

# Influence of amino acids, bleed grape and seaweed extract on vegetative growth, yield and its quality of fig

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**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 amino acids (Amister and Gusto) at concentrations of 500 mg / L each other, Bleed of grape 100% and seaweed *Ascophyllum nodosum* at concentrations of 4% in single way or in combination at 15 march and 15 May,2016 . Results showed that spraying with amino acids ,bleed grape and seaweed extract treatments and their interactions caused a significant increase percentage of leaf area ,total chlorophyll, length of shoots , percentage of carbohydrate in branches , percentage of nitrogen in branches , percentage of carbohydrate / nitrogen in branches , percentage of nitrogen in leaves, percentage of phosphor in leaves, percentage of potassium in leaves ,diameter of fruit , length of fruit , weight of fruit , percentage humidity of fruit , percentage dray matter of fruit, number of days to ripening , percentage of total soluble sold , fruit firmness and total yield of trees compared with control treatment . There were significant differences between above mentioned treatments. The Bleed of grape was more effective than amino acids(Amister and Gusto) and seaweed in that respect , but the combination of amino acids(Amister and Gusto) , Bleed of grape and seaweed gave the best results in the treatment ( Am + Gu+ Bg + Bs ) for the season of experiment.

**Keywords**— Amino acids, Bleed of grape, Seaweed extract, fig trees.

## I. INTRODUCTION

Amino acids are considered as precursors and constituents of proteins (Rai, 2002), which are important for stimulation of cell growth. They contain both acid and basic groups and act as buffers, which help to maintain favorable pH value within the plant cell (Cerdana, *et al.*,2009). Amino acids can directly or indirectly influence the physiological activities in plant growth and development such as exogenous application of amino acids have been reported to modulate the growth, yield and biochemical quality of squashes and garlic plants (Hounsoume, *et al.*, 2008 , Abd El- Aal *et al.*, 2010; Shiraishi *et al.*, 2010, ). Amino acids are responsible for improving physical and chemical parameters of fruits as well as increasing the productivity of trees ( Mouco, *et al.*,2009) .The spraying with amino acids led to increased leaf containing from growth regulators cytokinines (Cks) , Gibberellins (GA<sup>3</sup> ), Auxins , chemical eliminates and reducing Abscisic acid (ABA) (Talaat, *et al.*,2013). Shehata , *et al.*,(2011) found that spraying strawberry with amino acids and seaweed extract led to increased the length of fruit, diameter of fruit, weight of fruit, fruit firmness, percentage humidity of fruits , total yield .Datir, *et al.*(2012) found that , spraying with amino acids has the positive effect in fruits growth and it is quality . 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 ( Elham, *et al.*, 2010 ). 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. Foliar application of mixture of amino acids and seaweed extract at different growth stages had a positive effect on vegetative growth, reproductive growth, and berry quality of grapevines. Multiple application of 0.5 mL L<sup>-1</sup> mixture of amino acids and seaweed extract at flowering + fruit setting + one month after fruit setting stages is quite effective to improve growth and berry physicochemical quality characteristics of 'Perlette' grapes (EKhan, *et al.*, 2012 ) .The purpose is to study the effect of spraying with amino acids(Amister and Gusto) , Blee d of grape and seaweed *Ascophyllum nodosum* treatments and their interactions on vegetative growth , yield and fruit quality of local fig tree cv. Aswod Diala .

## II. 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 , 48 trees at same size and growth were selected with 12 years of age , that planted on (5 x 5 m.) , they were spraying with Amister it was mixtures of amino acids ( Arginine ,Tyrosine and Proline) and Gusto it was mixtures of amino acids ( Glutathione , Aspartic acid , Glycine and Lysine ) at concentrations of 500 mg / L each other , Bleed of local grape cv. Sada Batha at concentrations of 100% that containing Fe 40 mg/L , Ca 160 mg/L , P 28 mg/L , K157 mg/L total acidity 11.5 mg/L , Mg 22.7 mg/L , Succinct acid 0.130 mg/L ,Malic acid 4.50 mg/L ,Tartaric acid 2.15 mg/L ,Formic acid 0.020 mg/L ,Citric acid 5.63 mg/L ,Na 3.50 mg/L ,Zn 1.9 mg/L ,IAA26 mg/L , GA<sub>3</sub> 40 mg /L, ,CKs 35 mg/L, olego scoris 95 mg/L, amino acid 7%, organic nitrogen 3%, organic matter 16%, Algonac acid 50%. ( AL- Saidi,2000), and Brawn seaweed extract *Ascophyllum nodosum* that containing (Fe 46-70 mg/L , N 1400 -1800 mg/L , P 1500 -2000 mg/L , Cu 10-15 mg/L potassium 2000-2006 mg/L ,B 30-44 mg/L , Kinetin% 0.06 and organic matter 13% ) at concentrations of 4% in three periods at 1April , 1May and 1 June ,2016. The experiment included 16 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) . The experiment involved the following 18 treatments :

- 1- Control treatment (sprayed with tap water).
- 2- Amister ( Am )as foliar sprays at concentration of 4 % .
- 3- Gusto ( Gu ) as foliar sprays at concentration of 4 % .
- 4- Bleed of grape (Bg ) as foliar sprays at concentration of 100% .
- 5- Brawn seaweed extract ( Bs)as foliar sprays at concentration of 4 % .
- 6- Am + Gu .
- 7- Am + Bg .
- 8- Am + Bs .
- 9- Gu + Bg .
- 10- Gu + Bs .
- 11- Bg + Bs .
- 12- Gu + Bg + Bs .
- 13- Am + Gu % +Bg .
- 14- Am+ Bg +Bs .
- 15- Am + Gu+ Bs.
- 16- Am + Gu+ Bg + Bs.

Trees spraying were done early morning until wetness was full addendum. Tween 20 was added at conc. of 1cm<sup>3</sup>/L as spreader material. Leaf area cm<sup>2</sup> , total chlorophyll mg/1gm FW , shoot length cm, percentage total carbohydrate in branches, percentage Nitrogen in branches , percentage C/N in branches , percentage elements N,P,K, diameter of fruit cm ,length of fruit cm , length of fruit/ diameter of fruit , percentage humidity of fruit , percentage dry matter of fruit, number of days to ripening , total yield kg/tree according to ( Ibrahim , 2010 ) .Firmness was measured on two sides of each fruit with an Effegi penetrometer (Model NI , McCormick Fruit Tech ,Yakima ,WA) Fitted with an 11.1mm tip . The percentage of total soluble solids were determined by hand refractometer.

## III. RESULTS AND DISCUSSION

### 3.1 Leaf area , total chlorophyll, shoot length , percentage of carbohydrate in branches , percentage of nitrogen in branches , percentage of carbohydrate / nitrogen in branches.

The data in table (1) indicate that spraying with amino acids(Amister and Gusto) , Bleed of grape and seaweed *Ascophyllum nodosum* in single way or in combination led to a significant increase in the leaf area , total chlorophyll, shoot length , percentage of carbohydrate in branches , percentage of carbohydrate / nitrogen in branches compared to control treatment until reached highest rates (7.30 m<sup>2</sup> , 157.63 mg/1gm FW ,27.75 cm, 13.09% and 19.30 % ) in the treatment ( Am + Gu+ Bg + Bs ) in comparison to the lowest values rates (6.01m<sup>2</sup> , 137.70 mg/1gm FW ,16.20 cm, 11.90% and 15.35 % ) in control treatment , respectively . The increase in leaf area and leaf chlorophyll content , shoot length , percentage of carbohydrate in branches , percentage of nitrogen in branches , percentage of carbohydrate / nitrogen in branches that clearly obvious from the previous results could be due to the effective components of amino acids , bleed of grape and seaweed such as major and minor elements , growth regulator and vitamins which enhanced cell division, metabolism and other biological reactions, in addition to the activation effect of these components on photosynthesis and promoting

protoplasm formation including RNA and DNA that important for cell division .These idea goes in parallel with those of Attoa , *et. al.* (2002) and EL-Naggar, *et. al.* (2013) . The increase of this characterize of vegetative growth because of the treatment with concentrations of amino acids (Amister and Gusto) , Bleed of grape and seaweed *Ascophyllum nodosum* 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).

TABLE 1

**EFFECT OF SPRAYING WITH AMINO ACIDS, BLEED GRAPE AND SEAWEED EXTRACT ON VEGETATIVE GROWTH OF LOCAL FIG TREES C.V ASOWD DIALA FOR SEASON 2016**

Treatments	Leaf aria / tree m <sup>2</sup>	Total chlorophyll mg/1gm FW	shoot length cm	%Total carbohydrate in branches	% Nitrogen in branches	C/N % in branches
Control	6.01 k	137.70 cd	16.20 h	11.90 c	0.775 a	15.35 g
Amister 4%	6.18 j	138.87 cd	22.40 e	12.29 bc	0.735bc	16.72 ef
Gusto 4%	6.25 ij	139.75 cd	19.00 gh	12.18 bc	0.730 bcd	16.68 ef
Bleed of grape 100%	6.59 f	144.09 abcd	22.90 cd	12.35 bc	0.706 bcdefgh	17.49 bcdef
Brawn seaweed extract 4%	6.27 ij	140.61bcd	21.70efg	12.24 bc	0.726 bcde	16.58 f
Am + Gu	6.74 e	154.55 ab	24.25 b	12.20 bc	0.718 bcdef	16.80 def
Am + Bg	6.85 cd	151.80 abc	23.19 d	12.28 bc	0.725 bcde	17.08 cdef
Am + Bs	6.78 de	149.35 abc	23.50 d	12.30 bc	0.714 bcdefg	16.93 def
Gu + Bg	6.27 ij	147.69 abc	21.64 efg	12.33 bc	0.710 bcdefgh	17.22 bcdef
Gu + Bs	6.30 hi	148.29 abc	22.80 cd	12.46 bc	0.797 efgh	17.36 bcdef
Bg +Bs	6.38 hg	140.99 abcd	23.30 cd	12.42 bc	0.697 efgh	17.87bcde
Gu + Bg + Bs	6.42 g	155.87 ab	24.71 b	12.60 ab	0.703 cdefgh	17.66 bcdef
Am + Gu +Bg	6.92 c	153.42 ab	24.97 b	12.61 ab	0.685 gh	18.39 ab
Am +Bg +Bs	6.90 c	151.24 abc	25.16 ab	12.61 ab	0.690 fgh	18.27abc
Am + Gu +Bs	7.1 b	155.30a b	25.41 ab	12.64 ab	0.700 defgh	18.05 bcd
Am + Gu +Bg + Bs	7.30 a	157.63 a	27.75 a	13.09 a	0.678 h	19.30 a

**3.2 The percentage of nitrogen in leaves, percentage of phosphor in leaves, percentage of potassium in leaves, diameter of fruit, length of fruit and weight of fruit .**

Data in Table (2) shows that percentage of nitrogen in leaves, percentage of phosphor in leaves, percentage of potassium in leaves ,diameter of fruit , length of fruit and weight of fruit were a significant increased when trees sprayed with amino acids(Amister and Gusto) , Bleed of grape and seaweed *Ascophyllum nodosum* in single way or in combination . The highest significance result were recorded in treatment (Am + Gu+ Bg + Bs ) , that gave(2.86%, 0.79% ,1.40% , 4.76 cm, 3.83 cm and 38.45gm) comparison with lest rates (2.23%, 0.42 % ,1.02% , 3.63 cm, 3.40 cm and 29.15 gm) in control treatment , respectively .The higher rates of nitrogen , potassium and phosphor in the leaf contents were due to the process of spraying of the amino acids , Bleed of grape and seaweed led to increased concentration of these elements in the leaves because these material have elements in composition compared to the untreated trees . The spraying with amino acids , Bleed of grape and seaweed led to increase in the content of leaves from growth hormones and total chlorophyll , these led to increase the physical characters of fruits (Andreu,2009). The increase of this characterize of vegetative and fruit growth because of the treatment with concentrations of amino acids and seaweed extract 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 ( Subba Rao, 2008, Abedl-Aziz *et.al*, 2009 ) .

TABLE 2

## EFFECT OF SPRAYING WITH AMINO ACIDS, BLEED GRAPE AND SEAWEED EXTRACT ON VEGETATIVE GROWTH, YIELD AND ITS QUALITY OF FIG OF LOCAL FIG TREES C.V ASOWD DIALA FOR SEASON 2016

Treatments	% N in leaves	% P in leaves	% K in leaves	Diameter of fruit cm	Length of fruit cm	Weight of fruit gm
Control	2.23 F	0.42 f	1.02 i	3.63 i	3.40 j	29.15 i
Amister 4%	2.41 def	0.45ef	1.07 fgh	4.07 h	3.52 h	31.79 h
Gusto 4%	2.38 def	0.47def	0.10 fgh	4.24 fgh	3.60 ghi	33.00 g
Bleed of grape 100%	2.50 cdef	0.56 cd	1.13 efg	4.45 bcdef	3.70 cdef	34.18 f
Brawn seaweed extract 4%	2.30 ef	0.53 cd	1.07 fgh	4.14 gh	3.58 hi	32.46 gh
Am + Gu	2.54 bcdef	0.55cd	1.11 fg	4.30 efgh	3.61fghi	34.26 f
Am + Bg	2.65 abcd	0.50 cd	1.13 efg	4.34 defg	4.64 efghi	35.51 f
Am + Bs	2.68 abc	0.48 de	1.15 def	4.34 defg	3.66 defg	34.12 f
Gu + Bg	2.39 def	0.51cde	1.17 cde	4.37 cdefg	3.69cdefg	34.84f
Gu + Bs	2.71 abc	0.53 cd	1.22 cde	4.47 bcdef	3.72abcde	36.43 de
Bg +Bs	2.69 abc	0.57 cd	1.19 de	4.59 abcd	3.73abcde	36.60 cde
Gu + Bg + Bs	2.77 abc	0.61bc	1.22 cde	4.53abcde	3.73abcde	36.97 cde
Am + Gu +Bg	2.52 bcdef	0.68 ab	1.30ab	4.64 abc	3.75 abcd	36.37 bcd
Am +Bg +Bs	2.55bcde	0.62 bc	1.28bcd	4.70ab	3.80 ab	37.97 ab
Am + Gu +Bs	2.72 abc	0.70 ab	1.33 ab	4.67ab	3.78 abc	37.49 bc
Am + Gu +Bg + Bs	2.86 a	0.79 a	1.40 a	4.76 a	3.83 a	38.45a

## 3.3 The percentage of humidity of fruit , percentage dray matter of fruit, number of days to ripening , percentage of total soluble sold , fruit firmness and total yield of trees.

Concerning the results in Table (3), percentage of humidity of fruit, percentage dray matter of fruit, number of days to ripening, percentage of total soluble sold, fruit firmness and total yield of trees were significantly affected by all treatments.

TABLE 3

## EFFECT OF SPRAYING WITH AMINO ACIDS, BLEED GRAPE AND SEAWEED EXTRACT ON YIELD AND ITS QUALITY FIG TREES C.V ASOWD DIALA FOR SEASON 2016

Treatments	% Humidity of fruit	% Dry matter of fruit	Number of days to ripening	% Total soluble solids	Fruit firmness Kg/cm <sup>2</sup> cm <sup>2</sup>	Total yield Kg/ tree
Control	76.50 i	23.50 a	70 c	14.71 d	0.313 hij	15.50 j
Amister 4%	77.34 defgh	22.66 ab	75 bcd	15.22 cd	0.331fhj	21.60 ef
Gusto 4%	76.87ki	23.13 ab	72 de	15.39 cd	0.334efgh	17.86 hi
Bleed of grape 100%	76.99 ijk	23.01 ab	71 de	15.50 bcd	0.332 fgh	22.45 fg
Brawn seaweed extract 4%	76.95 jk	23.05 ab	72 de	15.37cd	0.322 fghi	18.21 ghi
Am + Gu	77.07 hijk	22.93 ab	72 de	16.10 cde	0.337efgh	22.90 fg
Am + Bg	77.14ghij	22.86 ab	73 cde	16.15bcd	0.339efgh	23.84 ef
Am + Bs	77.24 fgh	22.76 ab	72 de	16.06abcd	0.348efgh	23.51 efg
Gu + Bg	77.20 fghi	22.80 ab	73 cde	16.19bcd	0.351cdef	23.96 ef
Gu + Bs	77.40 cdef	22.60 ab	74 bc	16.22abcd	0.360 cde	22.93fg
Bg +Bs	77.54 bcd	22.46 ab	75 bcd	16.25abcd	0.373bcd	23.12 efg
Gu + Bg + Bs	77.46 cde	22.54 ab	77 abc	16.27 abc	0.382 ab	25.00 d
Am + Gu +Bg	77.50 bcd	22.50 ab	77 abc	16 .33 ab	0.379 bcd	24.30 de
Am +Bg +Bs	77.63abc	22.37ab	79 ab	16.79 ab	0.384 ab	25.87cd
Am + Gu +Bs	77.70 ab	22.30 ab	78 ab	16.58 ab	0.386ab	26.18 bc
Am + Gu +Bg + Bs	77.78 a	22.22 b	81 a	16.86 a	0.405 a	27.20 a

It is cleared that spraying amino acids, Bleed of grape and seaweed in single way or in combination to the fig trees increased physical and chemical characters of fruits compared with untreated trees. In addition, spraying this material in combination gave the highest parameters they were (77.78%, 81days, 16.80%, 0.405kg /cm<sup>2</sup>and 27.20 kg / tree). On the other hand, untreated trees gave the lowest value they were (76.50, 70 days, 14.71%, 0.313kg /cm<sup>2</sup>and 15.50 kg / tree ) respectively .In

addition, the single and combination treatments led to a significant decreased in the percentage dry matter of fruit and the lowest value 22.22% in the treatment (Am + Gu+ Bg + Bs ) comparison with the highest rates 23.50% in control treatment . These result are in line with ( Shehata et.al, 2011, EKhan, *et al.*, 2012 ) on strawberry and grape they mentioned that applying of amino acids and seaweed extract to the plants improved physical , chemical of fruits and yield . The increase in diameter of fruit , length of fruit and weight of fruit is ascribed to the increased of chlorophyll contents of leaves, which increased photosynthesis and ultimately overall health of fig and this increased total yield of trees .

#### IV. CONCLUSION

Foliar application of mixture of amino acids, Bleed of grape and seaweed extract at 1 April, 1May and 1 June, had a positive effect on vegetative and fruiting growth, and fruit quality of fig trees cv. Aswod Diala . Multiple application of (Am + Gu+ Bg + Bs) is quite effective to improve growth and fruit physicochemical quality characteristics and total yield of trees compared with control treatment.

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