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Research Article

IN VITRO REGENERATION OF CHRYSANTHEMUM *(CHRYSANTHEMUM MORIFOLIUM L.)*

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ABSTRACT

Chrysanthemum is commonly known as Autumn Queen. It belongs to the family *Compositeae (Asteraceae)*. It is highly attractive and charming short day plant, which behaves both as an annual as well as perennial flowering herb. Regeneration of Chrysanthemum plantlets through *in vitro* culture was obtained by using nodal segment explants. These explants were treated with different concentrations of auxins (IAA, IBA) and cytokinins (BAP) alone and in combinations. Nodal segments of chrysanthemum when placed on MS medium supplemented with different concentrations of BAP with IAA. The highest results were observed on MS medium containing 1.0 mg/l BAP + 0.1 mg/l IAA, shown 90% shoot initiation and 5.5 ± 0.51 average length of shoot per explant. Nodal segment of chrysanthemum were cultured in MS media with different concentration of BAP. The highest results were observed on MS medium containing 1.0 mg/l BAP, shown 93% shoot proliferation, 5.7 ± 0.22 average lengths of shoot per explant and 4.4±0.88 nodes per explant. The regenerated shoot lets were rooted on MS medium and ½ MS medium with different concentration of IBA. The highest results were observed on ½ MS medium containing 0.2 mg/l IBA shown 90% micro cuttings rooted. 9 ± 0.19 average length of roots was observed per explant and 11.8 ± 0.75 number per explant of chrysanthemum.

INTRODUCTION

Chrysanthemum morifolium is one the common ornamental plant of India. It is commonly known as Gul-e-Daudi or Autumn Queen. The plant height ranges from 1/3 to 1 m and flowers bloom in early winter with a wide range of color, shape and sizes. They are appreciated for their high keeping quality. Also their ability to produce desired grades and types at anytime during the year adds to their popularity. Plant tissue culture is a *invitro* technique for growing plant cells, tissues or organs ascetically on artificial medium in suitable congeners under controlled environmental conditions. The plant cell is totipotent. The totipotency is the ability of plant cell to regenerate in to whole plant.

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In this process the excised bud is transferred in to tube counting a sterile nutrient medium. The success of tissue culture depends very much in the stage of explants selection, the sterilization period and type of culture media used. Different type of plants required different sets of culture media. Plant tissues are grown *invitro* on artificial media, which supports the propagation, is greatly influenced by the nature of the culture media used. The rich tissue culture media provides a good nutrients source for bacteria and fungi, therefore precautions against microbial contamination must be taken in all *invitro* procedures.

MATERIALS AND METHODS

The experiments regarding the effect of different concentrations of growth regulators and their combinations on the regeneration and rooting of Chrysanthemum plantlets using shoot tips as explants were conducted at the Plant Tissue

Culture Laboratory, Department of Plant Biotechnology, College of Agricultural Biotechnology, Loni, Maharashtra, India. For the regeneration of C*hrysanthemum morifolium* plantlets, MS media was supplemented with varied concentrations of IAA (control, 0.1, 0.3 and 0.5 mg/l), BAP (control, 0.5, 1.0 and 2.0 mg/l) and their combinations. For rooting of Chrysanthemum micro-shoots, half strength MS media supplemented with various concentrations of IBA (0.1, 0.2 and 0.5 mg/l) and NAA (0.1, 0.2 and 0.5 mg/l) were used.

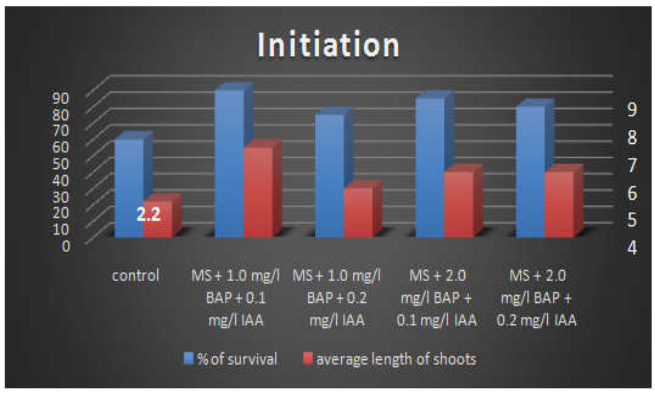
RESULT AND DISCUSSION

Initiation

Table 3.1. Effect of different conc. of BAP and IAA-

Sr. no.	Treatment	% of survival	Average length of Shoots (cm)
1.	Control	60%	2.2 ± 0.83
2.	MS + 1.0 mg/l BAP + 0.1 mg/l IAA	90%	5.5 ± 0.51
3.	MS + 1.0 mg/l BAP + 0.2 mg/l IAA	75%	3.0 ± 0.45
4.	MS + 2.0 mg/l BAP + 0.1 mg/l IAA	85%	4.0 ± 0.43
5.	MS + 2.0 mg/l BAP + 0.2 mg/l IAA	80%	4.0 ± 0.24

Initiation stage MS+1.0 mg/l BAP+0.1 mg/IAA



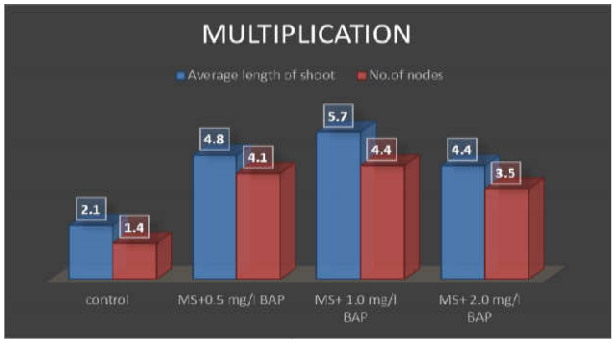
Graphical representation -Initiation stage MS+1.0 mg/l BAP+0.1 mg/IAA

Multiplication

Table 3.2. Effect of BAP on multiplication

Sr. No.	Treatment	% of survival	Average length of shoot (cm)	No. of nodes/ Explants
1.	Control	40	2.1 ± 0.2863	0.4 ± 1.02
2.	MS + 0.5 mg/l BAP	80	4.8 ± 0.4123	4.1 ± 0.78
3.	MS + 1.0 mg/l BAP	93	5.7 ± 0.2150	4.4 ± 0.88
4.	MS + 2.0 mg/l BAP	66.66	4.4 ± 0.3098	3.4± 0.55

Multiplication stage MS+1.0 mg/l BAP



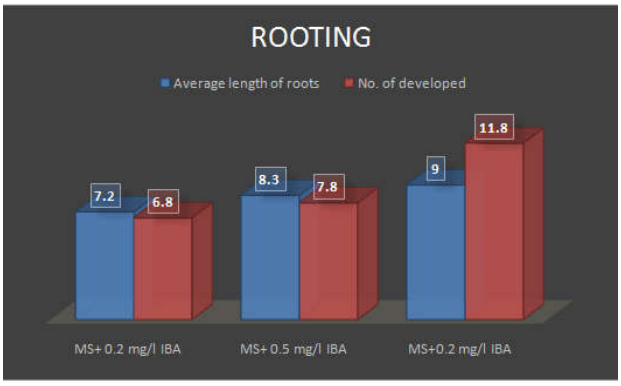
Graphical representation - Multiplication stage MS+1.0 mg/l BAP

Rooting of shoots

Table 3.3. Effect of different conc. of IBA

Sr. no.	Treatment	% of survival	Average length of roots (cm)	No. of root Developed/e xplants
1.	MS + 0.2 mg/l IBA	80%	7.2 ± 0.3114	6.8 ± 0.84
2.	MS + 0.5 mg/l IBA	70%	8.3 ± 0.5149	7.8 ± 0.75
3.	1/2MS + 0.2 mg/l IBA	90%	9 ± 0.1870	11.8 ± 0.75

Rooting stage (1/2MS + 0.2 mg/l IBA)



Graphical representation - Rooting stage (1/2MS + 0.2 mg/l IBA)

DISCUSSION

Effect of different concentration of BAP and IAA on the initiation of chrysanthemum plantlets from nodal segment: The result revealed that 1.0 mg/l BAP + 0.1 mg/l IAA showed it's superiority among all the other treatments. Average length of shoot (5.5±0.51cm) and percentage of survival rate was 90% recorded in 1.0 mg/l BAP + 0.1 mg/l IAA. Effect of different concentration of BAP on the multiplication of chrysanthemum plantlets from nodal segment: The result revealed that BAP (0.1 mg/l) showed it's superiority amongst all the other treatments. Average length of shoots (5.7±0.22 cm) and Average no. of shoots (4.4±0.88) and survival rate was 93% were recorded in 0.1 mg/l BAP. Effect of different concentrations of IBA on the rooting of shoots of Chrysanthemum raised from nodal segment of the explant: The result superiority of ½ MS + 0.2 mg/l IBA as compared to all the other treatment as it produce significantly maximum no. of roots per explants (11.8±0.75) and largest roots (9±0.19 cm) and survival rate was 90% were recorded in ½ MS + 0.2 mg/l IBA. IBA is considered as the most efficient auxins in root induction and development.

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