

Effect of Some Chemicals on Growth of Madagascar periwinkle Plant (*Catharanthus roseus* L.) and Production of Indolic Alkaloids *In Vivo* and *In Vitro*

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Several field and laboratory experiments was conducted in Horticulture and Landscape department, Faculty of agriculture ,Diyala University to study impacts of some treatments on, callus induction and production of Indolic alkaloids in Madagascar periwinkle whole plant and callus. Results showed as followed.

Tissue Culture experiments :

Three Experiments in laboratories of plant tissue culture were carried out aiming increase production of alkaloids, Seeds were germinated after disinfect by NaOCl at 4.5% for 20 min and cultured on half strength Murashige and Skoog (1962) (MS) medium. callus derived from shoot cultured on MS medium supplemented with 0.5 mg. l⁻¹ Kin and 2.0 mg. l⁻¹ NAA .The impact of MS supplemented with sucrose at 30, 40, 60, 80 g. l⁻¹ concentrations and Phenylalanine acid at 0, 5, 10, 20, 30, 45 mg. l⁻¹ concentrations and ABA at 0, 2, 4 mg. l⁻¹ alkaloids production. The results can be summarized as follows;

The results showed When the media supplemented with 80 g. l⁻¹ sucrose increased Vindoline , Catharanthine and Vincristine amounted 220.33, 269.6 and 147.12 µg. mg⁻¹ fresh weight of callus respectively, while, 60 g.l⁻¹ gave higher quantity of Vinblastine about 169.28 µg. mg⁻¹ fresh weight of callus. Also, added the ABA did not effect of the studied alkaloids production .

Get the highest amount of a compound Vindoline amounte in its value 213.0 µg. mg⁻¹ fresh weight of callus when add 20 mg. l⁻¹ Phenylalanine , and adding 10 mg. l⁻¹ Phenylalanine gave higher of Catharanthine , Vincristine and Vinblastine amounted 319.5 , 159.27, 646.0 µg. mg⁻¹ fresh weight of callus respectively.

Field experiments

This experiment was conducted to study the effects to foliar spray with Phenylalanine at 0,100 or 200 mg.l⁻¹ concentrations and ABA at 0,5 or 10 mg.l⁻¹ and Carbo lizer at 0 , 2.5 or 3.5 ml.l⁻¹ on vegetative growth parameters and alkaloids contents. of Heatwave Mix and Pacifica Mix , Heatwave Mix was superior compared with Pacifica Mix in leave number, root fresh weight which gave 82.332 leaf.plant⁻¹ and 3.149 g .respectively.

Also, Foliar application with Phenylalanine at 100 mg.l⁻¹ increased plant height and root fresh weight while, spraying with 200 mg.l⁻¹ , increased flowers dry weight, flower dry matter percentage, dry weight of root and vegetative. Whereas, the Carbo lizer spraying at of 2.5 ml. l⁻¹ , increased the number of leaves and leaves area, however spray 3.5 ml. l⁻¹ , increased total chlorophyll, dry weight of flowers, fresh weight of roots and vegetative parts, total dry matter of vegetative and dry matter of root, the results showed that spraying with 10 mg.l⁻¹ ABA increased carbohydrate by 42.213% as a compared with Control.

The interaction between all studied treatments gave similar results to the studied factors alone in recipes vegetative growth, plant height ,dry weight of flowers, dry matter of

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flowers, vegetative dry weight, fresh of root ,dry weight of root , chlorophyll content of leaves ,fresh weight to flowers, leaves area and number of branches , while the concentration 200 mg. l⁻¹ Phenylalanine with the Heatwave Mix cultivar there were increased in the number of leaves and the dry weight percentage for vegetative growth , which differed from the results of the treatment with the concentration of 2.5 and 3.5 ml. l⁻¹ Carbo lizer respectively.

Indolic Alkaloids Estimation from Field Growing Plants :

The type Pacifica Heatwave showed superiority on the type Heatwave Mix in vindoline and catharanthine, vincristine and vinblastine production. Results also showed that the amount of alkaloids extracted from the leaves was higher than other plant materials.

Spraying plants with Carbo lizer with concentration of 2.5 ml. l⁻¹ gave highest contents for Vindoline and Catharanthine amounted 251.35, to 528.2 µg. mg⁻¹ dry weight . respectively ,while spraying with Carbo lizer concentration of 3.5 ml. l⁻¹ gave the highest quantity of Vincristine and Vinblastine amounted 162.34 ,734.229 µg. mg⁻¹ . dry weight. respectively. Spraying with 10 mg. l⁻¹ ABA gave the highest composite value for Vindoline amounted 89.18 µg. mg⁻¹ . dry weight. Also, Vinblastine , Vincristine and Catharanthine was higher when spraying plants with concentration 5 mg. l⁻¹ ABA amounted which gave 148.47, 99.78, 417.0 µg. mg⁻¹ . dry weight. respectively

Spraying the plants with a concentration 100 mg. l⁻¹ Phenylalanine increased the amount of Vindoline and Vinblastine amounted 58.78 and 464.5 µg. mg⁻¹ . dry weight .respectively, while spraying with concentration of 200 mg. l⁻¹ gave the highest quantity of Catharanthine and Vincristine reached 172.9, 37.50 µg. mg⁻¹ . dry weight .respectively .