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SECTION 23. Agriculture. Agronomy. The technique.

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RESPONSE OF LOCAL SOURS ORANGE TREES (CITRUS AURANTIUM L.) TO SPARING WITH MAREN FERT, ALAFADA AND HLETAB ON VEGETATIVE GROWTH, PHYSICAL AND CHEMICAL FRUITS CHARACTERS

Abstract: *This study was carried out in a private orchard at AL- Abbasyia, Najaf Governorate during the growing of season 2015 on the local sours orange fruit. The trees were sprayed at 1/4, 1 / 10 and 1 / 11 / 2015 with three concentrations of Maren fert ,Alafada and Hletab (1 , 2 and 3) % for each other. The results indicated that spraying trees with treatments caused a significant increasing in the rate of leaf aria length of branches ,total chlorophyll, percentage of dry material , length, diameter, weight of fruit, percentage of juice , percentage of peel ,peel thickness, vitamin C Total soluble solids(T.S.S) , percentage of titratable acidity (TA) and percentage of T.S.S / TA .There was significant differences between these treatments .The treatments of concentration of Hletab 3 % gave the highest rate of vegetative and fruiting characteristics on the year of studied.*

Key words: *Maren fert, Alafada and Hletab, sours orange.*

Language: *English*

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Introduction

The trees Sours orange (Citrus aurantium L.) are evergreen fruits, belong to the Family "Rutaceae", genus "Citrus", Citrus fruits are among the most important fruit crops in the subtropical regions. where it belived that its origin is India and areas in south east Asia (AL-Bana and Hejazy 2010). The alga extracts are conceded from the organic source which used for agriculture product. They are important agriculture methods which participate to eliminate or decrease the use of chemical fertilizer and growth regulators besides the pesticides. This will decrease the health problems up on people and animals, reduce the environmental pollution. The positive effect is improvement in productivity because of the chemical minerals and other materials which are necessary to plant growth (Osman et al, 2010). It has high range in affecting bio-activity in plants and growth increase. It contains Betaine which considered nitrogen source in low concentration and a somatic pressure regulator at high concentration (Morales-Payan and Stall, 2013). Abo – Zaid (2000) mentioned that, spraying of extract of alga Oligo-x which containing hight percentage of salicylic acid and hormones at conc. of (1 and 2 %) on mango trees in Egypt has increased the total soluble sold (T.S.S), acidity and vitamin C . Basak (2008) mentioned that, spraying apple tress in the end of full bloom period with extract of alga Eckonia at conc. of (0.5, 1 and 2 %) caused a significant increased the leaf area, content of leaves from total chlorophyll, hormones, IAA, GA_3, and quality of fruits compared to control treatment . Ismaeal and Ghazzi (2012) found that spraying olive transplants with extract of alga's *Ascophyllum nodosum* at conc. of (0, 2 and 4 %) caused increase in the the rate of leaf aria length of branches ,total chlorophyll and percentage of dry material of leaves with increase of concentration of extract. Dell (2013) showed that, sea weed and extract of alga's contenting high percentage of Salicylic acid, cytokinin, Fume acid, GA^3 and auxins that increasing root and shoot of plant , process of photosynthesis and activate plant growth which led to enhance hormones synthesis and delay of

senescence of leaves. Bondok et al (2013) found that spraying grape trees with extract of alga's (Acadian, Goemar and BM86) at conc. of (0.5, 1 and 2 %) caused increase in the vegetative growth and fruits quality with increase of concentration of extract of alga's. Bund and Norrie (2011) observed that cherry trees when applied at (0.5, 1 and 2) Kg/ H seaweed increased length, diameter of fruit, total yield of trees, total soluble solids, total sugar, vitamin C and anthocyanine pigment in fruit compared with control treatment. AbdEL-Motty et al (2012) noticed that, spraying local tress of mango with alga extract caused inceease vegetative growth and quality of fruits compared to control treatment. The spraying with extracts of some brown marine algae at 1% and 2% on local tress of mango gave the best leaf area, leaf chlorophyll, p and Mg. In addition, algae at 2% was very effective to improve levels of N, K, Fe, Zn, and Mn, fruit length, diameter, weight, and volume (Abed El Hamied, 2014). The main objective of this investigation is to study of the effect of spraying with of Maren fert, Alafada and Hletab on vegetative growth and fruits quality during ripening of fruits of sours orange.

Materials and methods

This study was conducted in a private farm at AL-Abbasyia Najaf governorate for the 2015 season on the local sours orange trees, 30 at same size and growth trees were selected with 12 years of age, that planted on (5 x 5 m.), they were spraying at 1/4, 1 / 10 and 1 / 11 / 2015 with three concentration of Maren fert, Alafada and Hletab (1, 2 and 3) % for each other. Maren fert it was extract of alga *Ascophyllum nodosum* that containing (organic nitrogen 1.4%, phosphor 2%, potassium 3%, Kinetin % 0.04 organic matter 12%). Alafada, it was natural extract of alga Eckonia that containing IAA 13mg/L, CKs 20mg/L, amino acid 3%, nitrogen 2%, phosphor 3%, potassium 2%, Magnesium 2%, Iron 2%, Zinc 2%, organic matter 12%. Hletab, it was extract of alga Fucox that containing fucoxant pigment 70 mg/L, growth stimulator (methyl puntosan, 20 mg/L, fucodan, 23 mg/L, mantol 15mg/L, riboflavin 30mg/L, olego scoris 90mg/L), IAA 20mg/L, CKs 35mg/L, Vit.C 9mg/L, amino acid 6%, organic nitrogen 3%, phosphor 2%, potassium 3%, magnesium 2%, Iron 2%, Zinc 2%, organic matter 16%, Algonac acid 50%). from the production of Green river company. India. The experiment included 10 treatments with three replicates . It is adopted according to Randomized Complete Block Design (RCBD), and the results were statistically analyzed according to LSD test at the probability level of 5% (Al-Rawi and Khalf Allah, 2000). Trees spraying was done early morning until wetness was full addendum . Tween 20 was added at conc. of 1cm3/L as spreader material .Ten normal leaves and fruits were taken at random at **1 / 12 / 2015** each tree for quality determination. leaf aria cm^2 , Total chlorophyll mg / 1g dray weight, Shoot length cm, Length of fruit (cm), diameter of fruit (cm), weight of fruit (gm), %of juice, %of peel and peel thickness (mm) of fruits according to (Ibrahim, 2010). The total soluble solids (T.S.S) were determined by hand refractometer. Total acidty (TA) % and Vitamin C mg /100 ml Juice and T.S.S / TA according to (Ranganna, 1977).

Results and discussion

1- Leaf aria, length of branches, total chlorophyll and percentage of dry material of leaves.

Data in Table (1) shows that, spraying of Maren fert, Alafada and Hletab led to increased leaf aria, length of branches and content of leaves from total chlorophyll and percentage of dry material , that gave the highest rates (26.63 cm^2 / leaf, 23.81cm, 19.68 mg / 1 g and 15.94%) in the treatment Hletab 3% in comparison to the lowest values (19.14 cm^2 / leaf, 19.21cm, 11.51 mg / 1 g and 12.30%) in control treatment. The reason of increasing the leaf aria, length of branches and content of leaves from total chlorophyll and percentage of dry material as a result of the experiment treatments. Above mentioned treatments led to the root system in absorption the nutrients elements in which some of them are parts of chlorophyll which led to increase its quantity in comparison control treatment. This process increases photosynthesis an activate plant growth which led to enhance hormones synthesis (Jundi , 2003). These result are in line with Spinelli, et al. (2009) on apple they mentioned that applying of seaweed extract to the trees gave the higher growth vegetative compared with control treatment .

2- Length of fruit , diameter of fruit and weight of fruit

Data in Table (1) shows that, spraying alga's extracts Maren fert, Alafada and Hletab caused increase the length of fruit, diameter of fruit and weight of fruits significantly compared to control treatment. The highest values in the treatment Hletab 3% it were (66.60 cm, 68.85 cm and 89.30 gm), while the lowest percentages (80.09 cm, 79.98 cm, 97.75 gm) in control treatment. The spraying with alga extract led to increase in the content of leaves from growth hormones and total chlorophyll , these led to increase the physical and chemical fruits characters (AbdEL-Motty et al, 2012).

3-The percentage of juice, percentage of peel and peel thickness.

Data in Table (1) shows that, treating of local sours orange trees with Maren fert, Alafada and Hletab has led to significantly increase the percentage of juice, percentage of peel and peel thickness of fruits significantly compared to control treatment. The highest significance result were recorded in Hletab 3% it were (49.98 %, 39.68 % and 4.11mm), while the lowest percentages

(42.47%, 27.95% and 3.39mm) in control treatment. The highest values in the treatments of Maren fert, Alafada and Hletab due to increase in leave aria , that increase the efficacy of photosynthesis and enlargement of fruit and increase the percentage of juice, percentage of peel and peel thickness of fruits (Lamta, 2014).

3- Vitamin C, total soluble solids , total acidity and total soluble solids/ total acidity. Results indicated in table (2) that, spraying with Maren fert, Alafada and Hletab led to significantly increased the percentage of vitamin C, total soluble solids, total acidity and total soluble solids / total acidity in fruit juice compared to control treatment. The highest significance result were recorded in the treatment Hletab 3%, that gave the highest percentages of vitamin C, total soluble solids , total acidity and total soluble solids / total acidity, they were (50.15 mg / 100 ml Juice, 13.30 %, 2.60% and 5.11%) comparison with (43.60 mg / 100 ml Juice, 9.00%, 2.12% and 4.24%) in control treatment respectively. Increasing content fruits from vitamin C, total soluble solids, total acidity and total soluble solids / total acidity which results through spraying with Maren fert ,Alafada and Hletab due to increase in early growth in lateral branches which gave more leaves number after flowering stage .That led to early fruit maturity. The lateral Shoots might export nutrition materials to the fruits which increased the vitamin C , total soluble solids , total acidity and total soluble solids / total acidity in fruit juice (Bund and Norre, 2011).

Table 1

Effect of spraying with extracts of Maren fert, Alafada and Hletab on vegetative and physical characters fruits of local sours orange for season 2015.

Treatments	leaf aria cm^2	Total chlorophyll mg / 1g	Shoot length cm	% Dry material in leaves	Length of fruit cm	Diameter of fruit cm	weight of fruit gm
Control	**19.14**	**19.21**	**11.51**	**12.30**	**66.60**	**68.85**	**89.30**
Maren fert 1%	**20.57**	**20.45**	**13.70**	**12.62**	**68.45**	**69.90**	**92.15**
Maren fert 2%	**21.67**	**20.65**	**13.25**	**13.55**	**73.21**	**72.68**	**92.99**
Maren fert 3%	**21.99**	**22.25**	**14.24**	**13.90**	**74.25**	**74.42**	**93.19**
Alafada 1%	**21.97**	**21.76**	**14.47**	**13.45**	**73.68**	**72.90**	**92.76**
Alafada 2%	**22.12**	**21.90**	**15.81**	**14.03**	**75.88**	**76.75**	**94.47**
Alafada 3%	**22.84**	**22.46**	**16.11**	**14.39**	**77.54**	**78.26**	**95.74**
Hletab 1%	**24.67**	**22.33**	**14.24**	**13.80**	**76.43**	**76.70**	**95.87**
Hletab 2%	**25.23**	**22.16**	**17.90**	**14.87**	**78.35**	**78.56**	**96.61**
Hletab 3%	**26.68**	**23.81**	**19.68**	**15.94**	**80.09**	**79.98**	**97.75**
L . S. D. 0.05	**1.08**	**1.15**	**2.11**	**0.52**	**1.12**	**1.87**	**0.92**

Table 2

Effect of spraying with extracts of Maren fert, Alafada and Hletab on physical and chemical characters fruits of local sours orange for season 2015.

Treatments	**%of juice**	**%of peel**	**peel thickness mm**	Vitamin C mg / 100 ml Juice	% Total soluble sold **(T.S.S)**	% Total Acidity **(TA)**	T.S.S / TA
Control	**42.47**	**27.95**	**3.39**	**43.60**	**9.00**	**2.12**	**4.24**
Maren fert 1%	**43.64**	**30.71**	**3.57**	**45.56**	**9.98**	**2.18**	**4.57**
Maren fert 2%	**44.80**	**31.16**	**3.71**	**46.80**	**10.37**	**2.24**	**4.86**
Maren fert 3%	**46.84**	**33.42**	**3.86**	**47.84**	**10.25**	**2.25**	**4.55**

Alafada 1%	**44.26**	**31.03**	**3.75**	**44.26**	**11.17**	**2.24**	**4.98**
Alafada 2%	**46.66**	**33.25**	**3.97**	**46.61**	**11.86**	**2.38**	**4.57**
Alafada 3%	**48.95**	**36.83**	**3.91**	**47.95**	**12.09**	**2.50**	**4.83**
Hletab 1%	**47.21**	**34.91**	**3.92**	**46.75**	**12.24**	**2.45**	**4.99**
Hletab 2%	**47.90**	**37.65**	**3.87**	**48.00**	**12.35**	**2.52**	**4.97**
Hletab 3%	**49.98**	**39.68**	**4.11**	**50.15**	**13.30**	**2.60**	**5.11**
L . S. D. 0.05	**1.01**	**1.95**	**0.08**	**0.87**	**0.88**	**0.05**	**0.11**

Conclusion

It could be concluded from this experiment that the trees of local sours orange fruit which sprayed with concentrations of Maren fert, Alafada and Hletab had significant effect in terms of increasing in the rate of leaf aria length of branches, total chlorophyll, percentage of dry material, length, diameter, weight of fruit, percentage of juice, percentage of peel, peel thickness, vitamin C Total soluble solids(T.S.S), percentage of titratable acidity (TA) and percentage of T.S.S / TA. The treatment of Hletab 3% gave the best results of studied characteristics for season of experiment compared with control treatment .

References:

1. Abed El-Hamied SA (2014) Improving Growth and Productivity of "Sukkary" Mango Trees Grown in North Sinai Using Extracts of Some Brown Marine Algae, Yeast and Effective Microorganisms 1-Mineral content of leaves and fruit growth aspects . Middle East Journal of Agriculture Research, 3(2): 318-329.
2. Abd EL-Motty E.Z., Shahin M.F.M., EL-Shiekh. and Abd EL-Migeed, M.M.M. (2010) Effect of alga extract and yeast application on growth, nutritional, yield and fruit qualty s of mango trees. Biol.J. Agric. tatus N.Am. 1(3): 412-429.
3. Abo – Zaid AN (2000) Plant Hormones and Application Agricultural. Arabic home for putolishing. Cairo.
4. AL-Bana GA, Hejazy AA (2010.Eever green orchards. Arabic home for publishing. Egypt .
5. AL–Rawi KM, AM Khalf Allah (2000) Design and Analysis of Agricultural Experiments. College of Agric. Univ. Mosel . Iraq .
6. Basak A (2008) Effect of preharvest treatment with seaweed products, Kelpak and Gonemar (BM86) on fruit quality in apple . International Journal of fruit Sc . (1-2): 1-14 .
7. Bund S, Norre J (2011) Seaweed extract improve cherry fruit quality. Aphc. Aushs. Nziash. Joint. Con. 18-22 September. 2011. Lorne .Victoria .
8. Bondok SA, Omran YM, Abdel-Hamid HM (2013) Enhanced productivity and fruit quality of flame seedless Grapevines treated with sea extract .J.Plant production. 1 (12): 1625-1635.
9. Dell OC (2013) Natural plant hormones are biostimulants helping plants antioxidant activity for multiple benefits. Virginia, vegetable, small fruit and specialy crops. 2(6):1-3.
10. Ibrahim HM (2010) Analysis of plant samples. AL-Menia Unui. Dar AL-Fajar for printing and publishing .Egypt .
11. Ismaeal AA, Ghazzi KA (2012) Response of olive transplants to seaweed extract as soil application and foliar of magnesium .The Iraqi Journal of Agricultural Science. 43(2):119-131.
12. Jundi HM (2003) Physiology of tree fruits . Arabic home for publishing .Cairo . Egypt .
13. Lamta AK (2014) Fruit and Vegetative responses of Valencia orange to alga extract . J . Plant Growth Regul. 60 (5): 98 – 112 .
14. Morales-Payan JP, Stall WM (2013) Papaya response to foliar treatment with alga extract and amino acid. Proc. Fla. State. Hort. Soc. 116: 30-32.
15. Osman,.Sm.A.Khamis & A.M.Thorya (2010) Effect of mineral and bio-NPK soil application on Vegetative growth , flowering , fruiting and leaf chemical composition of young olive trees . Res.J .Agric .&Biol .Sci .6(1)54-63.
16. Ranganna S (1977) . Manual of analysis of fruit and vegetable products . Tata . McGraw . Hill publishing Co . New Delhi .
17. Spinelli F, Fiori G, Noferini M, Sprocatti M, Costa G (2009). Perspectives on the Use of a seaweed extract on apple trees. J.Hort. Sci. and Biotech. Special Issue. 131 – 137.