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COMPARATIVE STUDY OF CYTOKININS FOR PRODUCTION OF *IN VITRO* MULTIPLE SHOOTS AND *EX VITRO* ROOTING IN *TECTONA GRANDIS*

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Abstract: ***Tectona grandis*** **(teak, sagaun) is one of the most commercially important timber species which is a grown on a large scale by Forest Departments, private companies and farmers in India. In the present study, different cytokinins (Zeatin, Benzyl Adenine, Kinetin and TDZ) and their concentrations (0.55 and 2.22µM) were compared in order to improve *in vitro* multiple shoot formation and shoot multiplication. Observations were recorded for the morphometric traits viz., number of shoots, number of nodes, number of leaves and shoot length (cm). Zeatin was screened out to be the most effective cytokinin among the four cytokinins tested. Maximum number of shoots and nodes per shoot as well as maximum shoot length was obtained on MS semisolid medium supplemented with Zeatin. *Ex vitro* rooting was carried out with the pulse treatment of 1000 ppm IBA and healthy plants of teak were produced.**

Key words: *Cytokinin, In vitro, Shoot multiplication, Tectona grandis, Zeatin.*

Abbreviation: BA ,6-Benzyladenine; GA, Gibberellic acid; HgCl2, Mercuric Chloride; IBA-,Indole-3-Butyric acid; MS, Murashige and Skoog; TDZ,Thidiazuron; µM, Micro Molar; CY, Cytokinin; Conc., Concentration.

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Tectona grandis L. (teak, sagaun), a leafy tree species, native to India, Myanmar, Laos and Thailand, is one of the world's premier hardwood timbers, attractive for its mellow colour, fine grain and durability. The significant properties of teak include durability, strength with lightness, dimensional stability, anti corrosiveness, ease of seasoning and working, resistant to fungus and termites. It is highly sought after for shipbuilding as well as interior and exterior luxury furnishings. The species is reported to cover 27.5 millions ha as natural forests and more than 3.3 millions ha as plantations in Asia. At present, teak ranks among the top five tropical hardwood species in terms of plantation area established worldwide (Dah and Baw, 2001; Maldonado and Louppe, 2000, Mishra et al., 2018).

T. grandis is 96-100% self-incompatible. The species is hermaphrodite and pollinated by insects such as black ants, horse flies, and particularly by bees. Fruits mature about 4 months after fertilization. Premature shedding of fruit is a problem. Up to 60% fruit set has been reported following cross-pollination of teak. The individual flower has a 1-day cycle; optimum pollination period is between 1130 h and 1300 h (Orwa et al., 2009).

Teak is traditionally reproduced through seeds, but in most cases, germination is difficult due to the hard seed coat, low seed quality and late seed production. Poor germination rate leading to low production of seedlings, further contributes to the paucity of planting material (Bonal and Monteuuis 1997; Tiwari et al. 2002).

The propagation of teak via cuttings has been reported (Nautiyal et al., 1992, Singh et al., 2005, Singh et al., 2006) but this method has several limitations and only provides a few propagules from selected individuals.

Tissue culture is an important branch of plant biotechnology and can be used for improved productivity through multiplication of superior plants. Tissue culture of teak began in the seventies (Gupta et al., 1980) with more recent attempts to improve establishment and multiplication (Devi et al., 1994; Shirin et al., 2002; Shirin et al., 2005; Akram and Aftab, 2008; Shirin and Mishra, 2016, Mishra et al., 2018). Poor explant response and rapid explant browning are major hurdles to successful establishment of teak *in vitro* (Shirin and Sarkar, 2003). In the present paper, efforts were carried at to improve the *in vitro* multiple shoot formation and shoot multiplication in teak by comparing different cytokinins.