PRODUCTION AND QUALITY OF MINI WATERMELON UNDER DRIP IRRIGATION WITH BRACKISH WATER[1]

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ABSTRACT - Watermelon plays an important role in Brazilian agribusiness. The objective of present study was to evaluate the effect of different irrigation managements and water salinity levels, on the main productive and postharvest characteristics of mini-watermelon (*Citrullus lanatus*) cv. 'Sugar Baby'. The experiment was conducted in a greenhouse in a completely randomized design, arranged in a 2 x 4 factorial scheme, with four replicates. The treatments consisted of two types of irrigation management (conventional and pulse) and four saline levels of nutrient solution of fertigation (2.5; 4.5; 5.5; 6.5 dS m^{-1}). The control treatment corresponded to the electrical conductivity of the nutrient solution prepared with local supply water. The irrigation depth was calculated by the product of reference evapotranspiration and crop coefficient. The number of pulses were defined and fractionated according to the atmospheric demand. The salinity of the fertigation solution affects some variables of the production, but does not reduce the quality of the mini-fruit cv. 'Sugar Baby'. The management of pulse irrigation shows better results in low salinity, while conventional drip management is more suitable for high salinity (6.5 dS m^{-1}).

Keywords: *Citrullus lanatus*. Irrigation management. Salinity. Maturity index.

PRODUÇÃO E QUALIDADE DE MINIMELANCIA SOB IRRIGAÇÃO POR PULSOS COM ÁGUA SALOBRA

RESUMO - A melancia tem um papel importante no agronegócio brasileiro. O objetivo do presente trabalho foi avaliar o efeito de diferentes manejos de irrigação e níveis de salinidade da água de irrigação, nas principais características produtivas e de pós-colheita de minimelancia (*Citrullus lanatus*) cv. 'Sugar Baby'. O experimento foi conduzido em casa de vegetação em delineamento experimental inteiramente casualizado, arranjado em esquema fatorial 2 x 4, com quatro repetições. Os tratamentos consistiram de dois tipos de manejo de irrigação (gotejamento convencional e por pulsos) e quatro níveis salinos da solução nutritiva de fertigação (2,5; 4,5; 5,5; 6,5 dS m^{-1}). O tratamento controle correspondeu à condutividade elétrica da solução nutritiva preparada com água de abastecimento local. A lâmina de irrigação foi calculada a partir do produto da evapotranspiração de referência e o coeficiente de cultivo. Os números de pulsos foram definidos e fracionados em função da demanda atmosférica. A salinidade da solução de fertigação afeta algumas variáveis de produção, mas não reduz a qualidade dos frutos de minimelancia cv. 'Sugar Baby'. O manejo de irrigação por pulsos mostra melhores resultados em baixa salinidade, enquanto o manejo por gotejamento convencional é mais adequado para alta salinidade (6,5 dS m^{-1}).

Palavras-chave: *Citrullus lanatus*. Manejo da irrigação. Salinidade. Índice de maturação.

INTRODUCTION

Watermelon has significant economic importance in Brazilian agribusiness. In Brazil, watermelon production in 2017 reached 2,314,700 tons, and the Northeast region stood out as the main producer with 95.1% of the total production (IBGE, 2019). The watermelon production activity in Brazil has a family production profile (small farmer) due to the demand for the fresh product and market price, a profile in which it is commonly present in the semiarid regions of the Northeast (SOUSA; NUNES; ZONTA, 2019). In these regions it is only possible to exploit some crops by using irrigation, due to climatic factors such as high evapotranspiration rate and poor rainfall distribution (LOPES et al., 2017). However, as water is a limiting factor, low water availability does not meet the ideal irrigation parameters (CABRAL et al., 2019).

Water quality is one of the important factors for the production of good quality fruits, because under inadequate conditions, as occurs in the Brazilian semiarid region, the use of groundwater with high salt contents as well as soil salinity can cause losses in watermelon production and quality (SUAREZ-HERNANDEZ et al., 2019). Some authors have reported that salinity negatively affected germination, growth, development and ionic content in watermelon (ALI et al., 2015; SOUSA et al., 2016).

Among the technologies used to increase production and improve fruit quality, pulse irrigation (intermittent irrigation) has had positive effects (ELNESR et al., 2015; ZAMORA et al., 2019). The pulse system is a concept in which a small part of the water requirement per day is supplied by frequent irrigation, in order to meet the plant's water needs (MADANE et al., 2018). Thus, this technique makes it possible to keep water and soluble nutrients close to the root zone, reducing the risks of nutrient leaching and water loss by percolation (ZAMORA et al., 2019).

Several studies that tested pulse irrigation showed positive results with different crops: in lettuce, increasing water use efficiency (ALMEIDA; LIMA; PEREIRA, 2015), in beans, reducing the effects of water salinity (ALMEIDA et al., 2018), and in coriander, increasing the shoot biomass index (ZAMORA et al., 2019).

Given the importance of an effective irrigation management that adapts to the water quality conditions of the semiarid region, the objective of this study was to evaluate the production response and postharvest characteristics of mini watermelon cv. 'Sugar Baby', subjected to different irrigation managements and water salinity.

MATERIAL AND METHODS

The experiment was conducted during October and December 2018, in a greenhouse, belonging to the Federal University of Recôncavo da Bahia, in Cruz das Almas (12°40'19" S, 39°06'23" W, 220 m), BA, Brazil. The greenhouse was East-West oriented, 7.0 m wide, 24 m long, with ceiling height of 2.8 m, protected on the sides by black screen (50%) and covered by 150-μm-thick anti ultra -violet polyethylene film.

The climate of the site is tropical hot and humid (Af) according to Köppen's classification (ALVARES et al., 2013). During the experiment, the maximum and minimum temperatures within the greenhouse were respectively 36.5 and 19.8 °C, and the mean relative humidity was 51%.

The experimental design was completely randomized (CRD) in a 2 x 4 factorial scheme, with four replicates. The treatments consisted of two types of irrigation management (conventional drip and pulse drip) and four levels of electrical conductivity in the nutrient solution (ECsol) used in fertigation (2.5, 4.5, 5.5 and 6.5 dS m^{-1}). The nutrient solution was prepared according to Sasaki (1992), with NH_4^+-N, NO_3^--N, K, P, Ca, Mg, S, B, Cu, Fe, Mn, Mo and Zn concentrations respectively equal to 185.4, 24.8, 217.3, 39.0, 157.7, 36.0, 46.8, 0.20, 0.01, 0.21, 0.26, 0.06 and 0.20 mol 1000L^{-1}. The nutrient solution was prepared using municipal-supply water (EC = 0.5 dS m^{-1}), and ECsol was increased by adding NaCl in the solutions with ECsol greater than 2.5 dS m^{-1}.

The plant material used in this study was the mini watermelon cultivar 'Sugar Baby'. The seeds were sown in 200-mL plastic cups, containing coconut fiber. Transplantation occurred when the seedlings had the first pair of leaves (15 days after sowing) to 10 L pots with coconut fiber substrate and bovine manure in the ratio of 3:1 (v/v). The results of the chemical analysis of the substrate were: pH $_{(water)}$ = 6.7; P = 204 mg dm^{-3}; K = 5.2 cmol$_c$ dm^{-3}; Ca = 4.1 cmol$_c$ dm^{-3}; Mg = 4.7cmol$_c$ dm^{-3}, Na =1.78 cmol$_c$ dm $^{-3}$, Al = 0.0 cmol$_c$ dm^{-3}, H+Al = 3.57 cmol$_c$ dm^{-3}; OM = 71.5 g kg $^{-1}$. Irrigation was performed daily, using a dripper with flow rate of 4.0 L h^{-1} per plant.

To calculate the required irrigation depth, the climatic data were obtained from a meteorological station installed in the center of the study area, whose sensors provided the data of solar radiation (pyranometer), relative humidity and air temperature (thermo-hygrometer).

An electronic spreadsheet was used to calculate the daily ETo using the Penman-Monteith method standardized by FAO 56 (ALLEN et al., 1998) (Equation 1) and adapted for studies in greenhouses, fixing the wind speed at 0.5 m s^{-1}.

$$ET_0 = \frac{0.408\,\Delta\,(R_n\text{-}G) + \gamma\left(\frac{900}{T_a+273}\right)u_2\,(e_s\text{-}e_a)}{\Delta + \gamma\,(1+0.34\,u_2)} \quad (1)$$

where:

ET_0 – reference evapotranspiration (mm day^{-1});
R_n - radiation balance (MJ m^{-2} day^{-1});
G – soil heat flow (MJ m^{-2} day^{-1}), with G = 0 in a period of 24 h; Δ – slope of the water vapor saturation curve (kPa °C^{-1}); u_2 – wind speed at 2 m height (m s^{-1}), fixed at 0.5 m s^{-1}; T_a – average air temperature (°C); e_s – saturation water vapor pressure in the atmosphere (kPa); e_a – actual water vapor pressure in the atmosphere (kPa); γ – psychrometric constant (MJ kg^{-1}).

The daily crop evapotranspiration (ETc) was calculated using (Equation 2).

$$ET_C = ET_0\,K_C \quad (2)$$

where, ET_c - crop evapotranspiration (mm day^{-1}); ET_o - reference evapotranspiration (mm day^{-1}); Kc - crop coefficient.

The crop coefficients adopted were those recommended by Silva et al. (2015) for each phenological stage: initial (0.51) for nine days; vegetative (0.52) for 15 days; flowering (1.23) for 26 days and maturation (1.13) for 10 days.

Irrigation was performed daily and the required irrigation depth was calculated according to (Equation 3).

$$RID = \frac{ET_C\,K_P}{Ea} \quad (3)$$

where: RID - required irrigation depth (mm); Kp - dimensionless location coefficient (considered 1); Ea – water application efficiency of the system, adopting the value obtained by the uniformity test (0.95).

Thus, the RID value was used to obtain the operating times of the drip lines from (Equation 4).

$$Ti = \frac{RID\,A}{e\,q} \quad (4)$$

where: Ti - irrigation time for each treatment (h); A - pot area,(m^2); e - number of emitters per plant (1); q - average flow rate of the dripper (4.0 L h^{-1})

In the management of conventional drip irrigation (management 1 - M1), RID was applied uninterruptedly from 10 a.m. In the management of pulse irrigation (management 2 - M2), RID was split and applied in the interval between 7 and 17 h, period in which the net radiation inside the greenhouse was positive. Daily monitoring and control of irrigation times in each type of management was performed by an electronic controller based on the Arduino Pro Mini development board, connected to a 3.5-inch LCD and a keyboard.

Accumulated ETo (mm) was used to define the times of higher or lower demand. 15% of Ti was defined for the times of lowest demand (7-10 h and 14-17 h) thus totaling 30% of Ti. Three pulses for the interval of 7-10 h and three pulses for the interval of 14-17 h were also established. Therefore, in these intervals the system worked according to (Equations 5 and 6).

$$T_{PULSE(ij)} = \frac{Ti \cdot P_{ij}\{0.15\}}{n\{3\}} \quad (5)$$

$$I_{PULSE(ij)} = \frac{(t_{ijF}\text{-}t_{ijI})\text{-}(Ti \cdot P_{ij}\{0.15\})}{n\{3\}\text{-}1} \quad (6)$$

For the period of greatest demand (range of 10-14 h) 10 pulses were established to use the remaining 70% of the Ti, working according to the (Equations 7 and 8).

$$T_{PULSE(k)} = \frac{Ti \cdot P_k\{0.70\}}{n\{10\}} \quad (7)$$

$$I_{PULSE(k)} = \frac{(t_{kF}\text{-}t_{kI})\text{-}(Ti \cdot P_k\{0.70\})}{n\{10\}\text{-}1} \quad (8)$$

where,
T_{PULSE} (ijk) - pulse time for intervals i, j and k (hour); I_{PULSE} (ijk) - pulse interval (hour); Ti - irrigation time (hour); Pijk - Ti percentage for the intervals i, j and k (decimal); n - number of pulses; tijkF - final time of the intervals i, j and k (hour); tijkI - initial time of the intervals i, j and k (hour).

Plants were grown with two stems and one fruit. The branches were vertically trained with plastic ribbons tied to wires located at 1.5 and 2.0 m height from the soil. The spacing used was 0.50 m between plants and 1.0 m between rows. Pollination was done manually on all female flowers of the main stem from the eighth internode to 1.5 m height from the plant collar. Fruit thinning was performed when they reached 0.10 m in circumference, leaving only one fruit per plant (the most developed), which was kept in a nylon net.

Harvest point was determined according to the crop cycle (approximately 60 days after transplanting). The variables analyzed were: fresh fruit mass, fresh pulp mass, fresh rind mass, pulp yield, pulp diameter, transverse and longitudinal circumferences, fruit shape index, total soluble solids, hydrogen potential, total titratable acidity and maturity index.

The variables total soluble solids, hydrogen potential and total titratable acidity were determined as described by the Adolfo Lutz Institute (ZENEBON; PASCUET; TIGLEA, 2008). Fresh

masses of fruit (kg), pulp (kg) and rind (kg) were determined by weighing on a semi-analytical scale (0.001 g), whereas pulp diameter (m) and transverse (m) and longitudinal (m) circumferences were measured with a measuring tape. Pulp yield was measured by dividing fruit mass by pulp mass, the fruit shape index was determined by the division between longitudinal circumference and transverse circumference, and the maturity index was obtained by the division between total soluble solids and total titratable acidity.

The data were subjected to analysis of variance (ANOVA). In the case of a significant effect in the F test, the salinity levels (quantitative nature) were subjected to linear and quadratic regression analysis to obtain the most adequate equation for the data. For the types of management (qualitative nature), when significant by the F test, the means were compared by the Tukey test at 0.05

probability level. Statistical analysis was performed using the statistical software SISVAR, version 5.6 (FERREIRA, 2019).

RESULTS AND DISCUSSION

According to the F test result (Table 1), salinity had a significant effect on the variables fruit mass (FM), rind mass (RM), longitudinal circumference (LC) and potential of hydrogen (pH). There was a significant interaction between salinity levels and types of irrigation management for pulp diameter (PD) and transverse circumference (TC). For pulp mass (PM), pulp yield (PY), fruit shape index (FSI) and total soluble solids (TSS), there was no significant effect of the studied factors. For total titratable acidity (TTA) and maturity index (MI), there were single effects of both factors.

Table 1. Summary of the Fisher's test (F) for the variables fruit mass (FM) - kg, pulp mass (PM) - kg, rind mass (RM) - kg, pulp yield (PY) - %, pulp diameter (PD) - m, transverse (TC) - m and longitudinal circumference (LC) - m, fruit shape index (FSI), total soluble solid (TSS) - ºBrix, potential of hydrogen (pH), total titratable acidity (TTA) - % and maturity index (MI) of mini watermelon cv. 'Sugar Baby' irrigated with saline water under different irrigation managements.

SV	DF	FM	PM	RM	PY	PD	TC	LC	FSI	TSS	pH	TTA	MI
							Test F						
Management	1	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns	**	**
Salinity	3	*	ns	**	ns	ns	ns	**	ns	ns	**	*	**
Linear	1	**	ns	**	ns	**	**	**	ns	ns	ns	ns	**
Quadratic	1	ns	ns	**	ns	ns	ns	ns	ns	ns	ns	**	ns
Interaction	3	ns	ns	ns	ns	**	**	ns	ns	ns	ns	ns	ns
Residue	24												
Mean		1.32	0.81	0.51	60.63	0.13	0.55	0.57	1.01	11.00	5.37	0.24	48.17
CV%		16.8	19.2	20.3	9.8	6.4	5.5	5.4	6.3	8,14	3.0	18.0	21.7

SV - sources of variation; DF - degree of freedom; ns - not significant; * - significant at $p \leq 0.05$; ** - significant at $p \leq 0.01$.

The variables FM, RM, LC and pH were affected by the ECsol of fertigation (Figure 1). These variables showed reductions of 4.28, 8.14, 2.23 and 1.39% per unit increase in salinity, respectively. Thus, RM was the variable most affected by salinity, followed by FM, LC and pH.

The negative effect of increased salinity on FM, RM and LC occurs mainly as a result of the lower water potential in the substrate, in response to the osmotic effect, thereby reducing the absorption of water and nutrients and, consequently, the production of plants (OLIVEIRA et al., 2014). Sousa et al. (2016), working with the mini watermelon cv. Smile, reported a fruit mass reduction of 8.3% per unit increase in salinity and also attributed such reduction to the osmotic effect induced by salinity. Mini watermelons are characterized by having fruits weighing between 1 and 3 kg (FERRARI et al., 2013). Considering that the FM estimated at conductivity of 6.5 dS m⁻¹ was 1.2 kg, it is important to highlight that, despite the observed reduction, the increase in salinity did not compromise FM for

commercialization purposes.

The results showed that, compared to the control treatment (2.5 dS m⁻¹), FM and RM in the treatment of highest salinity (6.5 dS m⁻¹) decreased respectively by approximately 19 and 41%, suggesting a reduction in rind thickness, since the reduction in RM was much more pronounced than that in FM. In watermelon, rind resistance is an important characteristic in good packaging, so a thinner rind requires greater care with transport and handling, which can compromise the physical quality of the fruits during the transport from the field to the final destination.

Regarding the quality component pH, the data show a 5.8% reduction between the pH values of the 6.5 dS m⁻¹ treatment (5.23) and that of the control (5.55) (Figure 1D). These results corroborate those of Sousa et al. (2016) who observed in mini watermelon cv. 'Smile' a reduction of 1.90% per unit increase of salinity in the solution used in fertigation. These authors reported a decrease in pH from 5.5 to 5.2, as observed in our study. Although

the salinity of fertigation water caused a small reduction in pulp pH, the results of this study are similar to those found by Barros et al. (2012) and higher than those reported by Oliveira et al. (2015), indicating that salinity did not affect the pattern of commercialization of this fruit quality variable.
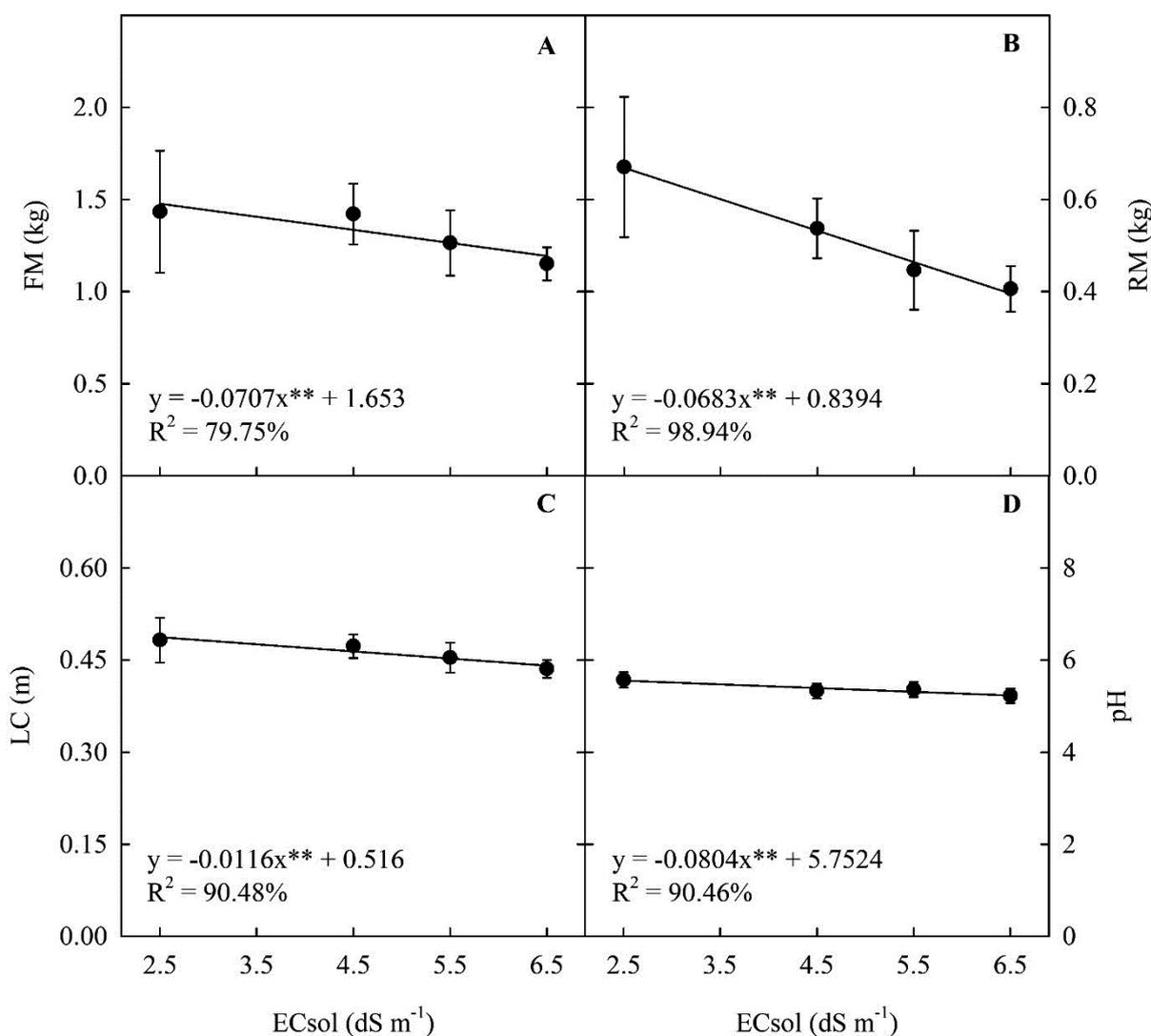

Figure 1. Fruit mass – FM (A), rind mass – RM (B), longitudinal circumference (LC) and potential of hydrogen (pH) of fruits of mini watermelon cv. 'Sugar Baby' grown in a greenhouse under different electrical conductivities of the nutrient solution (ECsol) used in fertigation. Means of four replicates and standard deviations.

There was no effect of salinity or irrigation management on PM, PY, FSI and TSS. The mean values of PM and PY were 0.81 g and 60.6%, respectively (Table 1). These variables are important from the point of view of both fresh consumption and industry, so the mini watermelon cv. 'Sugar Baby' showed a satisfactory yield under saline conditions because, in addition to the absence of significant reduction of pulp, the PY values were higher than the percentages obtained by Lima Neto et al. (2010) in different varieties of watermelon (42 to 58%).

FSI had an average value of 1.01 (Table 1). According to CEAGESP (2003), the fruit is considered cylindrical when the FSI is > 0.7.

Therefore, the FSI values, i.e., the LC/TC ratio, of mini watermelon cv. 'Sugar Baby' are close to 1.0, indicating a cylindrical conformation of the fruits.

The mean TSS value in the present study was 11.0 ºBrix (Table 1). Values above 10 ºBrix are considered ideal for the commercialization of watermelons (LIMA NETO et al., 2010; BARROS et al., 2012), indicating that, regardless of salinity, the fruits produced in the present study were suitable for commercialization. Similar results were found by Sousa et al. (2016), in studies with mini watermelon cv. 'Smile', subjected to salinity. Costa et al. (2013) also observed that TSS values were not influenced by salinity in watermelons of cvs. 'Leopard' and 'Quetzali', but for cv. 'Shadow' the TSS increased

with salinity. The authors reported that differences between planting site, cultivars, irrigation management and production system may alter TSS values.

The increase in salt concentration in irrigation water linearly reduced the variables PD and TC (Figures 2A and 2B) only under pulse management (M2). Consequently, the values of PD (0.14 m) and TC (0.52 m) in plants of the control treatment (2.5 dS m^{-1}) decreased to 0.12 and 0.40 m, respectively, at the highest salinity (6.5 dS m^{-1}). These results

represent reductions of 3.9 and 5.0% per unit increase in ECsol. Under conventional management (M1), there was no satisfactory linear or quadratic adjustment for these variables, but the results observed in both types of management were similar, with mean PD and TC values of 0.13 and 0.45 m, respectively. The variables PD and TC exhibited a similar response because the increase in pulp diameter leads to the transverse circumference increase of the fruit.
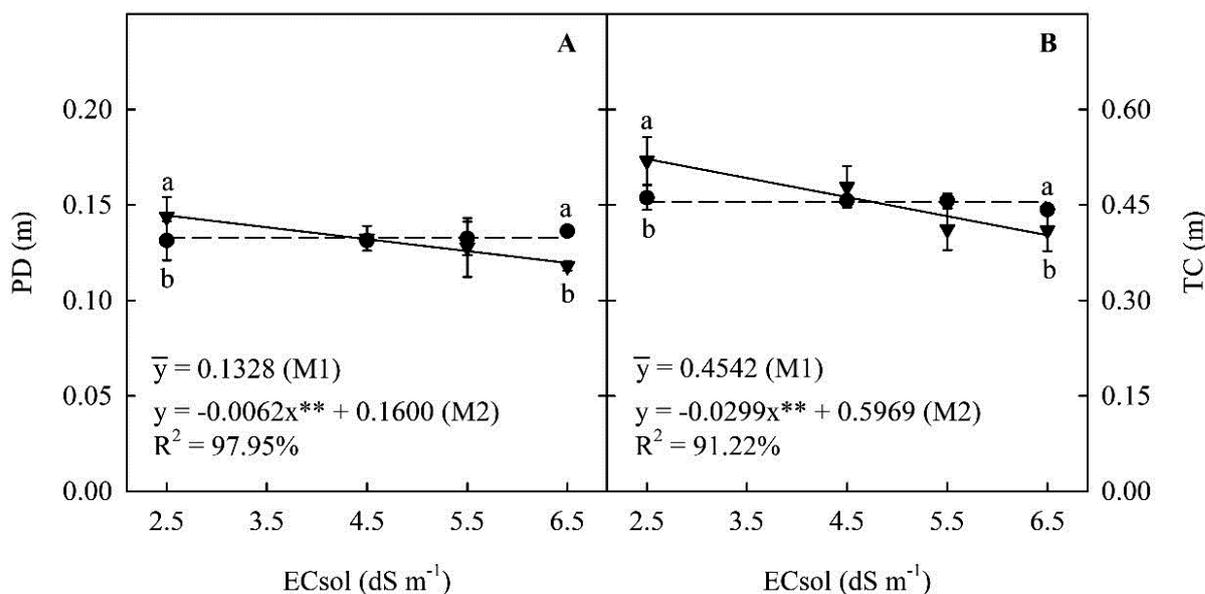

Figure 2. Pulp diameter – PD (A) and transverse circumference – TC (B) of fruits of mini watermelon cv. 'Sugar Baby' grown in a greenhouse under different electrical conductivities of the nutrient solution (ECsol) used in fertigation. Means of four replicates and standard deviations.

The data also showed that under pulse management the values of PD and TC were higher in the control treatment, while the conventional management led to higher values in the 6.5 dS m^{-1} treatment. The results obtained at low ECsol indicate that shorter irrigation interval guarantees a favorable growth of the crop, as it enables a balanced supply of water and nutrients throughout its cycle (MADANE et al., 2018; ZAMORA et al., 2019). For some authors, the process of water redistribution is more associated with soil or substrate characteristics than with water application characteristics (SKAGGS; TROUT; ROTHFUSS, 2010). However, for Morillo et al. (2015), the use of pulse irrigation becomes a viable alternative for the irrigation management of soils with high porosity as this strategy tends to reduce losses due to deep percolation. Almeida, Lima and Pereira (2015) observed that there was a greater development of surface roots in the superficial layer of the soil, which is attributed to the effect of pulse irrigation, and pointed out that the higher frequency of water application favors yield. It is worth remembering that the substrate used in the

present study also has high porosity, which explains the results observed.

In contrast, under high ECsol, no positive effect of pulse irrigation was observed on the variables PD and TC, which may have resulted from a greater accumulation of salts in the surface part of the substrate due to the slower application of water per unit of time. Under conventional management, there was higher water application per unit of time, promoting better growth under conditions of high water salinity, due to the formation of a larger wet bulb, diluting the content of salts present and transporting them to the periphery of the wet bulb, reducing negative effects of salinity on plants (RHOADES; KANDIAH; MASHALI, 1992).

For a palatable fruit such as mini watermelon, the ratio between total soluble solids and total titratable acidity is a very important characteristic, as it defines the fruit maturity index (CHITARRA; CHITARRA, 1990). (Figures 3 and 4) show the effect of both factors studied on the variables total titratable acidity and maturity index.
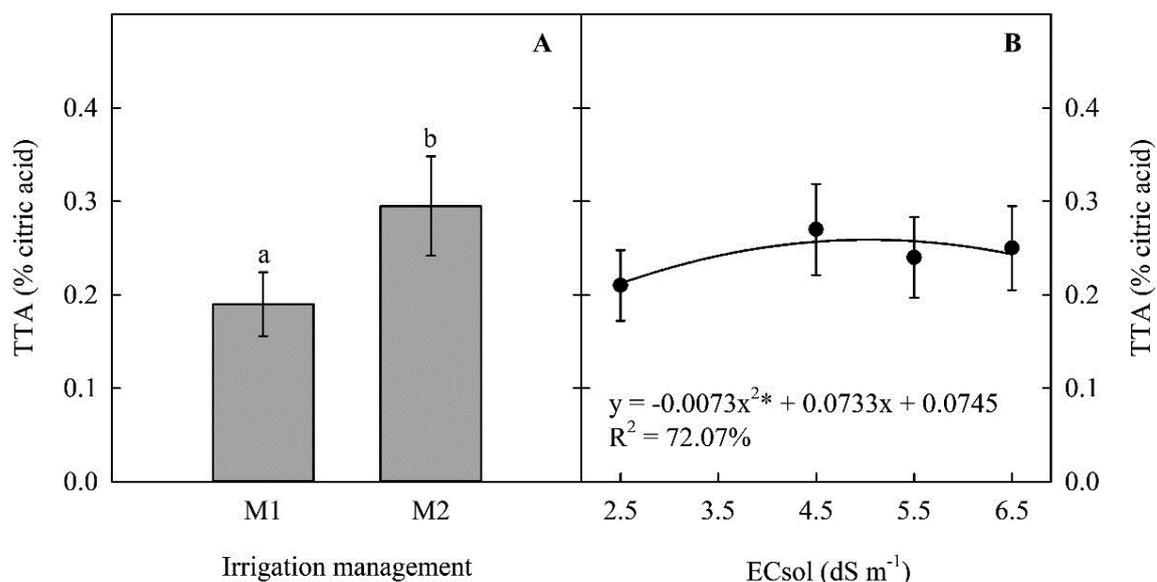
Figure 3. Total titratable acidity – TTA of fruits of mini watermelon cv. 'Sugar Baby' grown in a greenhouse under conventional drip - M1 or pulse drip - M2 irrigation management (A), and different electrical conductivities of the nutrient solution (ECsol) used in fertigation (B). Means of four replicates and standard deviations.

TTA responded significantly to both types of management (Figure 3A) and the salinity of irrigation water (Figure 3B), reaching the value of 0.29% under pulse management and 0.19% under drip management. For the same cultivar (cv. 'Sugar Baby'), under conventional cultivation, Lima Neto et al. (2010) found results higher than those observed in the present study (0.78% citric acid). Therefore, the different irrigation managements and cultivation conditions may alter TTA.

In relation to salinity, there was a quadratic response in TTA with the increase in the ECsol of the fertigation. TTA increased up to 0.26% at salinity of 5.2 dS m^{-1}, with subsequent reductions (Figure 3B). The effect of salinity on the increase in acidity may be due to the reduction of water accumulation in fruits, as observed by Mitchell et al. (1991) in tomato fruits under salt stress, which was not attributed to the synthesis of organic solutes. This response was also observed in the melon cultivar Orange Flesh subjected to salinity (GURGEL et al., 2010).

It was observed that the MI also responded to the types of management (Figure 4A) as a function of the salinity levels of irrigation water (Figure 4B). Conventional drip management led to the best maturity index (58:1), which is higher than that obtained under pulse management (38:1) (Figure 4A). Considering that TSS values were not influenced by irrigation management, this response is directly associated with the lower TTA obtained under drip management.
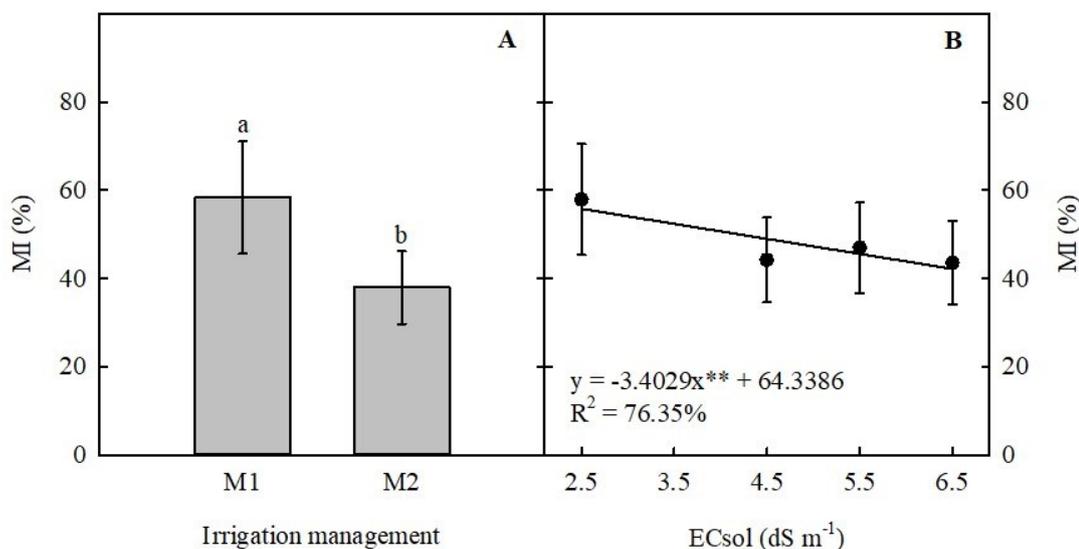

Figure 4. Maturity index (MI) of fruits of mini watermelon cv. 'Sugar Baby' grown in a greenhouse under conventional drip - M1 or pulse drip - M2 irrigation management (A), and different electrical conductivities of the nutrient solution (ECsol) used in fertigation (B). Means of four replicates and standard deviations.

Regarding the effect of salinity on MI, there was a reduction of 6.26% per unit increase in fertigation ECsol (Figure 4B). The results obtained in this study are similar to those reported by Dias et al. (2005) in melon and similar to those found by Cecílio Filho and Grangeiro (2004) in the triploid watermelon 'Shadow' (46:1 to 51:1).

MI is a principal attribute of post-harvest and in some crops this ratio is well determined. In melon, for example, ratios greater than 25:1 indicate excellent quality (CRUESS, 1973) and, in watermelon, ratios between 27:1 and 30:1 are already considered excellent (GARCIA, 1998). Considering that, regardless of the salinity level used or the irrigation management adopted, the MI values in the present study varied between 38:1 and 58:1, the results indicate that it is possible to cultivate the mini watermelon 'Sugar Baby' under a drip system with fertigation ECsol of up to 6.5 dS m^{-1} without compromising fruit quality.

CONCLUSIONS

Salinity of up to 6.5 dS m^{-1} in the nutrient solution used in fertigation reduces fruit mass, rind mass and longitudinal circumference of mini watermelon cv. 'Sugar Baby', but does not compromise the other production variables, pulp mass, pulp yield and fruit shape index. Salinity also does not compromise fruit quality assessed by pH, total soluble solids, total titratable acidity and maturity index. Under high salinity (6.5 dS m^{-1}), the conventional drip irrigation management is the most suitable, while the pulse irrigation management is indicated for low salinity.

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