

Effect of spraying organic fertilizer Untrigrin and alkaren algae extract on vegetative floral and chemical growth of Two types of tulip plant .

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Abstract

This study was carried out in the laths house of the Department of Horticulture and landscape design / College of agriculture and forestry / University of Mosul from 1\10\2018 to 1\5\2019 on two types of plants are tulip upstar and van eijk and the effect of that on characteristics of vegetative floral and chemical growth. Factors studied included the adding three levels of organic fertilizer nutrigrin is 0 and 2 and 4 ml .liter-1 and three levels of alkarin algae extract ,0 and 2 and 4 ml.liter-1 spray on leaves . The first spray when height of the plant reache 10 cm ,and the second spray 30 days after the first spray . the general experiment was carried out with the design of RCBD with three factors and three replicates and five bulbs per refined. The results were summarized by the superiority of the van eijk plants significantly over the tulip upstar cultivars in all traits expect for the two leaves and % for chlorophyll. The treatment of spraying plants with alkarin algae extract at 4 ml.liter⁻¹ was significant in all studied traits.

Introduction

The tulip plant is considered one of the plants of the lily family. Liliacies is its original habitat is turkey .the onion is a real and it is, a disc stem surrounded by the bases of fused juicy leaves covered from the outside by brown scales. Flower grow on a long stand (Alkatib,2000,Rees,1985 and Hay and Beckett,1978) . fertilization depends on important factors that affect the growth and development and production of plants .among the most important of these elements are the nitrogen, phosphorous and that the plant needs in promoting the root system (Biram and others ,2013) found in his study on tulip plant that the height of the plant and the number of leaves and the holder increased when fertilizing with chemical fertilizer NpK15:15:15 at (80g /m²)as it reached (31,42cm) and (70.3a leaf, plant) (41,4ml),while the lowest value was (97.41cm) and .(40.3a leaf, plant) (01.4ml) for untreated plants .in a study of (Al-naggar and others ,2013) on lilium plants when spraying with amino mixture on 0,1and 5,1and 0,2 ml .liter⁻¹thay found that spraying with 0,2ml. liter⁻¹ result in a significant increase in nitrogen ,phosphorus and potassium

values reached 57.2 % and 25.0 % and 87.3% for each of them, while the comparison recorded the lowest value 1.68% for nitrogen 0.19 for phosphorous and 20.3% for potassium and recommended

Materials and methods

This study was carried out in the laths house of the Department of Horticulture and landscape design / College of agriculture and forestry / University of Mosul from the period 1/10/2018 to 1/5/2019 on tulipa plant *tulip hybrid.L* to know the effect of spraying with different levels of organic fertilizer ,nutrigrin and alkarin algae extract in a characteristics of the vegetative and chemical growth of tulip plant and The experiment included three factors , van eijk and upstar spray with organic fertilizer nitrogen and three levels are 0,2,4,ml ,and spray with alkarin algea extract at three levels 0 and 2 and 4 ml .liter⁻¹ . the experiment was designed and implemented and with designing of RCBD with three factors distributed randomly to the experimental units (Al-Rawi and khalaf allah, 2000) transaction were repeated three times and with five plants per refined . Apolynomail test was adopted at a 5%probability level and the statistical analysis was performed using the SAS (1996). The plants were cultivated in plastic pots with a diameter of 20 cm ,containing soil consisting of garden soil: river stand in a rate of 2:1 the physical and chemical properties in it are estimated as shown in table (1).

Qualities studied:

Vegetable and chemical growth characteristic :1- Percentage of emergence (%) , 2-the height of plant (cm) , 3-number of leaves /plant, 4- Foliar area (cm²),5- chlorophyll , 6-nitrogen estimation 7-phosphorus estimation ,8-potassium estimation.

Result and discussion

Percentage emergence % : the percentage was taken with two dates, the first after 30 days of cultivation and the second after 45 days of cultivation and for both cultivars *van eijk* and tulip upstar ,where its found that the emergence rate of the van eijk after 30 days was 100 % while the cultivar *upstar* reached 75,77% while it reached 45 days after cultivation 100%and for both cultivars ,as in table NO. (2) ,the number of days required by the van eijk cultivar reached 28,33 days for percentage while the cultivar upstar required 38,96 days and in a difference 10,63 days between the two cultivars.

Plant height: we note from the data in the table (3) that the van eijk plants have achieved a height of 33,30 cm ,and significantly higher than the plants of the tulip upstar,19,41 cm.as for the

effect of the organic fertilizer ,nutrigrin , spraying plants with 4,0 ml.liter⁻¹.significant increase in plant height 29,22 cm ,which out performed the spray treatment with 2ml.liter⁻¹ which recorded 27,39 cm as well as on the comparison that achieved 22,30 cm. as for the effect of alkarin algae extract ,we noticed the superiority of spray treatment with 4ml ,liters⁻¹ on the rest of the coefficients where 30,30 cm was recorded which differed significantly from the comparison 22,37cm . the effect of the interaction between the cultivar and the spraying with organic fertilizers ,the spraying parameters of the van eijk plants were recorded in the two concentrations 2and 4ml.liter⁻¹ 26,34 and 35,43 cm significantly higher than the comparison that recorded 29,91 cm for the van eijk variety .as for the tulip upstar item , it recorded 4ml.liter⁻¹ .23.02 cm significantly different from the comparison recorded 14,69 cm .as for the effect of the interference between the cultivar and the extract,the van eijk cultivar plants with a concentration of 4ml.liter⁻¹ recorded a significant increase in the plant height 36,34cm with a significant difference from the treatment parameters of the upstar cultivar with the same concentration which recorded 24,26 cm. Likewise ,on the other parameters ,including the tulip upstar coefficients, the lowest value were 15,39 cm. as for the interaction between the organic fertilizer and the extract ,the treatment of spraying with organic fertilizer with 4ml.liter⁻¹with 4ml.liter⁻¹ of the extract 34,70 cm significantly difference from the rest of the transaction ,including the comparison,which recorded the lowest value 18,56 cm.as for the triple overlap ,the van eijk plants ,treated with organic fertilizer, Differences between the varieties may be explained in the light of the genetic differences whose interaction varies with the soil and climate conditions of the region (safiullah and Ahmed ,2001) As for the effect of the organic fertilizer, its effect may be explained by the conversion of the amino acids it contains to the indole acetic acid IAA (Eman and others,2012).

Number of leaves \plant: from the results shown in table (4),we note that the tulip upstar cultivar plants that recorded a number of leaves of 6,53 a leaf , plant significantly superior to van eijk which achieved the number of leaves reached 5,88a leaf, plant as for the organic fertilizer we find the treated plants with a concentration 4ml.liter⁻¹ achieved number of a leaves 6,60 aleaf, plant significantly superior to the comparison , which recorded the lowest values of 5,74 leaf, plant.as for the plants treated with an extract we notice the treated plant with 4ml .liters which recorded number of leaves reached 6,63 leaf, plant morally different from the treatment of spraying with 2ml.liter⁻¹ which recorded 6,24 leaf ,plant as well as a comparison with a lower value of 5,74 leaf, plant .and upon studying the interaction between the cultivar and organic fertilizer, we notice from

the table that tulip upstar plants at 4 ml.liter⁻¹ Significantly different from the other treated cultivars that recorded 7,02 leaf, plant significantly differs from the untreated van eijk cultivar which recorded 5,45 a leaf.plant .And on the overlap between the variety and the extract the table shows us that the plants of the tulip upstar cultivar treated with 4ml,liter⁻¹.has achieved 6,90 leaf, plant significantly superior to van eijk plants treated with the same concentration of extract which recorded 6,37 leaf, plant as well as on other transactions ,including the non-spray treatment of van eijk variety plants with a lower value of 5,28 leaf, plant ..With regarded to the bilateral interaction between the neutrigrin and the extract , the treatment of spraying the plants with compost was recorded in 4ml.liter the largest value of the number of leaves as it reached 7,18 leaf, plant is superior to the rest of the transaction and the comparison with the lowest value 5,52 leaf ,plant as for the three-way overlap between the three factors. . as for the effect of organic fertilizer ,this may be due to the positive effect of this fertilizer containing amino acids on cell division and elongation (Cohen,1998) .

Foliar area (cm²) :from table (5) we note that the van eijk cultivar recorded a paper area of 695,94 cm² significant difference from the cultivar :tulip upstar that adult 551,89 cm².as for the effect of organic fertilizer ,neutrigrin has given treatment spray the plants with concentration 4ml.lier, the largest value for this trait ,as it gave a foliar area reached 588,45 cm² where the leafy area here increases with increasing concentration and about the comparison which is reached 559,58 cm² as for the effect of the extract, the treatment of spraying plants with 4ml.liter⁻¹ the largest values 592,58 cm² recording significant differences from the comparison 557,65 ml regarding the effect of inside between the cultivar and organic fertilizer we notice from the table also that spraying the van eijk plants by 4ml.liter² has recorded the largest values in the leafy area as it reached 619,55 cm² significantly superior to the treatment of spraying the cultivar of tulip upstar with the same concentration which recorded 557,34cm² like wise the rest of the coefficients and comparison recorded 545,90ml and for the interference between the variety and extract ,we note that the van eijk plants that sprayed with 4ml.liter ,have achieved the largest values of the leafy area as it reached 628,04cm² significantly superior to the rest of the treatments including No-spray treatment of tulip upstar cultivar that recorded 547,32 cm² As for the interaction between the compost and the extract ,the treatment of spraying the plants with compost resulted in 4ml.liter¹ with 4ml⁻¹ of the extract have the largest values for this trait ,as they reached 628,04 cm² significantly superior to the rest of the treatment ,including the treatment of non-spraying upstar

cultivar plants which recorded 547,32 cm² .as for the interaction between the compost and the extract resulted in concentration, the treatment of spraying the plants with compost resulted in concentration 4ml⁻¹with 4ml.liter⁻¹ of the extract have resulted in the largest foliar area reached 674,20 cm² superior to all transaction . increased readiness of the plant and its transition to leaf composition , which positively increased the leafy area (yong and others , 2003) . it may also be due to the extract containing the amino acids (Jensen,2004) which activate carbon representation and build proteins , as well as the process of dividing and elongation cells.

Chlorophyll (%) : from table (6). We note that the plants of the tulip upstar cultivar have recorded the highest level of chlorophyll in the leaves 52.03 % compared to 46.31 % for the van eijk cultivar .it was found that the effect of organic fertilizer for plants treated with 4ml⁻¹had achieved the value of 58,72% significantly higher than the comparison of the lowest value 40,32 %.likewise ,the extract significantly affected this characteristic as the treatment of spraying was recorded with 4ml⁻¹ for the content of 53,47 % . it was significantly superior to the spray treatment with 2ml.liter⁻¹ and the comparison,which did not differ significantly between them ,as they recorded 48,46 and 45,57 % respectively ,and on the effect of the overlap between the cultivar and organic fertilizer ,the results indicated that the treatment of spraying tulip upstar plants with a concentration of 4ml.liter⁻¹ the relative content reached 46,61% followed by the treatment of van eijk cultivar plants with the same concentration with a score of 55.98 % the non-spray treatment of the van eijk cultivar recorded the lowest value of this interference , as it reached 37.54 % and on the overlap between the extract and the variety, the results indicated that there were no significant differences between the compost and the extract ,the result showed that the plants sprayed with a concentration of 4ml.liter⁻¹with 4ml.liter⁻¹ of the extract recorded the value 67.20 % significantly superior to all treatments ,whereas the treatment of untreated plants recorded the lowest value of this interference 37.92 % .as for the overlap between the three factors, differences between the varieties in this trait may be interpreted according to the genetic differences (Iftkhar and others , 2013 and Ahmed and others ,2002) .as for the effect of organic fertilizers, ,it may be attributed to the role of the amino acids contained in this nitrogen production of intention (Al-Sahaf,1989), as for the effect of the extract , it may be due to its contain of nitrogen that enters the synthesis of the chlorophyll molecule through its participation in the synthesis of the Prophyrene molecule included in the synthesis of this dye (Haviline and others ,2005) .

Nitrogen (%):- from the observation of the result in table (7) it is clear to us that the van eijk cultivars achieved the largest percentage of nitrogen in the leaves , as they reached 1.46 % with a significant superiority over the tulip upstar cultivars that achieved the lowest value amounting to 1.36 % , the use of organic fertilizers resulted in significant differences between treatment , as spray treatment was recorded with 4ml.liter⁻¹ a high nitrogen content was 1.82 % outperforming the no-spray treatment that achieved 1.00 % . As for the effect of the extract , the result showed that the spray treatment exceeded 4ml.liter⁻¹ significantly the remainder of the transactions , recording the largest value of 1.62% followed by spray treatment with 2ml.liter⁻¹ which caused the value of the content of 1.39% ,finally the comparison as it reached 1.23%.as for the interaction between the organic fertilizer and the cultivar, the van eijk cultivar treated with 4ml.liter⁻¹ the largest value 1.96 % achieved significantly over all transactions and for the two cultivars while the treatment of the plants, Tulip upstar un treated 0.96 % . and on the overlap between the cultivar and the extract the results indicated that there were significant differences between the treatment of spraying the van eijk plants with 4ml.liter⁻¹which recorded a relative content of 1.69 % and among the rest of the coefficients at the time that the tulip upstar cultivar was recorded the lowest value 1.20 % .with regarded to the interaction between the organic fertilizer and the extract.

Phosphorus (%): from the results in table (8).we see that the van eijk plants have recorded a relative content of phosphorus reached 0.286 % that has a significant correlation with the tulip upstar cultivar plants that recorded 0.266 % as for the effect of organic fertilizers ,the table may indicate the moral superiority of the plants that sprayed with 4ml.liter⁻¹ which recorded 0.337 % were followed by plants that were sprayed with 2ml.liter⁻¹ with the value 0.276 % then the lowest value 214,0 % was recorded by the comparison.as for the effect of the extract , the results showed that the treated plants had 4ml . liter⁻¹ a value of 0.301 % was reported the significantly outperform the spray treatment with 2ml.liter⁻¹ with a content of 0.275 % as well as on comparison that reached 0.252 % as for the interaction between the cultivar and the organic fertilizer ,the van eijk plants sprayed with 4 ml.liter⁻¹ the largest value reached 0.351 % which significantly outperformed the other treatments for the two cultivars ,while the treatment plant, tulip upstar , recorded the value of 0.203 % which is the lowest value . As for the overlap between the cultivar and the extract, we may note that the van eijk plants also sprayed with 4ml.liter⁻¹ achieved the largest value as well as ,as it reached 0.317 % significantly superior to all transactions .

Potassium (%) we note from the result in table (9) that the van eijk plants significantly outperformed the potassium content on the tulip upstar cultivar plants as they recorded 1.98 % corresponding to 1.83 % recorded by the tulip upstar cultivar plants. As for the organic fertilizer the treated plants outperformed 4ml.liter⁻¹ meaning by achieving the content of 2.73 % followed by the plants treated with 2ml.liters⁻¹ with 1.89 % and finally the lowest value 1.10 % . The effect of the extract ,we may note that the plants treated with 4ml.liters⁻¹ also achieved the largest value as it reached 2.18 % followed by a plants treated with 2ml.liters⁻¹ with 1.86 % than 1.69 % plants by comparison and with a significant difference between the three treatments .as for the interaction between the cultivar and the organic fertilizer, the van eijk plants excelled in 4ml.liters⁻¹ significantly on most treatment , recorded 2.81 % while the treatment of the untreated tulip upstar cultivar was recorded 1.02 % with regard to the interaction between the cultivar and the extract , we note that the van eijk cultivars treated with 4ml.liters⁻¹ , has achieved the largest value of 2.30 % significantly superior to all transactions and and for the two varieties , including the treatment of the non-comparative tulip upstar cultivar plants with 1.64 % as a relative content of the leaves of potassium .as for the interaction between the variety and the extract ,the plants recorded with organic fertilizer concentrate 4ml.liters⁻¹ with 4ml.liter of the extract had a relative leaf content of potassium of 3.03 % with a significant superiority over the rest of the treatments .

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Table (1) some characteristics of the soil model used in the experiment ⁽¹⁾.

Soil arthropods (%)			Soil tissue	Soil PH	Electrical conductivity EC ds/m	Organic matter (%)
Sand	Greene	Clay	Sandy	7.2	3.40	1.5
80.15	8.35	11.5				
Ready content for nutrients						
N %			P ppm		K ppm	
0.0588			32.06		6.8	

⁽¹⁾ The analyses were conducted in the soil and water resources department

Table (2): shows the percentage of emerging time for both types.

Cultivar	After 30 days	After 45 days
Van eijk	100 %	100 %
Tulip upstar	75.77 %	100 %

Table (3): shows the effect of spraying with Nutrigrin ,Alkarin extract and their interaction on plant height (cm) for two types of tulip.

cultivar	Nutriegrin organic fertilizer ml. liter ⁻¹	Alkarin algae extract ml. liter ⁻¹			Interference between cultivar and organic fertilizer	cultivar effect	Nutriegrin effects
		0	2	4			
Van eijk	0	25.55de	31.68bc	32.50bc	29.91b		
	2	32.25bc	34.65b	35.89b	34.26a		
	4	30.28c	35.36b	40.64a	35.43a		
Tulip upstar	0	11.57j	13.2ij	19.30gh	14.69e		
	2	15.70hi	21.13fg	24.70ef	20.51d		
	4	18.90gh	21.40fg	28.77cd	23.02c		
Interference between cultivar and alkene	Van eijk	29.36c	33.90b	36.34a		33.30a	
	Tulip upstar	15.39f	18.58e	24.26d		19.41b	
Interference between neutrigrin and alkene	0	18.56f	22.44e	25.90cd			22.30c
	2	23.97de	27.89bc	30.29b			27.39b
	4	24.59de	28.38bc	34.70a			29.22a
Alkarin effect		22.37c	26.24b	30.30a			

* Values with similar characters for each factor or their interactions , each separately dp not differ significantly according to the Duncan polynomial test under the 5 % probability level.

Table (4): shows the effect of spraying with nitrogen ,alkarin extract and interference between them in the number of leaves for two types of tulips.

cultivar	Nutriegrin organic fertilizer ml. liter ⁻¹	Alkarin algae extract ml. liter ⁻¹			Interference between cultivar and organic fertilizer	cultivar effect	Nutriegrin effects
		0	2	4			
Van eijk	0	5.10h	5.57e-h	5.66e-h	5.45d		
	2	5.20gh	6.30b-f	6.57b-d	6.02c		
	4	5.57f-h	6.13c-f	6.87a-c	6.18bc		
Tulip upstar	0	5.93d-g	6.06c-f	6.13c-f	6.04c		
	2	6.13c-f	6.37b-e	7.6ab	6.52b		
	4	6.57b-d	7.00ab	7.50a	7.02a		
Interference between cultivar and alkene	Van eijk	5.28d	6.00c	6.37bc		5.88a	
	Tulip upstar	6.21bc	6.84b	6.90a		6.53b	
Interference between neutrigrin and alkene	0	5.52e	5.82de	5.90de			5.74c
	2	5.67e	6.33b-d	6.82ab			6.27b
	4	6.05c-f	6.57bc	7.18a			6.60a
Alkarin effect		5.74c	6.24b	6.63a			

* Values with similar characters for each factor or their interactions , each separately dp not differ significantly according to the Duncan polynomial test under the 5 % probability level

Table (5) shows the effect of spraying with Nutrigrin , alkarin extract and their interaction in the leafy area of the plant(cm^2) for two types of tulips .

cultivar	Nutriegrin organic fertilizer ml. liter ⁻¹	Alkarin algae extract ml. liter ⁻¹			Interference between cultivar and organic fertilizer	cultivar effect	Nutriegrin effects
		0	2	4			
Van eijk	0	560.67fg	572.70e	586.40cd	573.25e		
	2	579.30de	591.24c	623.53b	598.02b		
	4	563.96f	620.50b	674.20a	619.55a		
Tulip upstar	0	541.26k	544.57jk	551.86h-j	545.90f		
	2	547.10i-k	550.97h-j	559.20f-h	552.42e		
	4	553.60g-i	558.12f-h	560.31fg	557.34d		
Interference between cultivar and alkene	Van eijk	567.98c	594.81b	628.04a		695.94a	
	Tulip upstar	547.32e	551.22e	557.12d		551.89a	
Interference between neutrigrin and alkene	0	550.96e	558.64d	569.13c			559.58c
	2	563.20d	571.10c	591.37b			575.22b
	4	558.78d	589.31b	617.26a			588.45a
Alkarin effect		557.65c	573.02b	592.58a			

* Values with similar characters for each factor or their interactions , each separately dp not differ significantly according to the Duncan polynomial test under the 5 % probability level.

Table (6) shows the effect of spraying with ntrigrin and alkarin algae extract and their interaction on the relative leaf content of chlorophyll (%)for two types of the tulips

cultivar	Nutriegrin organic fertilizer ml. liter ⁻¹	Alkarin algae extract ml. liter ⁻¹			Interference between cultivar and organic fertilizer	cultivar effect	Nutriegrin effects
		0	2	4			
Van eijk	0	36.33f	36.43f	39.87ef	37.54d		
	2	41.37d-f	44.70c-f	50.13b-e	45.40c		
	4	48.40b-e	54.13bc	66.40a	55.98		
Tulip upstar	0	39.50ef	46.37c-f	43.43c-f	43.10cd		
	2	49.80b-e	51.80b-d	51.97bc	51.52b		
	4	58.03ab	58.33ab	68.00a	61.46a		
Interference between cultivar and alkene	Van eijk	41.03c	44.76bc	52.13a		46.31b	
	Tulip upstar	49.11ab	51.17a	54.80a		52.03a	
Interference between neutrigrin and alkene	0	37.92f	41.40ef	41.65ef			40.32c
	2	45.58de	48.25c-e	51.55b-d			48.46b
	4	53.22bc	55.73b	67.20a			58.72a
Alkarin effect		45.57b	48.46b	53.47a			

* Values with similar characters for each factor or their interactions , each separately dp not differ significantly according to the Duncan polynomial test under the 5 % probability level.

Table (7) shows the effect of spraying with nutrigren and alkarin algae extract and their interaction in the relative leaf content of nitrogen (%) for two types of the tulips.

cultivar	Nutriegrin organic fertilizer ml. liter ⁻¹	Alkarin algae extract ml. liter ⁻¹			Interference between cultivar and organic fertilizer	cultivar effect	Nutriegrin effects
		0	2	4			
Van eijk	0	0.90kl	1.06 i-l	1.17 h-k	1.04 d		
	2	1.22g-j	1.39 e-h	1.56 d-f	1.39 c		
	4	1.68c-e	1.85 bc	2.35 a	1.96 a		
Tulip upstar	0	0.82 1	0.95 g-l	1.11 h-k	0.96 d		
	2	1.20h-j	1.33 f-i	1.49d-g	1.34 c		
	4	1.59c-f	1.76 cd	2.04 b	1.79 b		
Interference between cultivar and alkene	Van eijk	1.26 d	1.43 bc	1.69 a		1.46 a	
	Tulip upstar	1.20 d	1.34 gh	1.55 b		1.36 b	
Interference between neutrigrin and alkene	0	0.86 h	1.00 gh	1.14 fg			1.00 c
	2	1.21 ef	1.36 de	1.52 cd			1.36 b
	4	1.63 bc	1.80 b	2.19 a			1.82 a
Alkarin effect		1.23 c	1.39 b	1.62 a			

* Values with similar characters for each factor or their interactions , each separately dp not differ significantly according to the Duncan polynomial test under the 5 % probability level.

Table (8): shows the effect of spraying with nutrigren and alkarin extract and their interaction on the relative leaf content of phoshporous (%) for two types of the tulips.

cultivar	Nutriegren organic fertilizer ml. liter ⁻¹	Alkarin algae extract ml. liter ⁻¹			Interference between cultivar and organic fertilizer	cultivar effect	Nutriegren effects
		0	2	4			
Van eijk	0	0.207 i	0.226 hi	0.244f-i	0.225 d		
	2	0.264e-h	0.282 d-f	0.299b-e	0.282 c		
	4	0.316b-d	0.329 bc	0.408 a	0.351 a		
Tulip upstar	0	0.160 j	0.325 i	0.235 g-i	0.203 d		
	2	0.251 f-i	0.277 d-g	0.286 c-f	0.271 c		
	4	0.314b-d	0.320b-d	0.338 b	0.324 b		
Interference between cultivar and alkene	Van eijk	0.262 bc	0.279 b	0.317 a		0.286 a	
	Tulip upstar	0.242c	0.270 b	0.286 b		0.266 b	
Interference between neutrigrin and alkene	0	0.183h	0.220 g	0.239 fg			0.214 c
	2	0.258 ef	0.279 de	0.292 cd			0.276 b
	4	0.315 bc	0.324 b	0.373 a			0.337 a
Alkarin effect		0.252 c	0.375 b	0.301 a			

* Values with similar characters for each factor or their interactions , each separately dp not differ significantly according to the Duncan polynomial test under the 5 % probability level.

Table (9) shows the effect of spraying with organic fertilizer nutrigrin and alkarin algae extract and their interaction on the relative leaf content of potassium (%) for two types of the tulips.

cultivar	Nutriegrin organic fertilizer ml. liter ⁻¹	Alkarin algae extract ml. liter ⁻¹			Interference between cultivar and organic fertilizer	cultivar effect	Nutriegrin effects
		0	1.5	3			
Van eijk	0	1.00 ij	1.08 ij	1.48 gh	1.18 c		
	2	1.71 fg	1.87 f	2.29 de	1.95 b		
	4	2.53 cd	2.75 bc	3.15 a	2.81a		
Tulip upstar	0	0.78 j	1.06 ij	1.24 hi	1.02 c		
	2	1.67 fg	1.81 fg	2.01 ef	1.83 b		
	4	2.47 cd	2.59 b-d	2.91 ab	2.65 a		
Interference between cultivar and alkene	Van eijk	1.74 cd	1.90 bc	2.30 a		1.98 a	
	Tulip upstar	1.64 d	1.82 cd	2.05 b		1.83 b	
Interference between neutrigrin and alkene	0	0.89 f	1.07 f	1.36 e			1.10 c
	2	1.69 d	1.84 d	2.15 c			1.89 b
	4	2.50 b	2.67 b	3.03 a			2.73 a
Alkarin effect		1.69 c	1.86 b	2.18 a			

* Values with similar characters for each factor or their interactions , each separately dp not differ significantly according to the Duncan polynomial test under the 5 % probability level.

Table (10) shows the effect of spraying with organic fertilizer nutrigrin and alkarin algae extract and the overlap on the relative leaf content of sugars (%) for two types of the tulips.

cultivar	Nutriegren organic fertilizer ml. liter ⁻¹	Alkarin algae extract ml. liter ⁻¹			Interference between cultivar and organic fertilizer	cultivar effect	Nutriegren effects
		0	2	4			
Van eijk	0	0.57g	1.21 fg	1.54 e-g	1.11 c		
	2	1.87d-g	2.32 d-g	2.86 c-f	2.35 b		
	4	3.70b-d	4.73 a-c	5.65 a	4.69 a		
Tulip upstar	0	0.42g	1.15 fg	1.45 e-g	1.01c		
	2	1.69e-g	1.98 d-g	2.95 c-f	2.21 b		
	4	3.22c-e	4.51 a-c	5.46 ab	4.40 a		
Interference between cultivar and alkene	Van eijk	2.04b	2.75 ab	3.35 a		2.71 a	
	Tulip upstar	1.77b	2.55 ab	3.29 a		2.54 a	
Interference between neutrigrin and alkene	0	0.49f	1.18 ef	1.50 ef			1.06 c
	2	1.78de	2.15 de	2.91 cd			2.28b
	4	3.46bc	4.62 ab	5.56 a			4.54 a
Alkarin effect		1.91b	2.65 a	3.32 a			

* Values with similar characters for each factor or their interactions , each separately dp not differ significantly according to the Duncan polynomial test under the 5 % probability level.