International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2016): 79.57 | Impact Factor (2015): 6.391

In Vitro Multiplication in Celosia Argentea L.Var. Argentea

Sachin Nirpane[1], Narayan Pandhure[2]

Tissue Culture Laboratory, Department of Botany, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad-431001, India

Abstract: ***Celosia argentea L. is a herbaceous plant belongs to family Amaranthaceous. Traditionally the plant material is used for the treatment of jaundice, gonorrhea, wounds and fever. The leaves are also used for the treatment of inflammations, fever and itching. The seeds are bitter, useful in blood diseases, mouth sores. They are efficacious remedy in diarrhea. Hence, in vitro techniques for multiplication of Celosia argentea was developed using apical buds and shoot tip as an explant.***

Keywords: *Celosia argentia*, Multiplication. MS media

1. Introduction

Celosia argentea L. is a herbaceous plant belongs to family Amaranthaceae. It is Annual erect herbs, simple or with many ascending branches. Leaves 2-15 x 0.1-3.2 cm, lanceolate-oblong to narrowly linear, acute to obtuse, shortly mucronate with the excurrent midrib, glabrous; lamina of the leaves from the center of the main stem tapering below into an indistinctly demarcated, slender petiole, to 2 cm long; upper and branch leaves smaller, markedly reducing. Inflorescence a dense many-flowered spike, 2.5-20 x 1.5-2.2 cm, white to pink, terminal on the stem and branches, peduncle up to c. 20 cm long; bracts and bracteoles lanceolate or the lower deltoid, 3-5 mm, hyaline, more or less aristate with the excurrent midrib, persistent. Perianth segments 6-10 mm, narrowly elliptic-oblong, acute to rather blunt, shortly mucronate, margins hyaline. Filaments very delicate, free part subequalling or exceeding the staminal sheath, sinuses rounded with very minute intermediate teeth; anthers and filaments creamy to magenta. Ovary 4-8-ovulate, style filiform, 5-7 mm long; stigmas 2-3, very short.Capsule 3-4 mm, ovoid to globose; seeds c. 1.25-1.5 mm, lenticular, black, shining, very finely reticulate.

Medicinal and phytochemical properties

Celosia argentea is used traditionally for the treatment of jaundice, gonorrhea, wounds and fever. The leaves are used for the treatment of inflammations, fever an ditching. The seeds are bitter, useful in blood diseases, mouth sores. They are efficacious remedy in diarrhea (Kirtikar, 1935). Based on ethno botanical practice theplant was investigated for anti-inflammatory (Patil et al., 2003), anti–pyretic (Bhujbal et al, 2006) anti diabetic,(Thangarasu et al., 2002), anti bacterial and diuretic properties (Patel et al., 1993).Plant is also found to be useful in cancer. Even though plant is considered as weed but it is seasonal. Looking towards its medicinal properties it was decided to undertake in vitro studies in *Celosia argentia*.

2. Material and Methods

Preparation of Explants

Celosia argentea was collected from campus of Dr. Babasaheb Ambedkar Marathwada University campus and Over-Jatwada area of Aurangabad, Maharashtra. The explants were washed carefully in running tap water for 5 minutes and followed by distilled water for 5 minutes. Explants were surface sterilized for 5 minutes with 0.3% mercuric chloride, followed by three subsequent rinses with sterilized double distilled water, in a laminar air flow. Explants were dissected into small pieces and inoculated aseptically in culture vessel and test tube on sterilized MS medium.

Culture media

Murashige and Skoog (1962) media was supplemented with various concentrations of auxinsand Cytokinins. MS medium was fortified with 3% sucrose and gelled with 2.5% Clerigel. pH of the medium was adjusted up to pH 5.8 after addition of growth regulators. The media were autoclaved under 15 psi and 121° C for 20 minutes. After autoclaving, the vessels containing the media were transferred to laminar air flow for inoculation.

Culture conditions

After inoculation, culture tubes and vessels were transferred to culture room under a 10 h photoperiod supplied by cool white fluorescent tube lights and 25 ± 2^0C temperatures. At least five replicates were raised for each treatment.

Data record:

Data was recorded after 30days. Mean (μ) values with the standard error (S.E.) were calculated from five replicates each for callus induction, shoot multiplication and shoot length.

3. Result and Discussions

Surface sterilization of explants is necessary to disinfect tissues with a minimum amount of cellular damage to the host tissue (Conger 1987). Therefore the explants were excised in proper size and shape, surface sterilized and aseptically inoculated on MS medium. MS mediumwas fortified with different concentrations with BAP 1.0, 1.5, 2.0, 2.5, 3.0, mg/l and IAA, (0.2mg/L) produced maximum average percentage of shoot multiplications. Combinations of BAP and IAA were better for induction of shoots *in vitro*as compared to any other combination of growth regulators. It is noticed that *Celosia argentea*has produced maximum *in vitro* shoots with apical shoots as an explant.

Explants viz. apical shoots and axillary buds were tried in MS medium supplement with 3% sucrose 2.5% clerigel in combination with growth regulators viz. BAPand IAAas shown in table 1. Maximum induction of shoots was recorded in MS medium fortified with 0.5to 2 mg/l BAP and keeping 1 mg/L, IAAconstant using shoot tip and axillary bud as an explants. With increase in concentration of growth regulators i.e. BAP there was subsequent increase in induction of shoot (Table No. 1) and subsequently decline in the induction of callus (Plate.1.). Shoots recorded were healthy. Taking apical shoots as n explant and with 0.5 mg/lit of BAP and 1.0 mg/lit IAA more callus was recorded along with low frequency of shoot induction. With increase in concentration of BAP there was subsequent increase in frequency for shoot induction.

Table 1: Effect of BAP and IAA on Multiplication in *Celosia argentea*

Sources of Explant	Growth regulators Mg/l		Frequency of callus	No of multiple shoots induced
	BAP	IAA		
Apical Shoots	0.5	1.0	+++	1.05±0.21
	1.0	1.0	++	1.5 ±0.12
	1.5	1.0	+	7.05±0.10
	2.0	1.0	++	2.09 ± 0.12
Axillary Bud	0.5	1.0	+++	0.9 ±0.11
	1.0	1.0	+	4.5 ±0.19
	1.5	1.0	++	2.05±0.12
	2.0	1.0	++	2.04± 0.12

*****After 35 days, mean ± SE of 5 replicates.

Highest rate of shoot induction was recorded in medium fortified with 1.5 mg/lit BAP and 1.0 mg/lit. IAA.In case of axillary bud as an explant similar pattern was recorded but rate of shoot formation was less. Highest number of shoots was recorded on MS fortified with 1 mg/lit BAP and 1 mg/lit IAA. There was similar pattern for callus induction with axillary shoot as an explant (Plate.2).

Similar results were reported for callus initiation and shoot multiplication *in vitro*, using various explants, in different plants (Pandhure et al. 2010) in *Solanumnigrum*using shoot tip and axillary buds. Proliferating shoot cultures were established by repeatedly sub culturing the mother explants on the hormone free medium. Repeated sub-culturing was said to be one of the methods of maintaining juvenility (Franclet *et al*., 1987) which was proved through results recorded during these studies. During the present piece of work highest numbers of shoots were recorded on MS with 2 mg/it BAP and 1 mg/lit IAA. Experimental results of Devendra and Sandeep Reddy, (2011) indicated that nodal explants have high competence for shoot induction in *Ecliptaalba*. This is further confirmed from our studies, from the fact that Shoot tip explants have more recalcitrant capacity than other explants.

4. Conclusion

Even though *Celosia argentea* is considered as weed but looking towards the utility of plant material in various disorders, only *in vitro* methods are capable to make provision of fresh plant material. Hence multiplication of this plant through *in vitro* method makes this technique viable as well as valuable.

5. Acknowledgements

Authors are grateful to Professor and Head, Department of Botany, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad (M.S.), India for providing all necessary facilities and encouragement for the present research work.

References

[1] **Bhujbal S, Patil K, Patil M (2006).** Evaluation of Anti pyretic potentials of *Celosia argentea* Linn leaf extract. Planta Indica. 2: 19-20.
[2] **Conger, B.V., Novak, F.J., Afza, R. et al.1987.** Somatic embryogenesis from cultured leaf segments of *Zea mays* .Plant Cell Reports 6: 345
[3] **Devendra B. N., N. Srinivas and A. Sandeep Reddy.(2011)** High frequency somatic embryogenesis and plant regeneration in nodal explant cultures of *Eclipta alba* L. Hassk.Annals of Biological Research, 2 (3) : 143-149
[4] **Franclet A., Boulay M., Bekkaoui F., Fouret Y., Verschoore-Martouzet B., Walker N. (1987)** Rejuvenation. In: Bonga J.M., Durzan D.J. (eds) Cell and Tissue Culture in Forestry. Forestry Sciences, Vol 24-26. Springer, Dordrecht
[5] **Kirtikar K, Basu L (1935).** Indian Medicinal Plants, Vol. III 2nd ed.,Allahabad.2053-2054
[6] **Murashige, T. and Skoog, F. (1962),** A Revised Medium for Rapid Growth and Bio Assays with Tobacco Tissue Cultures. *PhysiologiaPlantarum*, 15: 473–497.
[7] **Narayan Pandhure, RanjitBansode and Vijay Kothekar(2010).**in vitro multiplication of important medicinal plant *Solanumnigrum*. Recent Research in Science and Technology *2010, 2(7): 33-35*
[8] **Patel K, Shah M (1993).** Contribution to Indigenous Drugs Part-I *Celosia argentea*. Int. J. Pharmacogn 31(3):223-234
[9] **Patil K, Bhujbal S, Chaturvedi S (2003).** Anti-inflammatory activity of various extracts *Celosia argentea* Linn Ind.J.Pharm. Sci. pp. 645-647.
[10] **Thangarasu V, Manuiappan J, Bangaru A (2002).** Anti-diabetic activity of alcoholic extract of *Celosia argentea* Linn. Seeds in Rats. Biol.Pharm. Bull. 25:526-528.

Plate 1: Callus with shoot Initiation

Plate 2: Multiple shoots with roots