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EFFECT OF DIFFERENT IRRIGATION LEVELS ON PRODUCTION, QUALITY AND STORAGE ABILITY OF CANTALOUPE (*CUCUMIS MELO* L.) GROWN UNDER POLYETHYLENE LOW TUNNELS IN A NEWLY RECLAIMED LAND.

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ABSTRACT: A field experiment was conducted under transparent polyethylene low tunnel cultivation which furnished with drip irrigation during the two winter seasons of 2003 and 2004. The study was carried out at Borollous area which represents the circumstance and conditions of coastal zone of North Nile Delta. The objective of the investigation was to find out the effect of watering with 0.6, 0.8 and 1.0 Et_0 on yield and yield components and post-harvest performance of cantaloupe.

Data revealed that irrigation with 0.6 Eto is the most suitable watering level for cantaloupe in such area as using. This level gave; highest yield, least water applied, highest productivity per each unit of applied water, and least water required to produce a unit of cantaloupe crop. In addition, this level produced the most vigour vegetative growth of cantaloupe plants.

Weight loss and decay percent increased with increasing irrigation level. Thus using the lower level of irrigation water (0.6 Et_0) produced firmest fruits and highest of flesh dry matter and T.S.S. content.

Also, fruits harvested from plots received the lowest irrigation level (0.6 Et_0) showed the best keeping quality during storage (12°C and 95% RH).

Key words: Drip irrigation, Cantaloupe, Dry matter, Low tunnel.

INTRODUCTION

Cantaloupe is one of the most important vegetable crops in Egypt as well as world wide. It is used for local consumption and also for exportation to many European countries. In the recent decades, a rapid growth in the cultivated area of cantaloupe has been observed. The cultivated area was 53036 fed. in 1999 and increased to 60941 fed. in 2001 (1 fed.= 0.42 ha.). In general, most of its cultivated area are presented in the sandy new reclaimed land.

In Egypt, irrigation is the main sector in water allocation, which consumed about 85% from total water budget. In addition, Per capita share per annum from water for different purposes is less than the poverty edge of 1000m3. Moreover, this level is continuously decreasing due to the rapid growth of nation's population with almost a fixed amount of water, which received from the river Nile. So, in this regard, a drop of water becomes vital and should be treated and consumed carefully owing to get the maximum benefits out of it. Meaningfully, a drop of water is the main input factor in cop production. Regarding Borollous area which is considered as one of the main coastal areas of north Nile Delta region has specific features such as, its soil is sandy in texture with shallow water Table (50cm), high relative humidity and high rainfall of about 200 mm. It should be stated that Egypt is notified as dry country i.e. seasonal rainfall is less than 250 mm.

In addition, due to the sever conditions in some months of winter season such as high wind speed, cold weather conditions and rainfall at Borollous, it is useful to insert the low tunnel cultivation technique to avoid the negative use of unfavorable weather conditions during the early stages of cantaloupe growth. Many investigators studied the effect of water irrigation levels on the growth, yield and fruit chemical composition of cantaloupe. Chander and Mangal (1983) used four moisture regimes of irrigation namely 0.3, 0.6, 0.9 and 1.2 PEC. They found that 0.9 and 1.2 PEC improved plant length, stem diameter, number of branches and leaf width of muskmelon. They noticed also that all these growth characters were reduced significantly under low irrigation rates (0.3 and 0.6 PEC). Same results were found by Beese *et al.* (1982), Ferreyra *et al.* (1985) on pepper and EL-Beltagy *et al.* (1984) on tomato. Pew and Gardner (1983) found that muskmelon irrigated with soil moisture tensions at 25 cm depth reached 50 or 75 Kpa gave the highest yield, largest fruit and earliest maturity compared with 25 Kpa, while the drier treatments were higher in soluble solids. Bogle and Hartz (1986) found that with the application of 20, 40 and 60% of available soil water depletion, the muskmelon yield was increased with increasing the water application regime. Hegde (1987) found that the highest dry matter production on fruits, fruit yield and mineral uptake were obtained by increasing irrigation frequency to 25Kpa in comparison with 75 Kpa. Water use efficiency increased with decreasing irrigation frequency stress of 75 Kpa at 15 cm depth in watermelon plants. Yadov *et al.* (1989) found that the maximum number of edible watermelon fruits/plants, TSS, vine length and yield were recorded with frequent irrigation at 83%mm (Cumulative pan evaperation, CPE) compared with 62.5, 125 and 250%. The water use efficiency was highest with irrigation at 83% mm (CPE) and it was the lowest with 62.5% (CPE).

The impact effect of irrigation level on the fruit quality of vegetables has been reported by several investigators. Omar *et al* (1976) found that irrigation tomato plants with the lowest amount added, resulted in an increase in fruit firmness, total soluble solids, and decrease in decay percentage and loss in weight. Srinivas *et al* (1989) indicated that frequent irrigation with 100% evaporation replenishment resulted in highest watermelon fruit yield, dry matter and total soluble solids. Cyu *et al.* (1995); Whoom *et al.* (1997) and Hosny *et al.* (2001) found that the higher values of total soluble solids and fruit firmness were obtained from watermelon plants which supplied with low amounts of irrigation water.

* Concentration of soluble solids in melon is affected by manu factors, including. Soil, moisture (wells and Nugent 1980), However, effects of environmental conditions and genetic factrs on sugar concentrations, firmness and color have not been well documented.
* Melon can be held at 5^0C for 28 days (Abd EL-Hady 2001; and Ezzat (2002). When melons stored for longer period or at to low temperature, they deteriorate (decy, surface breakdown, softening or off flavour . (Hardenburg *et al.,* 1986).

Firmness loss and Microbial spoilage were the principal causes of quality loss in melon stored in air at low temperature (Madrid and Cantwell, 1993 and Radove *et al.,* 2002).

Therefore, the main objective of this study was to find out the impact of irrigation on yield and quality of cantaloupe beside fruit quality during storage. Specific goals were: determination of cantaloupe water requirements, crop yield per each unit of applied water, yield components as affected by irrigation water amount and role of it on post harvest parameters.

MATERIALS AND METHODS

An Experiment was carried out at Borollous site, Kafr EL-Sheikh Governorate, north Nile Delta region during the two successive seasons of 2003 and 2004. Borollous area is situated at 31°-33' N Latitude, 31°-06' E longitude and represents the condition and circumstances of coastal area of the Nile Delta region. Soil was sandy in texture (Table 1) with shallow water table. Cantaloupe (Cucumis melo var. reticulatus) seeds of Ideal F_1 hybrid were sown on 2^{nd} of January in 2003 and 2004.

Table (1): Chemical and physical analyses of the soil at Borollous.

	Ec	CaCo3	PPm		Cations meq			Anions meq			Mechanical Analysis			
	dS/m	%	N	P	K^+	Ca^{++}	Mg^{++}	Hc_{03}^-	$C1^-$	$So4^-$	Sand %	Silt %	Clay %	Texture
8.20	1.5	4.50	Traces	0.46	1.52	2.55	1.30	1.87	2.10	1.40	88	5	7	Sandy Soil

Base dressing fertilization was added according to the recommendations of Ministry of Agriculture and land reclamation (MALR). Drip irrigation was the implemented system of irrigation, which was furnished underneath the low tunnel. Laterals of the system were spaced 1.5 m apart with 0.5 m between drippers. Each dripper with discharge of 4L/hr. was assigned to irrigate a single plant. Meaningfully, the seeds were sown nearly the drippers.

2-1 Experimental layout

The experiment was consisted of three strips and three irrigation treatments. Each strip has been labeled for a specific level of applied irrigation water. Each A strip contained three replicates and each replicate consisted of 10 rows (each 1.5 wide x 20m length 40 plants for each row. Before sowing, black plastic mulch of 1.2 m width was applied cover to rows. To enable the sowing process, holes were punched in the plastic mulch beside the drip emitters. To establish the low tunnels, clear polyethylene of 60 micron thickness was stretched over the hoops after sowing and kept closed until the completion of seedling emergence.

Ventilation of low tunnels started from seedling emergence till about mid March at which the outdoor climate become warm and more suitable for cantaloupe growth thereafter polyethylene low tunnels was removed. Fertigation started from seedling emergence till the end of harvesting .

2-2 irrigation treatments:

Three irrigation levels were studied, each level of applied water was adjusted to a specific strip. Irrigation treatments were labeled as low, moderate and high ones, which resulted in the same order of soil moisture status. Irrigation regime was computed based on different level of reference evapotranspiration (Eto) as follows:

- Treatment A was irrigated with 0.6 Eto.
- Treatment B was irrigated with 0.8 Eto
- Treatment C was irrigated with 1.0 Eto

2-2.1 Reference evapotranspiration (Eto):

Reference evapotranspiration (Eto) was computed according to Hargreaves *et al.*, method (1985):

$$Eto = 0.0023\ Ra.\ TD^{0.5}\ (Ta + 17.8)$$

Where:

Eto = reference evapotranspiration from grass in same units as Ra

Ra = obsolute radiation, values of Ra were recorded by Rijtema and Abou-Khaled (1975) at Baltim (Borollous) area.

TD = average daily temperature difference = (T max – T min), ^{0}C.

Ta = mean daily temperature = (T max + T min)/2.

Maximum and minimum temperatures were recorded daily in the site using Max. and min. thermometer. Hargreaves equalion is one the most suitable methods in Et_0, especially in arid and semi arid areas. It should be noticed that the applied irrigation water was recorded by water–meter which installed at the inlet of each strip within drip irrigation system.

2-2.2 Water utilization efficiency (W.U.E., kg./m³).

It was calculated according to Doorenbos et al. (1979):

$$\text{W.U.E.} = \frac{Y}{\text{W. a.}}$$

Y = Yield

W.a. = water applied

2-2.3 Statistical design:

Complete randomized blocks design was adopted. Data were adjusted to L.S.D. variance (Snedecor and Cochran, 1980).

2-3 Data collection:

The obtained data were classified as follows:

2-3.1 Vegetative growth parameters:

Random samples of 10 plants from each replicate were chosen at flowering stage (about 67 days after sowing) and measurements were taken on the following.

1-1 Plant length (cm.).
1-2 Number of branches / plant.
1-3 Number of leaves / plant
2-3.2 Fruit characteristics :
2-3.2.1 Average fruit height .
2-3.2.2 Fruit length, cm.
2-3.2.3 Fruit diameter, cm.
2-3.2.4 Flesh thickness, cm.
2-3.2.5 T.S.S. by using hand refractometer.
2-3-2 Total yield.
2-3-3.1 Total yield per plant, kg.
2-3.3.2 Total yield, ton / feddan.
2-3.3 Post harvest performance:

Cantaloupe fruits at ripe stage were picked and transferred to the laboratory of Vegetable Handling Department, Horticulture Research Institute (HRI), at Giza Governorate. Three healthy fruits from every replicate were chosen and put in a carton box as one replicate. The fruits were stored under cold storage i.e. at 5^{0}C, and 95% R.H. Samples were taken at random from three replicates for each treatment and examined at eight days intervals.

The following data were recorded:

2.3.4.1. Weight loss / fruit %.
2.3.4.2. Fruit decay

was determined at every eight days during storage and was evaluated on a scale of 1= none, 2 = slight, 3 = moderate, 4 = moderately severe and 5 = severe decay.

2.3.4.3. Flesh firmness (Newton).

2.3.4.4. Total soluble solids %.

2-3-4-5 Dry matter percentage.

2-3-4-6 Titratable acidity, mg./100g. fresh weight. Total titratable acidity as mg/100g fresh weight according to A.O.A.C., 1980.

2-3-4-7 Total sugar, mg./100g. on fresh weight basis according to Somogyi (1952) and Nelson (1974).

2.4- Fruit storage ability and its characters.

Cantaloupe fruits at green yellowish stage on 29th and 25th of April in the first (117 days from sowing) and second seasons (113 days) respectively were picked and transferred to the laboratory of post harvest and handling of vegetable crops department, Horticulture Research Institute, at Giza Governorate.

Healthy fruits were chosen, six to eight fruits were packed in 5 kg weight carton box as one replicate. Factorial experiment (irrigation levels x storage period) in complete randomized blocks design with four replications was used. Then the fruits were stored in a refrigerated cold storage at 5°C, 95% RH.). Samples were taken at random for each treatment and examined every 7 days intervals.

RESULTS AND DISCUSSION

Vegetative parameters:

It is clear from the data in Table (2) that plant length and leaf number were significantly decreased with the increase of the applied water irrigation level, however number of branches was not affected by different treatments. This was true in both seasons of study. The obtained data agreed with those of Bogle and Hartz (1986) on muskmelon, Chander and Mangal (1983) on muskmelon.

Table (2): Effect of different levels of irrigation water on vegetative growth of cantaloupe plants grown at Borollous site in both seasons of 2003 and 2004.

Treatments	2003 season			2004 season		
	Plant length (cm.)	No. of branches / plant	No. of leaves / plant	Plant length (cm.)	No. of branches / plant	No. of leaves / plant
A = 0.6 Et_0	149.3	4.0	118.0	142.7	4.3	115.0
B = 0.8 Et_0	140.7	4.4	107.7	131.7	4.5	107.7
C = 1.0 Et_0	131.0	4.6	102.0	117.3	4.6	102.3
L.S.D. 5%	1.9	N.S.	5.3	4.4	N.S.	2.6

Fruit characteristics

Data in Table (3) show that average fruit weight was highest with the low level of irrigation water i.e., watering with 0.6 Eto compared with the other irrigation levels in the two years of study. Fruit length was not affected by irrigation level whereas fruit diameter was decreased by increasing level of irrigation. Flesh thickness was greatest with the low level of irrigation but differences were significant only in the first year. Similarly, T.S. S. followed the same trend as the impact of the low irrigation level resulted in higher T.S.S.

Total Yield:

Table (3) indicated that irrigation water level had a significant effect on total yield of cantaloupe plants. Increasing irrigation water level resulted in significant reduction in total yield. Thus, low watering level of 0.6 Eto gave significantly the highest total yield. This was true in both seasons of sudy. So, it might be concluded that due to the specific features of this area along with cultivation under low tunnels with black mulch are principal factors to reduce the amount of water required to irrigate cantaloupe in Borollus. In other words, the features of coastal area of high relative humidity, rain fall, cold weather, shallow water table and enclosed system of the low tunnel which implemented with black plastic mulch led to keep the soil moisture and decrease the need to apply more irrigation water. Therefore, irrigation with 0.6 Eto is coincided with the highest values of vegetative growth, yield and fruit characters. In addition using this system saved pronounced amount of water compared with the two other irrigation treatments of watering i.e., 0.8 and 1.0 Eto.

Same results were obtained by Pew and Gardner (1983), Bogle and Hartz (1986) on Muskmelon.

Table (3): Effect of different levels of irrigation water on fruit characteristics and total yield of cantaloupe plants grown at Borollous site in both seasons of 2003 and 2004.

Treatments	2003 season							2003 season						
	Average fruit weight (g.)	Fruit length (cm.)	Fruit Diameter (cm.)	Flesh Thickness (cm.)	T.S.S.	Total yield per plant (kg.)	Total yield per feddan /Tom.	Average fruit weight (g.)	Fruit length (cm.)	Fruit Diameter (cm.)11.6	Flesh Thickness (cm.)	T.S.S.	Total yield per plant (kg.)	Total yield per feddan /Tom.
A = 0.6 Eto	1315.7	12.3	12.5	2.7	13.7	3.4	19.153	1065.8	11.6	11.6	2.7	13.8	3.2	17.672
B = 0.8 Eto	1151.1	11.5	12.4	2.5	13.3	2.6	14.612	989.5	11.3	11.3	2.5	13.1	2.4	13.297
C = 1.0 Eto	1015.5	11.2	10.9	2.4	12.0	1.9	10.580	883.2	11.2	11.1	2.5	11.7	1.9	10.392
L.D.D. 5%	189.5	N.S.	0.9	0.2	N.S.	0.5	2.8	62.4	N.S.	N.S.	N.S.	0.8	0.4	1.935

Crop water functions:

a- Water applied

Seasonal water applied (W.a.) consists of irrigation water (I.W.) plus effective rainfall (Rfe), which equals 0.8 from the total RF. As shown in Table (4) mean seasonal I.W. which applied for the different treatments are 1080.9, 1439.4 and 1799.2 m3/fed. or 25.7, 34.3 and 42.8 cm for treatments A, B and C respectively. The stated treatments were irrigation with 0.6, 0.8 and 1.0 Eto respectively.

The mean seasonal Rfe is equaled 431.8m3/fed. So, the total water applied under the studied different irrigation regimes are 1512.3, 1870.6 and 2230.6 m3/fed. respectively. The portion of I.W. is equaled 71.5, 77.0 and 80.7% for treatments A, B and C respectively.

b- Water utilization efficiency (W.U. E., kg./m3)

Water utilization efficiency (W.Ut.E.) is might be defined as the crop water productivity and reflects the capability of applied water in cops production. The magnitude of W.Ut.E. is a function of the crop yield as nominator and applied water as dominator.

So, mean values of W.Ut.E. for the two seasons as presented in Table (4) are 12.2, 7.5 and 4.7 kg/m3. Therefore it could be stated that by increasing the applied water, values of W.Ut.E. will be decreased. This finding could be attributed that, water applied is the dominator of such crop –water function. In the same direction, to produce one kg of cantaloupe, an amount of 82.0, 133.0 and/ or 213.0 liter under treatments A, B and C respectively.

c- Water applied per plant.

As shown in Table (4), the mean applied water for an individual cantaloupe plant during its growing season is 270.0, 334.0 and 398.5 liter under watering with 0.6, 0.8 and 1.0 Eto of treatments A, B and C respectively. The stated values are the summation of 193.1, 257.2 and 321.6 liter as irrigation water and the rest is rainfall for the lested treatments, respectively.

Table (4): Water utilization efficeiency (W.Ut. E., Kg.lm3), and water applied per plant under different irrigation treatments in the two seasons of 2003 and 2004.

Parameters Treat.	Yield kg/fed.	Seasonal water applied: Irrigation water M^3/fed.	Seasonal water applied: Rain fall M^3/fed.	Total water applied	W.UT.E.	W.a per plant
			a- 2003 season			
A = 0.6 Eto	19153	1101.7	426.0	1527.7	12.5	0.273
B = 0.8 Eto	14612	1468.9		1894.9	7.7	0.338
C = 1.0 Eto	10580	1836		2262.1	4.7	0.404
			b- 2004 season			
A= 0.6 Eto	17672	1060.0	436.8	1496.8	11.8	0.267
B = 0.8 Eto	13297	1409.8		1846.6	7.2	0.330
C = 1.0 Eto	10392	1762.2		2199.0	4.7	0.393

* No. of plants per feddan = 5600

Effect of irrigation levels on some properties of cantaloupe fruits during storage.

Weight loss %:

The lowest irrigation water amount (0.6 Et_0) gave significantly the lowest weight loss percentage in the two seasons of study (Table 5). Weight loss increased significantly with increasing irrigation water level.

Decay:

Regarding decay score, data in Table (5) show that the values of decayed fruits were higher when irrigation with 1.0 Et_0 was used than the other irrigation treatments i.e. 0.6 or 0.8 Et_0 in both seasons.

Flesh firmness:

Data in Table (5) indicated that fruit flesh firmness significantly increased with the low amount of irrigation. However, irrigation with 0.6 Et_0 had significantly the highest flesh firmness (17.51N) compared to irrigation with 0.8 Et_0 (15.91N) or irrigation with 1.0 Et_0 (15.52N) in the first season (2003). The same trend was also noticed in the second season (2004). These results are in harmony with that reported by Omar *et al* (1976) on tomao and Cyu *et al.* (1995).

Dry matter

Data presented in Table (5) indicated that irrigation level significantly affected dry matter content of cantaloupe fruit, irrigation with 0.6 Et_0 had the highest dry matter content followed by irrigation with 0.8 Et_0 and then irrigation with 1.0 Et_0 in the first season. Same trend was obtained in the second season. The obtained data a greed with Hegde (1987) and Srinivas *et al* (1989) on watermelon.

Table (5): Effect of irrigation levels on some physical and chemical properties of cantaloupe fruits during storage in 2003 and 2004 seasons.

Treatments	Weight loss (%)	Decay (score)	Flesh firmness (Newton)	Dry matter (%)	Total soluble solids (%) (T.S.S.)
		2003 season			
A = 0.6 Eto	[illegible]	1.25	17.51	7.67	12.63
B = 0.8 Eto	2.74	1.50	15.91	7.28	12.38
C = 1.0 Eto	3.17	1.67	15.52	6.59	11.07
L.S.D. at 0.05% level	0.02	N.S.	0.01	0.02	0.04
		2004 season			
A = 0.6 Eto	4.23	1.33	19.53	7.89	12.83
B = 0.8 Eto	4.57	1.42	17.39	7.46	12.02
C = 1.0 Eto	5.83	1.81	16.20	6.42	10.52
L.S.D. at 0.05% level	0.07	N.S.	0.14	0.03	0.04

Decay score rating: 1 = none , 2 = slight , 3 = Moderate, 4 = Moderately severe
5 = severe.

Total soluble solids (T.S.S.)

Data in Table (5) showed that T.S.S. significantly higher in fruit developed from plants supplied with low amount of irrigation water (irrigation with 0.6 Eto) in both seasons. Obtained results are in agreement with those reported by Yadov *et al.,* (1989); Cyu *et al.,* (1995) and Whoom *et al* (1997) on watermelon.

Fruit quality during storage:

Weight loss %:

Data in Table (6) indicated that extending the period of storage increased significantly the percentage of weight loss in both seasons. These results might be attributed to the increase in evaporation and respiration. These results agreed with those obtained by Ezzat (2002) on melon.

Decay:

Values of decayed fruits were increased with the prolongation of the period of storage. So that decayed scores reached 2.33 and 2.41 after 28 days of storage at 5°C in the first and second season, respectively (Table 6).

Similar results were obtained by Ezzat (2002) on melon fruits.

Flesh firmness:

The storage period affected significantly flesh firmness (Table 6). This was a progressive and constant decrease in flesh firmness of cantaloupe fruits with prolongation of the storage period in both seasons. These observation may be due to the conversion of protopectin to soluble pectin (Ryall and Lipton, 1979).

These results are in harmony with those obtained by Ezzat 2002, Madrid and Cantwell (1993) and Radove *et al.* (2002) on melon fruits.

Table (6): Effect of storage period on some physical and chemical characters of cantaloupe fruits during storage in 2003 and 2004 seasons.

Storage periods in days	Weight loss (%)	Decay (score)	Flesh firmness (Newton)	Dry matter (%)	Total soluble solids (%)
		2003 season			
At harvest	-	-	17.34	8.04	13.00
After 7 days	0.93	1.00	17.01	7.74	12.74
After 14 days	2.07	1.00	16.59	7.37	12.24
After 21 days	3.25	1.56	16.05	6.98	11.8
After 28 days	4.98	2.33	15.60	6.64	11.33
L.S.D. at 0.05%	0.02		0.02	0.03	0.06
		2004 season			
At harvest	-	-	20.18	8.25	12.87
After 7 days	1.87	1.0	19.39	7.90	12.54
After 14 days	3.99	1.0	18.03	7.50	11.94
After 21 days	5.82	1.67	17.11	7.07	11.61
After 28 days	7.82	2.41	16.28	6.56	11.07
L.S.D. at 0.05% level	0.09		0.18	0.04	0.05

Decay score rating: 1 = none , 2 = slight , 3 = Moderate, 4 = Moderately severe, 5 = severe.

Dry Matter %

Data presented in Table (6) indicated that the storage period significantly affected the dry matter content in cantaloupe fruits in the two seasons. Obtained results showed that, a slight decrease occurred as the time elapsed.

Total soluble solids % (T.S.S.%)

Data in Table (6) showed that (T.S.S.%) of cantaloupe fruits decreased gradually and significantly with the advanced storage period and reached its lowest value after 28 days of storage. These results might be due to the utilization of these compounds in respiration. These results are in harmony with those obtained by Ezzat (2002) and Yadov *et al.* (1989) on melon fruits.

Effect of interaction (irrigation level x storage period) on physical and chemical properties of cantaloupe fruits during storage.

Weight loss %:

Data in Table (7) Showed that the interaction (irrigation level x storage period) had insignificant differences on weight loss (%) in both seasons.

Decay score:

Data in Table (7) showed that the values of decayed fruits were higher in (Trt. C) than the other treatment (Tit. A x B) after 28 days of storage in both seasons.

Flesh firmness:

Data presented in Table (7) showed that the interaction between (irrigation level x storage period) had significant effect on flesh firmness. Irrigation with 0.6 Eto resulted in the highest flesh firmness, whereas the lowest values were obtained by using irrigation with 1.0 Eto after 28 days of cold storage. These results were true in the two seasons.

Table (7): Effect of the interaction between irrigation levels and the storage period on some physical and chemical characters of cantaloupe fruits during storage in 2003 and 2004 seasons.

Treatments	Irrigation levels x Storage period	Weight loss (%)	Decay (score)	Flesh firmness (Newton)	Dry matter (%)	Total soluble solids (%)
			2003 season			
A = 0.6 Eto	At harvest	-	-	18.35	8.52	13.7
	After 7 days	0.88	1.00	18.17	8.23	13.4
	After 14 days	1.78	1.00	17.8	7.96	12.92
	After 21 days	2.65	1.00	17.25	7.47	12.53
	After 28 days	4.72	2.00	16.82	7.05	11.67
B = 0.8 Eto	At harvest	-	-	17.25	8.14	13.30
	After 7 days	0.93	1.00	16.75	7.79	12.95
	After 14 days	1.94	1.00	16.1	7.38	12.49
	After 21 days	3.34	1.67	15.67	7.10	12.01
	After 28 days	4.74	2.33	15.11	6.85	11.60
C = 1.0 Eto	At harvest	-	-	16.41	7.48	12.00
	After 7 days	0.99	1.00	16.1	7.20	11.86
	After 14 days	2.48	1.00	15.87	6.76	11.31
	After 21 days	3.76	2.00	15.23	6.37	10.86
	After 28 days	5.46	2.67	14.87	6.02	10.27
L.S.D. at 0.05% level		N.S		0.05	N.S	0.17

Table (7): Cont.

Treatments	Irrigation levels x Storage period	Weight loss (%)	Decay (score)	Flesh firmness (Newton)	Dry matter (%)	Total soluble solids (%)
			2004 season			
A = 0.6 Eto	At harvest	-	-	22.53	8.86	13.8
	After 7 days	1.69	1.00	21.63	8.51	13.67
	After 14 days	3.44	1.00	20.07	8.11	12.83
	After 21 days	5.07	1.33	18.70	7.69	12.67
	After 28 days	6.71	2.00	17.70	7.25	12.13
B = 0.8 Eto	At harvest	-	-	19.70	8.41	13.10
	After 7 days	1.87	1.00	18.73	8.08	12.75
	After 14 days	3.68	1.00	17.75	7.72	12.20
	After 21 days	5.38	1.33	16.77	7.29	11.82
	After 28 days	7.34	2.33	16.30	6.74	11.33
C = 1.0 Eto	At harvest	-	-	18.30	7.49	11.70
	After 7 days	2.06	1.00	17.80	7.11	11.20
	After 14 days	4.84	1.00	16.27	6.67	10.80
	After 21 days	6.99	2.33	15.87	6.21	10.33
	After 28 days	9.40	2.89	14.85	5.68	9.73
L.S.D. at 0.05% level		N.S.		0.55	N.S	0.16

Dry matter:

With respect to dry matter contents data in Table (7) revealed that the interaction between irrigation level x storage period had no significant effect on such character in both seasons.

Total soluble solids (TSS%):

The data in Table (7) showed that there were significant interaction (irrigation level x storage period). Irrigation with 0.6 Eto had relatively higher T.S.S. content compared with other irrigation levels, (0.8 or 1.0 Eto) after 28 days of storage, these results are similar in the second season.

Conclusions:

It can be concluded that watering with 0.6 Eto proved to be the most convenient level of irrigation compared with the other two irrigation levels i.e., 0.8 and 1.0 Eto. due to the following advantages:

- Induced the highest yield of 18.4 ton/fed.
- The least in water applied of 1512.3m3/fed., 71.5 percent of this amount is irrigation water of about 1081.0m3/fed. and the rest is rainfall.
- The highest in crop production per each unit of applied water. About 12.0kg cantaloupe could be produced from one m3 of applied water.
- So. One kg cantaloupe required an amount of 82.0 liter of water applied.
- An individual plant of cantaloupe required (270.0 liter) to complete its growing season. Out of it, 193 liter as irrigation water.
- This amount of watering resulted in taller plants, greater number of leaves, higher yield and better fruit characteristics.
- The best watering regime on yield components such as: fruit length, diameter, flesh thickness and T.S.S.

These findings of the least amount of irrigation water (0.6 Eto) which associated with the all mentioned advantages in Borollous might be attributed to the specific features of the area of: high rainfall, high relative humidity and shallow water table. These factors contributed effectively in crop water needs which resulted in decreasing the irrigation water that should be applied.

At the end, it can be concluded that low irrigation rate (0.6 Et_0) had significantly positive effect on cantaloupe fruits stored at 5°C and 95% relative humidity. It is worth to mention that saving water resulted in higher yield, better fruit quality and prolonged storage period.

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تأثير المستويات المختلفة من الرى على الإنتاج والجودة والقدرة التخزينية للكنتالوب المنزرع تحت الأنفاق البولى إيثلين فى الأرض المستصلحة

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الملخص العربى

أجريت تجربتين حقليتين تحت ظروف الأنفاق البولى إيثلين بنظام الرى بالتنقيط فى الموسم الشتوى لعامى ٢٠٠٣- ٢٠٠٤ وذلك فى منطقة البرلس الواقعة تحت ظروف المنطقة الساحلية لشمال الدلتا لدراسة تأثير معدات الرى بـ ٠,٦ – ٠,٨ – ١ (بخر – نتح) على المحصول والجودة والقدرة التخزينية للكنتالوب.

أوضحت النتائج أن الرى بمعدل ٠,٦ (بخر – نتح) هو المعدل المناسب لرى الكنتالوب تحت ظروف منطقة البرلس حيث أعطى أفضل نتائج من حيث إنتاجية المحصول بالنسبة لأقل مياه المضافة، كما أنه أعطى أقل احتياجات مائية بالنسبة لوحدة الكنتالوب.

وبالتالى يعتبر هذا المعدل ٠,٦ (بخر – نتح) من أفضل معدلات الرى فى هذه المنطقة لزراعة محصول الكنتالوب.

وقد وجد أن معدل الرى بمعدل ٠,٦ (بخر – نتح) أقل معدل فى الفقد فى الوزن ونسبة التالف وكما أظهرت أعلى مستويات الجودة والصلابة والمواد الصلبة الذائبة والمادة الجافة بالنسبة لباقى المعاملات (٠,٨ – ١ بخر – نتح).

كما أظهرت النتائج أن معدل الرى المنخفض ٠,٦ (بخر – نتح) أعطى تأثير أيجابى على ثمار الكنتالوب المخزن عن ١٢° و ٩٥% رطوبة نسبية من حيث المحصول وجودة الثمار وطول فترة التخزين.