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Original Research Article

**IN VITRO PROPOGATION STUDIES ON TECTONA GRANDIS & ALBIZIA LEBBECK**

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**Abstract:** The present study deals with the explants of *Tectona grandis* & *Albizia lebbeck*. Explant of these species which is used in plant tissue culture may be an apical bud, root or shoot tip, ovule, anther, and an embryo. Establishment of explants under in-vitro conditions and hardening of plantlet to green house condition has to be done. A thorough study of this teak explant and the in-vitro culture response in co-relation with phenol was observed. The result of present study shows that the explant of the species contains a lots of phenolic compound and these compound arrest the growth of explants under in-vitro condition.

**Keyword:** Explant, in-vitro condition, *Tectona grandis*, *Albizia lebbeck*, phenolic compounds.

**Introduction:** *Tectona grandis* is said to be the world's biggest teak tree grows in forest of kerala, India. *Tectona grandis* species is placed in the flowering plant family Lamiaceae. This species also known as Burmese teak. Most important teak forests are found in Kerala, M.P, Rajasthan, Tamilnadu, Maharashtra, Orrisa, U.P, and also native to Sri Lanka, Thailand, Myanmar, Bangladesh, Malaysia, and Indonesia. Its height is more than 30m. Heartwood is brownish red in color and it becomes darker

while getting older. Its sapwood is whitish to pale yellowish brown in color. Its local name is Sagon. Wood density is 720kg/m cube. Flowers are small about 8 mm and flowering heads are about 45 cm long. Fruit is a drupe with four chambers. Each fruit may contain 0 to 4 seeds and there are 1000-3500 fruits/kg. Fruits mature about 4 months after fertilization. Red colored young leaves became dark green at maturity. Teak's fruit bears white colored flowers. Teak sheds leaves from November to January, fruits ripen from November to January and flowers appear from June to September. Insects pollination especially bees is required for this species. Teak's wood turns deep brown when exposed to sunlight and air. Teak withstands elements and has resistance to decay and termites. Teak is sensitizer for eye, skin, and

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respiratory irritation. Teak is used to make beams, columns, furniture, window frames, and doors. Another species *Albizia lebbeck* is also used for In-Vitro regeneration. It's a deciduous, perennial legume tree up to 25 m. Flowers are white, with numerous 2.5-3.8 cm long stamens. The fruit is a pod 15-30 cm long containing 6-12 fruits. The leaves are bipinnate 7.5-15cm long with one leaflet. It's flowering and seeding occurs in wet season. Its inflorescence are globular clusters of 16-40 white fragrance flowers. Wood of lebbeck is used for construction, furniture, and veneer and also it has many medicinal properties.

Thomas Hunt Morgan appeared to have been the first person to use totipotency. Hanning (1904) initiated a new line of investigation involving the culture of embryo and embryogenesis. Kotte and Robbins (1922) postulated that true tissue culture could be made easier by using meristematic cells such as root tip or bud. Gautheret (1934, 1935), White (1939) and Nobecourt (1939) cultured plant tissues for an unlimited period using media enriched with auxins. Harold Norman Moldenke published new descriptions of four forms of *Tectona grandis* species in the journal Phytologia.

**Material and Methods:** Explant for in-vitro growth must be 2-4cm it may be apical bud, root or shoot tip, ovule, anther, and an embryo. Explants must be sterilized before use. Shoot/root/bud regeneration of explant *Tectona grandis* requires MS media. After preparing media it can pour into test tube/ bottles and autoclave for 30 min. Inoculation of explant can be done over the flame and after sealing kept in culture room. Contaminated culture is removed immediately and after that sub culturing has to be done and growth should be measured time to time. In this study we included two species 1. *Tectona grandis*, and 2. *Albizia lebbeck*. In *Tectona grandis* species it was noticed that when explants were washed for 30 min the phenol were 90%, 1 hrs treatment 80%, and 2 hrs 75%. When explant were exposed for 3 -5 hrs the phenol was not reported in culture.

Likewise, the in-vitro culture response in correlation with phenol was observed 75% for 3 hrs, 80% for 4 hrs, and 100% for 5 hrs.

Table No. 1: Duration for reducing phenolic compounds using running tap water:-

Timing	Response %	Remark Phenol
30 min	-	90 %
1 hr	-	80 %
2 hr	-	75%
3 hr	75%	-
4 hr	80%	-
5 hr	100%	-

In *Albizia lebbeck* species it was observed that when explant were surface sterilized with  $HgCl_2$  for different time duration 100% free cultures were established when the explants were exposed 3 min, 4 min, and 5 min. For the successful invitro regeneration of explants of these species running tap water (RTW) and  $HgCl_2$  surface sterilizer should be used as well as growth regulators BAP (Benzyl aminopurine) & IAA (Indole 3 acetic acid) also supplemented.

Table no. 2: Different time duration for explant surface sterilized with  $HgCl_2$

Treatment During (min)	Rate Of Contamination After 10 Days	% of contamination free explants after 10 days
1 min	80 %	10 %
2 min	55 %	25%
3 min	-	100%
4 min	-	100%
5 min	-	100%

#### Result and Discussion:

**Species:** *Tectona grandis*- The explants of the species contains lots of phenolic compound and these compound arrest the growth explants under invitro conditions. An experiment was led out for reducing the phenolic compounds from explants through running tap water, and it was noticed that when the explants were washed for 30min the phenol were present 90% under culture conditions. In-vitro growth response various combination and concentration of plant growth regulators BAP & IAA.

**Species:** *Albizia lebbeck*- It was observed that when the explant were surface sterilized with HgCl<sub>2</sub> for different time duration 100% free cultures were established when the explants were exposed 3,4,5 min. Invitro growth response various combination &concentration of plant growth regulators BAP & IAA.

**Conclusion:** In the present invitro study of *Tectona grandis* species and *Albizia lebbeck* study found that the explant of the species contains lots of phenolic compounds and these compounds arrest the growth of explants under invitro condition. It was interestingly noticed that when medium was supplemented with BAP 4.0 mg/l and IAA+BAP (1+3) mg/l showed excellent morphogenesis response in leaves of shoot multiplication. Thus, other combination and concentration of PGR in BAP 4.0 mg/l and IAA+BAP (1+3) mg/l and BAP 3mg/l showed moderated morphogenetic response.

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