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RESPONSE OF AMAR APRICOT TREES TO SPRAY WITH YEAST EXTRACT AND KINETIN

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ABSTRACT

This study was conducted during 1999 and 2000 seasons on Amar apricot trees grown in the experimental farm at Faculty of Agric., Moshtohor, Qalubia Governorate as attempt to improve the productivity and fruit quality by using the naturally source of many growth factors, i.e., yeast extract (YE) and/or that synthetically growth promoter, i.e., kinetin.

Foliar spray with yeast extract at 50,100 and 200 ml/L, kinetin at 10, 20 and 30 ppm and yeast extract at 100 ml/L + kinetin at 20 ppm, besides water spray as control were applied 2 times viz.: the first spray was at full bloom stage (i.e., February 18th 1999 and February 21st 2000) during 1st and 2nd seasons, respectively. While, second spray was two weeks interval after the first one. The randomized complete block design with 3 replications was used for arranging these 8 spray treatments for evaluating their influence on the following measurements:

1- cropping indication (fruit set %; fruit retention% and yield Kg/tree); **2-fruit quality** i.e. both physical (weight –size - flesh % and fruit firmness) and chemical properties (TSS %, acidity, T.S.S./ acid ratio, Vit.C, total sugar and reducing sugars content); **3- leaf &fruit** N, P and K contents and leaf photosynthetic pigments content during three stages of fruit development.

Obtained data revealed that all cropping and fruit quality measurements were positively responded to all applied yeast extract and kinetin treatments when compared with the control. Yeast extract at 100 ml/L + kinetin at 20 ppm and yeast extract at 200 ml/L surpassed statistically other treatments. In addition, all applied yeast extract and kinetin treatments increased both leaf &fruit N, P and K contents as well as leaf photosynthetic pigments content during certain three stages of fruit development comparing with the control. Also, Yeast extract at 100ml/L + kinetin at 20 ppm gave the highest values in this respect.

INTRODUCTION

Apricot is one of the major Temperate Zone fruits planted in Egypt. Amar apricot cultivar is one of the most favorite early summer fruit in Egypt.The common reduction of final yield returns either to the obvious and high percentage of flower dropping before setting or directly their abortion after set.

Many trials have been carried out for increasing fruit set and minimizing fruit drop by the use of different factors including plant growth regulators (**Corgan and Widmoyer, 1971**) or Potash fertilization (**Nageib *et al*, 1991**). Biofertilizers were very safe for human, animal and environment and using them reduced the great environment pollution. The various positive effects of applying reactivated dry yeast as a newly used biofertilizer were attributed to its own of different bioconstituents such as, higher percentage of protein, large amount of vitamin B and the natural plant growth hormone namely cytokinins. In addition, application of active dry yeast was very effective in releasing CO_2 which reflected on improving net photosynthesis (**Ferguson *et al*, 1995**). The possibility of using the active dry yeast for improving growth and productivity of fruit crops was mentioned by (**Subba Rao, 1984 and Nijjar, 1985**). Active dry yeast at 0.1 % caused a striking improvement in growth, yield and quality of the berries for Rad roomy grapes (**Ahmed *et al*, 1997**). In apple, dry yeast was very effective in improving leaf area, nutritional status of the trees, yield and quality (**Mansour, 1998**). In Valencia orange trees, spraying active dry yeast at 0.25 to 0.75% on March or / and August was favorable in improving growth, yield, fruit weight and volume (**Hegab *et al*, 1997**). In Washington navel orange, spraying yeast extract at 100 & 200ml/L and some growth regulators improved fruit set percentage and reducing June drop (**Atawia and EL-Desouky, 1997**).

Hence, this study aimed to improve fruit set, fruit yield and its quality as well as elements & photosynthetic pigments in leaves of Amar apricot cultivar by using yeast extract and Kinetin as foliar spray.

MATERIALS AND METHODS

This study was carried out during two successive seasons (1999 and 2000) on 20 years old Amar apricot trees grafted on seedling apricot rootstocks. The trees were at 7 X 7m.apart grown in clay loamy soil at the Experimental farm of Faculty of Agriculture at Moshtohor, Zagazig University, Qalubia Governorate, Egypt.

Twenty-four healthy trees were carefully selected as nearly uniform as possible in vigorous and size and received regularly the same agricultural practices adopted in the orchard.

The complete randomized block design was used, where the experiment involved 8 treatments with 3 replicates each of one tree.

Selected trees were sprayed twice: 1- at full bloom stage (i.e., February 18th 1999 and February 21st 2000), 2- two weeks after the first one as follows: -

1-Tap water (as control).	5- Kinetin at 10 ppm.
2-Yeast extract at 50ml/ L.	6-Kinetin at 20 ppm.
3- Yeast extract at 100ml/ L	7-Kinetin at 30 ppm.
4-Yeast extract at 200ml/ L.	8-Yeast extract at 100ml/L +Kinetin at 20 ppm.

Preparation of Yeast extract:

The dry pure yeast powder was activated by using sources of carbon and nitrogen with the ratio of 6:1 (**Barnett *et al*, 1990 and EL-Desouky *et al*, 1998**). This ratio is suitable to get the highest vegetative production of yeast (each ml yeast contained about 12000 of yeast cells). Then the media was frozen and thawed directly before usage. Tween- 20 was added as a spreading agent for all treatments.

The yeast extract used in the present study was analyzed for phytohormones, mineral elements "macro and micro", amino acid, total carbohydrates, reducing sugars as glucose, enzymes and Vitamins by **Mahmoud (2001)** as shown in Table (1) and Fig. (1).

The response to investigated treatments was evaluated through determining the following parameters: -

Fruit setting and yield:

Four main branches grown at different directions of the tree were selected and tagged with about 3cm. diameter at their bases. At full bloom, number of flowers per branch were counted and recorded. Set fruits were counted and recorded 3 weeks after full bloom. At harvest time (May 5th 1999 and May 7th 2000) the number of retained fruits for each spray treatment were counted and estimated as percentage of total number of fruit setting. Yield per tree in Kg was determined.

Fruit quality: -

At harvest time, sixty fruits were randomly taken from each treatment (20 per replicate/ tree) were used for the physical and chemical properties (i.e. average fruit weight in gram, size, flesh %, fruit firmness, T.S.S%, acidity %, T.S.S / acid ratio, vitamin C, total sugars and reducing sugars) were determined according to **A.O.A.C. (1980).**

Table (1): Chemical analysis of yeast extract.

Minerals				Amino acids (mg/100g dry weight)		Carbohydrates (mg/100g dry weight)		Enzymes (mg/100g dry weight)		Vitamins (mg/100g dry weight)	
Major (g/100g dry weight)		Trace (mg/100g dry weight)									
Total N	7.21	Al	650.2	Arginine	1.99	Carbohydrate	21.2	Cytochrome oxidase	0.35	Vitamin B1	3.23
P_2O_5	5.168	Ba	175.6	Histidine	2.63	Glucose	10.33	Cytochrome peroxidase	0.29	Vitamin B2	0.31
K_2O	34.39	Co	87.8	Isoleucine	2.31			catalase	0.063	Riboflavin	4.96
Na_2O	0.83	Pb	438.6	Leucine	3.29					Nicotinic acid	39.58
MgO	3.76	Mn	81.5	Lysine	2.93					Pantothenic acid	13.56
CaO	2.03	Sn	203.9	Methionine	0.72					Biotin	0.09
SiO_2	1.55	Zn	335.6	Phenylalanine	2.01					Pantothenic acid	9.23
SO_3	0.49			Threonine	2.09					Vitamin B6	4.23
Cl	0.08			Tryptophan	0.45					Folic acid	4.56
FeO	0.92			Valine	4.19					Thiamin	3.71
NaCl	0.30			Glutamic acid	3.03					Pyridoxine	3.90
				Serine	1.93					Vitamin B12	13.0 µg/100g
				Aspartic acid	1.31					Inositol	263.15 µg/100g
				Cystine	0.23						
				Proline	1.33						
				Tyrosine	1.49						

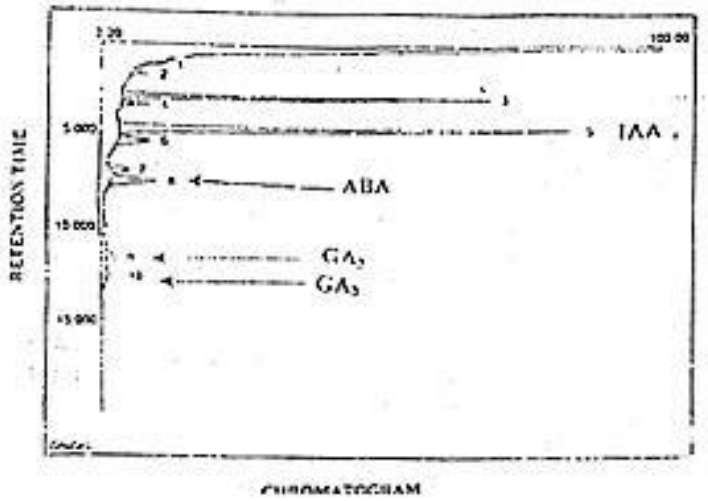

Fig (1): Chromatograms of endogenous IAA, GA3 and ABA at 100% level as determined by GLC.

-Some bioconstituents and mineral content in leaves and fruits:

Bioconstituents and mineral content in leaves and fruits were determined during three stages of fruit development: a)- after fruit setting; b)- after endocarp stone development; c)- after fruit maturity. Photosynthetic pigments content were determined in fresh leaves using the methods described by **Nornal (1982)**. Total nitrogen, phosphorus and potassium were determined according the methods described by **Horneck and Miller (1998); Jackson (1970) and Horneck and Hanson (1998)** respectively.

-Statistical analysis: -

Data obtained during both seasons were subjected to analysis of variance according to **Snedecor and Cochran (1980)**. Means were differentiated using Duncan' s multiple testes according to **Duncan (1955).**

RESULTS AND DISSCUSSION

Effect on fruiting:

Data in Table (1) clearly indicate that different applied treatments i.e. -yeast extract and kinetin as well as combination of the medium concentration of yeast extract and kinetin (i.e 100 ml/L YE and 20 ppm kinetin), significantly increased fruit set percentage of Amar apricot cv. in both seasons of this study.

The positive effect of different treatments in fruit set % was reversed on the other estimated characters, since the percentages of the retention mature fruits was also significantly increased. These beneficial effects were extended to the total yield per tree.

The major beneficial effects were obtained by the application of 100 ml/ L yeast extract + 20 ppm Kinetin, 200ml/ L yeast extract, 100ml/L yeast extract and 30 ppm Kinetin treatments, respectively.

Effect on fruit physical properties: -

As shown in Table (2) fruit weight, size; flesh % and fruit firmness was markedly increased with different treatments. The heighest increase of fruit weight (38.00, 37.00 gm/ fruit) was existed with 100 ml/ L yeast extract + 20 ppm. Kinetin treatment followed by yeast extract at 200ml/ L in both seasons. Also, the obvious result was the increase of fruit size by yeast extract at 100ml/ L + Kinetin at 20ppm treatment comparison with the other treatments. Concerning the average percentage of flesh in Amar apricot fruits was positively responded to the investigated spray

Table (2): Effect of yeast extract and kinetin spray treatments on fruit set percentage ,fruit retention percentage and yield (Kg /tree) of Amar apricot cv. during 1999 and 2000 seasons.

Treatments	Fruit set %		Fruit retention %		Yield (Kg /tree)	
	1999	2000	1999	2000	1999	2000
Water (control)	6.50 F	6.80 F	45.30 D	46.50 H	58.00 F	60.17 E
Yeast extract at 50ml /L	7.00 E	7.50 E	49.15 D	48.00 G	64.80 D	65.00 D
Yeast extract at 100ml /L	7.50 D	7.88 D	53.50 C	52.60 F	73.50 B	73.50 B
Yeast extract at 200ml /L	9.60 B	9.85 B	60.40 B	58.80 C	76.00 A	75.00 B
Kinetin at 10ppm	7.30 D	7.50 E	54.10 C	53.60 E	63.25 E	64.00 D
Kinetin at 20ppm	7.50 D	8.00 D	58.30 B	58.20 D	66.60 C	66.80 C
Kinetin at 30ppm	8.00 C	8.50 C	61.20 B	60.30 B	72.25 B	73.50 B
Yeast extract at 100ml/L + Kinetin at 20ppm	10.00 A	10.30 A	65.00 A	64.50 A	75.00 A	78.00 A

Means with the same latter are not significantly different (P=0.01).

treatments. The greatest value of fruit flesh % was statistically exhibited by yeast extract at 100ml/ L + Kinetin at 20ppm.i e. 86.50% and 85.00% during both seasons. On the other hand, other spray treatments increased the percentage of flesh over control.

As for fruit firmness Table (2) clearly shows that the treatment of 100ml/L yeast extract +20 ppm Kinetin gave the heighest significant increase comparing with the other treatment in both seasons of study.

Effect on fruit chemical properties: -

Data in Table (3) showed that juice TSS% of Amar apricot cv. varied in their response to the investigated foliar spray treatments as increased it over control during both seasons, but the obtained increase by yeast extract at 100ml/ L + Kinetin at 20ppm.foliar spray surpassed statistically the analogous ones of other treatments.

With regard to the effect on the total acidity percentage in fruit juice, insignificant differences were even increase or decrease.

As for fruit juice T.SS/ Acid ratio data in Table (3) revealed that yeast extract at 100ml/ L + Kinetin at 20ppm treatment gave the highest value in this respect when compared with other treatments.

As regards the Vitamin C content in fruit juice, there was an increase in this content but did not reach the level of significance, except yeast extract at 100ml/ L + Kinetin at 20ppm, Kinetin at 20ppm and Kinetin at 30ppm treatments.

Data in Table (3) also clearly show that total and reducing sugars content of Amar apricot fruits responded positively to the different applied treatments in most cases, however the yeast extract at 100ml/ L + Kinetin at 20ppm, Kinetin at 30ppm and yeast at 200ml/ L resulted in the highest values in this content.

Effect on leaf and fruit N, P, K contents: -

Data presented in Tables (4&5) clearly indicate that different applied treatments increased N, P and K levels in the leaves and fruits of treated trees during the three assigned stages of fruit development (after fruit set, after endocarp stone development and after fruit maturity). Yeast extract at 100ml/ L + Kinetin at 20ppm.treatment gave the highest values in this respect when compared with other treatments.

Effect on leaf pigments content: -

As shown in Table (6) foliar applications of yeast extract or Kinetin with the three applied concentrations significantly increased the total leaf content of photosynthetic pigments (i.e., chlorophyll a&b and carotoniods) during the three assigned stages of fruit development in both

Table (3): Effect of yeast extract and kinetin spray treatments on fruit physical properties of Amar apricot cv. during 1999 and 2000 seasons.

Treatments	Fruit weight (gr.)		Fruit size (cm^3)		Flesh %		Fruit firmness (lb/Inch2)	
	1999	2000	1999	2000	1999	2000	1999	2000
Water (control)	29.00 DE	32.00 C	5.08 D	5.12 D	70.80 E	71.10 E	4.03 B	4.07 B
Yeast extract at 50ml /L	30.00 CDE	33.00 BC	5.12 D	5.14 CD	73.47 D	72.33 E	4.10 AB	4.10 B
Yeast extract at 100ml /L	32.00 C	35.00 AB	5.30 BC	5.31 B	76.50 C	75.00 D	4.10 AB	4.10 B
Yeast extract at 200ml /L	35.00 B	35.00 AB	5.35 B	5.33 B	80.47 B	81.10 B	4.20 A	4.23 A
Kinetin at 10ppm	28.00 E	29.00 D	5.12 D	5.20 CD	73.00 DE	72.03 E	4.10 AB	4.14 AB
Kinetin at 20ppm	30.00 CDE	31.00 CD	5.20 CD	5.22 C	75.00 CD	75.03 D	4.12 AB	4.17 AB
Kinetin at 30ppm	31.00 CD	32.00 C	5.50 A	5.50 CD	80.00 B	78.00 C	4.17 AB	4.17 AB
Yeast at 100ml/L + Kinetin at 20ppm	38.00 A	37.00 A	5.60 A	5.63 A	86.50 A	85.00 A	4.20 A	4.26 A

Means with the same latter are not significantly different (P=0.01).

Table (4): Effect of yeast extract and kinetin spray treatments on fruit chemical properties of Amar apricot cv. during 1999 and 2000 seasons.

Treatments	T.S.S.%		Acidity %		T. S.S./ Acidity		Vitamin C(mg/100g F.W Juice)		Total sugars (g/100g F.W.)	
	1999	2000	1999	2000	1999	2000	1999	2000	1999	2000
Water(control)	10.21 F	10.69 F	0.44 A	0.45 A	25.48 F	24.20 E	9.50 F	9.54 G	7.05 H	6.92 H
Yeast extract at 50ml/L	10.32 E	11.34 D	0.43 A	0.43 A	26.33 EF	26.40 D	9.76 E	9.82 F	7.52 G	7.60 F
Yeast extract at 100ml/L	10.71 C	11.69 C	0.41 A	0.41 A	29.28 C	29.52 BC	9.90 D	9.93 E	8.03 D	8.11 D
Yeast extract at 200ml/L	12.30 B	12.33 B	0.40 A	0.40 A	30.75 B	29.33 BC	10.40 C	10.50 D	9.50 C	8.41 C
Kinetin at 10 ppm.	11.23 F	11.22 E	0.40 A	0.43 A	26.74 E	25.10 D	9.55 F	9.57 G	7.60 F	7.54 G
Kinetin at 20 ppm.	11.50 D	11.49 C	0.42 A	0.42 A	28.05 D	27.36 CD	11.31 B	11.33 C	7.82 E	7.69 E
Kinetin at 30 ppm.	11.74 C	11.73 B	0.41 A	0.40 A	29.36 C	29.33 B	11.30 B	11.42 B	8.56 B	8.60 B
Yeast extract at 100ml/L + Kinetin at 20 ppm.	12.55 A	12.53 A	0.38 A	0.39 A	32.01 A	32.14 A	12.20 A	12.30 A	8.78 A	8.71 A

Means with the same letter are not significantly different (P=0.01)

Table (5): Effect of yeast extract and Kinetin spray treatments on fruits N, P, and K content of Amar apricot cv. during 1999 and 2000 seasons.

Treatments	After fruit set			After endocarp stone			After fruit maturity		
	N	P	K	N	P	K	N	P	K
1999 season									
Water(control)	2.70 B	0.23 C	2.45 D	3.10 C	0.30 C	2.83 E	3.40 D	0.25 B	2.77 G
Yeast extract at 50ml/L	3.10 AB	0.26 BC	2.68 D	3.50 BC	0.34 BC	2.90 E	3.80 CD	0.29 B	2.95 F
Yeast extract at 100ml/L	3.30 AB	0.28 BC	2.83 CD	3.70 ABC	0.37 BC	3.83 D	4.70 ABC	0.31 B	3.20 E
Yeast extract at 200ml/L	3.80 AB	0.33 ABC	3.17 BC	4.10 AB	0.40 BC	4.36 BC	4.90 AB	0.34 B	3.56 D
Kinetin at 10 ppm.	2.90 AB	0.29 ABC	2.90 BC	3.30 BC	0.37 BC	3.04 E	3.50 D	0.34 B	3.35 E
Kinetin at 20 ppm.	3.00 AB	0.31 ABC	3.24 ABC	3.40 BC	0.43 B	4.22 C	4.10 BCD	0.36 AB	3.96 C
Kinetin at 30 ppm.	3.40 AB	0.35ABC	3.56 AB	3.80 AB	0.45 AB	4.49 B	4.60 ABC	0.37 AB	4.11 B
Yeast extract at 100ml/L + Kinetin at 20 ppm.	3.90 A	0.39 A	3.70 A	4.50 A	0.56 A	5.28 A	5.20 A	0.47 A	4.75 A
2000 season									
Water(control)	2.60 B	0.26 C	2.64 D	3.00 D	0.31 D	2.95 E	3.60 B	0.27 C	2.90 F
Yeast extract at 50ml/L	3.20 AB	0.27 C	2.90 CD	3.30 CD	0.36 CD	3.83 D	3.90 B	0.29 BC	3.04 E
Yeast extract at 100ml/L	3.30 AB	0.30 BC	3.04 CD	3.70 BCD	0.42 BCD	3.96 CD	4.10 B	0.33 ABC	3.35 D
Yeast extract at 200ml/L	3.70 AB	0.37 ABC	3.30 BC	4.40 AB	0.47 ABC	3.96 CD	5.40 A	0.36 ABC	3.56 C
Kinetin at 10 ppm.	3.10 AB	0.31 BC	3.13 C	3.20 CD	0.34 CD	3.96 CD	3.80 B	0.30 BC	3.30 D
Kinetin at 20 ppm.	3.30 AB	0.33 ABC	3.35 ABC	3.50 CD	0.45 BC	4.09 C	4.00 B	0.35 ABC	3.56 C
Kinetin at 30 ppm.	3.60 AB	0.40 AB	3.70 AB	4.00 ABC	0.50 AB	4.47 B	5.20 A	0.40 AB	3.70 B
Yeast extract at 100ml/L + Kinetin at 20 ppm.	4.20 A	0.43 A	3.83 A	4.89 A	0.59 A	5.41 A	6.00 A	0.46 A	3.96 A

Means with the same letter are not significantly different (P=0.01)

Table (6): Effect of yeast extract and Kinetin spray treatments on leaves N, P and K content of Amar apricot cv. during 1999 and 2000 seasons.

Treatments	After fruit set			After endocarp stone			After fruit maturity		
	N	P	K	N	P	K	N	P	K
1999 season									
Water(control)	2.40 C	0.21 C	2.11 D	2.50 C	0.19 C	2.58 F	3.80 C	0.16 D	2.50 E
Yeast at 50ml/L	3.00 ABC	0.23 BC	2.38 CD	2.80 C	0.28 C	2.77 F	4.00 ABC	0.18 D	3.17 D
Yeast at 100ml/L	3.30 AB	0.32 ABC	2.50 B	3.20 BC	0.28 BC	3.56 CD	4.30 AB	0.23 CD	4.22 B
Yeast at 200ml/L	3.60 AB	0.35 A	3.43 A	3.80 AB	0.35 AB	3.56 B	4.60 AB	0.31 BC	4.50 A
Kinetin at 10 ppm.	2.50 BC	0.33 AB	2.64 BC	2.70 C	0.26 BC	3.04 E	3.70 BC	0.26 CD	3.56 C
Kinetin at 20 ppm.	2.60 BC	0.36 A	3.43 A	2.90 C	0.36 AB	3.43 D	3.90 BC	0.33 BC	4.22 B
Kinetin at 30 ppm.	3.20 ABC	0.40 A	3.30 A	3.80 AB	0.40 A	3.70 BC	4.40 AB	0.38 AB	4.25 B
Yeast at 100ml/L + Kinetin at 20 ppm.	3.90 A	0.41 A	3.56 A	4.00 A	0.45 A	4.22 A	5.00 A	0.47 A	4.50 A
2000 season									
Water(control)	2.50 C	0.25 B	2.38 D	2.70 D	0.23 C	2.64 G	3.20 D	0.22 D	3.08 E
Yeast at 50ml/L	2.70 BC	0.29 AB	2.64 D	3.50 BC	0.31 BC	2.90 EF	4.00 BCD	0.30 CD	3.27 D
Yeast at 100ml/L	3.10 ABC	0.32 AB	2.56 D	3.60 ABC	0.35 B	3.04 E	4.20 ABCD	0.35 C	3.43 C
Yeast at 200ml/L	3.70 AB	0.36 AB	3.56 B	4.10 AB	0.36 B	3.56C	4.80 AB	0.37 BC	3.56 B
Kinetin at 10 ppm.	2.60 BC	0.29 AB	2.64 D	3.10 CD	0.33 BC	2.77 FG	3.70 CD	0.30 CD	3.30 CD
Kinetin at 20 ppm.	3.20 ABC	0.34 AB	2.64 D	3.40 BC	0.35 B	3.56 D	4.10 BCD	0.36 C	3.43 C
Kinetin at 30 ppm.	3.40 ABC	0.35 AB	3.56 C	3.70 ABC	0.40 AB	4.20 B	4.50 ABC	0.45 AB	3.83 B
Yeast at 100ml/L + Kinetin at 20 ppm.	3.90 A	0.40 A	4.62 A	4.30 A	0.48 A	4.49 A	5.20 A	0.49 A	4.85 A

Means with the same letter are not significantly different (P=0.01).

seasons. Also, Yeast extract at 100ml/ L + Kinetin at 20ppm treatment gave the highest values of chlorophyll a&b, caroteniods and total photosynthetic pigment contents during three stages of fruit development when compared with other treatments and control as well.

Data of the present study indicated that application of synthetic plant growth regulators i.e. Kinetin led to increase fruit set %, fruit retention %, fruit yield in Kg/tree (Table, 1), fruit weight, fruit size, flesh % and fruit firmness (Table, 2). Also, total soluble solids (T.S.S %), T.S.S/ acidity, vitamin C, total sugars and reducing sugars were also increased, but total acidity was reduced (Table, 3) as well as the elements content in both leaves and fruits and photosynthetic pigments in leaves (Tables, 4&5 and 6). In other studies, similar results were obtained by **Guardiola *et al.*, (1993), Kouka *et al.*, (1994); Atawia and EL-Desouky (1997) and Attala, *et al.*, (2000)** gained analogue results.

Of interest in the present study was the experimentation of the natural source of phytohormones and vitamins i.e. yeast extract of activated yeast for the first time on apricot and the comparison of its effects with that of synthetic plant growth regulator (kinetin). This approach is very important because there are many cautions about using such synthetic substances on fresh marketable vegetable and fruits used for human consumption. In addition, an individual synthetic plant growth regulator is likely to have some favorable influence and others that are unfavorable **(Atawia and El-Desouky, 1997)**.

Biosynthesis of phytohormones – like substances by microorganisms (included yeast) were reported by many workers. Of these are, **Lippi *et al*, (1988); Nieto and Frankenberger (1989) and Mahmoud (2001)**.

Therefore, we compared different effects of using yeast extract with those of Kinetin. In this respect, data obtained indicated that yeast extract increased N, P and K contents in the fruits of treated trees. The increase of fruit set that reflected on increasing yield / tree and other beneficial effects of different aspects of Amar apricot fruits.

Moreover, these obvious effects of yeast extract led to the increase of fruit set, fruit retention and yield in Kg / tree. This was in addition to the increase of the sink ability in fruit through increasing the level of endogenous phytohormones. This could be interpreted on basis that increasing both mineral uptake endogenous regulators in fruits act through mobilization of nutrients and other substances vitamins and

Tabe (2) Effect of yeast extract and Kinetin spray treatments on leaves photosynthetic pigments content of Amar apricot cv. during 1999 and 2000 seasons.

Treatments	After fruit set				After rapid fruit growth stage				After fruit maturity			
	Chl a	Chl b	Caros.	Total	Chl a	Chl b	Caros.	Total	Chl a	Chl b	Caros.	Total
1999 season												
Water (control)	.92 B	.42 C	.39 B	.84 E	.88 DE	.83 D	.31 C	.22 E	.95 D	.43 D	.35 B	.97 F
Yeast extract at 50ml/L	.91 B	.76 AB	.31 B -	.86 D	.74 CD	.91 BD	.41 ABC	.32 D	.85 BC	.71 D	.48 AB	.77 E
Yeast extract at 100ml/L	.68 A	.67 A	.33 B	.32 B	.76 C	.16 B	.34 BC	.78 BC	.58 BC	.86 C	.52 A	.51 CD
Yeast extract at 200ml/L	.53 A	.53 A	.46 A	.39 A	.36 BC	.57 AB	.47 A	.94 B	.74 BC	.99 AB	.49 A	.62 BC
Kinetin at 10 ppm	.93 B	.47 BC	.43 A	.82 CD	.65 E	.69 D	.41 AB	.39 D	.62 CD	.96 BC	.47 AB	.39 DE
Kinetin at 20 ppm	.13 A	.65 C	.35 AB	.18 BCD	.14 CD	.12 BC	.40 ABC	.70 C	.61 BC	.94 ABC	.46 AB	.43 D
Kinetin at 30 ppm	.13 A	.83 A	.43 A	.20 A	.48 AB	.28 AB	.53 A	.13 A	.15 B	.93 A	.51 A	.60 AB
Yeast extract at 100ml/L + Kinetin at 20 ppm	.14 A	.16 A	.40 A	.48 A	.49 A	.29 A	.47 AB	.28 A	.33 A	.96 ABC	.47 AB	.80 A
2000 season												
Water (control)	.88 D	.46 E	.38 B	.98 E	.12 D	.87 E	.38 C	.39 E	.61 F	.73 C	.41 C	.18 F
Yeast extract at 50ml/L	.65 D	.43 E	.39 B	.83 DE	.28 BC	.99 DE	.43 C	.49 CD	.37 DE	.89 B	.44 BC	.34 DE
Yeast extract at 100ml/L	.69 CD	.73 CD	.41 AB	.37 C	.79 C	.65 BC	.42 BC	.78 C	.33 CDE	.91 B	.49 ABC	.42 D
Yeast extract at 200ml/L	.52 C	.89 B	.42 AB	.58 B	.41 AB	.18 AB	.49 ABC	.13 B	.34 BC	.93 B	.58 AB	.86 C
Kinetin at 10 ppm	.86 CD	.66 DE	.42 AB	.12 CD	.26 C	.89 E	.41 ABC	.68 D	.12 EF	.83 BC	.49 ABC	.61 E
Kinetin at 20 ppm	.13 C	.76 CD	.44 B	.35 C	.26 C	.91 CD	.42 BC	.71 CD	.26 CD	.91 B	.45 BC	.62 D
Kinetin at 30 ppm	.32 B	.95 BC	.45 AB	.48 B	.45 AB	.21 A	.51 AB	.17 AB	.43 AB	.13 A	.52 ABC	.81 B
Yeast extract at 100ml/L + Kinetin at 20 ppm	.47 A	.89 A	.50 A	.81 A	.25 A	.23 A	.54 A	.28 A	.49 A	.98 A	.59 A	.23 A

Mean values within the same column followed by the same letter are not significantly different (P=0.05)

phytohormones **(Rajput and Babu, 1985)** from the source (leaves) to sink (fruit).

Therefore, in our opinion, it is safe to advise Amar apricot cv. producers to spray their trees twice, with yeast extract at 100ml/ L. +kinetin at 20ppm. or yeast extract at 200ml/ L.

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استجابة أشجار مشمش العمار للرش بمستخلص الخميرة والكينيتين

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كلية الزراعة بمشتهر- جامعة الزقازيق (فرع بنها)

أجريت هذه الدراسة خلال موسمين متتاليين هما ١٩٩٩ ، ٢٠٠٠ على أشجار المشمش صنف العمار بمزرعة كلية الزراعة بمشتهر- قليوبية بهدف إلقاء الضوء على تأثير الرش بمستخلص الخميرة والكينيتين على إثمار وصفات جودة ثمار المشمش وكذلك إمكانية استخدام الخميرة كبديل لمنظمات النمو الصناعية(الكينيتين) حيث تم رش الأشجار مرتين ١- عند الإزهار الكامل و ٢- بعد الأولي بأسبوعين بالخميرة بتركيزات ٥٠ ، ١٠٠ ، ٢٠٠ مل/ لتر والكينيتين بتركيز ١٠، ٢٠ ، ٣٠ جزء في المليون والخميرة بتركيز ١٠٠ مل/لتر + الكينيتين بتركيز ٢٠ جزء في المليون بالإضافة الى أشجار المقارنة. واتبع تصميم القطاعات الكاملة العشوائية في توزيع وتطبيق هذه المعاملات مع ثلاثة مكررات (شجرة / مكررة). وقد قيمت الاستجابة لهذه المعاملات من خلال القياسات الآتية المرتبطة بكل من :

أولاً : قياسات مؤشر الإنتاجية : (نسبة العقد- نسبة بقاء الثمار حتى القطف ومحصول الشجرة بالكيلو جرام).

ثانيا: قياسات جودة الثمار :

أ – الصفات الطبيعية (وزن وحجم الثمرة – نسبة اللب و صلابة الثمار) ،

ب – الصفات الكيميائية (نسبة المواد الصلبة الذائبة الكلية ، نسبة الحموضة ، نسبة المواد الصلبة / الحموضة ، السكريات الكلية والمختزلة وفيتامين ج).

وعن أهم النتائج يمكن إيجازها في الآتي :-

أظهرت نتائج الموسمين أن جميع الصفات التي درست من حيث قياسات مؤشر الإنتاجية وكذلك جودة الثمار قد استجابت بوضوح وبصفة عامة لجميع المعاملات التي أجريت وان تفاوتت هذه الاستجابة من معاملة لأخري بحيث كانت معاملتي الرش بالخميرة بتركيز ١٠٠ ملل/لتر + الكينيتين بتركيز ٢٠ جزء فى المليون و الخميرة بتركيز ٢٠٠ ملل /لتر هما الأكثر فعالية في هذا الصدد.

كما أدت المعاملات الى زيادة محتوى الأوراق و الثمار من النيتروجين، الفوسفور، البوتاسيوم بالاضافه الى زيادة محتوى الأوراق من الكلوروفيل ا ، ب و الكاروتينات.

ولذلك يمكن التوصية برش أشجار المشمش صنف العسار بالخميرة بتركيز ١٠٠ ملل/ لتر + الكينيتين بتركيز ٢٠ جزء فى المليون أو بالخميرة فقط بتركيز ٢٠٠ ملل /لتر كبديل لمنظمات النمو الصناعية.