



## IMPACT OF PRUNING SEVERITY, CHICKEN MANURE, AND FOLIAR APPLICATION OF KARE COMBI ON PRODUCTIVITY AND QUALITY OF ZAITOUNI GRAPE CULTIVAR (VITIS VINIFERA L.)

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### ABSTRACT

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This research aimed to study the effect of pruning severity, soil application of chicken manure, and foliar application of Kare Combi on productivity and quality of the Zaitouni grape (*Vitis vinifera* L.), during growing seasons 2021, using a Randomized Complete Design with three replications. Winter pruning with three levels (4, 6, and 8 buds. vine<sup>-1</sup>) was done in the 2nd week of March, chicken manure was added to the soil with three levels (0, 3, and 6 kg. vine<sup>-1</sup>), and foliar application of Kare-combi with three concentrations (0, 6 and 12 mg. L<sup>-1</sup>). The results showed that No of clusters, counterweight yield per vine as well as TSS, total sugar percentage, and Anthocyanin content, were increased significantly by pruning, chicken manure, and foliar application of kare-combi as compared with control, concerning the interaction, the best results were with the interaction of 4buds.cane<sup>-1</sup>+6 kg.vine<sup>-1</sup> chicken manure+ 12 mg.L<sup>-1</sup> Kare-combi for cluster's weight, TSS % total sugar %, and anthocyanin content, while the best interaction for the number of clusters per vine and total yield per vine resulted from the interaction of 8 buds.cane<sup>-1</sup>+6 kg.vine<sup>-1</sup> chicken manure+ 12 mg.L<sup>-1</sup> Kare-combi.

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## INTRODUCTION

Grapes belong to the Vitaceae family, which includes 14 genera, the most important of which is the genus *Vitis*, it is widely cultivated in the world, and he mentioned that this genus includes 700 species and more than 10,000 varieties of Grapes grown in the world (AL-Saidi, 2000), There are more than 100 cultivars of grapes grown in Iraq and Kurdistan region including dessert grapes, varieties that are used as a table grape or may be dried to give currants and raisin and varieties that can be used for the production of juice and wine. (Abdul-Qader; 2006; Al-Atrushy, 2018).

For medicinal value of grapes, it is a nutritional substance used as a stimulant for brain cells, and heart muscles, a tonic for the liver and kidneys and reduces the incidence of diseases of the stomach, intestine and urinary system (Jamal al-Din, 2010). The seeds and the leaves of the grapevine are used in herbal medicine and its fruits are utilized as a dietary supplement (Nassir-Asl and Hussein, 2009; Kanagarla *et al.*, 2013)

Zaitouni cultivar is one of the modern grape varieties grown in the Duhok governorate, it is considered to be a good table grape, and it ripens in end-July and is

considered a late variety. The clusters are small to medium (300-500 g), the berries contain 2-3 seeds, and the crust is thick and covered with a thick waxy layer. Pruning of this cultivar is not scientifically studied in Duhok; the flowers are hermaphrodites (AL-Saidi, 2000; Al.Bayati, 2020)

Pruning is the most important cultural practice in the management of grapevine to sustain production and productivity. Pruning methods have been developed to balance fruit productivity and vegetative growth and attain maximum yield without reducing vine vigor (Al-Atrushy, 2019). An increase in the severity of pruning will increase the vigor of the individual shoot at the expense of total growth and crop, Pruning the vines for optimum cropping according to the vigor is the most reliable method to maintain a balance between growth and production. The vine should carry a moderate number of canes to maintain uniform vigor throughout its life span. So, canopy, vigour and productivity can be balanced through pruning levels (Senthilkumar *et al.*, 2015).

(Abo-Assaly *et al.*, 2021) conducted a study in one of the vineyards in Sweida governorate during (2018-2019 and 2019-2020), under rain-fed conditions, to study the effect of winter pruning levels (5-7-9 nodes /cane with 14 cane/vine) on vegetative characteristics, leaf mineral content and the production of Halawani grape cultivar. The results showed that five nodes. cane-1 treatments significantly revealed the highest leaf area, nitrogen and carbohydrate content, chlorophyll, and carotene content as an average of two seasons. Leaving seven nodes. cane-1 significantly revealed the highest productivity, chlorophyll a, and b, total chlorophyll, and carotene. Therefore, it is preferable to rely on seven nodes pruning level in the Helwani grape cultivar to obtain the best productivity, and provide good production next year.

Chicken manure has long been known as the most desirable one because of its high N, P, and K content. The organic-N in Chicken manure is readily available, ranging from 30-50% (17). The P and K, irrespective of amounts, are mostly available or adsorbed on the soil to be available afterward for crop uptake. In addition, manures supply several micronutrients and serve as soil conditioners (Khalil *et al.*, 2005). (Suleman and Ibrahim, 2015) carried out a study on 10 years old, grafted on the rootstock B41, grapevines of the Al-Hulwani cultivar. Three levels (10, 20, 40 t/ha) of organic fertilizers of cow, sheep plus, and poultry were used, in addition to three treatments from a mixture of these levels (3.33, 6.66, 13.32 t/ha) for one type of the fertilizers.

The research also included three treatments from a mixture of mineral fertilization with (N, P, K) at the rate (1:1:1) by using urea 46%, super phosphate 46%, and potassium sulfate 50% in three levels (100-200-400 kg/ha), in addition to the control without fertilization, to study their effects on Some quantitative and qualitative Characteristics of the grapevine cultivar Al-Hulwani. The results showed that the use of organic and mineral fertilization gave all levels and types superiority in all studied characteristics compared to the control.

Kare Combi is a micronutrient mixture (EC fertilizer) as a High-tech manufacturing compound, consisting of a mixture of trace elements (micro) chemically complex on amino acids of plant source with citric acid that increases the efficiency of the final product. The compound is completely soluble in water and has

a high degree of purity. which is completely homogeneous in terms of color, density, and material complexity. It is used to prevent and treat the symptoms of deficiency of microelements in all different stages of plant growth, the contents are (Fe, 7.5 %; Zn, 11.5 %; Mn, 6.5 %; Cu, 1 %; B, 1 %; S, 13 % and 14 % of citric acid and amino acids, pH is 3-5) .

(Al-Atrushy, 2019) carried out a field experiment at the private vineyard located at Bare-Buhar village, Duhok Governorate, Kurdistan region, Iraq, during the seasons of 2016 and 2017 to investigate the effect of three concentrations of micronutrients (0, 50, and 100 mg. L<sup>-1</sup>) and determine the optimum bud loads per vine for "Mirane" grapevines. Twelve years old uniform vines were chosen and pruned to four different levels of bud's load, namely 36; 44; 48; 64 buds. vine-1. The results showed that applying micronutrients, especially at a high concentration, significantly increased leaf area, total chlorophyll content, and the number of clusters. Vine-1, cluster's weight and yield per vine, as well as weight and size of 100 berries, chemical parameters TSS, total sugar and juice percentage, juice density, and  $\beta$ -carotene, in addition, to increase mineral content in leaves petiole (Fe, Zn, and Mn), whereas the same concentration decreased total acidity and phenols percentage. On the other hand, buds load had a significant effect on some characteristics of the grapevine. The higher values of leaf area, total chlorophyll, cluster's weight, weight and size of 100 berries, TSS, and total sugars percentage were obtained when the vine was pruned to 36 buds. vine-1. The higher values of the number of clusters, yield per vine, total phenols, and total acidity percentage were obtained when the vine was pruned to 4buds.vine-1. The highest value of juice percentage was obtained when the vine was pruned to 48 buds. vine-1.

Aim of the study:

- 1- To determine the level of winter pruning suitable for this cultivar under our environmental conditions.
- 2- To determine levels of chicken manures suitable to the vineyard.
- 3- To study the effect of adding proper microelements as foliar fertilization on growth, yield as well as the quality of berries of grapevines.

## **MATERIALS AND METHODS**

A field experiment was carried out at a private vineyard located at Bare-Buhar Village, Duhok governorate during the growing season of 2021-2022. Healthy and almost uniform Zaitouni cultivar vines 8 years old on clay soil under a drip irrigation system were chosen, and these vines were planted at 2.5 + 2.5 m inter and intra rows, Vines were trained according to the 'T' trails system. During the second week of March, all vines were pruned to investigate the effect of different pruning severity (4, 6, and 8 buds. vine<sup>-1</sup>, plus six renewal spurs each with two buds), soil application of Chicken manure (0, 3 and 6 kg. vine<sup>-1</sup>), and foliar application of Kare Combi (EC fertilizer) (0, 6 and 12 g.l<sup>-1</sup>) on vegetative growth behavior and productivity of Zaitouni grape cultivar .

All vines received the standard agricultural practices used in the vineyard including irrigation and pest control, Chicken manure as soil application was added once per season during January, Micronutrients mixture (Kare Combi as EC fertilizer) contains (Fe, 7.5 %; Zn, 11.5 %; Mn, 6.5 %; Cu, 1 %; B, 1 %; S, 13 % and

14 % of citric acid and amino acids, pH is 3-5) as the foliar application was added twice per season, first two weeks pre-blooming, the second one month later. Detergent Powder as a wetting agent at 1-2 g.L<sup>-1</sup> was added to all micronutrient solutions. Foliar spraying was done in the morning (6-8 Am.) using a hand pressure sprayer. Therefore, the experiment will consist of twenty-seven treatments (three levels of winter pruning, three levels of chicken manure, and 3 conc. of kare-combi fertilizers), with three replications, with one individual vine for each experiment unit and will be applied as a factorial experiment by using (RCBD) design, All the results were analyzed statistically by using SAS programs (2009). Duncan's multiple range test (DMRT) at a 5% level of portability was used to compare the treatment means according to (Al-Rawi, and khalaf Allah, 2000).

### RESULTS AND DISCUSSION

#### Number of clusters (cluster. vine-1)

Data in Table (1) are shown the effect of the studied factors; pruning severity, soil application of chicken manure and foliar application of Kare-combi, each solely or as triple interaction of all three studied factors on the number of clusters per grapevine Zaitouni cultivar. It is clear that this parameter was significantly affected by all three factors under study, plus their interactions.

Table (1): Effect of pruning severity, soil application of chicken manure and foliar application of Kare-combi on a number of clusters per grapevine (*Vitis vinifera* L) cv. Zaitouni

Pruning bud. vine-1	chicken Manure kg. vine-1	Kare combi - g.l-1			Pruning * Ch. M	Mean Effect of pruning
		0	6	12		
4	0	20.80 j	25.20 hij	28.00 f-j	24.67 d	26.80 c
	3	23.60 ij	26.40 g-j	29.20 e-j	26.40 d	
	6	25.20 hij	29.20 e-j	33.60 d-h	29.33 d	
6	0	32.40 d-i	36.40 b-f	39.60 a-d	36.13 c	37.91 b
	3	34.80 c-g	38.80 b-e	42.00 a-d	38.53 bc	
	6	38.00 b-e	38.80 b-e	40.40 a-d	39.07 bc	
8	0	38.80 b-e	40.80 a-d	41.20 a-d	40.27 bc	42.89 a
	3	40.40 a-d	42.00 a-d	45.20 ab	42.53 ab	
	6	44.00 abc	44.80 ab	48.80 a	45.87 a	
pruning x K. combi	0	23.20 e	26.93 de	30.27 d	Main effect of chicken manure	
	3	35.07 c	38.00 bc	40.67 ab		
	6	41.07 ab	42.53 ab	45.07 a		
chicken x K. combi	0	30.67 d	34.13 bcd	36.27 abc	33.69 b	
	3	32.93 cd	35.73 a-d	38.80 ab	35.82 ab	
	6	35.73 a-d	37.60 abc	40.93 a	38.09 a	
Mean effect of Kare combi						

Means with the same letter are not significantly different according to Duncan multiple ranges test at 5% level

**Cluster weight (g. cluster-1)**

It's clear from Table (2) that both of pruning severity, soil application of chicken manure and foliar application of kare-combi caused a significant effect concerning cluster weight, the highest cluster weight (506.659; 500.222 and 508.104 g.cluster<sup>-1</sup>) respectively was resulted from leaving 4 buds.cane<sup>-1</sup>, 6 kg.vine<sup>-1</sup> chicken manure and 12g.l<sup>-1</sup> kare-combi compared to the lowest cluster weight (453.341; 450.370 and 438.933 g.cluster<sup>-1</sup>) respectively obtained from leaving 8 buds.cane<sup>-1</sup>, 0 kg.vine<sup>-1</sup> chicken manure and 0g.l<sup>-1</sup> kare-combi.

Table (2): effect of pruning severity, soil application of chicken manure and foliar application of Kare-combi on weight of clusters (g.cluster<sup>-1</sup>) of grapevine (Vitis vinifera L) cv. Zaitouni

Pruning bud. vine <sup>-1</sup>	Chicken Manure kg. vine <sup>-1</sup>	Kare combi - g.l <sup>-1</sup>			Pruning * Chicken	Mean Effect of kg. vine <sup>-1</sup>
		0	6	12		
4	0	463.400 abc	495.333 abc	503.533 abc	487.422 Ab	506.659 a
	3	480.333 ab	506.667 abc	516.667 abc	501.222 Ab	
	6	500.333 abc	530.333 abc	563.333 a	531.333 A	
6	0	397.667 bc	454.067 abc	473.667 abc	441.800 B	459.822 ab
	3	429.333 abc	461.333 abc	483.333 abc	458.000 Ab	
	6	440.000 abc	490.333 abc	508.667 abc	479.667 Ab	
8	0	387.333 c	419.333 ab	459.000 ab	421.889 B	453.341 b
	3	420.333 abc	409.333 abc	515.733 abc	448.467 Ab	
	6	431.667 abc	488.333 abc	549.000 ab	489.667 Ab	
Pruning x kare	0	481.356 abc	510.778 ab	527.844 a	Main	
	3	422.333 c	468.578 abc	488.556 abc	effect of	
	6	413.111 c	439.000 bc	507.911 ab	cheiken manure	
Chicken x kare	0	416.133 c	456.244 abc	478.733 abc	450.370 b	
	3	443.333 bc	459.111 ab	505.244 ab	469.230 ab	
	6	457.333 abc	503.000 ab	540.333 a	500.222 a	
Mean effect of k.c		438.933 b	472.785 ab	508.104 a		

Means with the same letter are not significantly different according to Duncan multiple ranges test at 5% level

Concerning the triple interaction among the three factors, the maximum weight of cluster (563.333 g.cluster<sup>-1</sup>) was caused by the combination effect among the leaving 4 buds.cane<sup>-1</sup> + soil application of 6kg.vine<sup>-1</sup> of chicken manure+ 12g.l<sup>-1</sup> kare-combi, whereas the lowest weight of cluster (387.333g.cluster<sup>-1</sup>) was caused by the combination effect among the leaving 8 buds.cane<sup>-1</sup> +soil application of 0 kg.vine<sup>-1</sup> of chicken manure+ 0g.l<sup>-1</sup> kare-combi.

**Yield (kg. vine-1)**

It's clear from Table (3) that both pruning severity, soil application of chicken manure, and foliar application of kare-combi caused a significant effect concerning yield per vine, with the highest yield (19.595; 19.010 and 19.556 kg.vine<sup>-1</sup>) respectively was resulted from leaving 8 buds.cane<sup>-1</sup>, 6 kg.vine<sup>-1</sup> chicken manure and

12g.l<sup>-1</sup> kare-combi compared to the lowest yields (13.641; 15.144 and 14.343 kg.vine<sup>-1</sup>) respectively obtained from leaving 4 buds.cane<sup>-1</sup>, 0 kg.vine<sup>-1</sup> chicken manure and 0g.l<sup>-1</sup> kare-combi. Concerning the triple interaction among the three factors, the maximum yields (26.649 kg. vine<sup>-1</sup>) were caused by the combination effect among the leaving 8 buds. cane<sup>-1</sup> + soil application of 6kg.vine<sup>-1</sup> of chicken manure+ 12g.l<sup>-1</sup> kare-combi, whereas the lowest yield per vine (9.616. kg. vine<sup>-1</sup>) was caused by the combination effect among the leaving 4 buds. cane<sup>-1</sup> +soil application of 0 kg. vine<sup>-1</sup> of chicken manure+ 0g.l<sup>-1</sup> kare-combi.

Table (3): Effect of pruning severity, soil application of chicken manure and foliar application of Kare-combi on yield kg. vine<sup>-1</sup> of grapevine (*Vitis vinifera* L) cv. Zaitouni

Pruning b. vine <sup>-1</sup>	cheiken Manure kg. vine <sup>-1</sup>	kare combi - g.l <sup>-1</sup>			Pruning * Ch. M	Mean Effect of pruning
		0	6	12		
4	0	9.616 g	12.495 efg	14.100 d-g	12.070 d	13.641 c
	3	11.199 fg	13.348 d-g	15.039 c-g	13.195 cd	
	6	12.554 efg	15.515 c-g	18.907 b-e	15.659 bcd	
6	0	13.166 d-g	16.560 b-g	19.157 b-e	16.295 bc	17.498 b
	3	14.585 c-g	17.851 b-f	19.612 b-e	17.349 b	
	6	16.780 b-g	19.514 b-e	20.257 a-d	18.850 ab	
8	0	15.022 c-g	17.256 b-f	18.919 b-e	17.065 bc	19.595 a
	3	17.333 b-f	16.897 b-g	23.368 ab	19.199 ab	
	6	18.833 b-e	22.082 abc	26.649 a	22.521 a	
pruning x kare	0	11.123 e	13.786 de	16.015 bcd	Main effect of chicken manure	
	3	14.844 cde	17.975 bc	19.675 ab		
	6	17.063 bcd	18.745 bc	22.979 a		
ck x kare	0	12.601 d	15.437 bcd	17.392 bc	15.144 b	
	3	14.372 cd	16.032 bcd	19.340 ab	16.581 B	
	6	16.056 bcd	19.037 ab	21.937 a	19.010 a	
Mean effect of k.c		14.343 c	16.835 b	19.556 a		

Means with the same letter are not significantly different according to Duncan multiple ranges test at 5% level

**Total Soluble Solid (TSS)**

It's clear from Table (4) that both pruning severity, soil application of chicken manure, and foliar application of kare-combi caused a significant effect concerning TSS percentage, with the highest TSS (22.600; 22.879 and 23.139 %) respectively, was resulted from leaving 4buds.cane<sup>-1</sup>, 6 kg.vine<sup>-1</sup> chicken manure and 12g.l<sup>-1</sup> kare-combi compared to the lowest TSS (19.508; 19.981 and 19.888) respectively obtained from leaving 8 buds.cane<sup>-1</sup>, 0 kg.vine<sup>-1</sup> chicken manure and 0g.l<sup>-1</sup> kare-combi.

Concerning the triple interaction among the three factors, the maximum TSS % (27.468) was caused by the combination effect among the leaving 4 buds. cane<sup>-1</sup> + soil application of 3kg.vine<sup>-1</sup> of chicken manure+ 12g.l<sup>-1</sup> kare-combi, whereas the lowest yield per vine (14.04) was caused by the combination effect

among the leaving 8 buds. cane<sup>-1</sup> +soil application of 0 kg. vine<sup>-1</sup> of chicken manure+ 0g.l<sup>-1</sup> kare-combi.

Table (4): effect of pruning severity, soil application of chicken manure and foliar application of Kare-combi on Total Soluble Solid of grapevine (*Vitis vinifera* L.) cv. Zaitouni

Pruning b. vine <sup>-1</sup>	chicken Manure kg. vine <sup>-1</sup>	kare combi - g.l <sup>-1</sup>			Pruning * Ch. M	Mean Effect of pruning
		0	6	12		
4	0	19.872 c-f	22.140 bcd	22.860 bcd	21.624 ab	22.600 a
	1	20.520 c-f	21.060 cde	26.460 ab	22.680 a	
	2	20.700 c-f	22.320 bcd	27.468 a	23.496 a	
6	0	20.100 c-f	22.320 bcd	22.320 bcd	21.580 ab	22.372 a
	1	22.620 bcd	22.680 bcd	21.960 bcd	22.420 a	
	2	24.060 abc	22.248 bcd	23.040 bcd	23.116 a	
8	0	14.040 g	16.920 efg	19.260 def	16.740 c	19.508 b
	1	16.380 fg	20.880 c-f	22.020 bcd	19.760 b	
	2	20.700 c-f	22.512 bcd	22.860 bcd	22.024 ab	
pruning x kare	0	20.364 b	21.840 b	25.596 a	Main	
	1	22.260 b	22.416 b	22.440 b	effect of	
	2	17.040 c	20.104 b	21.380 b	chicken manure	
ck x kare	0	18.004 D	20.460 c	21.480 bc	19.981 b	
	1	19.840 Cd	21.540 bc	23.480 ab	21.620 a	
	2	21.820 Bc	22.360 abc	24.456 a	22.879 a	
Mean effect of k.c		19.888 C	21.453 b	23.139 a		

Means with the same letter are not significantly different according to Duncan multiple ranges test at 5% level

**Total Sugar (%)**

Table (5) shows that total sugar significantly increased when the number of buds per cane was decreased, also both soil application of chicken manure and foliar application of kare-combi caused increasing in total sugar percentage. It is noticeable that treatment of 4 buds.cane<sup>-1</sup>, 6 kg. vine<sup>-1</sup> chicken manure and 12g.l<sup>-1</sup> kare-combi produced the highest total sugar (21.568, 21.056; 21.518 %), respectively compared to the control of soil application of chicken manure and foliar application of kare-combi which produced a lower significantly total sugar (18.887; 17.584) respectively, while lowest total sugar was found (18.839) when pruning severity, was increased from leaving 8 buds. cane<sup>-1</sup>.

Concerning the triple interaction among the three factors, the maximum total sugar percentage (25.912) was caused by the combination effect among leaving 4 buds. cane<sup>-1</sup> + soil application of 6kg.vine<sup>-1</sup> of chicken manure+ 12g.l<sup>-1</sup> kare-combi, whereas the lowest total sugar (14.068) was caused by the combination effect among the leaving 8 buds. cane<sup>-1</sup> +soil application of 0 kg. vine<sup>-1</sup> of chicken manure+ 0g.l<sup>-1</sup> kare-combi.

Table (5): effect of pruning severity, soil application of chicken manure and foliar application of Kare-combi on Total Sugar of grapevine (*Vitis vinifera* L) cv. Zaitouni

Pruning b. vine <sup>-1</sup>	chicken Manure kg. vine <sup>-1</sup>	kare combi - g.l <sup>-1</sup>			Pruning * Ch. M	Mean Effect of pruning
		0	6	12		
4	0	17.368 def	22.325 a-d	22.766 abc	20.820 ab	21.568 a
	3	18.835 c-f	21.054 b-e	22.395 a-d	20.761 ab	
	6	19.493 b-e	23.966 ab	25.912 a	23.124 a	
6	0	16.735 ef	18.666 c-f	19.361 b-e	18.254 bc	19.283 b
	3	17.848 c-f	19.751 b-e	20.289 b-e	19.296 bc	
	6	19.364 b-e	20.555 b-e	20.981 b-e	20.300 bc	
8	0	14.068 f	18.666 c-f	20.027 b-e	17.587 c	18.839 b
	3	16.848 ef	19.751 b-e	20.956 b-e	19.185 bc	
	6	17.697 c-f	20.555 b-e	20.981 b-e	19.744bc	
pruning x kare	0	18.565 cd	22.449 ab	23.691 a	Main effect of chicken manure	
	3	17.982 cd	19.657 c	20.210 bc		
	6	16.205 d	19.657 c	20.654 bc		
kare x kare	0	16.057 d	19.886 abc	20.718 ab	18.887 b	
	3	17.844 cd	20.185 abc	21.213 ab	19.747 ab	
	6	18.851 bc	21.692 a	22.624 a	21.056 a	
Mean effect of k.c		17.584 b	20.588 a	21.518 a		

Means with the same letter are not significantly different according to Duncan multiple ranges test at 5% level

**Anthocyanin (mg.100g-1 fresh wt.)**

It's clear from Table (6) that both pruning severity, soil application of chicken manure, and foliar application of kare-combi caused a significant effect concerning anthocyanin, the highest anthocyanin content (1.012; 1.014 and 0.999) respectively, was resulted from leaving 4buds.cane<sup>-1</sup>, 6 kg.vine<sup>-1</sup> chicken manure and 12g.l<sup>-1</sup> kare-combi compared to the lowest anthocyanin content (0.801; 0.832and 0.899) respectively obtained from leaving 8 buds.cane<sup>-1</sup>, 0 kg.vine<sup>-1</sup> chicken manure and 6g.l<sup>-1</sup> kare-combi.

Concerning the triple interaction among the three factors, the maximum anthocyanin (1.401) was caused by the combination effect among the leaving 4 buds.cane<sup>-1</sup> + soil application of 6kg.vine<sup>-1</sup> of chicken manure+ 12g.l<sup>-1</sup> kare-combi, whereas the lowest anthocyanin (0.450) was caused by the combination effect among the leaving 6 buds.cane<sup>-1</sup> + soil application of 0 kg.vine<sup>-1</sup> of chicken manure+ 6g.l<sup>-1</sup> kare-combi.

It's clear from tables 1-6 that both of pruning, chicken manure and foliar application of Kare-combi had a significant effect on yield and its components as well as chemical characteristics of grape cv. Zaitouni, Pruning works to achieve a balance between vegetative growth and fruiting. It also opens the heart of the vine for provide light and air, which increases the absorption of water and nutrients, so the grapevine creates vigorous bronchioles, clusters of regular shape (Popescu and Popescu, 2014; Abo-Assaly *et al.*, 2021). For the effect of chicken manure may be attributed to that



chicken manure contains 0.5% to 0.9% nitrogen, 0.4% to 0.5% phosphorus, and 1.2 - 1.7 % potassium (Foreman *et al*, 2015), which provide good nutrition to the plant, as it is known, Nutrition has a major role in determining yields and quality.

Table (6) effect of pruning severity, soil application of chicken manure and foliar application of Kare-combi on anthocyanin of grapevine (*Vitis vinifera* L) cv. Zaitouni

Pruning b. vine <sup>-1</sup>	chicken Manure kg. vine <sup>-1</sup>	kare combi - g.l <sup>-1</sup>			pruning Ch. M	Mean Effect of pruning
		0	6	12		
4	0	0.764 bcd	0.768 bcd	1.066 a-d	0.866 bc	1.012 a
	3	0.924 a-d	0.961 a-d	1.003 a-d	0.963 abc	
	6	1.044 a-d	1.176 abc	1.401 a	1.207 a	
6	0	0.968 a-d	0.555 cd	0.972 a-d	0.832 bc	0.9708 a
	3	1.074 a-d	1.054 a-d	0.891 a-d	1.007 ab	
	6	1.138 abc	0.855 a-d	1.229 ab	1.074 abc	
8	0	0.450 d	1.043 a-d	0.904 ad	0.799 bc	0.801 b
	3	0.862 a-d	0.561 cd	0.789 a-d	0.737 c	
	6	0.867 a-d	0.999 a-d	0.734 bcd	0.867 bc	
pruning x kare	0	0.911 ab	0.968 ab	1.157 a	Main effect of chicken manure	
	3	1.060 ab	0.821 b	1.031 ab		
	6	0.726 b	0.868 ab	0.809 b		
ck x kare	0	0.727 b	0.789 b	0.981 ab	0.832 b	
	3	0.953 ab	0.859 b	0.894 ab	0.902 ab	
	6	1.016 ab	1.010 ab	1.121 a	1.049 a	
Mean effect of k.c		0.899 a	0.886a	0.999 a		

Means with the same letter are not significantly different according to Duncan multiple ranges test at 5% level

It is more so in case of commercial crops such as grapes, pomegranate etc. (Kranthikumar and Sharma, 2016). The use of nutrition in the vineyards can influences fruit set, fruit quality and yield, imbalanced use of nutrients particularly uses of nitrogenous fertilizers alone lead to poor quality of fruits in terms of TSS, color, keeping quality etc. (Pal *et al.*, 2015). Concerning the effect of Kare-combi, their positive effect may be due to that is a micronutrients mixture (EC fertilizer) as High-tech manufacturing compounds, consisting of a mixture of trace elements (Fe, 7.5 %; Zn, 11.5 %; Mn, 6.5 %; Cu, 1 %; B, 1 %; S, 13 % and 14 % of citric acid and amino acids, pH is 3-5) chemically complex on amino acids of plant source with citric acid that increases the efficiency of the final product, and its role in increasing the content of plant tissues of proteins and also contribute to the regulation of metabolic processes to acquire plants more resistance to bear the stresses of the environment as well as its role in increasing the number of leaves and their area (Lisiecka *et al* 2011: Fabrizio *et al.*, 2019).

### CONCLUSIONS

According to the experimental results of this study, the most important conclusions can be expressed as follows: pruning to 8buds.cane<sup>-1</sup> markedly increased the number of clusters per vine and total yield per vine while pruning to 4buds.cane<sup>-1</sup>

<sup>1</sup> significantly increased cluster weight, TSS and sugar percentage, and anthocyanin content in berries skin. Soil application of chicken manure at 6kg.vine<sup>-1</sup> yield and physical and chemical properties of the grapevine. Foliar application of Kare Combi at 12g.L<sup>-1</sup> noticeably increased all properties of yield and physical and chemical properties of the grapevine; chicken manure and low level of pruning were effective on fruit quality more than the high level of pruning and Kare Combi.

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### CONFLICT OF INTEREST

The researcher supports the idea that this work does not conflict with the interests of others.

### تأثير شدة التقليم ومخلفات الدواجن والرش الورقي لـ Kare Combi على إنتاجية وجودة العنب صنف زيتوني (*Vitis vinifera* L.)

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### الخلاصة

يهدف هذا البحث إلى دراسة تأثير شدة التقليم، والتسميد الارضي بمخلفات الدجاج، والرش الورقي لـ Kare Combi على إنتاجية وجودة العنب (*Vitis vinifera* L.) صنف الزيتون، خلال موسم النمو 2021، باستخدام تصميم القطاعات العشوائية الكاملة وبثلاثة مكررات. تم إجراء التقليم الشتوي بثلاثة مستويات (4 و 6 و 8 براعم. كرمة<sup>-1</sup>) في الأسبوع الثاني من مارس، وتمت إضافة سماد مخلفات الدجاج إلى التربة بثلاثة مستويات (0، 3، 6 كجم كرمة<sup>-1</sup>)، والرش الورقي لسماد Care-combi بثلاثة تراكيز (0، 6 و 12 ملغم. لتر<sup>-1</sup>). أظهرت النتائج أن عدد العناقيد، ووزن العنقود الواحد والحاصل الكلي للكرمة وكذلك النسبة المئوية للمواد الصلبة الذائبة الكلية، والنسبة المئوية للسكريات الكلية، ومحتوى الأنثوسيانين، قد ازدادت زيادة معنوية عن طريق التقليم، وإضافة مخلفات الدجاج، والرش الورقي لسماد Kare-combi بالمقارنة مع معاملة الكونترول فيما يتعلق بالتداخل، كانت أفضل النتائج من تداخل 4 عين. قصب<sup>-1</sup> + سماد مخلفات الدجاج 6 كجم. كرمة<sup>-1</sup> + 12 غم. لتر<sup>-1</sup>، بالنسبة لوزن العنقود والنسبة المئوية للمواد الصلبة الذائبة الكلية، والنسبة المئوية للسكريات الكلية، ومحتوى الأنثوسيانين؛ فيما يخص أفضل النتائج بالنسبة لعدد العناقيد في الكرمة الواحدة والمحصول الكلي لكل كرمة نتج من التداخل عن تفاعل 8 براعم<sup>-1</sup> + 6 كجم سماد مخلفات دجاج + 12 غم. لتر<sup>-1</sup> Kare-combi.

الكلمات المفتاحية: برعم، حمل، كرمة العنب، سماد كهربائي، زيتوني.

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