BIOACTIVE COMPOSITION OF PERSIMMON FRUITS (DIOSPYROS KAKI L.)

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Abstract

4 Fruit of great commercial expression, the persimmon fruits (*Diospyros kaki* L.) has been cultivated worldwide on a large scale. Numerous research has been conducted with the fruit to identify compounds with nutraceutical and functional properties that promote human health. The objective of the present work was to perform the bioactive composition of persimmon fruits in the "ripe" stage (red skin color) and in the ideal harvest point. Persimmon fruits were harvested from domestic backyard plants located in Miguel Pereira - RJ. For the bioactive composition of the fruits, the following analyzes were performed: ascorbic acid, total carotenoids, yellow flavonoids, total anthocyanins, total phenolics and DPPH. Data were submitted to descriptive statistical analysis, obtaining mean values and standard deviations of persimmon fruits. Analyzes were performed in triplicate. The fruits studied proved to be important sources of functional components, supported by the high values for phenolics (46.48 mg GAE/100 g) and DPPH (300.38 µmol TE/100 g), characterized in this way as a product of high added value aimed to the promotion of human health.

Keywords: Postharvest, functional quality, antioxidant capacity.

INTRODUCTION

5 Persimmon (*Diospyros kaki* L.) has stood out as a fruit of great commercial expression worldwide and the Asian continent accounts for about 91% of world production. Nowadays, China as the main producer, contributing about 77% of all global production (FAOSTAT, 2018). In Brazil the persimmon crop has been gaining space and economic importance, both for the planted area and for the increase of the production. The Southeast region is responsible for the largest production of persimmon fruits in the country, where the state of São Paulo is the largest producer, with direct participation of 65% of national production (IBGE, 2018).

6 Among the nearly 350 species of the genus *Diospyros* that produce edible fruits is persimmon (*Diospyros kaki* L.), which has been considered as the species of major commercial interest in fruit growing due mainly to the nutritional and functional quality

of its fruits (Zhao et al., 2011; Yaqub et al., 2016). Persimmon fruits can be described as ovoid, varying widely in color, shape and size. When ripe, the fruits have a red pulp and skin color, high pulp yield, and are well sweetened due to the higher soluble solids content found at this ripening stage.

7 Due to the utilization potential and nutraceutical and functional properties of persimmon fruits, several studies have been conducted to provide necessary and detailed information on the quantification of these nutritional and bioactive compounds. The fruit has a great use, especially when consumed in fresh form or when intended for agroindustrial processing. Recent studies indicate that persimmon fruit is rich in vitamins and substances which have nutraceutical and functional properties, and these compounds are directly responsible for the contribution of beneficial effects to human health and the reduction of risk and development of diseases.

8 Therefore, the objective of the present study was to evaluate the bioactive composition of persimmon fruits from Miguel Pereira, RJ. The characterization was carried out in fruits in the “ripe” stage and harvested at the ideal point of harvest, aiming to assure their potential use, consumption and aiming to destined for agroindustrial processing.

MATERIALS AND METHODS

9 Persimmon fruits were harvested from a domestic backyard, located in Miguel Pereira - RJ, at approximately 618 m altitude, presenting as geographic coordinates: 22°27′14′′ south latitude and 43°28′08′′ of west longitude of the Greenwich meridian. According to Köppen classification, the climate of this region is Cwa type, characterized as tropical altitude, with average rainfall of 1.610 mm, minimum and maximum temperature of 11.1 and 23.1ºC, respectively.

10 The fruits were harvested directly from the plant crown, taking as a harvest index the color of the ripe fruit (reddish rind), and 10 fruits from different plants were collected. Subsequently, the fruits were taken to the Analytical Laboratory of Food and Beverage at the Rural Federal University of Rio de Janeiro, located in Seropédica - RJ, where the analyzes were performed. To evaluate the bioactive composition of persimmon, peel removal and fruit pulping were performed. Then, the edible portion (pulp) was homogenized in a blender and filtered in a domestic juicer and from this the analyzes were performed.

11 The following persimmon compounds of persimmon fruits were evaluated: ascorbic acid by Dinesh et al. (2015) with modifications and the results expressed in mg/100 g; total carotenoids by methodology proposed by Higby (1962) and the results expressed in mg/100 g; yellow flavonoids and total anthocyanins according to Francis (1982) and results expressed in mg/100 g; total phenolics according to Swain & Hillis (1959) and results expressed in mg GAE/100 g and DPPH by Rufino et al. (2010) and the results expressed in μmol TE/100 g.

12 The results were submitted to descriptive statistical analysis, obtaining mean values and standard deviations of persimmon fruits. Analyzes were performed in triplicate.

RESULTS AND DISCUSSION

13 The bioactive composition of persimmon pulp is detailed in Table 1.

14 *Table 1 - Bioactive composition of persimmon pulp from Miguel Pereira - RJ.*

Bioactive compounds	*Values
Ascorbic acid (mg/100 g)	23.46±0.04
Total carotenoids (mg/100 g)	0.76±0.04
Yellow flavonoids (mg/100 g)	3.24±0.03
Total anthocyanins (mg/100 g)	0.94±0.01
Total phenolics (mg GAE/100 g)	46.48±0.02
DPPH (µmol TE/100 g)	300.38±0.02

*Mean values ± standard deviations from the mean of triplicate determinations.

15 The bioactive characterization of persimmon fruits evaluated in this study showed that the average values obtained were close to those found in researches related to persimmon species from different biomes (Chen et al., 2016; Yaqub et al., 2016; Rashwan et al., 2017). According to Topuz et al. (2005) the characterization of plant species based on nutritional and bioactive composition is influenced by the different environmental conditions in which the plant is exposed, such as the variation in edaphoclimatic conditions, furthermore, other variables must be taken into account such as fertilization, degree of ripeness of the fruit and cultivars, which may justify the variations found in several studies and research conducted with persimmons produced in different locations and conditions of agricultural management.

16 It was observed in this study that the species can be considered rich source of compounds with nutritional and functional properties and that further studies on the detailed composition and biological potential of these fruit varieties should be urgently conducted.

CONSIDERATIONS

17 Persimmon fruits have been shown a good quality for consumption in natura, mainly because they contain significant quantities of phenolic compounds, in addition have high antioxidant capacity, which is a great importance point for the agroindustrial sector, when it comes to promoting human health.

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