Comunicata Scientiae
Horticultural Journal

ORIGINAL ARTICLE
published: 29 May 2023
https://doi.org/10.14295/CS.v14.3758

Production pruning in seasonality affects the postharvest quality of figs

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Abstract

This work aimed to evaluate the post-harvest quality of fruits of the fig cultivar 'Roxo de Valinhos' in two pruning times and three ripening stages, under the edaphoclimatic conditions of the semiarid region of the Piauí state. The experiment was carried out in the educational orchard of the Federal University of Piauí, Campus Professora Cinobelina Elvas, Bom Jesus, Piauí, Brazil. A completely randomized design (CRD) was used, with 4 replications, in a 2 x 3 factorial scheme, with treatments corresponding to two pruning times (April 2018, of the rainy season, and December 2018, the beginning of the rainy season) and three fruit ripening stages (Green Intermediate, and Ripe), using 5 fruits per experimental plot and performing chemical analyzes in triplicate. The pruning carried out in April (end of the rainy season) significantly influenced the post-harvest quality of the fig fruits, with greater weight (34.17 g fruits), transverse diameter (42.21 mm), luminosity (57.92°), and HUE angle (80.73°), when compared to the pruning carried out in December (beginning of the rainy season), with weight (26.58 g fruits), transversal diameter (39.83 mm), luminosity (52.53°), and HUE angle (73.60°). The cultivation of fig trees in the semiarid region of Piauí showed promising results with the anticipation of the crop cycle with pruning performed in the dry season.

Keywords: *Ficus carica* L.; fig; Piauí, ripening stages

Introduction

The fig tree (*Ficus carica* L.) is one of the oldest cultivated fruit species characterized by presenting a wide adaptive capacity and is currently cultivated in various regions of the world (Mawa et al., 2013). The cultivar 'Roxo de Valinhos' is the main variety cultivated by Brazilian producers as a function of the high economic value that it aggregates, the good acceptance in the consuming market, high vigor, yield, and adaptation to the intensive pruning management in the crop (Paula et al., 2007).

However, this fruit species still present some hindrances, such as a predisposition to ostiole-end splitting, which favors the attack by plagues and diseases, and a high sensibility of the fruit as a function of the thin epicarp, thus increasing its perishability and decreasing the post-harvest period, implying in the limitation of fruit commercialization in long distances (Irfan et al., 2013).

In this perspective, the knowledge of the physical-chemical alterations that occur during fruit development becomes essential to determine the ideal ripening stage for harvest given the several forms of fig usage, either for industrialization (green and ripe) or for natural consumption (ripe), as well as for planning the adoption of post-harvest technologies.

Pruning constitutes one of the main management practices that aims at stabilizing the production and quality of fruits throughout the years (Evangelista et al., 2021). Establishing the pruning time is important to understand the relationship between environmental variables and crop development since depending on the plant's response to climatic alterations during the reproductive stage (Silva et al., 2022), there may be an influence on the yield and quality of the produced fruits (Radünz et al., 2014).

In Brazil, the fig tree is usually cultivated in the

Received: 17 June 2021
Accepted: 05 September 2022

South and Southeast regions of the country. However, there are studies conducted in the states of Piauí (Evangelista et al., 2021; Silva et al., 2022), Ceará (Freitas et al., 2015; Silva et al., 2016a), and Rio Grande do Norte (Silva et al., 2017b; Moura et al., 2021) that attest the satisfactory adaptability and yield of this fruit species in the Northeast, a Brazilian region that presents high temperatures and the highest indices of solar radiation, allowing fruit production throughout the year if the water requirements are supplied with irrigation.

However, there are still potential regions, such as the semiarid region of the Piauí state, which require the development of studies to determine the most adapted fruit species (Silva et al., 2022), considering that the Brazilian Northeast presents the advantage of climatic conditions of temperature that induce early ripening and increased sugar content in fruits (Silva et al., 2017b).

In this perspective, this work aimed to evaluate the post-harvest quality of fruits of the fig cultivar 'Roxo de Valinhos', in two pruning times and three ripening stages, in the edaphoclimatic conditions of the semiarid region of Piauí.

Material and methods

Description of the study area

The study was performed from April 2018 to May 2019 in the didactic orchard of the Federal University of Piauí, *Campus* Professora Cinobelina Elvas (UFPI-CPCE), Bom Jesus, Piauí, Brazil, located in the coordinates 09°04'59,9'' S and 44°19'36,8'' W; with an elevation of 287 meters above sea level (m a. s. l.).

The climate of the region is classified as Aw (megathermal), tropical with a dry winter season (Köppen & Geiger, 1928). The mean annual rainfall is 1200 mm, with a mean annual temperature of 26.6 °C. The weather data of the area were obtained daily throughout the experimental period by the National Institute of Meteorology (NIM, 2019), through an automated weather station in the municipality of Bom Jesus, Piauí-A326, presented in **Figures 1** and **2.** The soil was classified as a Yellow Latosol (Santos et al., 2013), and the physical and chemical characteristics of the soil are presented in **Table 1**.

Sampling method and management practices

The research was developed with fig plants of the cultivar 'Roxo de Valinhos', propagated through cuttings and planted on May 23, 2017; the cuttings had 11 months of age at the beginning of the experiment. The plants were spaced in 2 x 1.5 m and conducted in an intensive pruning system.

The formative pruning in the fig plants followed an open-center design. The plants were conducted with a single stem, and upon reaching 50 cm of height (7 months after planting) they were pruned in the apex to induce the emission of lateral branches and form the base of the plant, constituted by the selection of three structural branches, which were the most vigorous and well-localized around the main stem (Chalfun, 2012).

The first and second intensive fructification prunings were performed in April (end of rainy season) and December 2018 (beginning of the rainy season), respectively, by pruning the three structural branches at 40 cm from the insertion in the stem and eliminating the secondary branches formed in the previous cycle. After sprouting, which began 4 days after the first cycle pruning and 12 days in the second cycle, the thinning was performed by allowing only two sprouts per structural branch (Silva et al., 2017b).

The topdressing fertilization was performed 30 days after the production pruning, according to soil analysis (Table 1) and the recommendation for the crop (Chalfun, 2012), with the superficial application of the fertilizer at a 40 cm distance from the trunk, using ammonium sulfate (20% of N), single superphosphate (18% de P_2O_5), and potassium chloride (60% de K_2O) as nutrient sources.

The foliar fertilization was performed 4 times, every 60 days after the first sprouting, using 2 ml/l^{-1} of the Ativax® micronutrient, with the following composition: 2% of S; 1% of Mg; 1% of Zn; 0.50% of Mn; 0.50% of Fe; 0.50% of B; 0.30% of Cu, and 0.10% of Mo for the nutritional supply of the plants.

A drip irrigation system was adopted, with one irrigation line per planting row, providing a daily mean of 40 L of water per plant. Weed control was performed through manual hoeing, every 20 days. The phytosanitary treatments for the control of the fig tree borer (abamectin) and rust (mancozeb) were applied, respectively, once in the first cycle and once in the second cycle, with the aid of a backpack sprayer and using a dose according to the package insert provided by the manufacturer.

Treatments and Experimental Design

The experiment was divided into two phases: the evaluations of plant production and the post-harvest analyses. In the field, the plants were distributed in a randomized block design (RBD) with 4 replications, two treatments, corresponding to two pruning times (April and December 2018), and 12 plants per experimental plot, totaling 48 plants.

For the post-harvest analyses, a completely randomized design (CRD) was used, with 4 replications, in

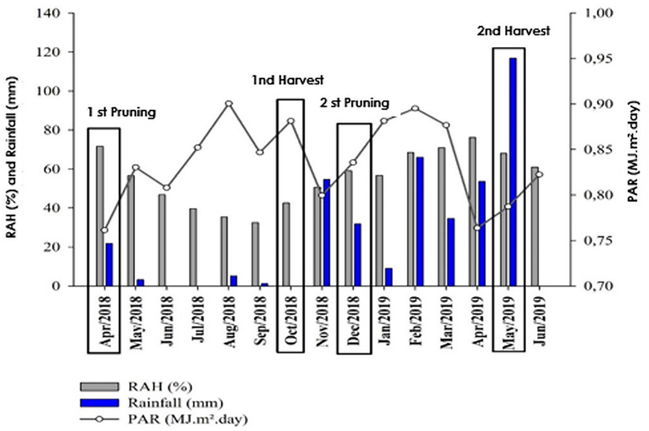

Figure 1. Mean values of relative air humidity (RAH), rainfall (PRE), and photosynthetically active radiation (PAR) in the period from April 2018 to June 2019, in Bom Jesus, Piauí, Brazil.

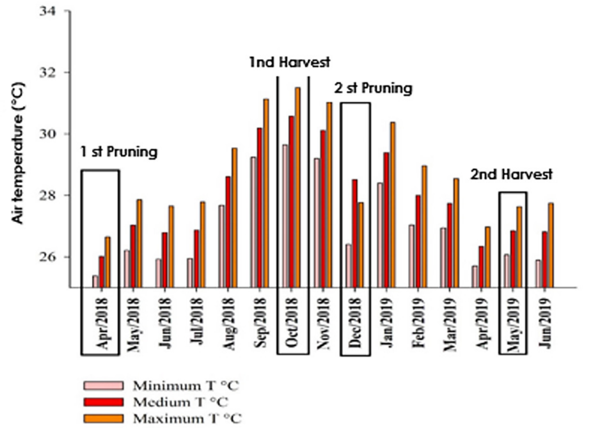

Figure 2. Mean values of air temperature (T) in the period from April 2018 to June 2019, in Bom Jesus, Piauí, Brazil.

Table 1: Chemical and physical characteristics of the soil in the experimental area before the implantation of the experiment at a 0-20 cm depth

pH	P resin	H+Al	Al	Ca	Mg	K	SB	T
H_2O	mg.dm^{-3}			--------------------------------cmol$_c$.dm^{-3}--------------------------------				
6.4	17.58	3.96	0.0	3.0	0.54	0.38	3.92	7.88

Cu	Fe	Mn	Zn	V	m	O.M	Clay	Silt	Sand
----------------mg dm^{-3}------------				----%----			-----------------g kg^{-1}-------------------		
1.12	58.90	18.19	1.46	49.7	0.0	12.5	266	31	703

Ca, Mg, and Al - KCl Extractor - 1 mol/L; [b]H + Al - Calcium Acetate extractor at pH 7.0; [c]P, K, Cu, Fe, Mn, and Zn - Extractor Mehlich 1; [d]Organic Matter (MO) - Walkley-Black method.

a 2 x 3 factorial scheme, with treatments corresponding to the two pruning times (April and December 2018) and three fruit ripening stages (Green, Intermediate and Ripe), using 5 fruits per experimental plot and performing the chemical analyses in triplicate.

At harvest, were considered as green the fruits that presented a green epicarp and reddish ostiole; fruits with intermediate maturation with a 50% purple epicarp; and ripe fruits with more than 75% of the epicarp with purple coloration.

Variables analyzed

In order to determine the number of fruits per branch (NFB) and per plant (NFP), the fruits were accounted for and quantified in three marked branches and in the entire plant at 118 and 120 days after pruning, for the first and second cultivation cycle, respectively. Production was measured by summing the fresh mass of all harvested fruits per plant, and for the estimated yield a planting density of 3,334 plants ha^{-1} was considered, corresponding to the spacing of the plants in the field, multiplied by the fresh mass of fruits per plant.

The harvest period began with the ripening of the first fruits and ended 216 days after the pruning in the first cycle, and at 168 days after the pruning in the second cycle, when there were no more commercial fruits in production, thus totaling 49 harvests in the first cycle, and 24 in the second cycle, performed every two days. The fruits from the harvests performed in October 2018 (1st cycle) and May 2019 (2nd cycle) were used for the post-harvest analyses. The previously mentioned harvests were performed during the morning.

After harvest, the fruits were taken to the Laboratory of Plant Propagation of the UFPI/CPCE, where they were washed in running water to remove the latex. Afterward, the fruits were dried with paper towel and classified regarding maturation and quality.

The physical variables evaluated were: fresh mass (FM), determined in an analytical balance (Shimadzu©, model AUX 220); longitudinal diameter (LD), transversal diameter (TD), measured with a digital pachymeter (Pantec©); and fruit coloration, the last one according to the system proposed by the *Commission Internacionale de L'Eclaraige* (CIE) in *L*a*b*, in which the values were expressed in luminosity (LUM), Hue angle or hue (HUE), and chromaticity (CRO). The readings were performed on the equatorial region of the fruit, in two opposite sides.

For the chemical analyses, the fruits had their pulp extracted (with the epicarp and without the peduncle) in a domestic multiprocessor (Philco©), with later storage of the pulp in a freezer at -18 °C until the moment in which the following variables were analyzed: total soluble solids (TSS), titratable acidity (TA), potential for hydrogen (pH), ratio of total soluble solids and titratable acidity (TSS/TA), according to the methodology of Instituto Adolfo Lutz (2008), and anthocyanins (ANT) and flavonoids (FLA), according to the method described by Francis (1982).

Statistical Analysis

The data were subjected to analysis of variance (ANOVA), the means were compared by Tukey's test (p < 0.05), and the variables were correlated using Pearson's correlation through the R software R (R Core Team, 2019).

Results and Discussion

The pruning carried out in April (end of the rainy season) significantly influenced the post-harvest quality of the fig fruits, with greater weight (34.17 g frutit), transverse diameter (42.21 mm), luminosity (57.92°), and HUE angle (80.73°), when compared to the pruning carried out in December (beginning of the rainy season), with weight (26.58 g frutit), transversal diameter (39.83 mm), luminosity (52.53°), and HUE angle (73.60°) (**Table 2**).

While the second pruning season (December, late rainy season) provided greater logitudinal diameter (56.12 mmm), antiocyanin content (1.22 mg), flavonoids (9.40 mg) and higher titratable acidity (0.20%). There was no statistical difference for the variable total soluble solids, with a mean value of 12.28 ± 12.83 °Brix between the evaluated pruning times (Table 2).

The results of the analysis of variance revealed a significant effect, at a 5% level of significance, for the interaction between ripening stages and pruning times for the variables of chromaticity, TSS/TA ratio, and pH (**Table 3**). The mean values of the TSS/TA ratio showed a statistical difference (p<0.05) only in the first pruning period, obtaining a higher value when ripe (stage III), mainly due to the high temperatures at harvest time (Figure 1 and 2).

In the second pruning season (December, beginning of the rainy season) there were no statistical differences (p<0.05), ranging from 43.76 ± 87.84 in the three stages of maturation, with no significant difference between the fruits of the April and December harvests (Table 3). The pH remained between 5.19 and 5.45 for the fruits of the first cycle and between 5.32 and 5.42 for those of the second cycle, with a significant difference between the stages and pruning times only for the green figs (Table 3).

Regarding the stages of ripening of the fig fruits (Tables 2 and 3), a standard growth is observed, according to the classification of Marei & Crane (1971). In this study, the authors describe that fig growth is divided into three phases: phase I consists of the rapid growth in fruit size, resulting from an extensive cellular division; in phase II the growth is interrupted, whereas phase III is characterized by cellular expansion, change in the coloration of the epicarp and pulp, and accumulation of sugars and acids.

The values obtained for the longitudinal and

Table 2: Fresh mass (FM), longitudinal diameter (LD), transversal diameter (TD), luminosity (LUM), HUE angle (HUE), anthocyanins (ANT), flavonoids (FLA), total soluble solids (TSS), and titratable acidity (TA) of fig fruits cultivated under pruning times and ripening stages in the semiarid region of Piauí

Variables	Pruning times		Ripening stages			CV (%)
	1st Pruning	2nd Pruning	Green	Intermediate	Ripe	
FM (g fruit)	34.17 A	26.58 B	21.16 c	31.53 b	38.44 a	21.38
LD (mm)	54.02 B	56.12 A	50.93 b	56.86 a	57.44 a	7.87
TD (mm)	42.21 A	39.83 B	37.82 c	41.31 b	43.99 a	6.28
LUM (°)	57.92 A	52.53 B	65.35 a	56.15 b	44.18 c	11.37
HUE (°)	80.73 A	73.60 B	98.40 a	79.88 b	53.25 c	13.04
ANT (mg)	0.59 B	1.22 A	0.79 b	0.80 b	1.12 a	12.77
FLA (mg)	8.39 B	9.40 A	10.08 a	8.78 b	7.81 b	9.18
TSS (°Brix)	12.28 A	12.83 A	8.67 c	12.58 b	16.42 a	13.76
TA (%)	0.16 B	0.20 A	0.21 a	0.18 ab	0.17 b	9.11

Uppercase letters: comparison between pruning times; Lowercase letters: comparison between ripening stages; Same letters are not statistically different by Tukey's test, at a 5% level of probability

Table3: Chromaticity(CRO),TSS/TAratio,andpHoffifruitsasafunctionofpruningtimesandripeningstagesinthesemiaridregionofPiauí

Variables	Pruning times	Ripening stages			CV (%)
		Green	Intermediate	Ripe	
CRO (°)	1st Pruning	43.45 Aa	33.67 Ab	25.72 Ac	11.37
	2nd Pruning	44.34 Aa	29.40 Bb	24.39 Ac	
TSS/TA	1st Pruning	42.83 Ac	74.19 Ab	146.12 Aa	15.01
	2nd Pruning	43.76 Ab	68.83 Aab	87.84 Ba	
pH	1st Pruning	5.19 Bb	5.44 Aa	5.45 Aa	0.59
	2nd Pruning	5.32 Ab	5.41 Aa	5.42 Aa	

Uppercase letters: comparison between pruning times; Lowercase letters: comparison between ripening stages; Same letters are not statistically different by Tukey's test, at a 5% level of probability transversal diameter of ripe fruits (57.7 and 43.9 mm, respectively), table 2, were above those of the figs produced in open cultivation in the Apodi Plateau, state of Ceará (Freitas et al., 2015) in a work in which the respective authors evaluated two cultivation environments (open and protected). The same was observed for the green fruits when comparing the fruits of the study performed by Gonçalves et al. (2006) in the north of Minas Gerais, in which figs in five ripening stages were evaluated, and when the epicarp reached a yellowish-green coloration the fruit presented a longitudinal diameter of 45.3 mm and transversal diameter of 37.8 mm.

Fresh mass and transversal diameter are important parameters in fruit commercialization since the producer obtains higher prices for fruits with greater mass and size, also allowing to determine and project the adequate package for the fruits (Pereira et al., 2017b).

For the variable of luminosity (LUM), the highest mean was verified in the 1st pruning, which may have probably occurred due to the lower concentration of anthocyanins, causing a lighter fruit coloration (Table 2) since these were less exposed to solar radiation given the wider foliar area of the fig plants, compared to the second cycle. The variation in the concentration of anthocyanins was also observed by Radünz et al. (2014) in blueberry fruits, with a higher concentration of anthocyanins in the fruits being related to the lower development of the vegetative canopy. The anthocyanins in the fig epicarp determine its color, which in turn depends on light (Rodov et al., 2012).

Regarding the ripening stages, a reduction in the luminosity values is observed with ripening, respectively 65.35° for green, 56.15° for intermediate, and 44.18° for ripe fruits. The values of chromaticity and luminosity tend to be higher in green fruits since they indicate lighter and intense colors (Crisosto et al., 2010).

For the hue angle (HUE) (Table 2), values from 53.25 to 98.4°, were obtained, ranging within the interval presented by Çaliskan & Polat (2011), who studied fig accessions with purple epicarp collected in Turkey (48.7-111.5°). The reduction in the hue angle indicates fruit ripening, meaning the increase in anthocyanins, as observed by Crisosto et al. (2010).

Chromaticity (CRO), which expresses color intensity, presented values of 25.72° and 24.39° for ripe fruits in the first and second pruning, respectively (Table 3). These means are within the interval found by Çaliskan & Polat (2011) and Moura et al., (2021) for fig cultivars with purple epicarp (10.9 – 34.5°).

It is observed that the green fruit presents superior chromaticity values, and a significant difference occurred between pruning times only for the intermediate figs, which presented more intense colors in the first pruning.

The chromaticity values of the green fruits (43.45° and 44.34°) approached those obtained by the cultivars Banane, Cuello Dama Blanco, Três Voltas L'any, and Blanca B'etera, which exhibited a light-green coloration and presented an interval between 37 and 50° for this color parameter (Pereira et al., 2017a).

The color analysis determines the extension of ripening and fruit quality (Moura et al., 2021), either in an independent manner or in combination with other parameters, and it is commonly used in marketing and for exportation since the brighter is the fruit, the higher its appreciation (Sedaghat & Rahemi, 2018).

Anthocyanins (ANT) and flavonoids (FLA) were found in greater amounts in the fruits from the second cycle, with a higher concentration in ripe and green fruits, respectively, corroborating the results obtained for the hue angle and luminosity (Table 2).

Flavonoids are classified as "environmental compounds" because they are produced as a direct response to environmental conditions, considering that their content is dependent on ultraviolet radiation and CO2 levels (Vallejo et al., 2012). Anthocyanins, in their turn, act as protectors against damages caused by ultraviolet radiation, removing harmful oxidants and free radicals (Silva et al., 2016b). This phenomenon can partially explain the fact that the fruits produced in the second cycle presented a higher content of anthocyanins and flavonoids and, consequently, lower hue angle and luminosity since due to the early fall of the leaves the fruits were more exposed to solar radiation.

The correlation of epicarp color with polyphenols, anthocyanins, and the total antioxidant capacity was verified by Çaliskan & Polat (2011), who demonstrated that fruits with purple and black coloration contained more of these bioactive compounds when compared to fruits with yellow and green epicarp, an important characteristic when aiming at the development of cultivars with health-promoting characteristics.

The mean values of total soluble solids (TSS) varied from 8.67 to 16.42 °Brix in the three ripening stages, with no significant difference being verified between the fruits from the April and December harvests (Table 2). Furthermore, an increase in the soluble solids can be observed with fruit ripening, which characterizes one of the main modifications during ripening caused by biosynthetic processes or the degradation of polysaccharides (Chitarra & Chitarra, 2005).

The green and ripe fruits presented means of 12.58 and 16.42 °Brix, respectively, which were above those verified by Leonel & Tecchio (2008) in ripe fig fruits subjected to pruning and irrigation (11.54 to 12.55 °Brix). This difference is probably due to the fact that air temperature was higher in the place of the present study, varying between 26.0 and 30.6 °C (Figure 2) during the conduction of the experiment, whereas in Botucatu, São Paulo, the temperature in the coldest month was 17.1 °C, and 23.3 °C in the hottest.

High air temperatures indicate more solar radiation hitting the surface, thus increasing the photosynthetic rate of the plants, which implies a greater accumulation of sugars. In this manner, during the photosynthesis process, the plants assimilate CO2 from the atmosphere and reduce it into triose-phosphate, which may be used for the production of carbohydrates, mainly sucrose and starch (Silva et al., 2010). As evidence for that, the photosynthetically active radiation was also associated with the greater accumulation of sugar in grapes, as observed by Radünz et al. (2013) in grapevines subjected to defoliation and cultivated under plastic protection (Chavarria et al., 2010).

For the titratable acidity (TA), there was a decrease in the values with the advance of ripening, and the fruits from the second harvest were more acid compared to those of the first cycle (Table 3). The values obtained in the present study (0.16 and 0.20%) were below those reported in figs treated with calcium chloride and fungicides, whose acidity values ranged from 0.17 to 0.26% (Paula et al., 2007).

The TSS/TA ratio presented a significant difference, at a 5% level, for the ripe fruits between pruning times, with means above those of the work by Freitas et al. (2015), who obtained values of 88.79 and 63.10. Furthermore, there was an increase of this variable with fruit ripening, being related to the greater accumulation of soluble solids and reduction in acidity, indicating, in these conditions, that the ripe fruits presented a sweeter taste (Table 4).

The increase in the content of soluble solids may occur due to the hydrolysis of polysaccharides, such as starch, as well as by gluconeogenesis, whereas the decrease in acidity can be the result of the intake of organic acids as a substrate in respiration, leading to the increase in the sugar/acid ratio (Prasanna et al., 2007). The TSS/TA ratio is a relevant parameter in fruit quality since it is associated with flavor, sweetness, and acceptance by the consumer (Pereira et al., 2017a).

The pH remained within 5.19 and 5.45 for the fruits of the first cycle, and within 5.32 and 5.42 for those of the second cycle, with a significant difference occurring between stages and pruning times only for the green figs (Table 3). These values were above those of the studies by Freitas et al. (2015) and Silva et al. (2017a). The pH is an important attribute for the industrialization of the pulp since the lower is its value, the higher the antimicrobial effect and the guarantee of conservation (Caetano et al., 2017).

The evaluation of the physical and chemical characteristics of fruits is important to determine the post-harvest quality and, consequently, to attend the demands of the consuming market. Through the correlation between the physical and chemical variables of fruits, it is possible to assess the interference of one variable on another, allowing to know how the improvement in a trait can cause alterations in another that is correlated (Giles et al., 2016). Additionally, it can aid in the quality determination of fruits through non-destructive analyses.

The analysis of correlation demonstrated significance for the relationship of practically all variables with one another, and the pH and TSS/TA showed little relation with the physical parameters (Table 3). The positive values indicate a direct relationship between the characteristics, and the negative values indicate an inverse relation.

The variables of fruit size (fresh mass, longitudinal diameter, and transversal diameter) presented a significant and negative correlation with the coloration parameters (luminosity, chromaticity, and hue angle). These results are related to fruit ripening. Larger fruits tend to be in a more advanced ripening stage and, therefore, present a darker epicarp color (purple), resulting in lower coloration values.

As for the soluble solids, a positive correlation can be observed with the fresh mass (r = 0.77) and the transversal diameter (r = 0.86), and a negative correlation with luminosity (r = -0.68) and chromaticity (0.72). This means that these parameters can aid in the identification of sweeter fruits in an advanced ripening stage, a fact verified by the correlation of the titratable acidity in relation to these same characteristics.

The pH had a significant correlation with the hue angle and the soluble solids, although weakly, whereas the TSS/TA ratio presented a significant correlation only with the fresh mass of fruit and the titratable acidity. As for the anthocyanins, they presented a negative and moderate significant correlation with luminosity (r = -0.46) and hue angle (r = -0.51). These results were similar to those by Çaliskan & Polat (2011), in whose study these parameters also showed the same behavior for the antioxidant capacity and total polyphenols.

Regarding flavonoids, these presented no significant correlation with the evaluated parameters. When evaluating the effect of the harvest year and genotypes on the phytochemical properties and quality of figs in Turkey, Çaliskan & Polat (2012) found no correlation between the weight and size of the fruit with the color of the epicarp and the anthocyanins, polyphenols, and antioxidant capacity, explaining that the physical growth of the fruits and the accumulation and biosynthesis of chemical components are distinct processes.

It was possible to identify the correlation of the color parameters (luminosity and hue angle) and the ratio of total soluble solids and titratable acidity (TSS/TA) with anthocyanins, which are related to the advance in fruit maturation and the exposure of these to environmental conditions, demonstrating that the ripen fruits presented a greater accumulation of these bioactive compounds and, possibly, they could have acted as photoprotectors during the exposure of the fruits to solar radiation. This suggests the continuation of studies associating the different types of pruning with environmental conditions so that the produced fruits are marketable and possess health-promoting characteristics.

Conclusions

The pruning performed in April increments the post-harvest quality of fig fruits in the semiarid region of Piauí. Green, intermediate, and ripe figs produced in the semiarid region of Piauí present physical and chemical characteristics of quality, making the region promising for the development of fig farming.

Acknowledgements

The Foundation for Research Support of the State of Piauí (FAPEPI), for granting the funding.

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Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.