# Effect of Spraying Ascorbic Acid, Citric Acid and Yeast on Vegetative Growth, Yield and Fruit Quality of "Florda prince" Peach Grown in New Reclaimed Land

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## ABSTRACT

The present experiment has been conducted during the two seasons of 2009 and 2010 on 9-years old "Florda prince" peach trees budded on "Nemagurd" rootstock grown in sandy new reclaimed land at EL-Nubaria, Behera Governorate. Treatments included ascorbic acid at 50 and 100 ppm, citric acid at 50 ppm and 100 ppm and yeast at 2 and 3 g/L were sprayed once at full bloom or twice at full bloom and after fruit set, also, each compound was sprayed alone. The results mentioned that, the treatments of ascorbic acid at 50 ppm, citric acid at 50 ppm and yeast at 2g/L. increased significantly shoot length and leaf area as compared to the control (unsprayed trees). Also, the highest fruit yield was resulted from the application of yeast twice at 3 g/l, while the lowest fruit yield was gained from the control trees. Furthermore, in general, all treatments increased weight, dimensions, firmness, TSS, acidity %, T.S.S. / acid ratio, vitamin c and total sugars in fruits of "Florda prince" peach. However, the most effective treatment for increasing growth and yield as well as improving fruit quality was found from yeast at 3 g/L (twice application) in the two seasons of study as compared with the control treatment which recorded the lowest growth, fruit yield and quality values

***Key words**: Peach, Florda prince, Ascorbic Acid, Citric Acid, Yeast.*

## INTRODUCTION

Peach trees are widely spread in Nubaria region which is considered a new sandy soil reclaimed area. "Florda prince" is considered one of the important peach cultivars which succeeded in our local environmental conditions. It has many advantages as a lower chilling requirements, early bearing, high yield with good quality for fresh consumption and processing.

Ascorbic and citric acids are two natural and organic antioxidants which have auxinic action, they provided diseases control against most fungi infections on differential fruit trees (Elad, 1992), and these compounds have synergistic effect on improving growth and productivity of fruits (Farag, 1996). Ascorbic and citric acids spraying at 200, 300 and 400 ppm and active dry yeast at 3 g/L increased yield as kilograms/tree, fruit weight, pulp firmness, T.S.S. (%), ascorbic acid, starch (%) reducing sugars, non-reducing sugars, total sugars and total phenols of "Alphonse" and "Badami" mango fruits (Awad, 2006). Moreover, "Anna" apple fruit physical and chemical characteristics were improved by spraying citric acid at 0.1% at three times at growth start, just after fruit set and at 21 days later (Ahmed and Abd El-all, 2007).

The possibility of using the active dry yeast for improving growth and productivity of fruit crops was mentioned by Subba Rao (1984). Furthermore, Bakry and Wanas (2003) indicated that the applying of yeast at 100 ml/L + Kinetin at 20 ppm or yeast at 200 ml/L alone increased fruit yield and quality of "Amar" apricot. However, the various positive effects of applying active dry yeast as a newly used biofertilizer were attributed to its content of different nutrients, high percentage of proteins, large amount of vitamin B and the natural plant growth hormones namely cytokinins (Abd-Elmotty and Fawzy, 2005).

Therefore, this investigation was carried out during the two successive seasons of 2009 and 2010 in order to study the effect of spraying different rates of ascorbic acid, citric acid and active dry yeast applied once or twice applications at full bloom and after fruit setting on vegetative growth, fruit set, fruit drop, yield and fruit quality of "Florda prince" peach cultivar.

## MATERIALS AND METHODS

This study was carried out during two successive seasons of 2009 and 2010 at a commercial orchard at EL-Nubaria, Behera Governorate on 9-years old "Florda prince" peach trees (*Prunus persica* L. Batsch) grown on "Nemagurd" rootstock. The trees were chosen as uniform as possible, planted at 5×5m apart and growing in sandy soil under drip irrigation system, and fertilized with ammonium sulphate, superphosphate and potassium sulphate at the rate of 200, 75 and 150 Kg/faddan, respectively. Also, trees were sprayed with zinc sulphate (5%) at the first week of October for defoliating the leaves, and pruned during the first week of November with about 300 branches per tree. Also, hand thinning allowed removal of double, smaller, undesirable,

misshapen scard and injured fruits. It was made for all trees including the control during the first week of March. The trees under study did not receive any irrigation water during the period from mid September until the end of October.

Thirty-nine healthy peach trees nearly uniform as possible in growth vigor and productivity were chosen for this study. Tap water used for dilution and "Triton B" was applied at 1% to all spray solutions as wetting agent. Foliar spray was carried out using hand sprayer until drip point to dormant buds. Approximately 0.35 to 0.45 liters were required for adequate coverage on trees. The control treatment was sprayed with water containing "Triton B". Thirteen treatments were arranged in a randomized complete block design and each treatment was replicated three times. Each replicate consisted of an individual tree.

Each treatment was surrounded by buffer trees. The thirteen treatments were as follows:

1. Ascorbic acid at 50 ppm once spray at full bloom.
2. Ascorbic acid at 100 ppm once spray at full bloom.
3. Citric acid at 50 ppm once spray at full bloom.
4. Citric acid at 100 ppm once spray at full bloom.
5. Yeast 2g/L once spray at full bloom.
6. Yeast 3g/L once spray at full bloom.
7. Ascorbic acid at 50 ppm twice sprays at full bloom and after fruit set.
8. Ascorbic acid at 100 ppm twice sprays at full bloom and after fruit set.
9. Citric acid at 50 ppm twice sprays at full bloom and after fruit set.
10. Citric acid at 100 ppm twice sprays at full bloom and after fruit set).
11. Yeast 2g/L twice sprays at full bloom and after fruit set.
12. Yeast 3g/L twice sprays at full bloom and after fruit set.
13. Untreated trees (control).

The chemical composition of the used active Baker's dry yeast (*k*) was indicated in Table (1) according to the results obtained by Marwad *et al.* (2001).

The Baker's yeast solution was prepared by mixing of raw baker's with sugar and keeping them in water for fermentation at room temperature (25°C) for 24 hours allowing the release of growth substances according to the method of Skoog and Miller (1957). All trees were sprayed until run off (3-5 L/tree).

Four main branches as similar as possible were chosen at the four cardinal points of each treated tree, tagged and the average of the current shoot per selected branch was counted, the lengths were measured with (cm) on June, in both season.

Leaf area was determined using leaf area meter (Model ICI-203, CID, Inc, and U.S.A.).

At harvest time, i.e., early April yield of each treatment was recorded as yield weight/tree by the multiplying number of fruits × average weight of fruit.

Twenty mature fruits of each treatment were taken to determine the fruit characteristics including the average fruit weight (gm) and fruit dimensions (cm) as well as fruit firmness which was measured at two opposite sides on the equator of each fruit (skin removed) using pressure tester at 5/16 Inch plunger (Magness and Taylor, 1925). In fruit juice, total soluble solids percentages (T.S.S.%) was determined using a hand refractometer.

Total acidity was estimated as malic acid while vitamin C content was determined using 2,6-dichlorophenol indophenol dye according to the A.O.A.C. (1980). Total sugar content was determined according to the procedures outlined by Malik and Singh (1980), the starch % was determined according to Woodman (1941).

The obtained data were statistically analyzed according to Steel and Torrie, (1980) and the New L.S.D test was used to compare the differences between treatments means.

**Table 1: Chemical composition of Baker's compressed yeast.**

| | |
|---|---|
| Protein % | 34.87 |
| Carbohydrates % | 33.50 |
| Ash % | 7.50 |
| Glycogen % | 6.52 |
| Fats | 3.11 |
| Cellulose | 4.85 |
| **Approximate composition of minerals** | |
| Na | 0.13 mg/ g |
| Ca | 0.76 |
| Fe | 0.02 |
| Mg | 1.64 |
| K | 21.0 |
| P | 13.4 |
| Zn | 0.18 |
| Mn | 0.02 |
| **Approximate composition of vitamins** | |
| Thiamine (B1) | 2.26 mg |
| Riboflavin (B2) | 5.36 mg |
| Niacin (B4) | 35.96 mg |
| Vitamin (B6) | 4.37 mg |
| Vitamin (B12) | 0.017 mg |

## RESULTS AND DISCUSSION

**Vegetative Growth:**

**1. Shoot length:**

The effect of ascorbic acid, citric acid and yeast treatments on shoot length of "Florda prince" peach trees in 2009 and 2010 seasons are shown in Table (2). All treatments increased significantly shoot length as compared to the control (unsprayed trees) except the treatments of ascorbic acid at 50 ppm, citric acid at 50 ppm and yeast at 2g/L which sprayed one time at full bloom, during the two studied seasons. That result indicated that the applications of ascorbic and citric acids as well as yeast at different concentrations twice (at full bloom and fruit set) were more effective than using of the same substances one time at full bloom. The highest shoot length values (39.25 and 39.45 cm) were resulted from the treatment of yeast at 3 g/L (twice) as compared with the lowest shoot length (34.42 and 34.31 cm) which resulted from the control treatment in the first and second seasons, respectively.

The present results are in harmony with those of Suba Rao (1984) who cleared the possibility of using the active dry yeast for improving growth and productivity of fruit crops and those of Farag (1996) who indicated that antioxidants compounds (ascorbic and citric acids) have synergistic effect on improving growth and productivity of fruits. In addition the present results are in line with the previous report which explained the various positive effects of applying active dry yeast as a newly used bio-fertilizer (Abd-Elmotty and Fawzy, 2005).

**2. Leaf area:**

Results in Table (2) show the effects of studied treatments on leaf area of "Florda prince" peach trees in 2009 and 2010 seasons. All treatments increased significantly leaf area as compared to the control (unsprayed trees) except the treatments of ascorbic acid at 50 ppm, citric acid at 50 ppm and yeast at 2g/L which sprayed one time at full bloom, during the first studied season. In the second season, all treatments increased significantly leaf area as compared to the control (unsprayed trees). These results indicated that the applications of ascorbic and citric acids as well as yeast at different concentrations twice (at full bloom and fruit set) were more effective than using the same substances one time at full bloom. The treatment of yeast at 3 g/L (twice) gave the highest values (30.93 and 29.48 $cm^2$) as compared with control treatment which gave the lowest values (25.39 and 25.78 $cm^2$) in the first and second seasons, respectively.

As mentioned above the present results are in line with those of Suba Rao (1984) who cleared the possibility of using the active dry yeast for improving growth and productivity of fruit crops and those of Farag (1996) who indicated that antioxidants compounds (ascorbic and citric acids) have synergistic effect on improving growth and productivity of fruits. In addition, Abd-Elmotty and Fawzy (2005) working on mango explained the various positive effects of applying active dry yeast as a newly used bio-fertilizer.

**Table 2: Effect of two organic acids and yeast treatments on shoot length and leaf area of "Florda prince" peach trees in 2009 and 2010 seasons.**

| Treatments | Shoot length (cm) | | Leaf area ($cm^2$) | |
|---|---|---|---|---|
| | 2009 | 2010 | 2009 | 2010 |
| **Once application** | | | | |
| Ascorbic acid 50 ppm | 35.21 | 35.37 | 26.28 | 26.92 |
| Ascorbic acid 100 ppm | 36.48 | 36.25 | 27.65 | 27.21 |
| Citric acid 50 ppm | 35.46 | 35.25 | 26.25 | 26.89 |
| Citric acid 100 ppm | 36.47 | 36.23 | 27.69 | 27.30 |
| Yeast at 2g/L | 35.70 | 35.69 | 28.10 | 27.98 |
| Yeast at 3g/L | 37.18 | 37.45 | 29.01 | 28.14 |
| **Twice applications** | | | | |
| Ascorbic acid 50 ppm | 37.16 | 36.46 | 28.57 | 27.23 |
| Ascorbic acid 100 ppm | 37.97 | 37.85 | 28.73 | 28.64 |
| Citric acid 50 ppm | 37.21 | 36.42 | 28.51 | 27.20 |
| Citric acid 100 ppm | 37.86 | 37.90 | 28.75 | 28.62 |
| Yeast at 2g/L | 37.11 | 36.66 | 29.04 | 28.36 |
| Yeast at 3g/L | 39.25 | 39.45 | 30.93 | 29.84 |
| Control (untreated) | 34.42 | 34.31 | 25.39 | 25.78 |
| New L.S.D. at 5% | 1.75 | 1.62 | 1.85 | 1.12 |

**Fruit Yield:**

Results in Table (3) reveal the effect of two organic acids and yeast treatments on yield (Kg./tree) of "Florda prince" peach trees in 2009 and 2010 seasons. Results revealed that, one time application of ascorbic acid, citric acid and yeast did not increase fruit yield (Kg./tree) on one hand, while the treatment of yeast at 3 g/L which increased significantly fruit yield as compared to the control in both seasons, on the other hand. All twice applications of the tested substances increased significantly fruit yield as compared to the control. The highest fruit yield (73.14 and 74.31 kg./tree) resulted from the twice application of yeast at 3 g/l as compared to the lowest fruit yield (66.00 and 66.65 kg./tree) for the control trees, in the two studied seasons, respectively.

The present results are in harmony with those of Bakry and Wanas (2003) who indicated that the applying of yeast at 100 ml/L + Kinetin at 20 ppm or yeast at 200 ml/L alone increased fruit yield of "Amar" apricot. Moreover, Awad (2006) on mango and Ahmed and Abd El-all (2007) on "Anna" apple fruits found the same trend of results using different natural preharvest treatments.

**Fruit Characteristics:**

**1. Fruit weight:**

The effects of ascorbic acid, citric acid and yeast treatments on fruit weight (g) of "Florda prince" peach trees in 2009 and 2010 seasons are illustrated on Table (3). Most treatments of ascorbic acid, citric acid and yeast (once or twice applications) at different concentrations increased significantly fruit weight as compared to the control in the two studied seasons. The highest fruit weights (85.36 and 83.71g) were recorded by the twice application of yeast at 3 g/L as compared to the control which recorded the lowest fruit weight (76.26 and 74.75 g.) in the first and second seasons, respectively.

**2. Fruit dimensions:**

Fruit dimensions of "Florda prince" peach trees as affected by two organic acids and yeast treatments in 2009 and 2010 seasons are revealed on Table (3). All treatments of ascorbic acid, citric acid and yeast (once or twice) at different concentrations increased significantly fruit length and diameter as compared to the control in the two studied seasons. The twice applications of yeast at 3 g/L was superior to the other treatments as recording the highest significant increment in fruit dimensions.

**3. Fruit firmness:**

Results in Table (3) show the effect of ascorbic acid, citric acid and yeast treatments on fruit firmness (lb/Inch$^2$) of "Florda prince" peach trees in 2009 and 2010 seasons. Only the two concentrations of yeast applications (once and twice) increased significantly the fruit firmness as compared to the control in the two studied seasons, however, the other treatments were not effective on the fruit firmness or were effective in one season only.

**Table 3: Effect of two organic acids and yeast treatments on yield and some physical properties of "Florda prince" peach trees in 2009 and 2010 seasons.**

| Treatments | Yield (kg/ tree) | | Fruit weight (g) | | Fruit length (cm) | | Fruit diameter (cm) | | Fruit firmness (lb/ inch$^2$) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2009 | 2010 | 2009 | 2010 | 2009 | 2010 | 2009 | 2010 |
| **Once application** | | | | | | | | | | |
| Ascorbic acid 50 ppm | 66.26 | 67.17 | 77.81 | 76.33 | 5.24 | 5.21 | 5.30 | 5.24 | 11.52 | 10.07 |
| Ascorbic acid 100 ppm | 68.43 | 69.83 | 80.64 | 77.12 | 5.32 | 5.26 | 5.36 | 5.31 | 11.86 | 10.24 |
| Citric acid 50 ppm | 66.62 | 67.20 | 77.65 | 76.28 | 5.21 | 5.19 | 5.31 | 5.21 | 11.51 | 10.06 |
| Citric acid 100 ppm | 68.32 | 69.91 | 79.81 | 77.20 | 5.33 | 5.27 | 5.35 | 5.32 | 11.84 | 10.21 |
| Yeast at 2g/L | 67.97 | 68.74 | 78.24 | 77.37 | 5.27 | 5.21 | 5.29 | 5.26 | 12.31 | 12.38 |
| Yeast at 3g/L | 69.19 | 70.36 | 81.31 | 79.21 | 5.38 | 5.31 | 5.41 | 5.35 | 12.79 | 12.41 |
| **Twice applications** | | | | | | | | | | |
| Ascorbic acid 50 ppm | 66.85 | 68.21 | 79.14 | 77.64 | 5.28 | 5.30 | 5.31 | 5.32 | 11.65 | 10.19 |
| Ascorbic acid 100 ppm | 69.81 | 69.74 | 81.36 | 79.85 | 5.37 | 5.39 | 5.42 | 5.45 | 11.83 | 10.22 |
| Citric acid 50 ppm | 66.71 | 68.14 | 79.20 | 77.70 | 5.29 | 5.31 | 5.32 | 5.37 | 11.61 | 10.15 |
| Citric acid 100 ppm | 70.00 | 70.48 | 82.00 | 80.05 | 5.35 | 5.40 | 5.37 | 5.45 | 11.82 | 10.17 |
| Yeast at 2g/L | 69.46 | 70.91 | 80.48 | 78.59 | 5.38 | 5.26 | 5.42 | 5.32 | 12.65 | 12.85 |
| Yeast at 3g/L | 73.14 | 74.31 | 85.36 | 83.71 | 5.43 | 5.41 | 5.47 | 5.47 | 12.85 | 12.64 |
| Control (untreated) | 66.00 | 66.65 | 76.26 | 74.75 | 5.19 | 5.16 | 5.21 | 5.20 | 11.51 | 10.14 |
| New L.S.D. at 5% | 1.75 | 2.24 | 1.41 | 1.21 | 0.04 | 0.03 | 0.02 | 0.03 | 0.11 | 0.14 |

**4. Fruit T.S.S. and acidity:**

Fruit T.S.S. and acidity percentages of "Florda prince" peach trees as affected by two organic acids and yeast treatments in 2009 and 2010 seasons are cleared in Table (4). In general, all treatments of ascorbic acid, citric acid and yeast (once or twice) at different concentrations increased significantly fruit T.S.S. (%) and acidity (%) as compared to the control in the two studied seasons. The twice applications of yeast at 3 g/L and citric acid at 100 ppm were superior to the other treatments as recording the highest significant increment in fruit T.S.S. and acidity as average in the two studied seasons.

**5. T.S.S./acid ratio:**

Results in Table (4) indicate the effect of some organic acids and yeast treatments on T.S.S./acid ratio of "Florda prince" peach trees in 2009 and 2010 seasons. The application of citric acid once at 50 ppm increased significantly the T.S.S./acid ratio as compared to the control during the two studied seasons. On the other hand, the twice application of yeast at 3 g/L decreased significantly the T.S.S./acid ratio as compared to the control in the two studied seasons. The other treatments were not clearly effective in that character.

The present obtained results of fruit characters agree with the results obtained by Awad (2006) who stated that ascorbic and citric acid spraying at 200, 300 and 400 ppm and active dry yeast at 3 g/L increased fruit weight, pulp firmness, T.S.S. (%), ascorbic acid, starch (%) reducing sugars, non-reducing sugars, total sugars and total phenols of "Alphonse" and "Badami" mango fruits and with those of Ahmed and Abd El-all (2007) on "Anna" apple fruits who found that fruit physical and chemical characteristics were improved by spraying citric acid at 0.1% at three times at growth start, just after fruit set and at 21 days later.

**6. Vitamin C (ascorbic acid) content:**

Vitamin C (mg/100 g. F. W.) of "Florda prince" peach trees as affected by two organic acids and yeast treatments in 2009 and 2010 seasons are revealed on Table (5). The treatments of ascorbic acid at 100 ppm (one time application) and ascorbic acid at 100 ppm and yeast at 3 g./L (twice application) increased significantly vitamin C content in fruits while, the other treatments recorded irregular trend in the two studied seasons. The highest vitamin C content (22.38 and 21.92 mg/100 g.F.W.) were recorded by the treatment of ascorbic acid at 100 ppm (twice application) as compared with the lowest values (18.10 and 17.75 mg/100 g.F.W.) resulted from the control in the two successive seasons, respectively.

**7. Total sugars and starch percentages:**

Results in Table (5) indicate the effect of two organic acids and yeast treatments on total sugars and starch (%) of "Florda prince" peach trees in 2009 and 2010 seasons. The highest significant total sugars (5.65 and 5.43%) were obtained by using citric acid at 100 ppm (twice application) as compared to the lowest values of the control (5.29 and 5.23%) in the two studied seasons, respectively. The other treatments recorded in-between values as compared to the control. As regard to starch content (%), the treatment of yeast at 3 g/L applied twice significantly increased starch percentages and recorded the highest starch content(2.40 and 2.43%) as compared to the control (2.26 and 2.28%) in the two studied seasons, respectively, however, the other treatments gave in between values.

**Table 4: Effect of two organic acids and yeast on some chemical properties of "Florda prince" peach trees in 2009 and 2010 seasons.**

| Treatments | T.S.S. (%) | | Acidity (%) | | T.S.S./ acid ratio | |
|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2009 | 2010 | 2009 | 2010 |
| **Once application** | | | | | | |
| Ascorbic acid 50 ppm | 10.17 | 10.10 | 0.38 | 0.34 | 26.76 | 29.71 |
| Ascorbic acid 100 ppm | 10.27 | 10.20 | 0.40 | 0.35 | 25.68 | 29.14 |
| Citric acid 50 ppm | 10.20 | 10.20 | 0.36 | 0.34 | 28.33 | 30.00 |
| Citric acid 100 ppm | 10.40 | 10.40 | 0.35 | 0.36 | 29.71 | 28.89 |
| Yeast at 2g/L | 10.20 | 10.30 | 0.38 | 0.37 | 26.84 | 27.84 |
| Yeast at 3g/L | 10.30 | 10.40 | 0.41 | 0.37 | 25.12 | 28.11 |
| **Twice applications** | | | | | | |
| Ascorbic acid 50 ppm | 10.33 | 10.20 | 0.39 | 0.35 | 26.49 | 29.14 |
| Ascorbic acid 100 ppm | 10.50 | 10.30 | 0.40 | 0.37 | 26.25 | 27.84 |
| Citric acid 50 ppm | 10.87 | 10.50 | 0.37 | 0.34 | 29.38 | 30.88 |
| Citric acid 100 ppm | 11.10 | 10.50 | 0.38 | 0.36 | 29.21 | 29.17 |
| Yeast at 2g/L | 10.30 | 10.40 | 0.39 | 0.38 | 26.41 | 27.37 |
| Yeast at 3g/L | 10.50 | 10.50 | 0.42 | 0.39 | 25.00 | 26.92 |
| Control (untreated) | 9.75 | 9.85 | 0.37 | 0.34 | 26.35 | 28.97 |
| **New L.S.D. at 5%** | 0.20 | 0.25 | 0.02 | 0.01 | 0.45 | 0.64 |

**Table 5: Effect of two organic acids and yeast on some chemical properties of "Florda prince" peach trees in 2009 and 2010 seasons.**

| Treatments | Vit. C (mg/100 g.F.W.) | | Total sugar (%) | | Starch (%) | |
|---|---|---|---|---|---|---|
| | 2009 | 2010 | 2009 | 2010 | 2009 | 2010 |
| **Once application** | | | | | | |
| Ascorbic acid 50 ppm | 18.80 | 18.33 | 5.42 | 5.30 | 2.31 | 2.32 |
| Ascorbic acid 100 ppm | 20.90 | 19.87 | 5.54 | 5.35 | 2.35 | 2.37 |
| Citric acid 50 ppm | 18.19 | 17.62 | 5.48 | 5.32 | 2.23 | 2.30 |
| Citric acid 100 ppm | 18.20 | 17.65 | 5.58 | 5.40 | 2.21 | 2.28 |
| Yeast at 2g/L | 18.36 | 17.87 | 5.40 | 5.28 | 2.32 | 2.33 |
| Yeast at 3g/L | 18.64 | 18.21 | 5.38 | 5.26 | 2.36 | 2.40 |
| **Twice applications** | | | | | | |
| Ascorbic acid 50 ppm | 20.29 | 19.15 | 5.40 | 5.31 | 2.32 | 2.33 |
| Ascorbic acid 100 ppm | 22.38 | 21.92 | 5.41 | 5.37 | 2.36 | 2.38 |
| Citric acid 50 ppm | 18.17 | 17.80 | 5.51 | 5.34 | 2.20 | 2.28 |
| Citric acid 100 ppm | 18.21 | 17.82 | 5.65 | 5.43 | 2.19 | 2.26 |
| Yeast at 2g/L | 18.85 | 18.31 | 5.39 | 5.25 | 2.35 | 2.35 |
| Yeast at 3g/L | 19.21 | 18.76 | 5.38 | 5.23 | 2.40 | 2.43 |
| Control (untreated) | 18.10 | 17.75 | 5.29 | 5.26 | 2.26 | 2.28 |
| **New L.S.D. at 5%** | 0.54 | 0.72 | 0.10 | 0.09 | 0.02 | 0.04 |

## CONCLUSION

It can be concluded from the above mentioned data that, all spraying treatments increased vegetative growth as compared with control treatment. Most of spraying treatments also increased yield and improved fruit quality. The most effective treatment for increasing growth and yield and improving fruit quality was markedly clearly using yeast at 3 g/L (twice application) in the two seasons of study as compared with the control trees which recorded the lowest growth, fruit yield and quality values.

## REFERENCES


Abd-EL motty, Z.E. and M.I.F. Fawzy **2005.** Response of "Zebda" and "Langra" mango trees to some biofertilization treatments. J. Agric. Sci. Mansoura Univ., 30(6): 3331-3341.

Ahmed, F.F. and A. M.K. Abd El-All **2007.** Influence of spraying sea wood extract and citric acid on yield and fruit quality of "Anna" apple trees. 1st inter. Conf. Desert Cultivation Problems and Solutions, Minia univ. 27-29 March: P. 253-261.

Association of Official Agriculture Chemists **1980,** Official methods of analytical chemists Washington, D.C., U.S.A.

Awad, R.U.A. **2006.** Effect of some natural preharvest treatments on mineral content, yield, fruit quality and storability of mango fruits. Ph.D. Thesis, Fac. Agric., Alex. Univ. P. 111.

Bakry, KH. A.E. and A.L. Wanas **2003.** Response of "Amar" apricot trees to spray with yeast and extract and kinetin. Egypt. J. Appl. Sci., **18** (6): 319-336.

Elad, Y. **1992.** The use of antioxidants to control gray mould (Botrytic cinera) and white mould (Sclerotinia Sclerotiorum) in various crops. Plant pathol.**141**: 417-426.

Farag, K.M. **1996.** Use of urea, phenylalanine, thiamine or their combination to accelerate anthocyanin development and their effect on the storage life of flame seedless graps. The first Egyptian Hungarian Hort. Conf. Kafr EL-Sheikh, Egypt. 15-17 Sept.

Magness, J.R. and C.F. Taylor **1925.** An improved type of pressure tester for the determination of fruit maturity. U.S. Dept. Agric. Circ. No. 350, pp.8.

Malik, C.P. and M.B. Singh **1980.** Plant enzymology and histoerzynology. A text manual Kalyaie Publishers. New Delhi.

Marwad, I.A.; H.A. Ibrahim and A.A. Abd El-Ghany **2001.** Effect of some foliar nutrients sprays and soil yeast application on growth and fruiting of Thompson seedless grapevines. Egypt. J. Appl. Sci; **16** (12): 256-274.

Skoog, F. and C.O. Miller **1957.** Biological action of growth substances. Camride Univ., press, Cam., 2000.

Steel, R.G.D. and J.H. Torrie **1980.** Principles and procedures of statistics: 2nd ed., Mc. Graw-Hill, Hagakusha, htd., Japan.

Subba Rao, N.S. **1984.** "Biofertilizers in Agriculture", Oxford, IBH company, New Delhi.

Woodman, A G. **1941.** Food analysis. Mc Graw-Hill book company, Inc., New York.

**الملخص العربي**

## تأثير رش حمض الأسكوربيك، حمض الستريك والخميرة على النمو الخضرى ومحصول وصفات جودة ثمار أشجار الخوخ صنف "فلوريدا برنس" المنزرعة فى الأراضي الجديدة

**نجوى أبو المجد عبد المجيد**

محطة بحوث البساتين – النوبارية ــ مركز البحوث الزراعية- جيزة ــ مصر

تم اجراء هذا البحث خلال موسمين (٢٠٠٩و٢٠١٠) على اشجار الخوخ صنف "فلوريدا برنس" مطعومة على اصل خوخ " النيماجارد " عمر ٩ سنوات والنامية فى تربة رملية بالنوبارية والتابعة لمحافظة البحيرة وقد تم استعمال حمض الأسكوربيك بتركيز ٥٠ و١٠٠ جزء/مليون والستريك بتركيز ٥٠ و١٠٠ جزء / مليون والخميرة بتركيز ٢و٣ جرام/لتر (وقد تم الرش مرة واحدة عند تمام التزهير أو مرتين عند تمام التزهير وبعد العقد) وقد تم رش كل مركب منفردا.

وقد أشارت النتائج إلى أن معاملات حمض الاسكوربيك بتركيز ١٠٠ جزء/مليون وحمض الستريك بتركيز ١٠٠ جزء/مليون والخميره بتركيز ٣ جرام/لتر أدت إلى زيادة معنوية في طول النموات الخضرية والمساحة الورقية بالمقارنة بمعاملة الكونترول (الأشجار الغير مرشوشة). أيضا لوحظ أن إضافة الخميرة مرتين بتركيز ٣جم/لتر أعطت أعلى إنتاجية ثمار بالمقارنة بمعاملة الكونترول. كما أظهرت النتائج، عموما، أن كل المعاملات أدت إلى زيادة وزن، أبعاد، صلابة الثمار، المواد الصلبة الكلية، نسبة الحموضة، نسبة المواد الصلبة الكلية إلى الحموضة، فيتامين ج والسكريات الكلية في ثمار الخوخ صنف " فلوريدا برنس" بالمقارنة بالكونترول.

وعلى أي حال ، كانت أفضل المعاملات الأكثر تأثيراً في زيادة النمو الخضري والمحصول كما ونوعا بالمقارنة بمعاملة الكونترول خلال موسمي الدراسة هى معاملة رش الخميرة بتركيز ٣ جرام/ لتر مرتين (الأولى عند تمام التزهير والثانية بعد العقد).