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Physical and physico-chemical characterization of pequi from of the region of Sete Lagoas, MG.

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Abstract. The Pequizeiro is a species that belongs to the Brazilian cerrado. Its fruits are the drupácea composed of: epicarpio of greenish color, mesocarpio corosa eternal whitish, and to compose what is known as pyrene, fleshy inner mesocarp, rich in oil, yellow or orange, with stone core covered with thorns that covers A rich whitish brown in oils, as well as the inner mesocarp is edible. The objective of this work was to characterize the physical parameters (fruit weight, volume, percentage sphericity and yield of pulp and nuts) and physicochemical parameters (pH, titratable acidity and total soluble solids) of the region of Sete Lagoas, in Minas Gerais The matrix presents fruits with better desirable characteristics, the processing of these fruits, the mother was 14. Taking into account the percentage of yield of the pulp and brown, the matrix showed higher values for this parameter is the matrix 17. The parameters Physicochemistry did not vary significantly among the studied matrices.
Keywords: *Caryocar brasiliense*, biometrics, physicochemical characteristic, cerrado

Introduction

The cerrado is one of the main biomes that belong to the Brazilian territory with an area of about two million km^2, occupying most of the Northeast, Midwest and Southeast regions. The climatic characteristics of this biome do not differ from other regions of savannah in the world: the precipitation of about 800-2000 mm in the dry season (April-September), the annual temperature oscillates between 18 and 28 ° C and low pH of (Coutinho, 2002; Morais et al, 2016; Ferreira et al, 2016; Rodrigues, 2016). The low humidity, high temperatures, the scarcity of precipitation and, consequently, frequent natural fires throughout the year are key factors to define a profile of the vegetation of this biome (Ratter et al., 1997). Among these species present in this biome is the pequizeiro (*Caryocar brasiliense* Camb).

The pequizariro belongs to the family Caryocaraceae the size of the tree can vary from 8-12 m high (Camargo et al., 2014). The fruits of pequizeiro consist of an epicarpio of greenish color, coloring external mesocarpio choreaceous that go from the yellowish and whitish tones. In the center of the fruit seed, also known as pyrene or putamen, a meaty with internal nucleus (that corresponds to the pulp), rich in oil, yellow or orange, a stony endocarp covered with core and covered with thorns, which Is a characteristic of the caryocaracean family, and a rich whitish-brown color in oil (Damiani, 2006; Oliveira et al, 2008; Rodrigues et al, 2016).

Little is little explored in Minas Gerais, focusing on the north, northwest and west, widely used as a source of food, being a source of lipids, proteins, vitamins, vitamins A and C, and minerals (Boas et al. 2013, Rodrigues et al, 2016). By allowing different products in different branches of industry, such as food production, medicines, cosmetics and energy resources, generating a large number of jobs in these regions thus adding a cultural importance and causing a large socio-economic impact on the Operating characteristic regions due to the generation of jobs. According to Santos et al. (2013), approximately 18% of the family income of rural workers in the north of Minas Gerais.

The aim of this study was to identify the best characteristics of pequi fruit (*Caryocar brasiliense*) from the region of Sete Lagoas, with a view to the

industrial interests of efficiency, storage and adaptation to industrial processes.

Methods

The fruits analyzed in the study were collected from 19 (nineteen) and the adult headquarters located in the region of Sete Lagoas, Minas Gerais. From each matrix twenty (20) of ripe fruit were collected at random. The fruits were sent to the chemistry laboratory of the Federal University of *campus* of Sao Joao del Rei Sete Lagoas, where they were cleaned and disinfected with water and a sodium hypochlorite solution, in which it is immersed for 10 minutes.

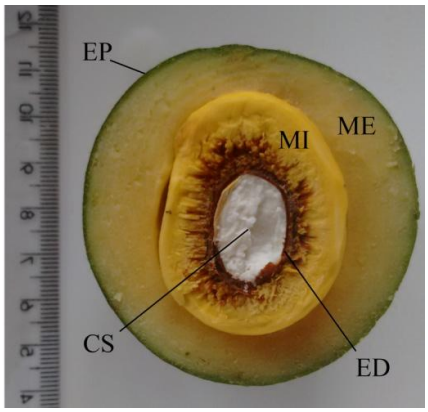


Figura 1. Pequi cut transversally (epicarp "EP", ME" external mesocarp, "MI" internal mesocarp, "ED" without heart "CS" chestnut)

After sterilization, thefts were weighed and measured for the biometric characteristics of the fruit. The measurements followed a three-dimensional model used by mediation Goneli, et al. (2011), that the calculation of the volume (formula 1) and the percentage sphericity (formula 2) of the fruit could be made through the expressions:

$$V = \frac{\pi(abc)}{6}$$

equation (1)

$$E = \left[\frac{(abc)^{1/3}}{a}\right] 100$$

equation (2)

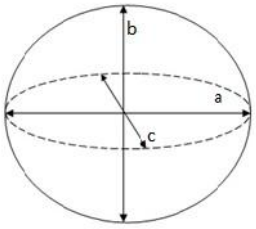


Figura 2 Three-dimensional measurement model used ("a" length, "b" height, "c" width)

The fruits were then opened using a stainless steel foil previously immersed in a solution of vitamin C to prevent oxidation of the pulp. The number of pyrenes contained in each fruit was recorded. The pyrenes of each fruit were then weighed and measured according to the measurement model used previously for the fruits.

They were separated into ten (10) random pyrenes, from each matrix, and used in a pulp and brown analysis performance. For the yield of the paste the pyrenes were then weighed individually into the beakers for 30 minutes with a volume of water of 100 mL. After cooking, the fruit had to remove the pulp and remove the heart with the chestnut weighed again. The nuts were then removed and weighed to obtain the percent yield of the nuts.

Within the physical and chemical analysis of the pulp were evaluated three parameters of analysis in the study are: total titratable acidity (TTA), was determined by the volumetric method by titration with 0.2 N NaOH, and values were expressed in % (percentage) citric acid (IAL, 2005), pH and total soluble solids (° Brix), the reading of the soluble solids was performed by means of a portable of the brand Atago..

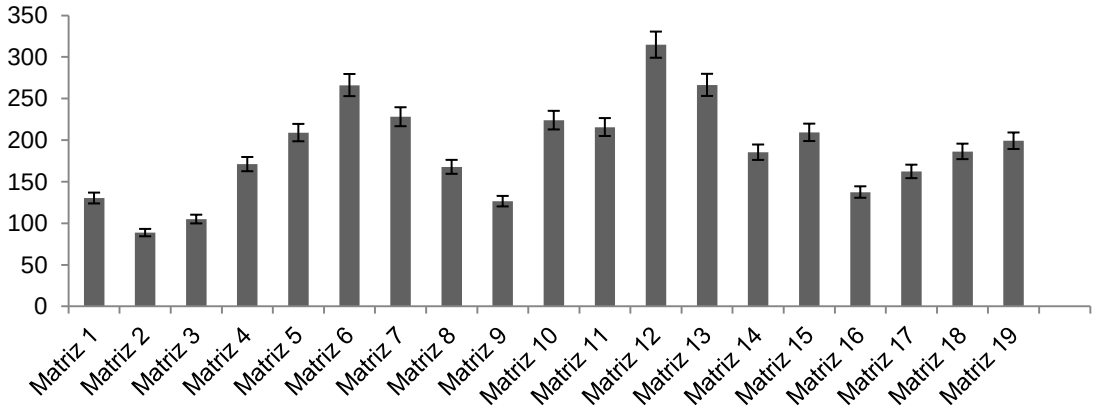
Results and discussion

The average fruit masses found in the micro region of Sete Lagoas, Minas Gerais, were 187.51 g remained within the pattern reported for the species by Silva et al. (1994). However, fruits were observed both upward and downward as described in the literature as in the case of 24: 2 plants, respectively, as shown in Figure 1. Rodrigues, et al. (2009) found an average weight of 119.26 g in the southern region of Minas Gerais. While Vera et al. (2007) found a fruit weight 103,55g in the region of Araguapaz (GO) and 177.93g in Manhaí (GO).

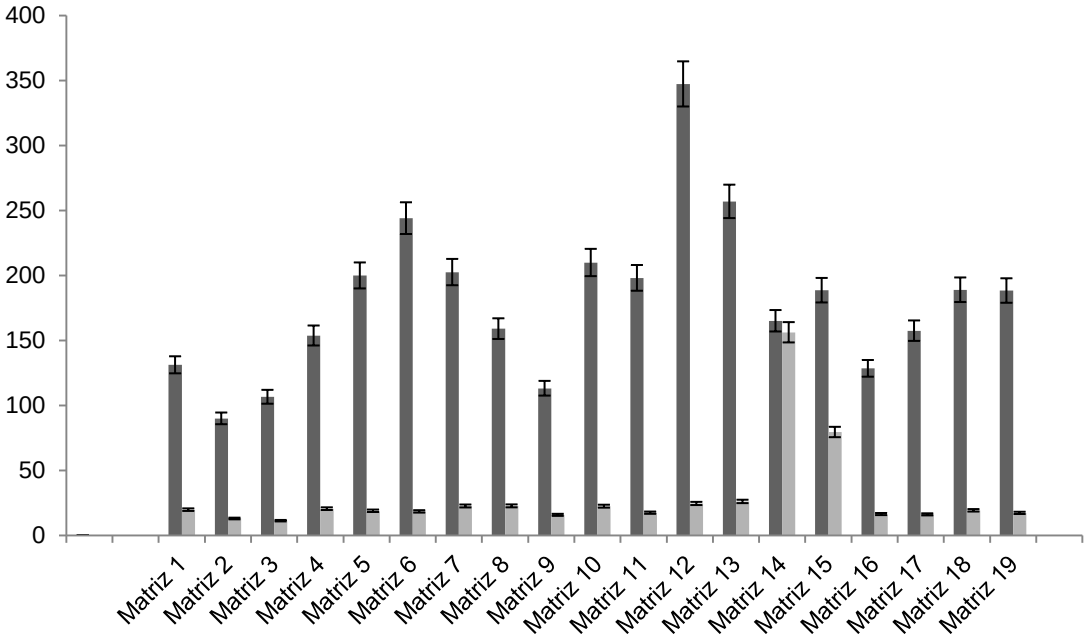
Of the total weight of the fruits found in this region (187.51 g), approximately 11% is the mass of each pyrene fruit, highlighting the fruits of plants 1 and 2 that have the highest percentages among the matrices studied and An average of 2.31 pyenes per fruit was found. This relationship between the pyrene mass and total fruit weight was also observed by Vera, et al. (2007), in the state of Goiás, and Lamb, et. Al. (2013) in the state of Mato Grosso.

Matrixes studied possessed the fruit with a volume ranging from 89.94 mL to 347.23 mL, with an average of 178.23 ml. Pyrenes have volumes ranging from 11.23 mL to 156.19 mL with a mean of 28.43 mL, it should be noted that volume and yield are not necessarily directly related. The fruits and pyenes analyzed showed higher volume compared to, found by Vera, et al. (2007) in the state of Goiás.

Graph 1. Mass (g) of *Caryocar brasiliensis* fruit of Sete Lagoas, MG region. Axis y (mass (g))



Graph 2. Volume of matrices of fruits and pyrenes the sample located in the region of Sete Lagoas, Minas Gerais. Y-axis (volume (mL)



As for the fruits and pyrenes format, all matrices present next sphericity percent sphericity percentage of the fruits analyzed by Vera, et al. (2007), with the exception of pyrenes present in the fruit of plant 15, which showed the most deformed pyrenes as shown in Graph 3.

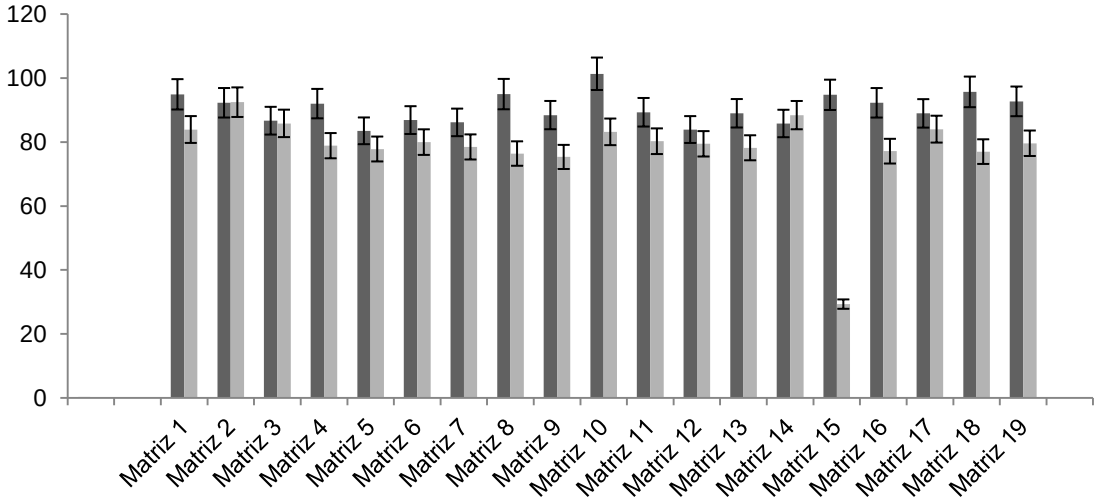
The average fruit yield of the pulp for the region was 14.47%, with respect to the total weight of the fruit, to separate the fruit from the 19 plant to the pulp of 27.3%. The ratio of pulp masses to fruit mass, the study was reported by close relationship Vera et al. (2007) and Nascimento and Cocozza (2015). Already the fruits described by Lamb et. al. (2013) carried out with a lower yield of fruit pulp coming from the region studied, with only 7.7 g per fruit pulp. The brown mass in the fruit mass was 2.37%, and the samples showed better plant samples were 17:05 4% and 3.22%, respectively. Fruits having a better mass ratio of the suspension mass and brown fruit were harvested 6, 5 and 15, respectively.

The pH is very important for the food industry dedicated to the transformation of fruits to be directly related to the retention of the volatile compounds in the product, directly influencing the olfactory characteristics (LIMA et al., 2015). The average pH found in the pulp of the studied region was 3.87. According to Brazil (2000) the pH of the

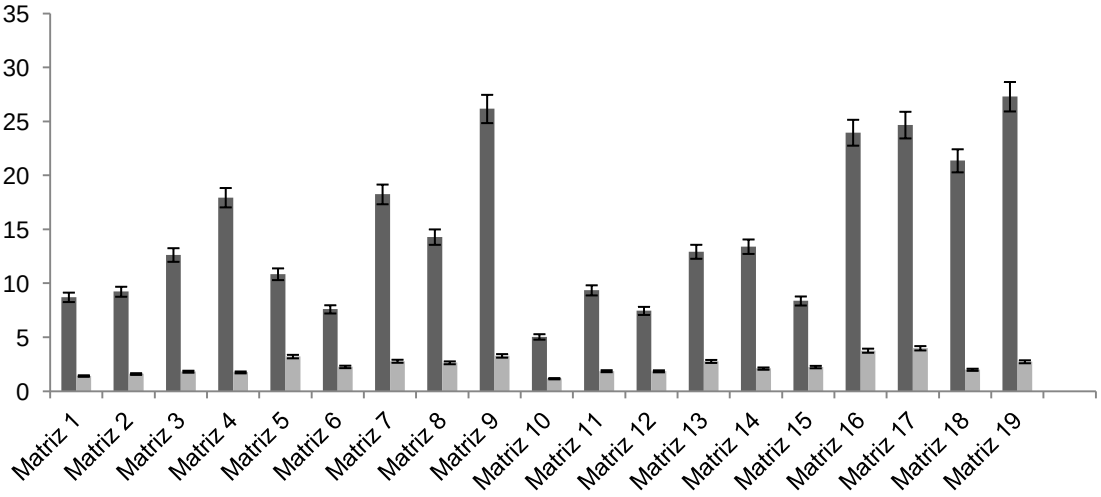
fruit pulp can vary from 2.2 to 4.6, it can be seen that all samples showed that the pH within the legal standard for its commercialization in Brazil. The pulp of the fruits of the study showed a lower pH in comparison with the fruits analyzed by Vera et al. (2007) in the state of Goiás by birth and Cocozza (2015) in the west of Bahia, and had its closest general means come fruits of Bahia.

Titratable total acidity (ATT) was used in this study to measure the content of organic acids in fruit pulp and processed fruit products (Lima et al., 2015). The presence of these acids is an indispensable factor for the preservation of foods that possess antioxidant, and acidic character assign to the taste of food. The total titratable acidity in the fruits of the region ranging from 0.83% to 1.16%, with an average of 0.33% per gram of pulp, similar values, but lower than the birth of the results and Cocozza (2015) in the analysis of fish in the west of Bahia.

Graph 3. Percentage sphericity of fruits and pyrenes of the region of Sete Lagoas, MG



Graph 4. Percentage ratio between pasta mass and nuts in relation to total weight of fruit harvested in the region of Sete Lagoas, MG



The °Brix gives us the sugar content present in the pulp, it is noteworthy that this measure does not provide exact data of the sugar concentration, since the samples are treated to a mixture of several substances (Lima et al., 2015). Among the samples analyzed, the dissolved sugar content, ranging from 13% to 6% with an average of 9.2%. Similar values of pequis from the west of Bahia (Nascimento and Cocozza, 2015)

Conclusion

Observing only the fruit formate, it can be said that the matrix presents fruits with better characteristics were the fruits of the plant of 14 due to the high proportion of sphericity percentage of

fruits and pyrenes and a relatively low volume compared to other matrices Which could lead to better suitability as some industrial processes, for example, pulping, desquamation and fruit storage.
Given the production of pulp and nuts in relation to the total weight of the fruit, the fruit matrix Provided with better characteristics was the plant 17, although it did not present the highest yield of pulp of percentage between the matrices of the sample, to condition of fruits with a greater relation between the yield of pulp and nuts. Thus, matrix 17 has a good potential for possible genetic improvements. The physico-chemical parameters remained close to the results found by researchers in other regions.

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