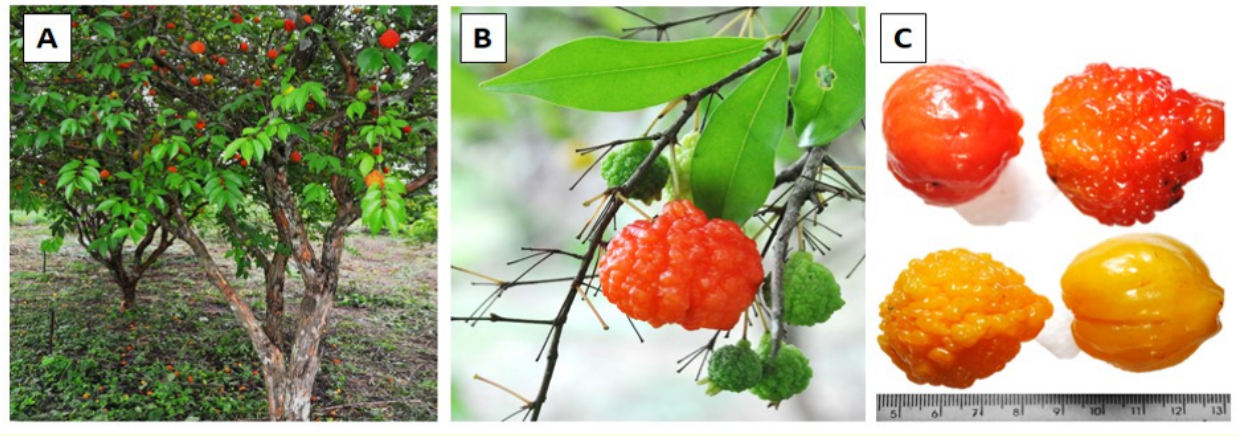

Figure 1*: Tree (A), immature fruits (green color) and ripe fruit (red color) (B) and the different expressions of the fruit in terms of color and pericarp texture (all in full maturity) (C) of the Guava Paujiza (Eugenia cf. cribrata McVaugh).*

On April 25, 2018, ripe fruits were collected from *E. cribata* plants, located at the "El Cairo" Farm, Arauca municipality, Arauca (Universidad Nacional de Colombia - sede Orinoquia), km 9 via Arauca -Caño Limón (Latitude: 07° 00'39.4''N; Longitude: 70° 44'33.1" W; 126 masl).

This plant apparently has a special breadth in terms of the genetic expressions of the color and texture of the pericarp of the fruit, since from the same mother plant or direct progenitor, diversity of characteristics in the fruits of the same daughter plant are obtained (for example: rough red, smooth red, rough yellow or smooth yellow fruits, see figure 1C). The flavor of the fruit's mesocarp is acidic and fruity.

Obtaining the fruit pulp: The fruits were collected in their full state of maturity, they were washed with abundant water, they were immersed 30 seconds in water at 100°C. Then, by removing the peel and seeds manually, the pulp was obtained. The fruit pulp was homogenized in a commercial blender and the final mixture was kept frozen at -14°C.

Physicochemical composition: All determinations were made in duplicate according to the official AOAC methods. Were determinate soluble solids (°Bx), in accordance with the official AOAC 932.125 method [8], pH through the AOAC 981.126 official method [9], Titratable Acidity in accordance with the AOAC official method 942.157.8 [10], Moisture by the AOAC official method 20.0139 [11], Ashes according to the AOAC official method 923.0310 [12], Fats through official method Soxhlet AOAC 963.1511 [13], Proteins by the official method Kjheldhal AOAC 990.0312 [14], Carbohydrates were determined by the sum of the content of Total Reducing Sugars (ART), Digestible Starches (AD) and Total Dietary Fiber (TDF).

Results

In the table 2, it is showed the physicochemical characteristics of Guayaba Pajuiza fruit pulp. The yield found for the fruit pulp was 68%. pH and soluble solids corresponds to reported by Diniz., *et al* [1]. The protein, fat and ashes, found in this fruit were 7.49%, 4.03% and 3.15% respectively.

Chemical characteristic	Value (average ± SD)		
	***Eugenia Cibrata* (present study)**	***Eugenia cibrata* [1]**	***Psidium guajaba* [15]**
pH	2.86 ± 0.01	2.38	4.7
Soluble solids (°Bx)	3.97 ± 0.07	3.7	10.2
Titratable acidity (%Citric acid)	1.71 ± 0.07	3.38	NR
Moisture content (%)	93.55 ± 1.11	NR	81.1
Total ashes (%)	3.15 ± 0.04	NR	0.6
Total fat (%)	4.03 ± 0.27	NR	2.6
Protein (%)	7.49 ± 0.13	NR	4.5
Carbohydrate (%)	85.33 ± 0.18	NR	NR

Table 2: *Physicochemical characteristics of guayaba paujiza fruit pulp.*
NR: Not Reported.

Discussion and Conclusion

Based on the nutritional composition (content of carbohydrates, soluble solids and acidity), the pulp of this fruit has gastronomic potential and functional properties associated with the development of new food products. It could be used in the preparation of jams, jellies, juices, among others, which would give a new approach to the local gastronomy.

The cultivation of native and exotic tropical fruits with nutritional potential could boost the regional economy. These species are adapted to regional eco-physiological conditions, which is an advantage in primary production. In turn, the processing of food products, would contribute to the development of the secondary sector of the local economy, based on sustainable use.

More studies are needed to evaluate all the physicochemical characteristics, content of phenolic and bioactive compounds and functional properties of this fruit, because there is very little information about it. This could be the starting point to develop the potential of this fruit.

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