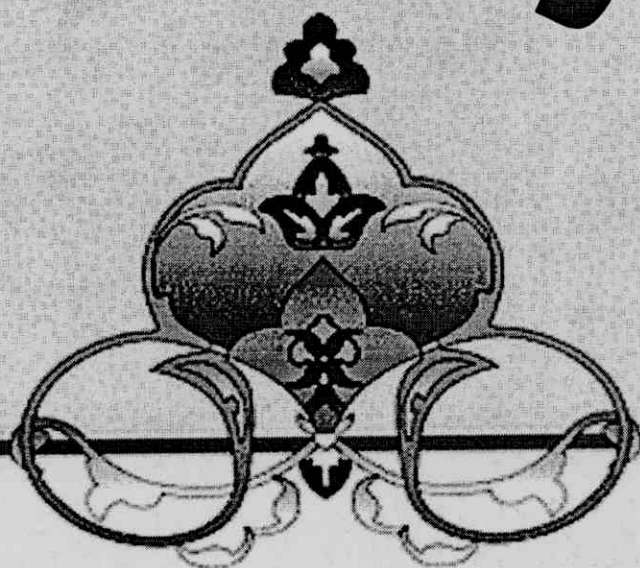




Summary



5. SUMMARY

1- This investigation was carried out during two successive seasons, 2005 and 2006 to study the response of Balady Mandarin trees to foliar application with active yeast and some micro-elements. The Trees were [16 years old budded on sour orange rootstock (Citrus aurantium L.)] nearly similar in vigor, and grown in sandy soil. The Trees were planted at 3.5 × 3.5 meters apart and were irrigated with drip irrigation system. This study was carried out in a private orchard at "El- Mansoria" Giza governorate. The trees were sprayed with one of the following solutions:

- 1- control (sprayed with water)
- 2- ZnSO_4 at 0.5%
- 3- MnSO_4 at 0.5%
- 4- H_3BO_4 at 0.2%
- 5- Yeast at 0.2%
- 6- Combinations of ZnSO_4 at 0.5% + Yeast at 0.2%
- 7- Combinations of MnSO_4 at 0.5% + yeast 0.2% .
- 8- Combinations of H_3BO_4 at 0.2% + yeast at 0.2% .
- 9- Combinations of ZnSO_4 at 0.5% + MnSO_4 at 0.5%
- 10-Combinations of ZnSO_4 at 0.5% + H_3BO_4 at 0.2%
- 11- Combinations of MnSO_4 at 0.5% + H_3BO_4 at 0.2%
- 12- Combinations of ZnSO_4 at 0.5% + MnSO_4 at 0.5% + yeast at 0.2%

- 13- Combinations of ZnSO_4 at 0.5% + H_3BO_4 at 0.2% + yeast at 0.2%
- 14- Combinations of MnSO_4 at 0.5% + H_3BO_4 at 0.2% + yeast at 0.2%
- 15- Combinations of ZnSO_4 at 0.5% + MnSO_4 at 0.5% + H_3BO_4 at 0.2%
- 16- Combinations of ZnSO_4 at 0.5% + MnSO_4 at 0.5% + H_3BO_4 at 0.2% + Yeast 0.2%

The results could be summarized as follows

1- Leaf nutrient contents.

- 1- Application of combination treatments consisted of ZnSO_4 (0.5%)+ MnSO_4 (0.5%)+ H_3BO_4 (0.2%)+ yeast (0.2%)are important for inducing an increase in all leaf nutrient contents under study in "On" year or "Off" year as compared with that of the control.

2- Leaf chlorophyll (a and b) and carotenoides

- 1- All spraying treatments of Balady mandarin trees in the present study significantly increased leaf content of chlorophyll a and carotenoides as compared with those of the control treatments, but the surpassed treatment over all other ones was spraying with ZnSO_4 (0.5%)+ MnSO_4 (0.5%)+ H_3BO_4 (0.2%)+ yeast (0.2%) in both seasons of study in On-year. These results were more announced for leaf content of chlorophyll a and b as well as carotenoides when Balady mandarin trees in Off-year were sprayed with the same treatments in both seasons of study.

3. Yield and Fruit quality

a- Yield:

- 1- All treatments significantly increased the yield either number or weight of fruits per tree in "On" year trees of both seasons as compared with that of the control treatment. Moreover, combined treatments caused the highest effect in increasing the yield followed by active dry yeast treatment, while the lowest increase was obtained from micronutration treatments and the control.
- 2- Similar trend was found as a results of spraying Balady mandarin trees in Off-year with the same treatments, but spraying with ZnSO_4 (0.5%)+ MnSO_4 (0.5%)+ yeast (0.2%), MnSO_4 (0.5%)+ yeast (0.2%) or ZnSO_4 (0.5%)+ MnSO_4 (0.5%)+ H_3BO_4 (0.2%)+ yeast (0.2%) surpassed other treatments in this respect in both seasons of study.

b. Fruit quality:

b.1. Fruit weight:

- 1- Fruit weight of both active dry yeast either alone or combined with micronutrients treatments were remarkably heavie remarkably than that of the control treatment in both seasons in "On" and "Off" year trees.

b.2. Juice volume:

- 1- All treatments used failed to show any constant effect on volume of fruit juice of Balady mandarin trees in "On" year in both seasons of study.

- 2- Volume of fruit juice was higher as a result of spraying H_3BO_4 (0.2%) or active dry yeast as compared with that of the control in both seasons of study in "Off" year.
- 3- The other treatments had no constant trend for their effect on volume of fruit juice of Balady mandarin trees in "On" year or "Off" year.

b.3. Weight of fruit juice:

- 1- Effect of spraying Balady mandarin trees in On-year with different treatments had no constant trend on weight of fruit juice in both seasons of study.
- 2- In Off-year, spraying Balady mandarin trees with yeast or H_3BO_4 alone as well as MnSO_4 (0.5%) + H_3BO_4 (0.2%) + yeast (0.2%) significantly increased weight of fruit juice in both seasons of study as compared with that of the control. The other treatments had no constant effect on the weight of fruit juice in Off-year for both seasons of study.

b-4- Fruit volume

- 1- Spraying yeast alone or combined with one of the three compounds of micronutrients used in addition to ZnSO_4 (0.5%)+ MnSO_4 (0.5%)+ yeast (0.2%), ZnSO_4 (0.5%)+ H_3BO_4 (0.2%)+ yeast (0.2%), MnSO_4 (0.5%) alone, MnSO_4 (0.5%)+ H_3BO_4 (0.2%) or significantly increased fruit volume in both seasons of study as compared with that of the control. The other spraying treatments tend to cause the same effect, but the differences were significant in one season only in On-year.

- 2- In Off-year, all treatments increased fruit volume of Balady mandarin trees than that of the control in both seasons of study. The surpassed treatment affected fruit volume of Balady mandarin trees over the other treatments was spraying $\text{H}_3\text{BO}_4(0.2\%)$ + yeast (0.2%) in both seasons of study.

b.5. Fruit dimensions

- 1-The results of the present study showed that there was no stable trend from season to another (either in On- or Off-year) for the effect of spraying yeast or micronutrients alone or combined with each other on fruit length or diameter in both seasons of study.

b.6. Chemical characteristics

b.6.1 Titratable acidity:

- 1-Most treatments used under study significantly recorded low values of acidity as compared with that of the control in "On" year or "Off" year trees. In addition combined treatments succeeded in decreasing Acidity in fruits followed by active dry yeast treatment in "On" year or "Off" year trees.

b.6.2 Total soluble solids (TSS):

- 1- All treatments used under study significantly increased total soluble solids in juice as compared with that of the control in "On" year or "Off" year trees in both seasons.
- 2- Trees sprayed with MnSO_4 (0.5%) and H_3BO_4 (0.2%) in the first season as well as H_3BO_4 (0.2%) in the second season increased T.S.S in fruit juice as compared with those sprayed with active dry yeast and other micronutrients treatments in "On" year trees

- 3- Trees sprayed with ZnSO_4 (0.5%) + MnSO_4 (0.5%) + H_3BO_4 (0.2%) + yeast (0.2%) in both seasons as well as with ZnSO_4 (0.5%) + MnSO_4 (0.5%) + H_3BO_4 (0.2%) in the second season increased T.S.S in fruit juice in "Off" year trees.

b.6.3. T S S / acid ratio:

- 1- All treatments used under study gave higher significant values of TSS/ acid ratio as compared with that of the control in "On" year or "Off" year trees.
- 2- Combined treatments ZnSO_4 (0.5%) + MnSO_4 (0.5%) + H_3BO_4 (0.2%) + yeast (0.2%) markedly raised TSS / acid ratio in fruit juice as compared with that of the other used treatments in "On" year or "Off" year trees.

b.6.4 Ascorbic acid

- 1- Most used spraying treatments significantly increased juice content of ascorbic acid as compared with that of the control either in On- or Off- year. In this respect, combined treatments caused the highest increase of juice content of Ascorbic acid followed by active dry yeast, while, the lowest increase was obtained from micronutrient treatments in "On" year or "Off" year trees.
- 2- Combined treatment of ZnSO_4 (0.5%) + MnSO_4 (0.5%) + H_3BO_4 (0.2%) + yeast (0.2%) significantly succeeded in raising up the juice content of ascorbic acid among the most of the other used treatments under study in "On" year or "Off" year trees.