



EFFECT OF SPRAYING WITH SALICYLIC ACID AND CALCIUM CHLORIDE ON THE YIELD CHARACTERISTICS OF CORM AND CORMLETS FOR THREE CULTIVARS OF *Gladiolus X hortulanus* L

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ABSTRACT

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This experiment was carried out in the shade of the green network of the Department of Horticulture and Landscape, College of Agriculture and Forestry, University of Mosul, for the period from Apr. 11, 2019 to Sept. 30, 2019, with the aim of producing corm and cormlets in the summer of three varieties of *Gladiolus X hortulanus* L. They are: "Break of dawn" White flowers, "Espresso" with red flowers, and "Blue frost" with purple flowers after being treated with salicylic acid (SA) at 0 and 250 mg.l⁻¹, as well as treatment with calcium chloride in three concentrations: 0, 500 and 1000 mg.l⁻¹ by spraying them on the foliage twice. The Factorial Experiment conducted by RCBD. The results show that the red cultivar recorded the largest weight of the corm was 28.98 g, its volume was 34.01 cm³, its diameter was 4.94 cm, and the number of cormlets was 12.33. per plant, the size of the cormlets is 13.52 cm³. Spraying with salicylic acid at 250 mg.l⁻¹ had a significant effect in recording the largest values for the corm diameter and their volume. Treatment with calcium chloride at both concentrations 500 and 1000 mg.l⁻¹ resulted in a significant increase in the corm weight, its diameter and the volume of cormlets. The treatment with calcium chloride at 1000 mg.l⁻¹ caused to record the largest values for the number of cormlets are 9.53 cormlet. pl⁻¹, while the treatment with calcium chloride at 500 mg.l⁻¹ increased of the corm volume is 27.68 cm³. The red cultivar plants treated with or without salicylic acid interact with calcium chloride at 500 mg.l⁻¹ was gave the best grade of corms ranked 7.00 (Jumbo).

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INTRODUCTION

Gladiolus plant (*Gladiolus X hortulanus* L.) belongs to the family Iridaceae, and this genus is the largest among the genera of the Iridaceae family, which includes about 92 genera, the genus includes 270 species and 30,000 species, spread naturally in the regions of South Africa, the Arabian Peninsula, the Mediterranean Basin and Central Europe. (Singh, 2006; Kole, 2011 and Quattrocchi, 2012).

Gladiolus is a perennial herbaceous plant that reproduces by seeds to develop new cultivars. In recent years, it has been possible to use tissue culture technology to obtain pure strains, as well as to multiply it widely with corms and cormlets. *Gladiolus* are very rich in their diversity of cultivars, and every year new cultivars are added, so it has become important to evaluate the produced cultivars to determine

their suitability to environmental conditions and market requirements (Kumar *et al.*, 2019).

In study of Mushtaq *et al.*, (2013) indicated that the response of cultivars is affected by different cultivation environment and genetic composition, as it was observed that many cultivars of similar species behaved differently when grown under the same environmental conditions. Kumar *et al.*, (2017) showed in their study on five cultivars of *Gladiolus grandiflorus*: Nova Lux, White Prosperity, Rose Supreme, American Beauty and Big Time Supreme planted with three planting dates, that among all the cultivars, American Beauty scored the highest significant values of the number of corms $2.77 \text{ corm.pl}^{-1}$, also recorded the largest values for corms volume and weight of 74.88 mm^3 and 24.99 g , respectively, while the white Prosperity cultivar recorded the largest number of cormlets $65.23 \text{ cormlets.pl}^{-1}$.

Plant growth regulators are the third factor affecting plant growth and development after genetic and environmental factors (Pahade, 2015). Sewedan *et al.*, (2018) mentioned that when the *Gladiolus* plants sprayed with salicylic acid at 150 mg.l^{-1} , it had a significant effect in increasing the diameter and dry weight of the corms (5.9 cm and 5.17 g , respectively). Padmalatha *et al.*, (2013) showed a difference in the response of two cultivars of *G. hortulanus*, namely: Darshan and Dhiraj when treated with salicylic acid at 150 mg.l^{-1} , the results showed that salicylic acid was very effective and led to increase the number of corms per plant as well as the largest volume and weight of corms.

Calcium is a critical regulator of plant growth and development, as this divalent cation is involved in many life activities (Hirschi, 2004). Reddy and Sarkar (2016) noted that the treatment of *Gladiolus* cultivar summer sunshine with calcium nitrate or calcium carbonate sprayed on the vegetative growth when the appearance of the 3-4th or sixth leaf or when the inflorescence appeared, led to an improvement in the characteristics of the produced corms and cormlets. They also indicated that spraying with calcium nitrate at 300 mg.l^{-1} on the sixth leaf led to the recording of the largest significant values of corm diameter, thickness and weight. A study aims the possibility of producing corms and cormlets of three types of *Gladiolus* during the summer in the Mosul city after conducting some growth-supportive treatments, including treatment with salicylic acid and calcium chloride and their effect on the characteristics of the produced corms and cormlets.

MATERIALS AND METHODS

The experiment was carried out in shade of the green network of the Department of Horticulture and Landscape / College of Agriculture and Forestry / University of Mosul, during the period from April 2019 to September 2019, using three cultivars of *Gladiolus X hortulanus* L. They are: "Break of dawn" with white flowers and "Espresso" with red flowers and "Blue frost" with purple flowers, and salicylic acid was used in two concentrations: 0 and 250 mg.l^{-1} and calcium chloride in three concentrations: 0, 500 and 1000 mg.l^{-1} was sprayed on the vegetative growth twice: the first after the formation of three leaves and the second after the formation of the sixth leaf on the plant. The factorial experiment was used in the complete randomized block design with three replications and 15 plants for treatment.

The corms were in furrows, the distance between the furrows 30 cm with five corms per furrow. Urea nitrogen fertilizer $\text{CO}(\text{NH}_2)$ 46% N was used at 42 kg.dunum^{-1}

¹ and potassium fertilizer in the form of potassium sulfate 42% K₂O by 68 kg.dunum⁻¹ and phosphate fertilizer in the form of mono superphosphate 46% P₂O₅ at a rate of 44 kg.dunum⁻¹. the fertilizer was added spread over the soil, and the micro-elements fertilizer Mikrom (Italian CIFO company) was added two weeks before flowering at 0.5 g.l⁻¹ spraying on the foliage once in the early morning. The plants were left to grow until September 2019, when irrigation was prevented from them ten days. Then the corms and cormlets were removed from the soil, they were cleaned, and data were recorded on the following characteristics: corms weight (gm), corms volume (cm³), corms diameter (cm) and classification Corms within the international scale (ranked), which included seven ranks according to the gradation of the diameter of the corms and according to the American Association of gladiolus, the number of corms (cormlet.pl⁻¹) and the volume of cormlets (cm³). The data were statistically analyzed by using SAS software (2002) and the differences between the treatments were compared according to Duncan's Multiple Range Test (DMRT) at a probability level of 5%.

RESULTS AND DISCUSSION

Corm weight (gm): The results in Table (1) indicate that the corms taken from plants of the red cultivar recorded the largest significant values of corm weight, which amounted to 28.98 g. Spraying with either of the two concentrations of calcium chloride used led to a significant increase in the recorded values of corm weight. The largest significant values of 30.30 g were recorded for the weight of the corms taken from plants of the red cultivar when treated with SA. The largest values were also recorded from plants of the red cultivar sprayed with a 500 mg.l⁻¹ of calcium chloride and it reached 34.77 gm, which was significantly greater compared to all other interactions. The results showed that not treating plants with SA interact with calcium chloride at 500 mg.l⁻¹ recorded the largest significant values of 23.59 g. In general, it can be said that the largest significant values of corms weight 35.30 g were recorded from the red cultivar plants when not treated with SA interact with calcium chloride at 500 mg.l⁻¹.

Corm volume (cm³): From the results of the statistical analysis of the corm volume data in Table (2), the cultivars studied varied among themselves in the volume of the corms, reaching 34.01 cm³ for the corms of the red cultivar compared to 13.42 cm³ for plants of the white cultivar. Spraying with calcium chloride at 500 mg.l⁻¹ resulted in a significant increase in corm volume of 27.68 cm³. The results showed that the largest values of corm volume recorded from plants of the red cultivar treated with SA 34.78 cm³. The interaction effect between the cultivars and calcium chloride was significant, as it recorded a significant increase in the values of this trait from the plants of the red cultivar sprayed with a 500 mg.l⁻¹ of calcium chloride. The untreated plants with SA interacted with calcium chloride at a 500 mg.l⁻¹ recorded the largest values. Untreated plants with SA interacted with spraying with calcium chloride at 500 mg.l⁻¹ of red cultivar plants resulted in a significant increase of 443.5% in the volume of corms.

Table (1): Effect of spraying with different concentrations of salicylic acid, calcium chloride and their interactions in corm weight (gm) for three cultivars of Gladiolus.

Cultivars Response	Inter. effect of Cv. & SA	Calcium chloride conc. (mg.l ⁻¹)			SA conc. (mg.l ⁻¹)	Cultivars
		0	500	1000		
white	0	8.56 h	11.36 f-h	10.85 gh	10.26 d	11.26 c
	250	10.33 gh	10.19 gh	16.26 e-g	12.26 d	
red	0	22.17 c-e	35.30 a	25.48 b-e	27.65 ab	28.98 a
	250	25.25 b-e	34.25 ab	31.39 a-c	30.30 a	
violet	0	20.76 de	24.11 c-e	27.91 a-d	24.26 bc	22.53 b
	250	19.14 d-g	23.37 c-e	19.91 d-f	20.81 c	
Inter. effect of Cv. & CaCl ₂	white	9.44 d	10.78 d	13.56 d	Effect of SA	
	red	23.71 bc	34.77 a	28.44 b		
	violet	19.95 c	23.74 bc	23.91 bc		
Inter. effect of SA & CaCl ₂	0	17.17 c	23.59 a	21.41 a-c	20.72 a	
	250	18.24 bc	22.60 ab	22.52 ab	21.12 a	
Effect of CaCl ₂		17.70 b	23.10 a	21.97 a		

Means with same letter for each factor and interaction are not significantly different at 5% level based on DMRT.

Table (2): Effect of spraying with different concentrations of salicylic acid, calcium chloride and their interactions in corm size (cm³) for three cultivars of Gladiolus.

Cultivars Response	Inter. effect of Cv. & SA	Calcium chloride conc. (mg.l ⁻¹)			SA conc. (mg.l ⁻¹)	Cultivars
		0	500	1000		
white	0	7.66 l	18.44 i	9.99 k	12.03 f	13.42 c
	250	12.66 j	13.99 j	17.77 i	14.81 e	
red	0	26.51 fg	41.65 a	31.55 e	33.24 b	34.01 a
	250	31.89 de	38.84 b	33.62 d	34.78 a	
violet	0	24.70 gh	26.51 fg	36.35 c	29.19 c	27.59 b
	250	23.78 h	26.62 f	27.55 f	25.98 d	
Inter. effect of Cv. & CaCl ₂	white	10.16 h	16.22 f	13.88 g	Effect of SA	
	red	29.20 c	40.24 a	32.59 b		
	violet	24.24 e	26.57 d	31.95 b		
Inter. effect of SA & CaCl ₂	0	19.62 d	28.87 a	25.97 b	24.82 a	
	250	22.78 c	26.49 b	26.31 b	25.19 a	
Effect of CaCl ₂		21.20 c	27.68 a	26.14 b		

Means with same letter for each factor and interaction are not significantly different at 5% level based on DMRT.

Corm diameter (cm): The results in Table (3) indicate that the diameter of the corm has varied significantly and reached a maximum of 4.94 cm for the corms harvested from plants of the red cultivar. Treatment plants with SA led to a significant increase in the diameter of the corms, which reached to 4.35 cm. Spraying plants with calcium chloride at both concentrations significantly increased the volume of the corms. The corms of the red cultivar were distinguished in their diameter, as they recorded the

largest significant values when spraying with SA at 250 mg.l⁻¹. The largest diameter of corms was recorded from plants of the red cultivar sprayed with calcium chloride at 500 mg.l⁻¹ reached to 5.25 cm. Spraying plants with SA was interacted with spraying with calcium chloride at 1000 mg.l⁻¹ has a significant effect on recording the largest significant values. The results of the triple interaction between the factors under study indicate that the largest significant values of this trait were 5.36 cm for the corms harvested from the red cultivar plants not sprayed with SA interact with the spraying with calcium chloride at 500 mg.l⁻¹.

Classification of Corms (ranked): The results in Table (4), which shows the classification of the Corms according to their diameters according to the international scale of the American Gladiolus Society, indicated that the corms obtained from the red cultivar were significantly better at rank 6.50 than the corms harvested from plants of the white cultivar, which reached a rank of 5.22. The salicylic acid treatment led to a significant improvement in the classification rank. Spraying plants with calcium chloride under any of its concentrations led to a significant increase in the rank of corms classification 6.11 and 5.94 for the concentrations 500 and 1000 mg.l⁻¹ respectively. The red cultivar corm was significantly superior to grading at 6.66 rank when sprayed with salicylic acid. The results indicate that the best rank values of the corms were recorded from the red cultivar plants sprayed with calcium chloride at a concentration of 500 mg.l⁻¹ which ranked 7.00 (Jumbo). In general, it can be said that the rank values of the red cultivar corms treated with or without salicylic acid and sprayed with calcium chloride at a concentration of 500 mg.l⁻¹ was significantly better which reached the rank of 7.00 (Jumbo) in contrast to the values of the interactions of the white cultivar, which recorded the lowest ranks.

Number of cormels (cormel.pl⁻¹): The results in Table (5) indicate that the red variety recorded the largest significant number of cormels 12.33 cormels.pl⁻¹. With the increase in the concentration of calcium chloride used, the number of cormels increased significantly and reached a maximum of 9.53 cormels.pl⁻¹ at 1000 mg.l⁻¹. It was possible to record the largest values for the number of cormels, which amounted to 12.57 cormels.pl⁻¹ of red variety plants sprayed with salicylic acid. While the results showed that the largest values 16.87 cormels.pl⁻¹ were recorded from the red variety plants sprayed with calcium chloride at 500 mg.l⁻¹. The plants sprayed with salicylic acid interact with the spraying with calcium chloride at 1000 mg.l⁻¹ records the largest significant values. It is noted from the results of the triple interaction that the largest significant values of 18.51 cormels.pl⁻¹ are recorded from the red variety plants treated with salicylic acid interacted with calcium chloride treatments at 500 mg.l⁻¹.

Table (3): Effect of spraying with different concentrations of salicylic acid, calcium chloride and their interactions in corm diameter (cm) for three cultivars of Gladiolus.

Cultivars Response	Inter. effect of Cv. & SA	Calcium chloride conc. (mg.l ⁻¹)			SA conc. (mg.l ⁻¹)	Cultivars
		0	500	1000		
White	0	3.14 j	3.74 h	3.49 i	3.47 e	3.58 c
	250	3.26 j	3.47 i	4.35 ef	3.69 d	
Red	0	4.50 de	5.36 a	4.64 d	4.83 b	4.94 a
	250	4.86 c	5.15 b	5.11 b	5.04 a	
violet	0	4.09 g	4.28 e-g	4.68 cd	4.35 c	4.33 b
	250	4.33 ef	4.42 e	4.18 fg	4.31 c	
Inter. effect of Cv. & CaCl ₂	white	3.21 h	3.60 g	3.92 f	Effect of SA	
	red	4.68 c	5.25 a	4.87 b		
	violet	4.21 e	4.35 de	4.43 d		
Inter. effect of SA & CaCl ₂	0	3.92 e	4.46 ab	4.27 c	4.22 b	
	250	4.15 d	4.34 bc	4.55 a	4.35 a	
Effect of CaCl ₂		4.03 b	4.40 a	4.41 a		

Means with same letter for each factor and interaction are not significantly different at 5% level based on DMRT.

Table (4): Effect of spraying with different concentrations of salicylic acid, calcium chloride and their interactions in classifying corm (degree) for three cultivars of Gladiolus.

Cultivars Response	Inter. effect of Cv. & SA	Calcium chloride conc. (mg.l ⁻¹)			SA conc. (mg.l ⁻¹)	Cultivars
		0	500	1000		
White	0	4.66 e	5.66 d	5.00 e	5.11 d	5.22 c
	250	5.00 e	5.00 e	6.00 cd	5.33 d	
Red	0	6.00 cd	7.00 a	6.00 cd	6.33 b	6.50 a
	250	6.33 bc	7.00 a	6.66 ab	6.66 a	
violet	0	6.00 cd	6.00 cd	6.00 cd	6.00 c	6.00 b
	250	6.00 cd	6.00 cd	6.00 cd	6.00 c	
Inter. effect of Cv. & CaCl ₂	White	4.83 d	5.33 c	5.50 c	Effect of SA	
	Red	6.16 b	7.00 a	6.33 b		
	Violet	6.00 b	6.00 b	6.00 b		
Inter. effect of SA & CaCl ₂	0	5.55 c	6.22 a	5.66 c	5.81 b	
	250	5.77 bc	6.00 ab	6.22 a	6.00 a	
Effect of CaCl ₂		5.66 b	6.11 a	5.94 a		

Means with same letter for each factor and interaction are not significantly different at 5% level based on DMRT.

Cormels volume (cm³): It is noticed from Table (6) that the cultivars differed significantly in the volume of cormels, the largest values 13.52 cm³ were recorded from the red variety plants. Treated plants with salicylic acid led to a significant increase in the values of this trait. A significant increase in the cormels volumes was also recorded when treated with calcium chloride and at any of the two concentrations used. On the other hand, the largest significant values of cormels volumes were

recorded when the red variety plants were treated with salicylic acid. The results also showed that treating the red variety plants with calcium chloride at 500 mg.l⁻¹ resulted to record the largest significant values of 18.44 cm³. The treatment of plants with salicylic acid interacts with spraying with calcium chloride at both concentrations of 500 and 1000 mg.l⁻¹ has a significant effect on increasing the volumes of cormels. Overall, the volumes of cormels increased significantly, reaching to 24.44 cm³ for the red variety plants sprayed with salicylic acid and calcium chloride at 500 mg.l⁻¹, this treatment increased by 1550.5% over the lowest values recorded for plants of the white variety not sprayed with salicylic acid and calcium chloride.

Table (5): Effect of spraying with different concentrations of salicylic acid, calcium chloride and their interactions in cormels number (cormel.Pl⁻¹) or three cultivars of Gladiolus.

Cultivars Response	Inter. effect of Cv. & SA	Calcium chloride conc. (mg.l ⁻¹)			SA conc. (mg.l ⁻¹)	Cultivars
		0	500	1000		
white	0	1.22 k	5.29 g	7.48 f	4.66 d	4.57 c
	250	1.22 k	2.14 j	10.11 d	4.49 d	
red	0	11.74 c	15.22 b	9.29 e	12.08 b	12.33 a
	250	3.88 i	18.51 a	15.33 b	12.57 a	
violet	0	4.11 i	4.62 h	9.55 e	6.09 c	4.17 b
	250	2.44 j	4.88 h	5.44 g	4.25 e	
Inter. effect of Cv. & CaCl ₂	white	1.22 i	3.72 g	8.79 c	Effect of SA	
	red	7.81 d	16.87 a	12.31 b		
	violet	3.27 h	4.75 f	7.49 e		
Inter. effect of SA & CaCl ₂	0	5.69 d	8.38 c	8.77 b	7.61 a	
	250	2.51 e	8.51 c	10.29 a	7.11 b	
Effect of CaCl ₂		4.10 c	8.45 b	9.53 a		

Means with same letter for each factor and interaction are not significantly different at 5% level based on DMRT.

Table (6): Effect of spraying with different concentrations of salicylic acid, calcium chloride and their interactions in cormels volume (cm³) or three cultivars of Gladiolus.

Cultivars Response	Inter. effect of Cv. & SA	Calcium chloride conc. (mg.l ⁻¹)			SA conc. (mg.l ⁻¹)	Cultivars
		0	500	1000		
white	0	1.48 i	9.77 e	8.03 f	6.43 d	6.21 c
	250	2.48 i	5.62 h	9.88 e	5.99 d	
red	0	6.18 h	12.44 cd	12.07 cd	10.23 b	13.52 a
	250	6.51 gh	24.44 a	19.48 b	16.81 a	
violet	0	6.59 gh	11.33 d	12.62 c	10.18 b	8.79 b
	250	7.48 fg	7.99 f	6.74 gh	7.40 c	
Inter. effect of Cv. & CaCl ₂	white	1.98 f	7.70 d	8.96 c	Effect of SA	
	red	6.35 e	18.44 a	15.77 b		
	violet	7.03 de	9.66 c	9.68 c		
Inter. effect of SA & CaCl ₂	0	4.75 d	11.18 b	10.91 b	8.95 b	
	250	5.49 c	12.69 a	12.03 a	10.07 a	
Effect of CaCl ₂		5.12 b	11.93 a	11.47 a		

Means with same letter for each factor and interaction are not significantly different at 5% level based on DMRT.

From the results in Tables (1, 2, 3, 4, 5 and 6), which indicated that the red variety plants surpass in recording the largest significant values of the weight, volume and diameter of the corms, classification rank, the number and volume of cormels, these traits were associated with a significant increase in the number of leaves and the intensity of chlorophyll in the leaves (unpublished data). (Allawi and AL-Atrakchii, 2020), that these plant organs are the sink for the collection and storage of processed nutrients in the leaves as indicated by Das (1998) in their study on the *Gladiolus* plant, or may explain the increase in the values of these traits distinguish the red cultivar plants from other cultivars plants in the strength of the root group, which supported plant growth better than the other two cultivars (Jacoby and Halevy, 1970). The results in Tables (3, 4 and 6) indicated that the corm diameter, classification rank, and the cormels volume increased significantly when treated with salicylic acid. This result may be explained according to the role of salicylic acid, which is involved in many morphogenetic processes, including the formation of flowers and tuber formation (Koda *et al.*, 1992, Khurama and Cleland, 1992), and its effect on improving vegetative growth, which is reflected in an increase in the corms volume, as stimulating the synthesis of chlorophyll and increasing the photosynthesis resulted in more nutrients i.e. more dry total sugars accumulated in the corms, this is supported by Sewedan *et al.*, (2018) in their study on the *Gladiolus* plants.

The results indicated in Tables (1, 2, 3, 4, 5 and 6) regarding the yield of the corms and cormels and the classification of the corms according to the international scale of the American Society of *Gladiolus*, that treatment with calcium chloride had a positive effect in improving the quantitative and qualitative characteristics of the corms and cormels, this may be explained according to the role of calcium involved in the process of photosynthesis and facilitation of nitrate uptake in the presence of calcium, increasing the processes of cell division and thus growth, as well as the binding of nucleic acids to proteins and participation in the formation and strengthening of cell membranes, this is supported by Reddy and Sarkar (2016) in their study on the plant *Gladiolus*.

CONCLUSION

Deduce from this study that sprayed with salicylic acid interaction with calcium chloride it was possible to produce corms yields for three cultivars of *Gladiolus X hortulanus* L. by good quality with classification degrees that allowed it to enter the classifications according to the international grade of the American Association of *Gladiolus* and suitable for local marketing and at an inappropriate time for production from high temperatures with high light intensity and low relative humidity under conditions of the canopy green net.

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CONFLICT TO INTEREST

Author proclaim no conflicts of interest related to this article.

تأثير الرش بحامض السالسليك وكلوريد الكالسيوم في صفات حاصل الكورمات والكريمات لثلاثة أصناف
من الكلايولس *Gladiolus X hortulanus L.*

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الخلاصة

نُفذت التجربة في ظللة الشبكة الخضراء التابعة لقسم البستنة وهندسة الحدائق في كلية الزراعة والغابات في جامعة الموصل، للمدة من 11 نيسان 2019 ولغاية 30 ايلول 2019، بهدف انتاج الكورمات والكريمات صيفاً لثلاثة أصناف من الكلايولس *Gladiolus X hortulanus L.* هي: "Break of dawn" ذات الأزهار البيضاء و"Espresso" ذات الأزهار الحمراء و"Blue frost" ذات الأزهار البنفسجية بعد معاملتها بحامض السالسليك بتركيزين صفر و 250 ملغم. لتر⁻¹ وكذلك المعاملة بكلوريد الكالسيوم بثلاثة تراكيز هي صفر و 500 و 1000 ملغم. لتر⁻¹ رشاً على المجموع الخضري مرتين. أُستُخدم في تنفيذ البحث التجربة العاملية بتصميم القطاعات العشوائية الكاملة بثلاثة مكررات و 15 نبات للمعاملة. أشارت النتائج إلى أن الصنف الأحمر سجل أكبر وزن للكورمة 28.98 غم وحجمها 34.01 سم³ وقطرها 4.94 سم وعدد الكريمات 12.33 كريمة. نبات⁻ و حجم الكريمات 13.52 سم³، وكان لرش النباتات بحامض السالسليك بتركيز 250 ملغم. لتر⁻¹ تأثيراً معنوياً في تسجيل أكبر القيم لقطر الكورمات وحجمها، كما أدت المعاملة بكلوريد الكالسيوم بكلا تركيزيه 500 و 1000 ملغم. لتر⁻¹ إلى زيادة معنوية في وزن الكورمة وقطرها وحجم الكريمات، في حين سجلت المعاملة بكلوريد الكالسيوم بتركيز 1000 ملغم. لتر⁻¹ أكبر القيم لعدد الكريمات 9.53 كريمة. نبات⁻ في حين زادت المعاملة بكلوريد الكالسيوم بتركيز 500 ملغم. لتر⁻¹ من حجم الكورمة 27.68 سم³، وأن مرتبة تصنيف الكورمات الناتجة من الصنف الأحمر المعاملة بحامض السالسليك أو بدونه مع الرش بكلوريد الكالسيوم بتركيز 500 ملغم. لتر⁻¹ كانت الأفضل وبلغت المرتبة 7.00 (Jumbo).
الكلمات الدالة: حامض السالسليك، كلايولس ، كلوريد الكالسيوم، كورمات.

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