➔DOI : 10.15740/HAS/AJBS/11.1/49-51
e ISSN-0976-8343 | ■ Visit us : *www.researchjournal.co.in* ■ – AFBSAH-2016 ASIAN JOURNAL OF BIO SCIENCE
Volume **11** | Issue 1 | April, 2016 | 49-51

RESEARCH **P**APER

In vitro floral morphogenesis in *Eclipta prostrata* (L.)

RAYEES AHMAD DAR, **EAPEN P. KOSHY AND** GEORGE THOMAS

Department of Molecular and Cellular Engineering, Sam Higginbottom Institute of Agriculture, Technology and Sciences, ALLAHABAD (U.P.) INDIA
Email : eapen.koshy@shiats.edu.in

Article Info : Received : 15.12.2015; Accepted : 7.02.2016

The efficacy of cytokinins in *in vitro* flowering of *Eclipta prostrata* was evaluated. The MS media fortified with Kin (4 mgl^{-1}) supported the formation of 4-7 flowers and a maximum of 13 flowers was obtained in MS media fortified with 2iP (5 mgl^{-1}). It highlights the positive role of cytokinins in *in vitro* floral induction.

Key words : Bhringraj, *Eclipta prostrata*, *In vitro* flowering

How to cite this paper : Dar, Rayees Ahmad, Koshy, Eapen P. and Thomas, George (2016). *In vitro* floral morphogenesis in *Eclipta prostrata* (L.) . *Asian J. Bio. Sci.*, **11** (1) : 49-51 [Special Issue of AFBSAH-2016].

INTRODUCTION

Flowering of plants occur only when many factors like physiological and environmental factors are suitable (Tisserat and Galletta, 1995). Alteration of these conditions can induce a plant to flower early. *In vitro* flowering facilitates the understanding of physiology of flowering and depends on the level and interaction of exo- and endogenous phytohormones, sugars, minerals, etc. (Ramamurthy *et al.*, 2012). There is considerable variability in the requirements of plant growth regulators, temperature, light regime and nutritional factors for *in vitro* flowering in explants from different species and multiplicity of factors regulating *in vitro* flowering process (Bernier *et al.*, 1981).

In vitro flowering has immense potential in selective hybridization when pollen from rare stocks is used. It can be used for recombining genetic material via *in vitro* fertilization in otherwise nonhybridizable lines. An *in vitro* flowering mechanism is considered to be a convenient tool to study specific aspects of flowering and whole mechanisms of the reproductive process such as floral initiation, floral organ development and floral senescence.

Eclipta prostrata (L.) is an important herbaceous medicinal plant of the family Asteraceae. It is popularly known by different names like *False daisy, Trailing eclipta, Bhringraj, Kesaraja,* etc. This herb is used in Ayurveda, Unani and Siddha, the three major forms of traditional medicinal systems in India. Considering the availability of a wide range of eclipta-based human health care products in the market, Kaur (2011) conducted a survey and documented 36 such medicinal preparations of different Indian manufactures. These herbal products are reported to have antioxidant, antiaging properties, useful in hair care, as a remedy for the diseases of liver, heart, kidney, skin and dietary supplements. World over, there are several granted patents and patent applications on the products and preparations of *Eclipta*.

There are several reports on the micropropagtion of *Eclihta prostrata* plants (Franca *et al*., 1995; Zafar and Sagar, 1999; Gawde and Partakar, 2004; Baskaran and Jayabalan, 2005a and b; Dhaka and Kothari, 2005; Hussain and Anis, 2006; Hassan *et al*., 2008; Ray and Bhattacharya, 2008; Singh *et al*., 2012; Sharma *et al*., 2013; Ragavendran *et al*., 2014; Sharan *et al*., 2014 and Prakash *et al*., 2015) however, there are only scanty reports on the *in vitro* flowering of this valuable medicinal

Fig. 1: *In vitro* flowering in MS+2iP (5 mgl^{-1})

Fig. 2: *In vitro* flowering in MS+Kin (4 mgl^{-1})

Fig. 3: Flowering in hardened plants of *Eclipta prostrata*

plant (Borthakur *et al.*, 2000 and Tejavathi *et al.*, 2014). The present study aims at proposing a suitable plant tissue culture media for *in vitro* flowering of *Eclipta prostrata* plants.

RESEARCH METHODOLOGY

Eclipta prostrata (L.) L. plants grown in the green house facility were used as the mother plants to collect healthy explants. MS media with various combinations and concentrations of cytokinins were used for assessing their *in vitro* flowering ability. 2iP (1-6 mgl^{-1}) and Kin (1-6 mgl^{-1}) were used in the present study. Healthy explants were collected and rinsed with 2 per cent teepol and kept under running tap water for one hour. The explants were then sterilized with 0.1 per cent $HgCl_2$ treatment for 5 minutes followed by rinsing with sterile distilled water. The explants were then trimmed and inoculated in culture bottles containg various hormone combinations. The cultures were incubated under normal tissue cultrure conditions.

RESEARCH FINDINGS AND ANALYSIS

In vitro flowering was obtained in *E. prostrata* when cultured on MS media fortified with different concentrations of 2iP and Kin. It was observed that when the explants were cultured and left in the same media combination for a period of 3 months, *in vitro* flowering occurred. A maximum of 13 flowers were obtained in MS media fortified with 2iP (5 mgl^{-1}) (Fig. 1). Flowering was also observed in media containing Kin (4-6 mgl^{-1}, 4-7 flowers) (Fig. 2). Flowering was also obtained when the plantlets were subject to hardening (Fig. 3). Borthakur *et al.* (2000) reported maximum *in vitro* flowering in MS media supplemented with Kin (0.05 mgl^{-1}; 7 flowers). While in the present study, it was observed that 2iP supported maximum *in vitro* flowering. In contrast to thte present study, Thejavathi *et al.* (2014) reported *in vitro* flowering in *Eclipta alba* when MS media was supplemented with GA_3.

Conclusion :

In vitro flowering in *Eclipta prostrata* was obtained in plantlets cultured in MS media fortified with 2iP (1-6 mgl^{-1}) and Kin (1-6 mgl^{-1}) after 3 months. The media supported with Kin (4 mgl^{-1}) supported the formation of 4-7 flowers and maximum of 13 flowers was obtained in MS media fortified with 2iP (5 mgl^{-1}).

LITERATURE CITED

Baskaran, P. and Jayabalan, N. (2005a). Role of basal media, carbon sources and growth regulators in micropropagation of *Eclipta alba*- a valuable medicinal herb. *KMITL Sci. J.,* **5** (2): 469-482.

Baskaran, P. and Jayabalan, N. (2005b). An efficient micropropagation system for *Eclipta alba*- a valuable medicinal herb. *In Vitro Cellular & Develop. Biol. Plant,* **41** (4): 532-539.

Bernier, G., Kinet, J.M. and Saches, R.M. (1981). The physiology of flowering. *Boca Raton,* **5** (1) : 1-19.

Borthakur, M., Dutta, K., Nath, S.C. and Singh, R.S. (2000). Micropropagation of *Eclipta alba* and *Eupatorium adenophorum* using a single-step nodal cutting technique. *Plant Cell, Tissue & Organ Cult.,* **62** (3): 239-242.

Dhaka, N. and Kothari, S.L. (2005). Micropropagation of *Eclipta alba* (L.) Hassk.- an important medicinal plant. *In Vitro Cellular & Develop. Biol. Plant,* **41** (5): 658-661.

Franca, S.C., Bertoni, B.W. and Pereira, A.M.S. (1995). Antihepatotoxic agent in micropropagated plantlets of *Eclipta alba*. *Plant Cell, Tissue & Org. Cult.,* **40** (3): 297-299.

Gawde, A.J. and Partakar, G.T. (2004). Micropropagation of *Eclipta alba* Hassk.: An approach to shorten the protocol. *Indian J. Biotechnol.,* **3** (1): 128-132.

Hassan, A.K.M.S., Afroz, F., Bari, L.S., Munshi, J.L., Jahan, M.A.A. and Khatun, R. (2008). Micropropagation of *Eclipta alba* (Linn.) Hassk- a valuable medicinal herb. *Bangladesh J. Scient. & Industrial Res.,* **43** (2): 215-222.

Husain, M.K. and Anis, M. (2006). Rapid *in vitro* propagation of *Eclipta alba* (L.) Hassk. through high frequency axillary shoot proliferation. *Acta Physiologiae Plantarum,* **28** (4): 325-330.

Kaur, R. (2011). Assessment of phenotypic and genotypic diversity of *Eclipta alba* (L.) Hassk.: an important medicinal plant. Ph.D. Thesis, Department of Botany, Punjabi University, Patiala, PUNJAB (INDIA).

Prakash, P., Sharumathy, D., Sunkar, S., Nandagopal, D. and Narendrakumar, G. (2015). Micropropagation of *Eclipta alba* using humic acid as media component. *Plant Archiv.,* **15** (1): 181-185.

Ragavendran, C., Kamalanathan, D. and Natarajan, D. (2014). A rapid micropropagation of nodal explants of *Eclipta alba* (L.) A multipurpose medicinal herb. *Res. Biotechnol.,* **5** (2): 6-12.

Ramamurthy, K.S., Kondamudi, R., Rao, C.P.V. and Pullaiah, T. (2012). *In vitro* flowering. *J. Agric. Technol.,* **8**(5)**:** 1517-1536.

Ray, A. and Bhattacharya, S. (2008). An improved micropropagation of *Eclipta alba* by *in vitro* priming with chlorocholine chloride. *Plant Cell, Tissue & Org. Cult.,* **92** (3): 315-319.

Sharan, A.K., Dubey, S.R., Kumar, R., Chandra, V., Singh, B.P., Kumar, G. and Kumari, S. (2014). A novel protocol for propagation of *Eclipta alba* (L.) Hassak. *Internat. J. Pure & Appl. Biosci.,* **2** (2): 137-141.

Sharma, A., Bhansali, S. and Kumar, A. (2013). *In vitro* callus induction and shoot regeneration in *Eclipta alba* (L.) Hassk. *Internat. J. Life Sci. & Pharma Res.,* **3** (2): 43-46.

Singh, S.K., Rai, M.K. and Sahooa, L. (2012). An improved and efficient micropropagation of *Eclipta alba* through transverse thin cell layer culture and assessment of clonal fidelity using RAPD analysis. *Indust. Crops & Prod.,* **37** (1): 328-333.

Tejavathi, D.H. and Shailaja, K.S. (1999). Regeneration of plants from the cultures of *Bacopa monnieri* (L.) *Pennell. Phytomorphology,* **49** (4): 447-452.

Tejavathi, D.H., Roopashree, M.G. and Purushothama L. (2014). *In vitro* flowering of *Eclipta alba* (L.) Hassk and*Evolvulus alsinoides* L.*J. Trop. Med. Plants,* **7:** 2.

Tisserat, B. and Galletta, P.D. (1995). *In vitro* flowering and fruiting of *Capsicum frutescens.* L. *Hort. Sci.,* **30:** 130-132.

Zafar, R. and Sagar B.P.S. (1999). *In vitro* plant regeneration of *Eclipta alba* and increased production of coumestans. *Fitoterapia,* **70** (4): 348-356.