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To cite this article: Omer Abdul Kareem Mohamed Alsherefe and Alaa Hashim Younis Altaee 2023 *IOP Conf. Ser.: Earth Environ. Sci.* **1262** 042001

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Effect of Spraying with Different Concentrations of Organic Fertilizer Nutrigreen and Salicylic Acid on the Vegetative Growth of Two Cultivars of *Gladiolus hybrid* L.

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Abstract. The experiment was carried out inside the wooden canopy of the Department of Horticulture and Landscaping / College of Agriculture and Forestry / University of Mosul during the period from 17 March to 10 October 2022 in order to evaluate the response of two varieties of *Gladiolus X hortulanus* L. They are: White Prosperity with white flowers and Plumtart with flowers Purple for treatment with Nutrigreen organic fertilizer in three concentrations: zero, 1000- and 2000-ml. L⁻¹, as well as treatment with salicylic acid in three concentrations, 500 and 1000 mg. L⁻¹ sprayed on the shoots three times. In the implementation of the experiment, the factorial experiment with a randomized complete block design (RCBD) was used in split plots (Factorial Experiment with in split plot) with three replications and 7 treatment plants. The results indicated that the white cultivar recorded the largest plant height 136.596 cm, while the purple cultivar plants recorded the largest values for the leaf length per plant 86.312 cm and the number of leaves per plant 8.206 leaves. Plant⁻¹, the leaf area of the plant was 484.472 (cm²), and the dry weight of the leaves was 16.559 (g).

Keywords. Salicylic Acid, *Gladiolus* plant, Organic Fertilizer.

1. Introduction

Gladiolus plant *Gladiolus X hortulanus* L. It belongs to the Iris family Iridaceae The name of the genus *Gladiolus* was named by Pliny 23-79 BC, which means the small sword, which is due to the shape of its leaves that resemble the shape of the sword. 72 genera, 270 species, and 10,000 varieties. *Cladiolus* spreads naturally in the Arabian Peninsula, regions of South Africa, Central Europe, and the Mediterranean basin. The fields of Asia Minor were called corn lilies, and among the common names of caladiols are 'Queen of bul', 'bons flowers', 'Sword Lily' [1,2]. Amino acids and other essential substances for growth, especially when sprayed on plants, where foliar nutrition plays an important role in plant growth, which means spraying the shoots of plants with nutrients in the form of dissolved solutions [3]. Major and microelements play an important role in the growth and development of the plant, and their presence in concentrations less than the plant's need may weaken its growth. The leaf is considered the basis for the photosynthesis process, because the lack of elements appears on the leaf, and nutrients must be sprayed on the leaves in a homogeneous manner compared to fertilization [4,5]. Salicylic acid (SA) is one of the plant hormones with a phenolic nature, as it works to absorb



ions and plays an important role in regulating the response of plants and hormonal balance and influencing the work of stomata and photosynthesis, and it also plays a role in resisting environmental stress, as it turned out that this compound provides Protection against types of environmental stress such as salt stress, drought stress, heat stress and stress resulting from heavy metals [6]. It was found that salicylate delays aging through its strong relationship in preserving cellular membranes and preserving the energy needed for vital processes. It also affects many enzymes and osmosis regulators such as cleavage and proline, and reduces stress resulting from heat, cold, heavy metals, and dehydration [7-9]. [10] indicated that the different growth parameters differ significantly between cultivars in response to the variety used during their evaluation of the performance of five varieties of *Gladiolus grandifloras* grown in the greenhouse, where the results showed that the Amsterdam cultivar was recorded The largest values were in plant height, weight and number of corms , while the cultivar Wiss Sensation recorded the largest values in stem diameter, leaf length and width, inflorescence length and number of florets per inflorescence , while Roma cultivar excelled, and that recorded the largest values for corms weight and diameter, reaching 40.80 g and 56.00 mm and the largest diameter The flower has a diameter of 9.25 cm and the longest flowering life is 9.66 days.[11] clarified, during his study on two varieties of iris, that the effect of spraying the sky The organic d Nutri-Crene had a significant effect, as it achieved the treatment of spraying plants at a concentration of 3.0 ml. L⁻¹ significant increase in plant height (39.22) cm, and the number of leaves amounted to (4.60) leaves / plant. From planting to flowering, it reached (60.40), and it led to recording the largest fresh weight of the flowering bearer (5.86) g. Ben , while spraying salicylic acid on shoots with four concentrations: 0, 50, 100 and 150 mg. liters⁻¹ four times, after 30, 45, 60 and 75 days of sowing, and it had a significant effect on all the traits under study, where the largest significant values were recorded when spraying with a concentration of 150 mg was used. l⁻¹ in the characteristics of leaf area, plant height and leaf dry weight.

2. Materials and Methods

The experiment was carried out inside the wooden canopy of the Department of Horticulture and Landscape Engineering / College of Agriculture and Forestry / University of Mosul, during the period from March 2022 to October 2022 to study the effect of spraying with organic fertilizers Nutrigreen and Salicylic acid and the interaction between them on the vegetative growth of two varieties of *Gladiolus X hortulanus* L.. Nutrigreen organic fertilizer was used in this study by spraying it on the shoots with three concentrations (0, 1000 and 2000) ml. L⁻¹ by three sprays on the shoots and until the wetness stage, the first spraying was after a month of germination and the period between one spray and another is two weeks, pure salicylic acid was added to the plant in three concentrations, which are (0, 500 and 1000) mg. L⁻¹ by dissolving it with distilled water and spraying it on the plant three times until the vegetation gets wet. The first spray was after (35) days of germination, and the period between one spray and another is two weeks. Studied traits: Emergence speed (day): Calculated by the number of days from sowing until the bud appears above the soil surface. Emergence percentage: Emergence percentage was calculated = Plant height (cm): The plant height was measured from the soil surface to the highest point in the flowering raceme, using a tape measure. Leaf length (cm): Measure the length of the leaf from the point of attachment of the leaf to the stem to the end of the leaf apex using a tape measure. Number of leaves (leaf. plant⁻¹): The number of leaves per plant was counted at the time of flowering. Leaf area of the plant (cm²): Leaves dry weight (g): The leaves dry weight was calculated using an electro balance after all the plants were dry.

3. Results and Discussion

3.1. Time Required for Emergence (Day)

It is clear from Table (1) that there was no significant effect of the cultivar on the period required for the emergence of vegetative growths, as the white cultivar emerged after 21.992 days, compared to 21.450 days for the purple cultivar. This may explain the occurrence of a kind of hormonal balance in the corms, especially gibberellic acid and abscisic acid, in addition to the duration of dormancy and the amount of food storage inside the corm [12].

Table 1. Duration required for emergence (day) for two varieties of *Gladiolus hortulanus* L.

Time required for emergence (day)	Varieties
21.992 a	White Prosperity
21.450a	Plumtart

*Averages that share the same letter for each factor and each interaction do not differ significantly between them according to Duncan's polynomial test at the probability level ($P < 0.05$).

3.2. Eruption %

It was observed in Table (2) that the percentage of emergence was 100% in all plants of the white variety and the purple variety. *Gladiolus hortulanus* L.

Table 2. Percentage of emergence of two varieties of *Gladiolus*.

Eruption %	Varieties
%100	White Prosperity
%100	Plumtart

3.3. Plant Height (cm)

The results showed in Table (3) that the cultivars differed significantly in the plant height characteristic, as the white cultivar plants were superior to the purple cultivar plants, which amounted to 136.596 cm for the white cultivar, compared to 130.524 cm for the purple cultivar, and the treatment with Nutrigreen organic fertilizer led to a significant increase in the value of these plants. The characteristic reached 138.511 and 137.504 cm compared to 124.61 cm for the control treatment, as spraying with salicylic acid at a concentration of 500 and 1000 mg. L-1 led to a direct significant increase in plant height with an increase in the concentration of 131.881 and 142.333 cm, respectively, compared to 126.467 cm for the plants of the control treatment. 123.758 cm in the comparison treatment, and the largest values for this trait were recorded as 146.222 cm when the white and purple cultivars were sprayed, respectively, with salicylic acid at a concentration of 1000 mg. L-1, which significantly increased the values of all other interactions and recorded the lowest values of 121.557 cm for the comparison treatment, while the plants treated with or without Nutrigreen organic fertilizer were distinguished when spraying with salicylic acid at a concentration of 1000 mg. L-1 recorded the largest significant values of 148.57 cm compared to 109.398 cm for the comparison treatment, and in general for the results of the triple interaction of the factors under study, it was found that the white variety plants were treated with Nutrigreen organic fertilizer at a concentration of 2000 ml. L-1 mixed with salicylic acid spray at a concentration of 1000 mg. L-1 led to recording the highest significant values at 156.952 cm, while this value decreased to below 107.333 cm for the purple cultivar without treatment with the organic fertilizer NutriCrane and salicylic acid.

Table 3. Effect of spraying with different concentrations of Nutrigreen organic fertilizer and salicylic acid and their interactions on plant height at flowering (cm) of two varieties of *Gladiolus hortulanus* L.

Varieties	Nutrigreen	Salicylic acid			Average Class	Average Nutrigreen	Overlap Class Nutrigreen
		0	500	1000			
White Prosperity	0	111.46 3 j	120.285 i	139.52 7bc	136.596 a	124.61 b	123.758 d
	1000	141.66 6 b	141.238 b	142.18 8 b		137.504 a	141.697 b
	2000	141 b	135.047 de	156.95 2 a		138.511 a	144.333 a
Plumtart	0	107.33 3 k	134.48d e	134.57 1 de	130.524 b	123.758 cm	125.462 d
	1000	130.62 gh	132.428 e f	136.57 1 cd			132.786 c
	2000	126.71 8 fg	127.809 gh	142.28 4b			133.272 c
average salicylic acid		126.46 7 c	131.881 b	142.33 3a			

Varieties	Nutrigreen	Salicylic acid			Average Class	Average Nutrigreen	Overlap Class Nutrigreen
		0	500	1000			
overlap Class × salicylic acid							
White Prosperity	0	131.37	132.19c	146.22	79.550 b	77.873 b	72.873 c
		6 c		2 a			
Plumtart	1000	121.55	131.573	138.44	86.312 a	83.261 ab	79.681 bc
		7 d	c	3 b			
overlap Nutrigreen × salicylic acid							
N0	0	109.39	127.383	137.04	77.873 b	77.873 b	72.873 c
		8 g	f	9 c			
N1000	1000	136.14	136.833	139.94	86.312 a	83.261 ab	79.681 bc
		3 cd	c	1 b			
N2000	2000	133.85	131.428	148.57	86.312 a	83.261 ab	79.681 bc
		9 d	e	a			

*Averages that share the same letter for each factor and each interaction do not differ significantly between them according to Duncan's polynomial test at the probability level ($P < 0.05$).

3.4. Leaf Length (cm)

From the data of Table (4), we find that the cultivar had a significant effect on the recorded values of the average leaf length for each plant, as the purple cultivar plants recorded the largest significant values and amounted to 86.312 cm compared to 79.550 cm for the white cultivar plants. Spraying with Nutrigreen organic fertilizer led to a significant increase in the leaf length and amounted to 87.658 cm. In contrast to 77.873 cm for the comparison treatment. While treatment with salicylic acid at a concentration of 1000 mg. L⁻¹ resulted in a significant increase in leaf length, which amounted to 87.102 cm compared to 78.333 cm for the comparison treatment. The results of the bilateral interaction between the cultivar and Nutrigreen organic fertilizer indicated that there were significant differences in leaf length in the purple cultivar plants, which amounted to 89.222 cm compared to 72.873 cm for the comparison treatment plants of the white cultivar. On the other hand, we find that the interaction between the cultivar and salicylic acid led to significant differences in leaf length in the purple cultivar plants, which amounted to 89.618 cm, compared to 74.111 cm for the plants of the white cultivar. L⁻¹ overlapped with spraying salicylic acid at a concentration of 1000 mg. L⁻¹ led to recording the largest significant values in leaf length, which amounted to 92.833 cm, while the lowest values were recorded at 67.928 cm for the plants of the control treatment. The results of the triple interaction between the cultivar and the organic fertilizer Nutrigreen and salicylic acid showed that the treatment of the white variety plants with the organic fertilizer Nutrigreen at a concentration of 2000 ml. L⁻¹ mixed with salicylic acid spray at a concentration of 1000 mg. L⁻¹ led to recording the largest significant values in the leaf length of 94.333 cm in the purple cultivar plants, while this value decreased to below 62.095 cm for the plants of the white cultivar.

Table 4. Effect of spraying different concentrations of Nutrigreen organic fertilizer and salicylic acid and their interactions on leaf length (cm) of two varieties of *Gladiolus hortulanus* L.

Varieties	Nutrigreen	Salicylic acid			Average Class	Average Nutrigreen	Overlap Class Nutrigreen
		0	500	1000			
White Prosperity	0	62.095	73.286	83.238	79.550 b	77.873 b	72.873 c
		e	de	a-d			
		77.714	82.143	79.188			
Plumtart	1000	bcd	a-d	bcd	86.312 a	83.261 ab	79.681 bc
		82.523	84.428	91.333			
Plumtart	2000	a-d	a-d	ab	86.312 a	87.658 a	86.095 ab
		73.762	87.476	87.380			
		cde	abc	abc			
White Prosperity	1000	86.523	86.857	87.142	86.312 a	83.261 ab	79.681 bc
		a-d	a-d	abc			
Plumtart	2000	87.381	85.952	94.333a	86.312 a	83.261 ab	79.681 bc

Varieties	Nutri-green	Salicylic acid			Average Class	Average Nutri-green	Overlap Class Nutri-green
		0	500	1000			
		abc	a-d				
average salicylic acid		78.333b	83.357 a	87.102a			
overlap Class × salicylic acid							
White Prosperity		74.111 c	79.952 bc	84.586 ab			
Plumtart		82.555 ab	86.762 ab	89.618a			
overlap Nutri-green × salicylic acid							
N0		67.928 c	80.381 b	85.309 ab			
N1000		82.119b	84.500 ab	83.165 b			
N2000		84.952a b	85.190 ab	92.833a			

*Averages that share the same letter for each factor and each interaction do not differ significantly between them according to Duncan's polynomial test at the probability level ($P < 0.05$).

3.5. The Number of Leaves (Leaf. Plant⁻¹)

It was observed from the follow-up data of Table No. (5) that the cultivar had a significant effect on the recorded values of the average number of leaves per plant, as the purple variety plants recorded the largest significant values, amounting to 8,931 leaves. Plant⁻¹ vs. 7.492 leaves. Plant⁻¹ of white cultivar plants. Spraying with Nutri-green organic fertilizer resulted in a significant increase in the number of leaves, which reached 9,627 leaves. Plant⁻¹ against 6.779 leaves. Plant⁻¹ for the control treatment, while the treatment with salicylic acid at a concentration of 1000 mg. L⁻¹ led to a significant increase in the number of papers, which amounted to 8,899 papers. plant⁻¹ against 7.342 leaves. Plant⁻¹ for the comparison treatment, and the results of the binary interaction between the cultivar and the organic fertilizer Nutri-green indicated that there were significant differences in the number of leaves in the purple cultivar plants, amounting to 10,513 leaves. Plant⁻¹ vs. 5.885 leaves. Plant⁻¹ for comparison treatment plants of the white variety. On the other hand, the interaction between the cultivar and salicylic acid indicated that there were significant differences in the number of leaves in the purple cultivar, which amounted to 9,469 leaves. plant⁻¹ against 6.673 leaves. Plant⁻¹ for comparison treatment plants of the white variety. The results showed that when the plants were treated with Nutri-green organic fertilizer at a concentration of 2000 ml. L⁻¹ overlapped with spraying salicylic acid at a concentration of 1000 mg. L⁻¹ led to recording the largest significant values of 10,665 papers. plant⁻¹, while the lowest values were 6.091 leaves. Plant⁻¹ of the plants of the comparison treatment, on the other hand, the results of the triple interaction of the factors under study showed that the treatment of white cultivar plants with Nutri-green organic fertilizer at a concentration of 2000 ml. L⁻¹ mixed with salicylic acid spray at a concentration of 1000 mg. L⁻¹ led to recording the largest significant values in the number of leaves in the purple cultivar plants 11,521 leaves. Plant⁻¹ while this value decreased to below 5.182 leaves. Plant⁻¹ for comparison treatment plants of the white variety

Table 5. Effect of spraying with different concentrations of Nutri-green organic fertilizer and salicylic acid and their interactions on the number of leaves at flowering (leaf. plant⁻¹) for two cultivars of *Gladiolus hortulanus* L.

Varieties	Nutri-green	Salicylic acid			Average Class	Average Nutri-green	overLap Class Nutri-green
		0	500	1000			
White Prosperity	0	5.182 j	5.718 j	6.756 i	7.492 b	6.779 c	5.885 e
	1000	7.327g hi	7.809 e-h	8.419c -f		8.229 b	7.851cd

Varieties	Nutri- reen	Salicylic acid			Average Class	Average Nutrigreen	overLap Class Nutrigreen
		0	500	1000			
Plumtart	2000	7.509f -i	8.904 bcd	9.809 b	8.931a	9.627 a	8.741 b
	0	7.000 hi	7.714e -i	8.307c -g			
	1000	8.013d -h	9.228b c	8.580c de			
	2000	9.020b cd	10.999 a	11.521 a			
average salicylic acid		7.342 c	8.395 b	8.899a			
overlap Class × salicylic acid							
White Prosperity		6.673d	7.477 c	8.328 b			
Plumtart		8.011 bc	9.313a	9.469a			
overlap Nutrigreen × salicylic acid							
N0		6.091f	6.716 f	7.532 e			
N1000		7.670 de	8.518 c	8.499 c			
N2000		8.264 cd	9.952b	10.665 a			

*Averages that share the same letter for each factor and each interaction do not differ significantly between them according to Duncan's polynomial test at the probability level ($P < 0.05$).

3.6. Leaf Area of the Plant (cm^2)

The results of the statistical analysis of the leafy area of the plant showed that there were significant differences for the cultivar in the values recorded for the leafy area of the plant Table (6), as the purple variety plants recorded the largest significant values and amounted to 484.472 (cm^2) compared to 445.868 (cm^2) for the white variety plants, and spraying with Nutrigreen organic fertilizer increased Significant in the leaf area of the plant was 551.774 (cm^2) compared to 358.964 (cm^2) for control plants. While treatment with salicylic acid at a concentration of 1000 mg. L^{-1} led to a significant increase in the leaf area of the plant and amounted to 515.357 (cm^2) compared to 402.796 (cm^2) for the comparison treatment. Compared to 343.10 (cm^2) for plants of the comparison treatment of the white variety.

On the other hand, the interaction between the cultivar and salicylic acid indicated that there were significant differences in the leaf area of the plant for the purple cultivar plants, amounting to 533.877 (cm^2) compared to 381.723 (cm^2) for the plants of the comparison treatment of the white variety. The results showed that when the plants were treated with Nutrigreen organic fertilizer at a concentration of 2000 ml. L^{-1} overlapped with spraying salicylic acid at a concentration of 1000 mg. L^{-1} led to recording the largest significant values of 616.157 (cm^2), while the lowest values were recorded as 322.786 (cm^2) for plants of the comparison treatment. In general, it can be said that the results of the triple interaction of the factors under study showed that the treatment of white cultivar plants with Nutrigreen organic fertilizer at a concentration of 2000 ml. L^{-1} mixed with salicylic acid spray at a concentration of 1000 mg. L^{-1} led to recording the highest significant values for the purple cultivar plants 637.42 (cm^2), while this value decreased to below 299.83 (cm^2) for the plants of the comparison treatment of the white cultivar.

Table 6. Effect of spraying with different concentrations of Nutrigreen organic fertilizer and salicylic acid and their interactions on plant leaf area (cm²) for two cultivars of *Gladiolus hortulanus* L.

Varieties	Nutrigreen	Salicylic acid			Average Class	Average Nutrigreen	Overlap Class Nutrigreen
		0	500	1000			
White Prosperity	0	299.8 3 j	345.33 i	384.15 gh	445.868 b	358.964 c	343.10 f
	1000	404.6 4 g	476.36 e	511.46 d			
	2000	440.7 0 f	555.44 c	594.89 b			
Plumtart	0	345.7 4 i	372.90 h	405.82 g	484.472 a	551.774a	374.82 e
	1000	439.8 0 f	517.98 d	558.39 c			
	2000	486.0 6 e	596.12 b	637.42 a			
average salicylic acid			477.35 7 b	515.35 7 a			
overlap Class × salicylic acid							
White Prosperity			459.04 4 c	496.83 7 b			
Plumtart			495.67 0 b	533.87 7 a			
overlap Nutrigreen × salicylic acid							
N0			359.11 8 h	394.98 9 g			
N1000			497.17 0d	534.92 5 c			
N2000			575.78 4 b	616.15 7 a			

*Averages that share the same letter for each factor and each interaction do not differ significantly between them according to Duncan's polynomial test at the probability level ($P < 0.05$).

3.7. Leaves Dry Weight (g)

The results in Table (7) indicate that the cultivars differed significantly among themselves in the dry weight of the leaves, as the purple cultivar plants recorded 16.559 (gm) compared to 14.905 (gm) for the white cultivar plants. Spraying with Nutrigreen organic fertilizer led to a significant increase in the dry weight of the leaves and amounted to 17.400 (gm) compared to 13.999 (gm) for the comparison treatment. While it was found that the treatment with salicylic acid at a concentration of 1000 mg. L⁻¹ led to a significant increase in the dry weight of the leaves and amounted to 17.775 (gm) compared to 13.984 (gm) for the comparison treatment, and the results of the binary interaction between the cultivar and the organic fertilizer Nutrigreen showed that there were significant differences in the dry weight of the leaves of the purple cultivar plants and amounted to 18.786 (gm). In comparison to 13.341 (gm) for plants of the comparison treatment of the white variety. On the other hand, the interaction between the cultivar and salicylic acid indicated that there were significant differences in the dry weight of the leaves of the purple cultivar, which amounted to 19.014 compared to 13.307 (gm) for the plants of the white cultivar. The results showed that when the plants were treated with Nutrigreen organic fertilizer at a concentration of 2000 ml. L⁻¹ overlapped with spraying salicylic acid at a concentration of 1000 mg. L⁻¹ led to recording the highest significant values in the dry weight of the leaves 21.139 (gm), while the lowest values were recorded 11.005 (gm) for the control plants. The results of the triple interaction of the factors under study showed that the white cultivar plants were treated with Nutrigreen organic fertilizer at a concentration of 2000 ml. L⁻¹ mixed with salicylic acid spray at a concentration of 1000 mg. L⁻¹ led to recording the highest significant values in the dry

weight of the leaves of the purple cultivar plants, which amounted to 23.001 (gm), while this value decreased to below 10.581 (gm) for the plants of the white cultivar.

Table 7. Effect of spraying different concentrations of Nutrigreen organic fertilizer and salicylic acid and their interactions on the dry weight of leaves (g): for two cultivars of *Gladiolus hortulanus* L.

Varieties	Nutrigreen	Salicylic acid			Average Class	Average Nutrigreen	Overlap Class Nutrigreen
		0	500	1000			
White Prosperity	0	10.581 g	15.190 c-f	14.252 f	14.905 b	13.999 c	13.341 c
	1000	14.977 ef	15.0217 def	16.078c -f			
	2000	14.363 ef	14.404 ef	19.277 b			
Plumtart	0	11.429 g	15.926c -f	16.613c d e	16.559 a	17.400 a	14.656 bc
	1000	15.294 c-f	15.985 c-f	17.429 bc			
	2000	17.262 bcd	16.096 cf	23.001a			
average salicylic acid overlap Class × salicylic acid			15.437b	17.775a			
White Prosperity			14.872 cd	16.536 b			
Plumtart			16.002 bc	19.014 a			
overlap Nutrigreen × salicylic acid							
N0			15.558 bc	15.433 bc			
N1000			15.503 bc	16.753 b			
N2000			15.250 bc	21.139a			

*Averages that share the same letter for each factor and each interaction do not differ significantly between them according to Duncan's polynomial test at the probability level ($P < 0.05$).

Addition of Nutrigreen organic fertilizer had a significant effect as it increased the characteristics of plant height, leaf length, number of leaves, leaf area and dry weight of the shoot. The basis for the biosynthesis of IAA auxin. On the other hand, amino acids are a good source of nitrogen [13], which is one of the most important essential elements for plant growth. In building the protoplasm necessary for cell division, increasing its number and breadth, and then building tissues [14,15] in addition to that nitrogen is involved in the composition of chlorophyll pigment, as about 70% of the nitrogen in leaves is included in the composition of chlorophyll [16] in addition to that Nitrogen is involved in building the amino acid tryptophan, which is the main initiator for the manufacture of auxins, which stimulate cell division and elongation and increase activity. meristem and build new tissues, which leads to an increase in the characteristics of the vegetative growth of the plant [17] and this contributes to improving the characteristics of vegetative growth such as the number and area of leaves [18] and delaying their aging [19]. As well as the effect of salicylic acid in the representation of some important building materials in the areas of their manufacture into effective growth areas that contribute to increasing cell division and elongation, as well as having a role in regulating hormonal activity within the plant, and that the overlap between the two spray solutions and the appointment is due to the nutritional balance of these elements in their effect and positive reflection On growth [20,21] The two sources are not available. The treatment with salicylic acid showed a stimulating effect on the vegetative growth characteristics of the caladiolus plant, such as plant height, which is the result of biochemical changes in the plant. This may be attributed to the participation of salicylic acid in the process of rapid cell division and elongation as a result of participation between auxins and phenols

[22,23]. This may be due to the role of salicylic acid in increasing the water content of cells, which encourages division and growth, and then improves the characteristics of vegetative growth [24].

Conclusions

The following is concluded from the study:

- The White Prosperity cultivar with white flowers recorded the highest values, being the largest plant height compared to the purple cultivar Plumtart.
- The purple cultivar Plumtart with purple flowers recorded the highest values in leaf length, number of leaves, leaf area of the plant and leaf dry weight against the white cultivar.
- The treatment resulted in the organic fertilizer NutriCrane at a concentration of 2000 ml. To⁻¹ to record a significant effect on all traits subject of the study.
- The treatment with salicylic acid had a positive stimulating effect for most of the traits under study. The white variety showed a clear response to the treatment with the organic fertilizer Nutri-Crane at a concentration of 2000 ml. Ltr and salicylic acid recorded the best values in all the traits under study.

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