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Effect of plants extract in vegetative and flowering growth, aromatic and volatile oil extracted from *Narcissus daffodil L* 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 1/6/2019 . In order to study the effect of four types of plant extracts Licorice , orange peel , pomegranate peel , banana peel powder at (5 g , 10 g) per plant In the vegetative and flowering growth and the essential oil extract of *Narcissus daffodil L* . All extracts were added monthly to the soil compared with comparison treatment (without extract) . It was observed that high levels of banana peel powder at 10 g. plant⁻¹ was significantly higher rate in all vegetative and floral characteristics of the plant, plant height , leaf number, leaf length, percentage of chlorophyll and the number & length of flowers were reached 40.17 cm, 9.50 leaves plant⁻¹ , 24.90 cm , 70.53 spad, 4.18 cm, 36.37 cm respectively. In aromatic of oil characteristics , the same treatment (10 g. plant⁻¹ of banana peel powder) gave the best results in the percentage of oil, quantity and qualitative weight of oil was 3.880%, 37.12 g .kg-1 and 0.836 respectively, while the oil Intensity was 0.827.

1-Introduction

Narcissus bulbs related to the Amaryllidaceae family, the native home of the narcissus was Central Asia and the Mediterranean, and is widely distributed in Iraq. *Narcissus tazeta L.* grows in the northern regions of Iraq [1] . It is considered one of the most beautiful medicinal and aromatic plants. It produces aromatic oils on a commercial scale , which is used in the manufacture of perfume, cosmetics and for purposes Medical. A number of chemical compounds were isolated, including Cinnamyle Alcohol: Eugenol: Benzaldehyde and Benzoic acid [2]. It was found to have an effect against some cancers due to contains the enzyme Benzaldehyde , which is transformed in human body tissues into Laetrile-Like, which is known to reduce the growth of cancer cells [3] . The plant of Narcissus reaches a height more than 50 cm and appears long before flowering. The leaves are thick and striped. The length is shorter than the length of the syphilis and white flowers in the center. A yellow crown in the shape of a cup in the wild species, [4] . The bulb is either pearly or oval shaped , containing thick brown leaves in which food is stored and the bases of leaves are sheath. The shoots are located in the follicles, which develop into follicles. After growth and attainment , the final size is known as the bulb . [5] . In the study of [6] for the effect of garlic extract and ginger seeds in the growth and yield of Chickpeas plant, the results showed that garlic extract and ginger seeds increased in many characteristics: plant height , chlorophyll content, relative growth rate, absolute growth rate, seed yield, mean weight of seed, yield, percentage of carbohydrates and protein in seeds with the



increase in the percentage of treatment with garlic and ginger extracts by 96% and 45%, respectively, the yield increased by (45, 20, 52 and 42%) , respectively, and the percentage of protein in seeds was 174% and 70% . [7] reported that the best percentage of essential oil at the third date at diameter of the bulb at 16 cm was 3.876 % and the highest quantity of oil at 14 cm for the same time was 39.22 g. kg⁻¹. The best density and qualitative weight of the essential oil was 14 cm and 0.749 For the first date while the Qualitative weight of oil was 0.869. In the study of [8] to determine the effect of spraying with garlic extract and licorice roots and urea in the characteristics of syphilis and cucumber growth spraying process was repeated twice (first time at the beginning of the flowering and the second after two weeks and at the interval of 3 days between the material) , the results showed that spraying with extracts improved the characteristics of syphilis And the total value, gave the concentration of garlic extract 2.5 cm above a total of 29.94 tons ha⁻¹. With an increase of 9.87 for the spring season and 24.73 tons ha⁻¹ with an increase of 12.12 for the spring and autumn season. Therefore, the aim of this study was find natural alternatives to fertilization instead of conventional fertilizers by utilizing plant residues.

2-Methods and materials

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 1/6/2019 to study the effect of four types of plant extracts (Licorice powder, orange peel powder, pomegranate peel powder and banana peel powder) in vegetative, flowering , and the essential oil of *Narcissus* plant (*Narcissus daffodil* L) in this study *semper Avanti* cultivar imported from Dutch origin. Level were used (5, 10) g as a powder for all extracts, which added monthly to the soil in powder form compared with the comparison treatment (without extract). Bulbs were Planted in plastic pots 20 cm in diameter and 12 cm deep after processing in an agricultural center consisting of mixed soil and decomposed animal manure (1: 1: 1). After flowering, all vegetative and floral measurements were calculated. Oil measurements were taken after extracting oil from wet flower petals when blooming After collection of flowers directly from plants early. The way of [9] was followed by using the organic solvent, ethyl and boiling 40-60. After obtaining the oil, it was transferred to dark glass bottles with a sealed lid and then stored at 4 C° until some physical measurements of oil were measured [10 ; 11].

Experiments were designed in Randomized Completely Block Design (R.C.B.D) with three replicates. Vegetative growth characteristic (Percentage of emergence (%), Plant height (cm), Number and length of leaves and flowering characteristics : total chlorophyll content in leave, Number of flowers: and Length of flower holder (cm) and essential oil and volatile characteristic (The percentage of volatile oil and quantity of essential oil and the volatile (g. kg⁻¹) , The qualitative weight of oil volatile, Intensity of essential oil and volatile were recorded, Data was analyzed using randomized complete block design with three replicates and 5 bulbs for each repeater,,and the mean of the Dunkin Multipliers was measured at a 5% probability level . means were compared using Duncan's test at a probability level of 5% [12].

3-Results and Discussion

3.1.Characteristics of vegetative growth

3.1.1. The Percentage of emergence (%)

The percentage of emergence was calculated as shown in Table (1) the first date after 45 days of planting and the second date after 50 days of planting for the *Narcissus* variety *Semper Avanti*, which showed that the percentage of emergence after 45 days was 85.65 % After 50 days of planting 100%, the cultivar was started after 25 days of planting.

Table 1. Shows the percentage of emergence (%) of the Narcissus plant *Semper Avanti* cultivars.

After 60 days	After 45 days	Narcissus <i>Sempre Avanti</i>
% 100	% 85.65	

3-1-2 Plant height: -

It appears from the results of Table (2) that the addition of banana peel powder at a concentration of 10 g plant⁻¹ resulted in the highest plant height reaching (40.17) cm, which differed significantly from the comparison plants (25.21) This increase in plant height by plant extract may be related to involvement the extract with GA₃ during the process of photosynthesis of the intermediate compound Mevalonic acid and as a form of turbine compounds and it may have been the behavior of GA₃ in the effect of increased vegetative Cell division and plant height [11].

3.1.3 Number of leaves: -

It is clear from the results in Table (2) that the addition of banana peel powder at 10 gave highest value in the number of leaves (9.50) leaf plant⁻¹ which differed significantly from comparison treatment and other extracts.

The increase in the number of leaves can be explained by the fact that the banana peel extract contains the main nutrients such as nitrogen, phosphorus, potassium and calcium, which stimulate plant growth and development through its effect on the physiological processes such as photosynthesis and thus positively affect on the characteristics of vegetative growth [13]. Also may be due to the effect of the zinc element in the process of photosynthesis, respiration and energy production as well as the entry of this element into the synthesis of nucleic acids which was considered necessary for the cell division process and promotes the formation of leaf buds [14 ; 15].

3.1.4 Length of the leaf cm:

By looking at the data in Table (2) The effect of banana peel powder is also shown in increase in the length of the leaf of the narcissus plant at concentration 10 g plant⁻¹ reached 24.90cm which not significant differ with the same plant extract at 5 g. plant⁻¹ (20.44 cm) while differed with other treatments. In general, the effect of the extract is attributed to the effect of nitrogen in increasing the rate of leaf length and its role in plant growth which affecting the increase in the number and size of leaf cells and increasing chlorophyll, thus increasing the effectiveness of leaves in photosynthesis, which is reflected in vegetative growth [16] . Another reason of increasing the rate of leaf length may be related to the role of potassium and phosphorus in controlling enzyme and photosynthesis products in protein and carbohydrate formation, which has been shown to increase the rate of leaf length in cell activation and division [17].

Table 2. Effect of different treatments of plant extracts on vegetative growth characteristic of Narcissus plant *Semper Avanti* cultivars.

Treatment	Plant height cm	number of leaves	length of the leaf cm
Comparison treatment	25.21 d	7.00 c	10.53 c
5 g pomegranate peel powder	27.01 cd	8.00 bc	12.67 c
10 g pomegranate peel powder	30.78 bc	8.33 b	15.60 bc
5 g orange peel powder	30.49 bc	7.66 bc	14.53 c
10 g orange peel powder	32.22 b	8.03 bc	15.81 c
5 g banana peel powder	37.54 a	8.44 b	20.44 ab
10 g banana peel powder	40.17 a	9.50 a	24.90 a
5 g licorice peel powder	26.67 cd	7.66 bc	11.37 c
10 g licorice peel powder	32.65 b	8.00 bc	17.97 bc

Means followed by the same letters are not significantly different ($P < 0.05$) according to Duncan's test

3.1.5 Chlorophyll: -

The data in Table (3) indicate that the levels of the extracts have significantly affected on their chlorophyll content. The use of the high level of banana peel powder at a concentration of has increased the content of the chlorophyll dye in the leaves which ranged from Maximum value (70.53) to Minimum value (45.06) which were in comparison treatment. The reason for increasing chlorophyll in the leaves could be explained to the role of the element of nitrogen in the structure of porphyrin, which is involved in the construction of chlorophyll. These results have been agreed with [16 ; 18]. Is the effect of phosphorus in the formation of a good radical total and thus increase absorption of nutrients, which may be accompanied by increased production of chlorophyll and thus increase the concentration of this pigment in the plant.

3.2. Characteristics of flowering growth

3.2.1 Number of flowers

Table 3. Effect of different treatments of plant extracts on growth characteristic of Narcissus plant *Semper Avanti* cultivars.

Treatment	% chlorophyll	Number of flowers	Length of flower holder (cm)
Comparison treatment	45.06 b	1.44 d	22.30 d
5 g pomegranate peel powder	52.66 ab	2.66 c	23.01 cd
10 g pomegranate peel powder	55.66 ab	2.00 c	26.87 bc
5 g orange peel powder	51.86 ab	2.18 c	27.57 bc
10 g orange peel powder	54.70 ab	2.66 c	29.31 b
5 g banana peel powder	61.42 ab	4.14 a	33.66 a
10 g banana peel powder	70.53 a	4.18 a	36.37 a
5 g licorice peel powder	50.73 b	2.99 bc	22.67 cd
10 g licorice peel powder	55.00 ab	3.54 b	29.73 b

Means followed by the same letters are not significantly different ($P < 0.05$) according to Duncan's test The statistical analysis of table 3 data showed that the increase in number of flowers was due to Treatment with banana peel powder at a concentration of 10 g plant⁻¹. The number of flowers was 4.18 compared to 1.44 g for the comparison treatment. This can be attributed to the extracted content of

Nitrogen and Phosphorus Potassium and their important role in the biological processes within the plant cells and the formation of proteins and increase the efficiency of photosynthesis by increasing the rate of leave length and that the presence of potassium has a significant role in increasing the number of flowers [19].

3.2.2 Length of the flower holder : -

In relation to the length of the flower holder , we note from Table (3) that the treatment with 10 g. plant⁻¹ extract of banana peel powder significantly exceeded the rest of the coefficients and recorded (36.37 cm) and also exceeded the comparison treatment , which recorded the lowest values of (22.30) cm This result corresponds to the results of what they found [18 , 20]. This can be attributed to the role of the extract of nitrogen and phosphorus in stimulating the production of oxin and increase the activity of GA₃ in the plant tissues, which encourages the process of cell division and elongation of the cells and their expansion and increase in size [21].

3.3. Essential oil measurements.

3.3.1 Percentage of essential volatile oil

Table (4) shows a significant increase in the percentage of essential volatile oil, where the highest ratio was 10 g. plant⁻¹ of banana peel extract, which was 3.880 compared with the other used extracts, which exceeded the treatment of 0.168 , The reason may be due to the increase of the total flower yield / plant and the content of the extract on which contain potassium, which in turn led to increased oily glandulae growing in flower petals, leading to increase the proportion of oil. [22] noted that temperate temperatures in the spring and autumn keep the plant high in oil and this confirms the importance of the date of planting and flowering because of their effect on the percentage of volatile oil, which is also consistent with [23].

3.3.2 Quantity of essential volatile oil (g. kg⁻¹)

As shown in Table (4) , there was a significant increase in the amount of essential volatile oil, where the highest ratio was 10 g. plant⁻¹ of banana peel powder as it reached 37.12 g .kg⁻¹ compared with the rest of the extracts which exceeded the comparison treatment of 12.06 g kg⁻¹. This may be attributed to the appropriate weather conditions, especially planting in the laths house , which had an effect on the increase of photosynthesis, which had a positive effect "in increasing the volume of vegetative and thus increase the processed carbs and then increase the total oil or the reason may be appropriate Weather conditions had a "positive" impact on the plant growth and most of the turbine materials consist high as a result of higher metabolic rate during the day "reflected" on the product first and secondary oil and thus led to the increase in the total amount of oil [24 ; 25].

Table 4. Effect of different treatments of plant extracts in percentage of essential volatile oil . quantity of essential volatile oil (g. kg⁻¹) of of Narcissus plant *Semper Avanti* cultivars.

Treatment	percentage of essential volatile oil	Quantity of essential volatile oil (g. kg ⁻¹)
Comparison treatment	0.168 c	12.06 d
5 g pomegranate peel powder	0.246 c	20.58 b
10 g pomegranate peel powder	0.225 c	19.05 c
5 g orange peel powder	0.202 c	9.34 d
10 g orange peel powder	1.408 b	19.46 c
5 g banana peel powder	1.905 b	23.69 b
10 g banana peel powder	3.840 a	37.12 a
5 g licorice peel powder	1.420 b	23.86 b
10 g licorice peel powder	1.124 bc	22.60 b

Means followed by the same letters are not significantly different ($P < 0.05$) according to Duncan's test

3.3.3 Qualitative weight of essential Volatile oil:

The results of the statistical analysis of Table (5) showed that the highest Qualitative weight of volatile oil was at 10 g. plant⁻¹ of banana peel powder at 0.836 and a significant difference from the rest of the other extracts used and the comparison treatment of 0.492. Temperatures in the spring may increase the accumulation of oxygen solids in oil and thus increase its Qualitative weight [11].

3.3.4 Intensity of essential Volatile oil:

It is noted from Table (5) that treatment with 10 g. plant⁻¹ of banana peel powder gave the highest value of the volatile essential oil density at 0.827 and significant differences with the rest of the other extracts used in the study and the comparison treatment of 0.549. On the plants of germanium, where he explained that the reason for this is due to the accumulation of the components of oil is slow evaporation and the survival of oxygen compounds high, which led to an increase in the density of essential oil volatile.

Table 5. Effect of different treatments of plant extracts on the qualitative weight of volatile oil, Intensity of essential volatile oil of of Narcissus plant *Semper Avanti* cultivars..

Treatment	volatile Qualitative weight of oil	Intensity of essential volatile oil
Comparison treatment	0.492 d	0.549 d
5 g pomegranate peel powder	0.577 c	0.623 cd
10 g pomegranate peel powder	0.750 b	0.811ab
5 g orange peel powder	0.757 b	0.782 b
10 g orange peel powder	0.719 bc	0.748 b
5 g banana peel powder	0.671 c	0.716 b
10 g banana peel powder	0.836 a	0.827 ab
5 g licorice peel powder	0.758 b	0.782 b
10 g licorice peel powder	0.790 ab	0.656 c

Means followed by the same letters are not significantly different ($P < 0.05$) according to Duncan's test.

4. Conclusions

The present assessment obviously indicated that high levels of banana peel powder at 10 g. plant⁻¹ was significantly affect rate in all vegetative and floral characteristics of the plant.

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