Original Research Paper

VOLUME-6 | ISSUE-3 | MARCH - 2017 • ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46

Improving Growth and Productivity of fig tree cv. Aswod Diala with Navel Kelp ,Trust-Rumor and Fenugreek

Agriculture

KEYWORDS: seaweed Navel Kelp , Trust-Rumor , extract of seed Fenugreek , fig trees .

Abbas Mohsin Salman Al- Hameedawi

Professor, College of Agriculture , University of Kufa . Iraq.

ABSTRACT

This study was conducted during the growing season of 2016 in a private orchard at AL-Abbasyia , Najaf Governorate on the local fig cv. Aswod Diala . The trees were spraying with seaweed Navel Kelp at concentrations of (2 and 4%) , Trust-Rumor at concentrations of (2 and 4%) and extract of seed Fenugreek at conc. of 50% in single way or in combination at 15 march and 15 May,2016 . Results showed that spraying with seaweed Navel Kelp , Trust-Rumor and extract of seed Fenugreek treatments and their interactions caused a significant increase percentage of leaf area ,leaf moisture , total chlorophyll , length of shoots ,number of node ,length of internodes , percentage humidity of fruit , fruit firmness , percentage of total soluble sold , Vitamin C, Calcium pictate and antioxidant capacity compared with control treatment . There was significant differences between above mentioned treatments . seaweed Navel Kelp was more effective than Trust-Rumor in that respect , but the combination of Navel Kelp , seaweed and extract of seed Fenugreek gave the best results in the treatment (seaweed Navel Kelp 4%+ Trust-Rumor 4% + Fenugreek 50%) for the second crop .

Introduction

Algae extract has a positive effect on growth (Hegab *et al.,* 2005). Algae extract as a new bio fertilizer containing N, P, K, Ca, Mg, and S as well as Zn, Fe, Mn, Cu, Mo, and Co, some growth regulators, polyamines and vitamins applied to improve nutritional status, vegetative growth in different orchard such as vineyards (Eman, Abd El-Moniem & Abd-Allah, 2008, Elham, *et al*., 2010 and Spinelli *et al*., 2009). Subba Rao (2008) noticed the impact of algae extract application to orchard trees was caused a significant increased total chlorophyll in leaves , total yield of tree , total soluble solids ,vitamin C , and fruit firmness . Al – Hamdawi (2016) found that ,spraying trees of fig cv. Aswod Diala with Hletab and Kelpak led to increased leaf aria and the content of leaves from total chlorophyll , shoot length ,number of shoots , total carbohydrates percentage in shoots , total yield of tree and its quality compared with control treatment . 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 . AL-Eneabi (2008) noticed that , the spraying of material wax Vapor -Gard at percentage (2 , 3 and 4 %) and calcium chloride at concentration (500, 750 and 1000 mg/L) on fig trees cv. Aswod Diala at depressed period reduced the proportion of fruit cracking and increased the length of fruit, diameter of fruit , weight of fruit, fruit firmness , percentage humidity of fruits , total yield , leaf area , total chlorophyll , percentage of carbohydrate . Sabir, *et. al.* (2004)) observed that apple trees when applied at (2 and 3%) from antitranspirant after 60 days from full bloom increased yield and fruit quality compared with control treatment . Abdlecho (2013) noticed that , spraying the local pomegranate trees with wax material Wilt – Pruf at percentage (2 and 4%) produced increasing significant in the moisture peels , pulp, juice percentage and reducing the cracking, T.S.S, acidity, anthocyanine and vitamin C in juice during fruits ripening. AL – Ebraheme (2013) noticed that , spraying apple c.v. Read summer tress with two concentration of castor oil (2 and 4)% produced increasing significant in the moisture peels , pulp, juice percentage and reducing the cracking, T.S.S, acidity, anthocyanine on peels and Vitamin C in juice during fruits ripening . AL – Noumani (2013) found that spraying local apple trees with antitranspirant led to increased total soluble solids , total sugar , vitamin C and firmness at ripening. Abo – Zaid (1988) noticed that , the seed of Fenugreek containing (Alkaloids , phosphor , diosgenine, gitogenine , organic matter ,tigogenine, digitigogenine ,sterols ,choline , bitaine , some minerals).The purpose is to study the effect of spraying with seaweed Navel Kelp , antitranspirant Trust-Rumor and extract of seed Fenugreek treatments and their interactions on vegetative growth , yield and fruit quality of local fig tree cv. Aswod Diala .

Materials and methods

This study was conducted in a private farm at AL-Abbasyia .Najaf governorate for the 2016 season on local fig tree cv. Aswod Diala , 54 trees at same size and growth were selected with 12 years of age , that planted on (5 x 5 m.) , they were spraying with tow concentrations (2 and 4%) of seaweed extract Navel Kelp from the production of Australian , antitranspirant Trust-Rumor it was (Carnoba material wax contain antioxidant Ethoxguin 15% according to the characteristics of American foods and drags organization production of Italia Co. Servalesa) and extract of seed Fenugreek 50% (Trigonella foenum -graecum L.)in two periods at15 March and 15 May,2016. The experiment included 18 treatments with three replicates . It is adopted according to Randomized Complete Block Design (RCBD) , and the results were statistically analyzed according to Duncan 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 $1cm^3/L$ as spreader material . Leaf aria cm^2 , leaf moisture , total chlorophyll , number of fruits on shoots and percentage humidity of fruits according to (Ibrahim , 2010) .Firmness was measured on two sides of each fruit with an Effegi penetro meter (Model NI , McCormick Fruit Tech ,Yakima ,WA) Fitted with an 11.1mm tip . The percentage of total soluble solids were determined by hand refract meter and vitamin C mg /100 ml Juice according to (A.O.A.C, 1985) . Calcium pictate was determined according to (Rouhani and Basiri , 1976) . Antioxidant capacity was determined to previous work (Crisosto and Crisosto, 2001) .

Results and discussion

1-Leaf aria , leaf moisture , total chlorophyll, shoot length ,number of node and length of internodes .

The data in table (1) indicate that Spraying with seaweed Navel Kelp, Trust-Rumor and extract of seed Fenugreek in single way or combination led to a significant increased in the leaf aria , leaf moisture , total chlorophyll, shoot length ,number of node and length of internodes compared to control treatment until reached highest rates (140.17 cm2 ,77.90%, 123.33 mg/1gm FW ,24.78 cm, 7.85 and 3.09 cm) in the treatment (seaweed Navel Kelp 4%+ Trust-Rumor 4% + extract of seed Fenugreek 50 %) in comparison to the lowest values rates (127.11 cm2, 70.50%, 113.43 mg/1gm FW ,15.87 cm, 4.45 and 2.12 cm) in control treatment , respectively . The increase of this characterize of vegetative growth because of the treatment with concentrations of seaweed Navel Kelp, Trust-Rumor and extract of seed Fenugreek due to the fact that 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) .The presence of minerals and some growth regulators in algae extract and protein, carbohydrates, vitamins increasing vegetative growth (Abed El- Hamied ,2014). These result are in line with (AL – Hameedawi and AL- Shemmeryi, 2016) on fig trees cv. Aswod Diala they mentioned that applying of

Stickchut to the trees improved growth vegetative .

2-The percentage of fruit humidity , fruit firmness , total soluble solids , vitamin C ,Calcium pictate and antioxidant capacity .

Data in Table (2) shows that percentage of fruit humidity , fruit firmness , total soluble solids , vitamin C ,Calcium pictate and antioxidant capacity were increased significantly when trees sprayed with seaweed Navel Kelp, Trust-Rumor and extract of seed Fenugreek . The highest significance result were recorded in treatment (seaweed Navel Kelp 4%+ Trust-Rumor 4% + extract of seed Fenugreek 50 %) , that gave the highest percentages of fruit humidity , fruit firmness , total soluble solids , vitamin C ,Calcium pictate and antioxidant , they were (77.35 %,0.448 kg/ cm2 , 14.71% , 7.90 mg / 100 ml Juice ,3.31% and 3.90 m mol TE/g FW) comparison with lest rates (75.80 %,0.376 kg/ cm2 , 12.65% , 6.95 mg / 100 ml Juice ,2.30 % and 2.42 m mol TE/g FW) in control treatment , respectively . 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,2010). The reduction in respiration of fruits and increase in the percentage of fruit water contents due to the sprayed with antitranspirant led to increase the physical and quality of fruits characters (Hayat et al,3003)

Conclusion

It could be concluded from this experiment that ,spraying fig trees cv. Aswod Diala with seaweed Navel Kelp, antitranspirant Trust-Rumor and extract of seed Fenugreek led to increased the leaf area, leaf moisture, total chlorophyll, shoot length ,number of node , length of internodes , percentage of fruit humidity , fruit firmness , total soluble solids , vitamin C ,Calcium pictate and antioxidant capacity in second crop compared with control treatment .

Table 1 . Effect of spraying with Navel kelp , Trust-Rumor and extract of seed Fenugreek on vegetative growth of local fig trees c.v Asowd Diala for season 2016 .

Treatments	Leaf aria cm2	% Leaf moistu re	Total chloroph yll mg/1 gm FW	shoot lengt h cm	num ber of node	length of interno des cm
Control	127.1 1 g	70.50g	113.43 h	15.87 i	4.45f g	2.12 cd
Navel kelp 2%	132.2 5de	71.67 g	116.87de	17.21f g	4.80c d	2.18 cd
Navel kelp 4%	135.6 5cd	72.19 ef	117.95cd	18.96 e	5.13 c	2.21 bc
Trust-Rumor 2%	129.3 4f	72.90 e	115.18efg	16.05 ghi	4.64 cdf	2.15 bcd
Trust-Rumor 4%	128.9 0ef	73.14d e	115.67ef	16.23 gh	4.75c d	2.14 bcd
Fenugreek 50 %	129.0 9f	72.21 ef	116.55 ef	17.15 fg	5.00 cd	2.19 bcd
Navelkelp2% + Trust-Rumor 2%	132.4 0 d	72.87 e	116.92 de	18.30 ef	5.17 c	2.22 bc
Navelkelp2% + Trust-Rumor 4%	135.7 2 cd	74.09 cd	117.88 cd	18.57 ef	5.80c	2.25 bc
Navelkelp 4% +Trust-Rumor 2%	136.7 6 bc	73.68 d	118.46 cd	19.35 de	5.72c	2.29 bc
Navelkelp 4% + Trust-Rumor 4%	136.9 7 bc	74.50 c	118.80 c	19.65 d	4.95 cd	2.30 ab
Navel kelp 2% + Fenugreek 50 %	133.5 8 d	73.56 d	117.74 cd	20.32 d	5.84 c	2.37 ab
Navel kelp 4% + Fenugreek 50 %	135.4 5 cd	74.84 c	118.65 cd	22.43 c	6.23b	2.41ab
Trust-Rumor 2%+ Fenugreek 50 %	131.2 4 de	74.90 c	117.15 de	19.90 d	5.00 cd	2.32 ab
Trust-Rumor 4%+ Fenugreek 50 %	132.8 6 d	75.15 bc	117.34 d	20.51 d	5.16 c	2.34 ab
Navelkelp2%+Trust-Rumor 2%+ Fenugreek 50 %	136.8 0 bc	75.67 b	119.5 4 c	21.98 c	6.18 b	2.45 ab
Navelkelp2% + Trust-Rumor 4%+ Fenugreek 50 %	137.5 5 b	75.81 b	119.8 9 c	23.53 b	6.33 ab	2.58 ab
Navelkelp4% + Trust-Rumor 2%+ Fenugreek 50 %	138.3 5 b	76.25 a	121.2 3 b	23.84 b	7.50 a	2.97a b
Navelkelp4% + Trust-Rumor 4%+ Fenugreek 50 %	140.1 7 a	77.90 a	123.3 3 a	24.78 a	7.85 a	3.09 a

Table 2 . Effect of spraying with Navel kelp , Trust-Rumor and extract of seed Fenugreek on physical and chemical characters of local fig trees c.v Asowd Diala for season 2016 .

Antioxidant capacity (mmol TE/g FW	Calc%ium pictat e	Vitamin C mg / 100 ml Juice	% Total soluble solids	Fruit firmne ss Kg/cm 2	Hu%midity of fruit	Treatments
2.42 g	2.30 g	6.95f	12.65 f	0.376 de	75.80 h	Control
2.60 ef	2.76 de	7.35 ce	13.10 de	0.389 cd	76.11 fgh	Navel kelp 2%
2.57 ef	2.70 def	7.39 ce	13.58 d	0.394 cd	76.24 fg	Navel kelp 4%
2.61 ef	2.64 ef	6.90 f	12.55 f	0.385 cd	76.30 fg	Trust-Rumor 2%
2.63 cde	2.65 ef	6.88 f	12.60 f	0.390 cd	76.41 fg	Trust-Rumor 4%
2.60 ef	2.85 cde	7.30 ce	13.15 c	0.389 cd	75.98 def	Fenugreek 50 %
2.65 cde	2.77 de	7.44 c	13.52 d	0.409 bc	76.53 ef	Navelkelp2% + Trust-Rumor 2%
2.70 cd	2.80 cd	7.59 bc	13.80 bc	0.419 bc	76.62 ef	Navelkelp2% + Trust-Rumor 4%
2.68 cd	2.87 cd	7.68 b	13.92 bc	0.422 bc	76.70 cd	Navelkelp 4% +Trust-Rumor 2%
2.75 bcd	2.95 cd	7.72 b	14.18 b	0.432b c	76.60 ef	Navelkelp 4% + Trust-Rumor 4%
2.77 cd	2.99 cd	7.35 ce	13.70 cd	0.393 bcd	76.49 ef	Navel kelp 2% + Fenugreek 50 %
2.74 bcd	3.07 cb	7.63 b	13.96 bc	0.425 bc	76.74 cd	Navel kelp 4% + Fenugreek 50 %
2.81bc	3.00 bc	7.40 c	14.00 b	0.4.19 bc	76.80 cd	Trust-Rumor 2%+ Fenugreek 50 %
2.85 bc	3.10 bc	7.52 c	13.95 bc	0.430 ab	76.85 bc	Trust-Rumor 4%+ Fenugreek 50 %
2.80 bc	3.18 ab	7.45 c	14.15 b	0.422 bc	76.79 cd	Navelkelp2%+Trust-Rumor 2%+
2.91 ab	3.15 ab	7.69 b	14.26 b	0.436 ab	76.94 b	Navelkelp2% + Trust-Rumor 4%+ Fenugreek 50 %
2.97 ab	3.23ab	7.78 b	14.50 b	0.434 ab	77.13 b	Navelkelp4% + Trust-Rumor 2%+ Fenugreek 50 %
3.09 a	3.31 a	7.90 a	14.71 a	0.448 a	77.35 a	Navelkelp4% + Trust-Rumor 4%+ Fenugreek 50 %

References

1. Abed El- Hamied , S.A.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
3. , yield and fruit qualty s of mango trees.Biol.J. Agric . tatus N.Am.1(3):412-429.
4. Abdlecho, S , H.2013. Effect of spraying Grofalcs and Wilt– Pruf on quality characters of fruits local trees pomegranate .J . AL-Kufa Univ .For Biology .2 (5) : 1 – 5 .
5. Abo – Zaid , A. N. (1988) . Plant Medica . Arabic home for publishing . Cairo .
6. AL-Eneabi, R.M. 2008 . The effect of spraying NAA , CaCl2 and Vapor-Gard on the vegetative growth , specific and Storage Gravity of Fig Fruits c.v. Asowd Diala (ficus carica L.). M.Sc . D.Thesis . Dep. Hort. Agric. Colle. Univ.of Kufa .Iraq .
7. AL – Ebraheme,A.A . (2013) .Effect of spraying with Stavals and castor oil on quality of

local apple cv. Read summer tress. Journal of Babylon. 2 (21):694-698 .
8. AL– Hameedawi , A. M.2016.Effect of Hletab , kelpak and Paisein on vegetative growth and yield of fig trees(Ficus carica L.) . Journal of Environmental Science and Pollution Research. 2(2) :87-89 .
9. AL – Hameedawi , A. M and AL- Shemmeryi,W.H .2016.The impact of Stickchut and Groplanofix on vegetative growth , yield and fruit quality of fig tree cv. Aswod Diala . Theoretical and Applied Science . 3 (35) : 17- 20 .
10. AL –Numani, R. M .(2013) . Effect of Salicylic acid and Grofalcs on physical and chemical characteristics of local apple fruits) Maluspumila M .). J . ALphrat of Agricultural Scions . 5 (1) :34 – 39 .
11. AL – Rawi , K. M. and A. M. Khalf Allah (2000) . Design and Analysis of Agricultural Experiments . College of Agric. Univ. Mosel . Iraq .
12. A.O.A.C.1985.Association of Official Analytical Chemist. Official Methods of Analysis .13th Ed. APAC . Washington .D.C.
13. Bondok ,S .a ., Omran ,Y.M.and Abdel-Hamid ,H.M. 2013. Enhanced productivity and fruit quality of flame seedless Grapevines treated with sea extract .J.Plant production . 1 (12):1625-1635.
14. Crisosto, C.H. and G.M. Crisosto. 2001. Understanding consumer acceptance of early harvested 'Hayward' kiwifruit. Postharvest Biol.Technol. 22:205–213.
15. Elham, Z., Abd El-Motty, Mohamed F.M. Shahin, Mohamed El-Shiekh and Mahmoud M.M. Abd-El- Migeed, 2010. Effect of algae extract and yeast application on growth, nutritional status, yield and fruit quality of Keitte mango trees Agric. Biol. J. N. Am., 1(3): 421-429
16. Eman, A. Abd El-Moniem and A.S.E. Abd-Allah, 2008. Effect of green algae cells extract as foliar spray on vegetative growth, yield and berries quality of superior grapevines. Am. Euras. J. Agric. and Environ. Sci., 4 (4): 427-433.
17. Hegab, M.Y., A.M.A. Sharawy, S.A.G. El-Saida, 2005. Effect of algae extract and mono potassium phosphate on growth and fruiting of Balady orange trees (Citrus sinensis). Proc. First Sci. Conf. Agric. Sci. Fac. of Agric., Assuit Univ., (1): 73-84.
18. Hayat, I. ; T. Masud and H. A. Rathore . 2003. Effect of coating and wrapping materials on the shelf life of apple (Malus domestica c.v. Borkh). Department of Food Technology, University of Arid Agriculture, Rawalpindi.
19. Ibrahim , H. M. (2010) . Collection and Analysision of plant sample . Univ. Mena.Dar AL-Fager for publication and distribution.Egypt .
20. Jundi , H . M .(2003) . Physiology of tree fruits . Arabic home for putolishing .Cairo .
21. Rouhani , I. and A. Bassiri (1976) . Changes in the physical and chemical characteristics of Shahani dates during development and maturity . Hort. Sci . 15 :
22. Sabir, S .M .; Z .A . Shah and A.A Fzal (2004). Effect of Chemical treatment, wax coating, oil dipping and different wrapping materials on physiological and chemical characteristics and storage behavior of apple Malas domestica, L. Bork . Pakistan J. of nutr. 3 (2):122-127.
23. Spinelli ,F.,Fiori,G .,Noferini .M .,Sprocatti . M .and Costa,G . (2009). Perspectives on the Use of a seaweed extract on apple trees . J.Hort . Sci . and Biotech . Special Issue . 131 – 137 .
24. Subba Rao, N.S., 2008. Biofertilizer in Agriculture. Oxford IBH Company, New Delhi.