Plant Archives Volume 20 No. 2, 2020 pp. 6966-6968 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

IN VITRO MULTIPLICATION OF *CITRUS LEMON* L WITH DIFFERENT 6-BENZYLAMINOPURINE (BA) CONCENTRATIONS

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Abstract

This Research carried out in the plant tissue culture laboratory of the Department of Horticulture and Landscape design - College of Agriculture - University of Kirkuk - IRAQ on explant taken from *Citrus lemon* L. Var. local trees during 2020 for micro propagation which cultured on MS media with different concentrations of BA and the results indicated that the highest number of branches was 5 branches/explant in the MS media supplied with 0.75 mg/L BA after 4 weeks of cultivation and 5.8 branches/explant of the same BA concentration after 8 weeks of cultivation, with highest length (5.1 cm) and branches number (5.3 branches/explant) in control after 4 weeks. And then it was done at 8 weeks (5.7cm) and (6 branches/explant) for the same treatment.

Key words: *Citrus lemon,* 6-Benzylaminopurine (BA)

Introduction

Citrus fruits are an evergreen fruit tree belonging to the Rutaceae family, which includes a number of genera Citrus, Poncirus and Fortunella and species belonging to the genus Citrus are widespread throughout the world because of their adaptation to a wide range of environmental conditions and citrus cultivation is spread in areas under Tropical (arid) and subtropical regions and equatorial regions between latitude of 40° north and 40° south(AL-Taey *et al.,* 2010; Carota *et al.,* 2020)

The Citrus race includes four groups: the orange group, the mandarin group, the lemon group and the acid group. Each group includes a number of species that include many varieties and strains.(Noori *et al.,* 2019 ; Hasan *et al.,*2019).

Citrus propagation is done in two ways: sexual propagation with seeds, which is often used in the production of assets for vaccination with desired varieties and asexual propagation, which is the traditional vegetative propagation method widely used in the propagation of most economically important citrus trees (Hartmann *et al.,* 1997; AL-Taey, 2010; Fentahun *et al.,* 2017).

Tissue culture technology is a biotechnology that play an important role on humans lives , especially in the field of propagation of many types of plants because of the advantages of this method, perhaps the most important of which is obtaining huge numbers of plants without pathogens and similar to the mother plant at Relatively short time and at any time of the year, in addition to using this technology in research and fields applications including plant breeding and improvement, the production of medicinal drugs and medicines and rapid cloning propagation which is one of the applications of great importance that is followed by different methods of differentiation and morphogenesis such as the formation of adventitious buds, stimulation of the growth of axillary buds and the development of asexual embryos (somatic embryos) as well as the study of the primary aspects of plant growth and development and secondary metabolism (Ford, 2000) (Kasumi *et al.,* 2004) (Gupta *et al.,* 2006).

Cytokine is an organic base with high molecular weights and is used in low concentrations to give an effect to the cultivated parts and plays an important role in plant tissue cultivation as it affects plant cell division and differentiation and eliminates apical dominance and lateral bud growth (Shukri and Moaqil, 2013, Al-Taey and Majid, 2018).

The aim of this study to obtain the highest average number of branches from axillary bud culture by tissue culture techniques on MS media with different

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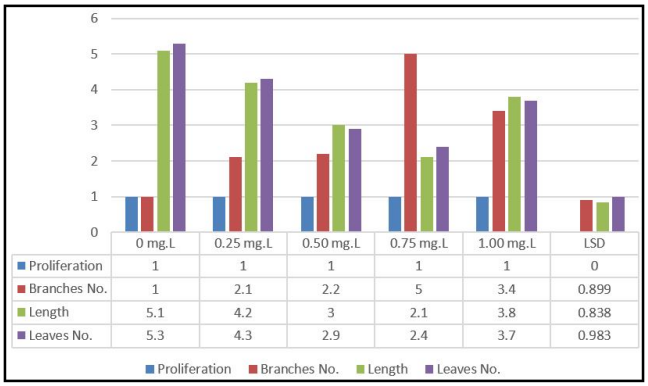
concentrations of BA.

Materials and Methods

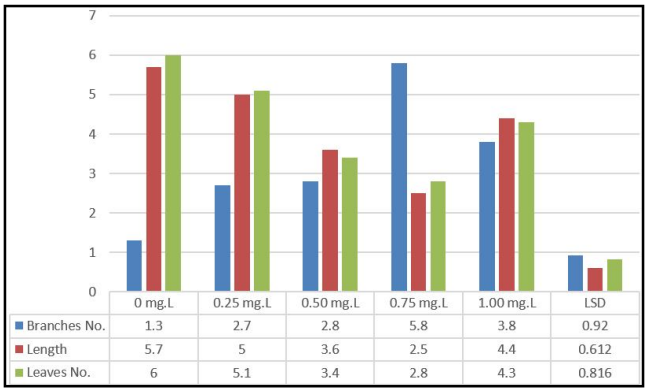
The experiment was carried out in the plant tissue culture laboratory of the Department of Horticulture and Landscape design - College of Agriculture - University of Kirkuk - Iraq on explant taken from *Citrus lemon* L. Var. local trees during 2020, as were placed under running water for 15 minutes, then washed with washing powder for 5 minutes with continuous stirring, then washed by placing them in a filter under running water for a 5 minutes, then transferred to the laminar hood and add 6% v : v NaOCl solution for 15 minutes, then washed with distilled and sterile water for three consecutive times for 5 minutes each time. The Single nodal segments was cut and planted with adding 6-Benzylaminopurine (BA) to the MS media in concentrations (0.0, 0.25, 0.5, 0.75, 1.0) mg/L (Martini & Papafotiou, 2014) at pH 5.7, sterilized. The culture media Autoclaved at 121°C. and pressure 1.04 kg/cm^2 for 20 minutes, after planting the vegetable parts, the explants were transferred to the growth chamber under the intensity of illumination of 3000 lux and daily succession 16 hours of light followed by 8 hours of darkness equipped with white fluorescent tubes and a temperature of 25 ± 2 °m, Complete Randomized Design was used in a statement analysis T tests were compared to the averages by LSD test for '5% probability (Alrawy and Khalafallah, 1980). Each treatment consisted of ten replicates and each duplicate contained one vegetable portion.

Table 1: *In vitro* (*Citrus lemon* L.) multiplication with different BA concentration after 4 weeks of cultivation.



	0 mg.L	0.25 mg.L	0.50 mg.L	0.75 mg.L	1.00 mg.L	LSD
Proliferation	1	1	1	1	1	0
Branches No.	1	2.1	2.2	5	3.4	0.899
Length	5.1	4.2	3	2.1	3.8	0.838
Leaves No.	5.3	4.3	2.9	2.4	3.7	0.983

Table 2: *In vitro* (*Citrus lemon* L.) multiplication with different BA concentration after 8 weeks of cultivation.



	0 mg.L	0.25 mg.L	0.50 mg.L	0.75 mg.L	1.00 mg.L	LSD
Branches No.	1.3	2.7	2.8	5.8	3.8	0.92
Length	5.7	5	3.6	2.5	4.4	0.612
Leaves No.	6	5.1	3.4	2.8	4.3	0.816

Results and discussion

Table 1 shows that the explant of lemon grown on MS media equipped with different concentrations of BA in addition to the control treatment responded to the tissue cultivation by 100% proliferation for all treatments and that cultivation with 0.75 mg / L BA resulted in obtaining the highest number of branches 5 branches/explant was significantly superior to the other treatments and cultivation when comparing treatment gave the highest length of branches and number of leaves as it was 5.1 cm and 5.3 leaves/explant respectively for the first four weeks, when re-culturing another 4 weeks table 2 formed the Cultivated at the medium supplied with 0.75 mg/L BA, the highest number of branches, as it was 5.8 branches/explant were significantly superior of the transactions, the control treatment gave the highest length of branches and number of leaves, it was 5.7 cm and 6 leaves/explant, respectively.

The results may explain the multiplication of cultivated parts that BA is one of the cytokines that have positive role to control apical dominance and consequently branches number increase and as a result of the state of balance between internal hormones and added growth regulators the highest values were obtained and that the increased concentration leads to a decrease The values are for the number of branches because its effect becomes inversive (Fentahun *et al.,* 2017) and the composition of the branches and leaves of the cultivated parts when comparing in the proliferation stage is due to the internal content in the tissues of the plant part of plant hormones (Murashige and Skoog, 1962) and Explanation of increased lengths and number of sheets Different factors indicate the effect of cytokines in the division and elongation of cells, which in turn is reflected in the characteristics of growth as well as its effect on building nucleic acids (Iqbal *et al.,* 2019).

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