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Callogenic response of petals and tuber parts of medicinal plant

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Abstract

Callogenic response of different plant parts of explant type such as petals and tuber of *Momordica cymbalaria* was tried on MS medium with varied concentrations hormones. The light green yellowish friable callus and white light brown compact callus was produced in petals and tuber respectively. Maximum fresh weight 545 ± 2.23 mg was observed in the callus derived from petals on MS + 0.9 mg/l IAA within 15 days, MS+ 1.0 mg/l BA within 14 days with maximum fresh weight 702 ± 3.40 mg and white light brown compact callus derived from tuber on MS + 2.8 mg/l NAA within 12 days with maximum fresh weight 747 ± 3.50 mg.

Keywords: Cucurbitaceae, *Momordica cymbalaria*, Callogenesis. MS (Murashige and Skoog), BA (Benzyl adenine), IAA (Indole -3acetic acid), NAA (Naphthalene acetic acid)

1. Introduction

Tissue culture is a promising area of biotechnology, which enables the production of large number of plants with improved qualities and useful in conservation. Identification and screening of plant organs suitable for callus growth are prerequisite for secondary metabolite production. Hence present investigation was undertaken to study the potentiality of different organs in *Momordica cymbalaria* and to determine the most suitable concentration and combination of growth regulators for excellent callus induction.

Momordica cymbalaria belongs to the family Cucurbitaceae. The plant has also been named *Luffa tuberosa* (Roxb.) or *Momordica tuberosa* (Roxb). It is seen growing in the crop fields of Tamil Nadu, Andhra Pradesh and Karnataka. The fruits are used as vegetables by local people. The juice of the leaves are used to cure whooping cough (Koneri *et al.*, 2006)^[2]. The paste of tubers is used for applying boils, ulcers and snake bite (Togunashi *et al.*, 1977)^[6]. Tubers were reported to have antiovolatory activity.

2. Materials and Methods

2.1 Explant material

Momordica cymbalaria (Hook. Fenzl ex Naud) were collected from their natural habitats, Tamil Nadu during the rainy season. As the explants such as petals and tuber were surface sterilized using 75% alcohol for one minute and immersed in 0.1% mercuric chloride for 4 minutes and rinsed through with sterile distilled water.

2.2 Medium and culture conditions

The basal medium used in the present investigation was full strength Murashige and Skoog, (1962) medium with various combinations of (NAA, IAA and BA). The pH was adjusted to 5.8 by adding 0.1 N Lactic acid or 0.1 N NaOH. Inoculated tubes were incubated at $25^{\circ} \pm 1^{\circ}\text{C}$ under cool white fluorescent lamps of intensity 2000 lux for 12 hours photoperiod. Replicates were tried for each concentration and each combinations. The percentage of frequency, morphology of callus, maximum fresh weight and the time duration for each explant were tabulated.

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3. Results and Discussion

Difference in the composition and culture medium can result in variation in callus induction. MS with hormones to induce callus in *Momordica cymbalaria* and the results are given in (Table 1, Plate 1). Two explants such as petals and tuber, the callus was observed from petals on MS 0.7-9.0 mg/ l IAA and MS + 0.5, 1 mg/ l BA, from the tuber on MS + 2.0 -2.8 mg/l NAA.

Light green yellowish friable callus was produced from the petals on MS + 9.0 mg/ l IAA with a maximum fresh weight of 545 ± 2.23 mg and frequency (50%) within 15 days, The maximum fresh weight 702 ± 3.40 mg and highest frequency of the callus (60%) was observed on MS + 1 mg/ l BA with in 14 days. Other than this there are minimum reports only available on this medicinal plant. This is the first report on the callogenic Response of petals and tuber of this medicinal plant.

(Tarrahi and Rezanejad *et al.*, 2013) [5] reported callus production from the petals of *Rosa gallica* and *R. hybrida* using different combinations hormones on modified MS medium. Bonga (1987) [1] reported that the type mainly depends upon the juvenility of the explants. From the petals of gerbera the maximum callus induction and growth was

recorded with MS + 1, 1.5 and 2 mg/ l 2, 4-D (Surinder Kumar, Jitender Kumar Kanwar., 2006) [4].

In tuber callus was observed only MS + 2.8 mg/l NAA with 20% frequency, But the callus was white light brown compact callus in nature with fresh weight of 747 ± 3.50 mg. Plant cell culture have potential to produce and accumulate the chemicals. Identification and screening of plant organs suitable for callus growth are prerequisite for secondary metabolite production.

4. Conclusion

From the foregoing account it is clear that promoted cell division when added together at lower concentration with (ie, IAA, BA and NAA). *M. cymbalaria* are capable of producing callus which can be further manipulated for both

Regeneration and secondary metabolite production. In the past few decades, secondary metabolite production from plant tissue culture has been identified as a resource for new drug development and clinical research in the fields of pharmacology and medicine. *In vitro* developed callus tends to produce various compounds. Hence tissue culture is a biotechnological approach to produce required amount of phytochemicals which can be commercially exploited for the production of drugs.

Table 1: Showing the effect of growth regulators on callus formation on different explants of *M. cymbalaria*

S. No	Explant	MS+ Hormones	Concen-tration (mg/l)	% Frequency of Callus	Fresh Weight in mg	Time duration	Response
1	Petal	IAA BA	0.7	32	421 ± 0.30	15 days 14 days	Light green yellowish friable callus
			0.8	40	435 ± 0.80		
			0.9	50	545 ± 2.23		
			0.5	30	687 ± 3.51		
			1	60	702 ± 3.40		
2	Tuber	NAA	2.0	15	679 ± 0.78	12 days	White light brown compact Callus
			2.8	20	747 ± 3.50		

The results are statistically analysed and the results are presented in Table 1

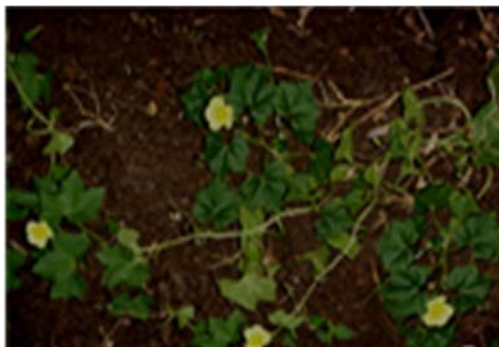
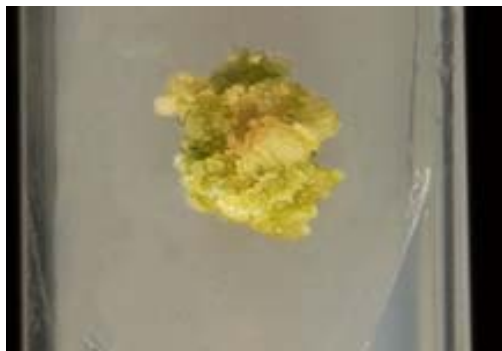


Plate 1: Habit



(b) tuber



(a) petal

6. Reference

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