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Effects of Roselle extract and Magic Grow Tonic Balanced Solution spray on Vegetative Growth and Flowering of *Tagetes erecta*

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Abstract: A field experiment was conducted in Basra city during 2020-2021 to assess the effect of three levels of Roselle extract (*Hibiscus subdaiffa* L.) at 0.3 and 5.7 g.L^{-1} and three levels of balanced solution Magic Grow Tonic (0, 3, 5, 7 m.L^{-1}) and their interaction. The experiment was factorial experiment in Randomized Complete Block Design (R.C.B.D) with three replications. Results showed that spraying with the Roselle extract and balanced solution interaction at 5g. L^{-1} Roselle extract + 7 ml. L^{-1} Magic Grow Tonic give the highest rate plant height (30.87 cm) leaves number (16.44 leaf. $plant^{-1}$) flower number(11.95 flower. $Plant^{-1}$), flower diameter (5.86 cm) except the stem diameter surpassed as sprayed with 5g.L^{-1} Roselle extract + 5ml.L^{-1} Magic Grow Tonic (7.88 mm), while the spray with 3g.L^{-1} Roselle extract + 7ml.L^{-1} Magic Grow Tonic superior in the dry matter in leaf and flower stem of flowers (17.48%), (18.43%) and (3.51 cm). the treatment of balanced solution at a concentration of (7.5ml.L^{-1})gave highest dray Wight for plant (58.72 g).

Keywords: Tagetes erecta, Roselle Extractions, Magic Grow Tonic.

تأثير الرش بمستخلص الكجرات والمحلول المغذي Magic Grow Tonic في نمو وإزهار نبات الجعفري (*Tagetes erecta*)

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المستخلص: نفذت تجربة حقلية في أحد المشاتل الأهلية في محافظة البصرة خلال الموسم الزراعي 2020 – 2021 على نبات الجعفري لدراسة تأثير الرش بأربعة مستويات من مستخلص الكجرات (0، 3، 5، 7 غم. لتر$^{-1}$) وأربعة مستويات من الرش بالمحلول المغذي Magic Grow Tonic(0، 3، 5، 7 مل. لتر$^{-1}$) والتداخل بينهما. صممت تجربة عاملية وفق تصميم القطاعات العشوائية الكاملة RCBD وبثلاثة مكررات.

أظهرت النتائج أن رش النباتات بالتوليفة المتكونة من 5غم.لتر$^{-1}$ كجرات + 7مل.لتر$^{-1}$ Magic Grow تفوقاً معنوياً في معظم صفات النمو الخضري والزهري متمثلة بارتفاع النبات (30.87 سم) وعدد الأوراق (16.44 ورقة. نبات$^{-1}$) وعدد الأزهار (11.95 زهرة.نبات$^{-1}$) وقطر الزهرة (5.86 سم)، أما بالنسبة لصفة قطر الساق فقد تفوقت التوليفة 5غم.لتر$^{-1}$ كجرات + 5 مل. لتر$^{-1}$ Magic Grow Tonic) إذ بلغ (7.88 ملم) ملم في حين تفوقت التوليفة 3 غم. لتر$^{-1}$ كجرات + 7 مل. لتر$^{-1}$ Magic Grow Tonic في صفات المادة الجافة في الأوراق

والأزهار والحامل الزهري إذ بلغت 17.48 % و 18.43 غم و3.51 سم على التوالي، فيما تفوق التركيز 7 مل. لتر$^{-1}$ Magic Grow Tonic في صفة الوزن الجاف للنبات إذ بلغ 58.72 غم.

الكلمات المفتاحية: نبات الجعفري، مستخلص الكجرات.

INTRODUCTION:

The *Tagetes erecta* plant belongs to the Asteraceae family. And it is native to Mexico in the west of Arizona in the southern of north America, and is cultivated in most countries of the world[5]. It is also found in most of the governorates of Iraq, where it is grown from the beginning of October to January, and it is a medium-height herbaceous plant. Its stems are thick and the leaves are lanceolate with a serrated edge. They are rectangular or feathery. flowers ranged from yellow to orange colors and propagated by seeds. Successfully planted in places exposed to sunlight [10].

plant extracts are important in the growth and nutrition of many different plant species, including Roselle extract (*Hibiscus sabdarriffa* L.), which is an important source of vitamins, minerals, compounds and amino acids[2]. as it stimulates functional processes such as photosynthesis, respiration, chlorophyll formation and encourages cell division and tissue growth. Regulating and activating plant hormones[7].

[9]found that spraying the chrysanthemum plants with Rosella extract at a concentration of 10 g. L^{-1} caused a significant increase in the rate of plant height (35.23cm) and the number of leaves (74.38 leaves $Plant^{-1}$), plant dry weight (17.27g).

A recent trend by flower and ornamental plant producers is to use foliar fertilizers, including the Magic Grow Tonic nutritional solution, which contains sodium that increases the flow of plant sap, accelerates the growth of roots, gives vitality to plant cells, increases lateral branching and reduces flower fall.

Due to the low production of *Tagetes erecta* plant for flowers, the study aimed to use leafy nutrients to increase the plant's production of flowers.

MATERIALS AND METHODS:

This study was conducted in the Basra city during the growing season 2020-2021 in one of the private nurseries in al-Khora area of Basra governorate to study the effect of spraying the extract Roselle and the nourishing solution Magic Grow Tonic in the growth and flowering of the *Tagetes erecta* plant in a trial that included 16 treatment which is the compatibility between four levels of the extract of the Roselle (0.3, 5.7 g. L^{-1}) and Magic Grow Tonic with four levels also (0, 3, 5.7 ml. L^{-1}) and its interference with three replications. attended the concentrations of the extract of the gypsies according to the method[7] by taking 50 g of powder of casserole leaves for the cougars and melted in 500 ml distilled water and put in a laboratory shakers for half an hour and left another half hour to settle after filtering with gauze to remove plankton and put in the centrifugal (3000 cycle. minutes) for (15 minutes) after taking the spray and

focused using the rotary evaporator and taking weight from it (3, 5, 7 g) and melt in a liter of distilled water to prepare the required concentrations. also attended the required stacks of magic grow tonic, a product that contains sodium Ortho- nitrophenolate 0.6%, Sodium para- nitrophenolate 0.9% and Sodium 5- nitrophenolate 0.3% which is produced by Al-Abed Chemical Fertilizer company in The Hashemite Kingdom of Jordan.

The spraying process was carried out in the early morning three times (with a two-week interval), The seeds were sown at 1/11/2020 in pots (25cm diameter and (30cm) height with sandy loam soil. compared transactions by the test of the least moral difference (R. C. B. D) Randomized Complete Block Design[1].

Table (1) some physical and chemical properties of the soil

Greene %	Clay %	Sand %	Organic matter %	K (Mg.kg)	P (Mg.kg)	N (Mg.kg)	Ph Soil	Degree of electrical conductivity	Qualities
9.33	80.90	9.77	0.10	5.93	0.17	0.32	7.1	6.20	

Examined traits:

1- **Plant height (cm):** the height was measured with a metric ruler from the surface of the soil till top of the plant, and then the plant height rate was deducted for each treatment.

2- **Number of leaves (leaves. plant^{-1}):** leaves were counted in the main stem of the plant after harvest then the rate was calculated.

3- **The number of branches (branch. plant^{-1}):** The number of branches of the plant was calculated according to the rate.

4- **Stem diameter (mm):** stem diameter was measured by Vernier Caliper then the rate was calculated.

5- **leaves' dry matter (%):** a specific weight of chopped leaves was placed in an electric oven at 70 for 72 hours till dry weight reached stabilized, leaves dry matter percent was calculated according to the following equation:

$$\text{Dry matter (\%)} = \frac{\text{leaves dry weight}}{\text{Leaves fresh weight}} \times 100$$

6- **The number of flowers (flower. plant^{-1}):** The number of flowers was calculated according to the rate.

7- **The length of the flower stand (cm):** measure the length of the pink holder using the Vernier caliper.

8- **The diameter of the flower (cm):** measured using the Vernier caliper.

9- **flower dry matter (%):** a specific weight of chopped flowers was placed in an electric oven on 70^{o} for 72 hours till dry weight reached stabilized, percentage of dry matter in leaves has been calculated according to the following equation:

$$\% \text{ of the dry matter} = \frac{\text{Weight of dry sample}}{\text{Weight of the moist sample}} \times 100$$

10- **Dry weight of the vegetative system (g):** The dry weight of the vegetative total was measured in the delicate balance after drying at 70 and for 72 hours.

RESULTS AND DISCUSSION:

Results in table 2, 3 revealed that sprayingRoselleextractat5gl^{-1}+7mlL^{-1}magic grow tonic gave the highest values in plant hight (30.87cm) leaves number (16.44 leaf.$plant^{-1}$), flower number (11.95 flower. $Plant^{-1}$), flower diameter (5.86 cm) compared with untreated control which gave the lowest average height plant (21.70 cm) leaves number (9.95 leaf. $plant^{-1}$)، flower number (4.9 flower. $Plant^{-1}$) , flower diameter (3.91 cm), but regarding the stem diameter surpassed as sprayed 5g.L^{-1} Roselle extract + 5ml.L^{-1} Magic Grow Tonic (7.88 mm) compared With the lowest stem diameter Compared with untreated control (4.75 mm).

As for the percentage of dry matter content in leaves, flowers and The length of the flower stand the combination of 3gm.L^{-1} Roselle extract and 7ml.L^{-1} Magic Grow Tonic has been exceeding respectively as (17.48%) and (18.43%) and(3.51cm) compared to Compared to untreated control which gave the lowest percentage of dry matter in leaves flowers and The length of the flower stand, as recorded respectively flower (9.7%), (6.29 %) and (1.12cm). as for the dry matter weight for plants control treatment of spraying of (7.5ml.L^{-1})Magic Grow Tonic has exceeded by (58.72gm), compared to the least dry weight of the plant treatment by control (37.32g).

The superiority of the treatment of spraying with Roselle extract may be due to its containment of ascorbic acid and di-phenols that act as antioxidants in addition to its containment of nitrogen, phosphorous and potassium elements as potassium is an enzymatic activator as well as magnesium that is important in the ribosomes in which the protein is synthesize and is the heart of the chlorophyll molecule[4] in addition to encouraging the processes of photosynthesis and respiration, regulating plant hormone activity and cell promoting division[8].

The superiority of the Magic Grow Tonic nutrient solution can also be explained by the fact that it contains sodium, which increases the flow of plant sap, stimulates leaf growth cell division and elongation, thus increasing the leaf area and the efficiency of photosynthesis that stimulate the

characteristics of vegetative and Floral growth[4, 6]. It is evident from the above that plant extracts such as Roselle extract and Magic Grow Tonic nutrient solution can be used to improve the vegetative and floral growth characteristics compared With untreated control.

Table (2) effects of spray application of Roselle extractions and balanced solution Magic Grow Tonic on the vegetative growth of *Tagetes erecta*

dry matter in leaf (%)	number of branches (branches. Plant^{-1})	Stem diameter (mm)	leaves number (leaf. plant^{-1})	Height plants (cm)	Treatment / Comparison Treatment	
	Roselle extract (g. L^{-1})					
11.26	1.45	4.75	10.81	22.71	0	
14.00	1.80	6.00	12.77	24.62	3	
12, 91	1.95	6.71	13.57	26.53	5	
13.04	1.77	7.00	14.07	23.12	7	
	Magic Grow Tonic (ml. L^{-1})					
11.50	1.41	6.58	12.54	23.66	0	
12.23	1.83	6.85	11.91	23.75	3	
12.61	2.08	6.75	12.41	23.66	5	
14.78	2.00	6.91	14.41	25.91	7	
	Interaction Roselle extract (g. L^{-1}) and Magic Grow Tonic (ml. L^{-1})					
9.07b	1.71	5.83	9.95b	21.46 b	0	0
9.76	1.75	6.85	10.28	24.13	3	
12.08	1.05	6.88	11.87	21.70	5	
14.12	1.73	7.53	11.62	23.80	7	
11.03	1.63	7.41	12.85	25.04	0	3
14.21	2.30	6.78	11.19	24.40	3	
13.26	1.30	5.08	12.19	23.37	5	
17.48a	1.96	6.75	14.85	26.60	7	
12.83	1.00	6.21	11.61	23.44	0	5
12.30	1.62	7.43	14.11	23.78	3	
11.23	2.95	7.88a	12.11	28.15	5	
15.28	2.29	5.50	16.44a	30.87a	7	
13.06	1.35	6.83	14.02	22.37	0	7
13.05	1.68	7.16	12.70	23.06	3	
13.83	2.02	7.18	15.40	21.74	5	
12.23	2.00	7.83	14.74	25.37	7	
4.69	5.19	1.47	5.19	4.02	P < (0.05) L.S.D	

Table (3) effects of spray application of Roselle extractions and balanced solution Magic Grow Tonic on the flower growth of *Tagetes erecta*

dray Wight for plant (g)	dry matter in flower (%)	flower diameter (cm)	stem of flowers (cm)	flower number (flower . plant^{-1})	Treatment / Comparison Treatment	
	Roselle extract (g. L^{-1})					
37.32b	6.29b	4.77	2.80	8.52	0	
49.09	11.84	4.37	2.89	6.89	3	
53.52	12.91	4.95	2.99	6.95	5	
43.21	12.12	5.58	2.90	8.95	7	
	Magic Grow Tonic(ml. L^{-1})					
37.32b	10.69	4.62	2.62	7.08	0	
49.08	10.79	4.37	2.83	7.91	3	
52.00	11.08	5.01	2.65	8.33	5	
51.52	15.83	5.68	3.17	8.00	7	
	Interaction Roselle extract (g. L^{-1}) and Magic Grow Tonic(ml. L^{-1})					
42.07	11.33	3.91b	1.12b	4.9 b	0	0
58.40	14.18	4.25	2.82	8.10	3	
57.41	12.64	4.82	3.02	9.10	5	
58.72a	13.37	5.42	3.12	9.77	7	
41.34	9.37	4.00	2.86	6.22	0	3
51.67	11.62	4.20	2.69	7.20	3	
48.43	10.05	4.63	2.59	6.56	5	
55.01	18.43a	5.55	3.51a	7.55	7	
50.86	9.67	4.59	2.59	6.04	0	5
54.19	8.77	4.41	2.65	6.70	3	
53.86	14.43	5.58	2.69	7.70	5	
55.19	15.29	5.86a	3.09	11.95a	7	
41.71	9.75	5.48	2.91	8.95	0	7
42.38	17.30	5.32	4.19	9.62	3	
51.31	11.52	5.65	2.28	7.37	5	
54.15	14.04	5.91	3.28	7.23	7	
18.58	12.03	2.19	2.19	4.90	P < (0.05) L.S.D	

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