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Effect of Concentrations of Growth Regulator Thidiazuron 2,4-D and Various Interventions on Induction and Growth of Callus from Leaves of *Catharanthus roseus (L.) G.Don.*

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Abstract

In this study, the results show the effect of the concentrations of the growth regulators Thidiazuron (TDZ) and 2,4-D on the percentage of callus induction from parts of the leaf of the Ayna plant. The statistical analysis showed that there are significant differences between the concentrations of the two growth regulators and their interactions to induce callus. The concentration of 3 mg.L-¹ of 2,4-D was the best rate of callus induction, while the concentration of 1.5 mg.L-¹ of TDZ excelled with an induction rate of up to 100%. While the comparison sample did not give any callus induction.

Keywords: Soil; *Phytophthora*; Community structure; Perth; Thidiazuron

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1. Introduction

The production of secondary compounds by plant cells and tissues has become an active field of study due to its potential as a source of valuable pharmaceutical compounds due to its distinct physicochemical properties [1]. The secondary compound is known to be two organic molecules with heavy weights, and does not mainly participate in low natural growth in large quantities, and the absence of this compound does not lead to immediate death, but rather leads to a great result of survival, and the contribution is made to the defense of the plant [2-4]. Alkaloids are known to be uniquely basic with a ring structure containing carbon, hydrogen, and oxygen atoms in addition to a nitrogen atom, where alkaloids are the final products of primary metabolism and are produced in print in [5]. As a result of bazon plants, there are many pharmaceutically important alkaloids, including bisindole alkaloids, vinblastine, vinblastine, and vincine. Vincristine and several tumor complexes, and the mono-indole alkaloids agmalicin and serpentine, which are among the many antihypertensive drugs [6]. This study conducted to examination the effect of concentrations of the growth regulator Thidiazuron (TDZ) and 2,4-D and various interventions on the induction and growth of callus from the leaves of Catharanthus roseus (L.) G.Don (see Fig. 1).

Fig. (1) Plant of *Catharanthus roseus*

2. Materials and Methods

The study experiments are being conducted in the graduate studies laboratory in the Department of Biological Sciences, College of Education, Al-Iraqia University and various university laboratories for a

period from October 2022 until May 2023 to study the effectiveness of plant growth regulators and biostimulants in inducing the callus of *Catharanthus roseus* (L.) G. Don and Tauli The secondary mission because it came through the following: Collecting Ain al-Bazun seedlings from nurseries and straining them. Cultivation of selected vegetative parts from the leaves of Ain al-Ain plant on Murashige and Skoog MS medium [7,8] possessing different concentrations of 2,4-D auxin and interacting with succinin TDZ to induce callus. Re-cultivation of the induced callus from above to above in MS medium of the preparation of biosynthesis of regulators with different concentrations of biostimulants (marine moss extract and extract), and the callus and distinct compounds can be represented in it.

Fig. (2) TDZ growth regulator used in this study

3. Preparation of the Nutrient Medium and its values

Ready-made powder for nutrient medium MS [7] is used with ready-made powder from HI Media Ltd to direct callus induction from the sweet spots on it. It weighs 4.9 grams of ready-to-use powder. Sucrose (30 gm/L) was added to it as a source of energy and carbon, and the ingredients were mixed well on a hot plate magnetic stirrer to dissolve them without heat. Then the growth regulators 2,4-D and TDZ were added in the required concentrations and the volume was completed to a liter with distilled water, and the function was set. The pH of the medium is reduced to (5.7±1.0) with a solution of hydrochloric acid (HCl) or a solution of sodium hydroxide (NaOH) (1.0). My caliber). Then add the agar (Agar-Agar) 7 gm L-1 to the urban areas better on the magnetic feeder and heat to the boiling point to dissolve the agar and prepare the nutrient medium and then pour the medium directly into the culture tubes with a metal cap (glass screw-top bottles) at a rate of 10 ml for each tube. It was sealed with a special Autoclave back cover with a resistance of 121 °C and a pressure of 1.5 kg/cm^2 for 20 minutes, then the tubes were sealed without affecting the sterile nutrient medium and left to cool the solid medium at room temperature until used in the spring of autumn.

4. Results and Discussion

The effect of concentrations of the growth regulator TDZ and 2,4-D and various interventions on the induction and growth of callus from *Catharanthus roseus* (L.) G. don leaves after five weeks of cultivation in MS medium.

The results of table (1) show the effect of the concentrations of the growth regulator TDZ and 2,4-D on the rate of callus induction from the leaf of the Ayna plant. The statistical analysis showed that there were significant differences between the concentrations of the growth regulator and their interactions for callus induction. The concentration of 3 mg.L^{-1} of 2,4-D was the best in inducing callus, while it was strongly superior to 1.5 mg.L^{-1} of TDZ with a rate of furniture discoloration that reached 100%.

The results of table (2) showed that there were significant differences assigned to the 2,4-D growth systems, where a non-significant increase was obtained in the average fresh weight of lime, where 4 mg.L^{-1} was chosen, the highest rate amounting to 434 mg, followed by 1 mg. .L^{-1} gave a growth rate of 429 mg, while only 3 mg.L^{-1} gave the lowest growth rate of 291 mg.

Table (1) The regulating effect of the growth rate of TDZ and 2,4-D and their relative interaction in the rate of callus induction from the leaves of the Ain al-Azun plant after five weeks of cultivation on MS medium

(mg.L^{-1}) TDZ						D-2,4-D
average 2,4-D	2	1.5	1.0	0.5	0	(mg.L^{-1})
76.0	90.0	100.0	100.0	90.0	0	**0**
92.0	90.0	100.0	90.0	90.0	90.0	**1**
96.0	100.0	100.0	100.0	100.0	80.0	**2**
98.0	100.0	100.0	100.0	100.0	90.0	**3**
92.0	100.0	100.0	100.0	100.0	70.0	**4**
	94.0	100.0	98.0	96.0	66.0	**average TDZ**
TDZ*2,4-D=19.40		**TDZ= 8.67**		**2,4-D=8.67**		**. L.S.D. (0.05)**

As for the growth effect of TDZ, we note from the results of the same table that there are higher significant differences, as 1 mg.L^{-1} was given a growth rate regulator of 500 mg, then it was followed, with a distinct significant difference, by 2 mg.L^{-1}, giving it a rate of 419 mg, while The minimum number is 0. The minimum possible number is 166 mg.

What is important is that the bilateral interaction between the growth regulator 2,4-D and TDZ achieved significant differences in the growth rate, as

D2T2 gave the highest rate of 739, while D0T0 immediately accelerated the lowest rate of 0.00.

Table (2) The effect of concentrations of the growth regulator TDZ, 2,4-D, and interventions in soft industries (mg) on lime induced by the leaves of the Ain al-Azun plant after five weeks of cultivation in the medium

Average 2,4-D	TDZ					2,4-D
	2	1.5	1	0.5	0	
306	562	251	446	273	0.00	**0**
429	477	388	514	443	322	**1**
398	437	298	739	356	259	**2**
291	339	277	300	335	207	**3**
434	280	603	502	643	143	**4**
	419	363	500	410	166	**average TDZ**
D*T= 188			T= 84	D= 84		**LSD** $_{0.05}$

5. Conclusion

The results show the effect of the concentrations of the growth regulators TDZ and 2,4-D on the percentage of callus induction from parts of the leaf of the Ayna plant. The statistical analysis showed that there are significant differences between the concentrations of the two growth regulators and their interactions to induce callus. The concentration of 3 mg.L-¹ of 2,4-D was the best rate of callus induction, while the concentration of 1.5 mg.L-¹ of TDZ excelled with an induction rate of up to 100%. While the comparison sample did not give any callus induction.

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