

EFFECT OF DIFFERENT CONCENTRATIONS OF AUXINS ON THE REGENERATION OF *CHRYSANTHEMUM MORIFOLIUM* PLANTLETS.

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Abstract— *Chrysanthemum* is a common floriculture crop of winter months which belongs to the family asteraceae. The plant can attain a height of up to 3 meters. *Chrysanthemum* is grown not only for its beautiful flowers but it also has many other health benefits. Plants are generally raised through suckers and terminal cuttings. But it has been seen that micro propagation has proved to be very efficient technique for the fast and disease free raising of *Chrysanthemum* plants. The present investigation was conducted to access the effect of two different auxins (IBA and NAA) on the *in vitro* regeneration of *Chrysanthemum* plantlets.

Key words: regeneration, IAA, NAA, *in vitro*.

I. INTRODUCTION

Chrysanthemum commonly called as gul-e-daudi or golden flower or autumn queen has been cultivated for more than 2000 years ago. It is world's second most important floriculture crop only after Rose. Belonging to the family asteraceae it behaves both as an annual as well as perennial flowering crop. The plant can attain a height of up to 3 meters. The flowers of *Chrysanthemum* usually blossom in the months of winters and show a wide variety in size, shape and color. Recently the popularity of *Chrysanthemum* has increased not only because of its aesthetic value but also due to its antigenotoxic/antioxidative/antimutagenic properties. Usually the cultivars of the commercially grown chrysanthemum are grown through root suckers and terminal cuttings. This conventional method of plant propagation is very slow. Secondly, the plant is also prone to the attack of a large number of viruses which are responsible for the lower yield of the flowers. Murashige (1990) stated that clonal plant propagation is the most useful and visible application of tissue culture. Due to high popularity and demand for *Chrysanthemum* it becomes commercial targets for micropropagation and tissue culture and can be utilized for large scale production of chrysanthemum. Micropropagation is the true to type propagation of selected genotypes using *in vitro* culture techniques. This technique provides a reliable system for the rapid multiplication of the genetically uniform disease free plants. Many workers have

reported micropropagation of *Chrysanthemum* through shoot tips and axillary buds.

II. MATERIALS AND METHODS

Experiments on micro propagation of chrysanthemum were carried out. Healthy and vigorously growing plants of *Chrysanthemum* were procured from department of floriculture, PAU, Ludhiana, Punjab. Nodal segments were collected from 25-30 years old plants, washed with 0.1% teepol and then under running water for half an hour. The nodal segments were then surface sterilized using 0.1% mercuric chloride for one minute and then washed thrice with double distilled water so as to remove the toxic effects of mercuric chloride. These segments were then inoculated in MS medium whose pH was adjusted to 5.8 before autoclaving. MS medium was supplemented with various concentrations of auxins. One explant per culture tube having about 20 ml of MS medium was placed. The inoculated culture tubes were then placed in culture room having temperature of $25 \pm 2^{\circ}\text{C}$ and relative humidity maintained at 70 percent. The light intensity was maintained at 2000 lux for 16 hours per day. After few days the explants proliferated into plantlets. Data was recorded for different parameters after 45 days.

III. RESULTS

Effect of Indole Butyric Acid (IBA) on the regeneration of *Chrysanthemum* plantlets: The nodal segments were grown on the different concentrations of IBA. It was noted that maximum shoot initiation was shown by the conc. of 0.2 mg/L, which was followed by 0.5 mg/L. Minimum shoot concentration and number of shoots were recorded for the conc. of 0.8 mg/L. At the concentration of 1 mg/L there was no shoot initiation reported, only a callus mass was seen. Similar trends were recorded for other characteristics like average length of shoots, average shoots per explants and average number of nodes per explants.

Table1. Effect of different concentrations of IBA on the regeneration of chrysanthemum from nodal segments.

S.No.	Treatment of IBA (mg/L)	Shoot initiation percentage	Average length of shoots (in cm)	Average shoots/explant	Average nodes/explant
1	Control (0.0)	25.3	1.2	1.4	1.9
2	0.2	48.6	1.8	2.6	2.8
3	0.5	30.2	1.3	2.1	2.2
4	0.8	19.7	1.2	1.5	1.7
5	1.0	-	-	-	-

Effect of NAA on the regeneration of chrysanthemum plantlets:

It was noticed that maximum shoot initiation was shown at the percentage of 0.5mg/L of NAA, while the minimum percentage of shoot initiation was shown by the control i.e. when no NAA was added to the medium. Similar observations were made for the other parameters like average shoot length, average number of shoots per explant and average nodes per explants.

Table2. Effect of different concentrations of NAA on the regeneration of chrysanthemum from nodal segments

S.No.	Treatment of NAA (mg/L)	Shoot initiation percentage	Average length of shoots (in cm)	Average shoots/explant	Average nodes/explant
1	Control (0.0)	25.3	1.2	1.4	1.9
2	0.2	42.4	1.6	1.9	2.3
3	0.5	68.9	2.3	2.1	2.9
4	0.8	38.6	1.9	2.0	2.6
5	1.0	29.9	1.8	1.7	2.3

IV. DISCUSSION

Plant Growth Regulators are an integral part of all *in vitro* studies. Fruitful results of *in vitro* culture techniques lies in the addition of several growth regulators in standardized sequence and to induce the formation of shoots and roots in undifferentiated tissues. The main plant growth regulators used in this study were Indole Butyric Acid (IBA) and Naphthalene Acetic Acid (NAA). Although these auxins show some variations in relation to the extent of shoot initiation, shoot length etc., but the general observation was that auxins enhance the growth of *Chrysanthemum* plantlets in *in vitro* conditions.

The results of these experiments also indicate that *Chrysanthemum* can be multiplied in large scale through micro propagation using right concentration of the auxins. Farmers growing chrysanthemum on commercial scale have to face many difficulties while raising the plants in the open fields as the yield of the flowers per plant can be low due to the climatic conditions prevailing in that particular geographical area, the chance of occurrence of diseases and many other factors. This study clearly indicates that the above problems can be minimized by micro propagation of *Chrysanthemum*.

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