

Review: Micropropagation and Genetic Assessment of *Litsea Glutinosa*

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Abstract- *Litsea glutinosa* (Lour) C.B. Robinson is a member of family *Lauraceae* and it is small tree commonly known as Maida lakdi. It is a medicinal plant of immense pharmaceutical value. The species is critically endangered due to its indiscriminate collection as raw material for pharmaceutical industry, where it is used for manufacturing drugs for pain, arousing sexual power and in treatment of diarrhea and dysentery etc. It was distributed throughout Madhya Pradesh but due to over exploitation it becomes endangered now. An attempt has been made for development of in vitro propagation procedure for the species. It is found through in India such as Andhra Pradesh, Madhya Pradesh, Chhitarh, Orissa, Western ghat and outer Himalayas. In Madhya Pradesh this species has been reported in Hosangabad, Chhindawara, Anuppur, Mandla Balaghat Satna and Rewa districts in mixed forest areas, along with streams and hilly slopes.

Keywords- *Litsea glutinosa* (Lour) C.B., Propagation

I. INTRODUCTION

Litsea glutinosa (Lour) C.B. Rob. (Hindi: Maida lakri) is an evergreen tree of medium size, which grows to a height of about 25 m. Found in mixed primary and secondary forest and thickets throughout India and in the outer Himalayas (Kirtikar and Basu, 1981). This species is critically endangered (Reddy and Reddy 2008). The conventional propagation is hampered due to low seed viability and no rooting of vegetative cuttings (Rabena, 2010). The Laurels are economically very important as sources of medicine, timber, nutritious fruits spices and perfumes. Different parts of these plants are famous for traditional medicines (Z.Y. Wu, P.H. Raven, D.Y. Hong, 2008). Western Ghats are using the leaves extract and the aromatic oil from the seeds for the treatment of rheumatic pain. Its barks and leaves are also used as a demulcent and mild astringent for diarrhoea and dysentery, the roots are used for poulticing sprains and bruises (Yung-chien Tseng et.al, 1982). The leaves were reported for the treatment of the spontaneous and excessive flow of semen in young boys (Kirtikar and Basu, 1981). Recently, research disclosed that the bark extract of *L. glutinosa* significantly showed analgesic effect on mice and the results justified the reported uses in rheumatism (Pattari Lohitha et.al, 2010). Some alkaloids from the leaves and barks of *L. glutinosa*. Megastigmane diglycoside, (6S, 7E, 9R)-roseoside; (7'R, 8'R)-3, 5'-dimethoxy-9,9'-dihydroxy-4,7'-epoxylignan-4'-b-D-glucopyranoside; (7'R,8'S)-dihydrodehydrodiconiferyl alcohol-9'-O-b-D-xylopyranoside; and Pinoresinol-3-O-b-D-glucopyranoside

were reported from the EtOH extract of *L. glutinosa* leaves and twigs (Yun Song Wang et.al, 2011). A new 2'-Oxygenated Flavone Glycoside, named Glutin was isolated from the leaves extract of *L. glutinosa* (Wang YS et.al, 2010).

Tannin, β -sitosterol, and actinodaphnine are reported to be the common constituents of the species; and other constituents known are: Boldine, norboldine, laurotetanine, n-methylaurot etanine, n-methylactinodaphnine, quercetin, sebiiferine, litseiferine etc.

(Chatterjee A, 1994).

The leaves of *L. glutinosa* possess antibacterial, cardiovascular activities

(Chomkamon Ubonnucha et.al and Kar A et.al, 1970).

Antinociceptive property of leaves extract of *Litsea glutinosa* was evaluated by abdominal writhing and Tail flick methods using mice. Acetyl salicylic acid was used as the standard reference. This investigation suggested that the ethanol extract of leaves of *L. glutinosa* has significant antinociceptive property and supported the ethnomedicinal claims of *L. glutinosa*. (Krishna V et al. 2013)

Plant profile:

Title of plant	: <i>Litsea glutinosa</i>
Family	: Lauraceae
Synonyms	: Moidalatki, vasa. Garbijaur, kurkuchita
Parts used	: Bark

II. REVIEW

A. Medicinal values:

Anti-inflammatory activity of *Litsea glutinosa*:

Devi and Meera (2010) identified the medicinal values of the *Litsea glutinosa*. *Litsea glutinosa* acts as an anti inflammatory agent. *Litsea glutinosa* ointment is used to cure the effect of healing. This category of ointment is also used to cure the animal disease. *Litsea glutinosa* plays an important role in curing the disease for both the human and the animals. This *Litsea glutinosa* reacts with methanol to cure the lot of animal diseases based on the histamine and carrageenan induced paw edema method.

Choudhury et.al (2012) studied the importance of the medicinal plants which is used to cure various non curable skin diseases. The types of ethno medicinal plants are useful for different tribes. Ethno medicinal plant includes the *Litsea glutinosa* which has the tendency to cure the various types of skin diseases. Authors have pointed that the *Litsea glutinosa* is used in the treatment of skin diseases such as infection, boils and the inflammation. Authors also have pointed that the crude extraction from *Litsea glutinosa* leaves is applied in the external area to cure the inflammation of the skin.

Singh et.al (2014) identified the traditional medicinal knowledge of minor fruits which is taken as a medicine in Manipur. *Litsea glutinosa* leaves and barks are used in the treatment of cut and injuries for early clotting of blood and sprain of muscles area. Authors have pointed that the fruits of medicinal plants are playing an important role in the treatment of non curable diseases and hence it is mostly preferred by the tribal people more than the urban people. This *Litsea glutinosa* has an anti-inflammatory effect in the treatment of wound boils.

Azad et.al (2014) studied about the medicinal plants of the santal tribal healer in Bangladesh. Authors identified that the *Litsea glutinosa* cures the skin inflammation. It also paves an important role in providing the treatment in related to the bone fracture, cuts and wounds and also the sprain. The bark of *Litsea glutinosa* is soaked in water and this water provides the reddish gum which is further used to cure the fracture of bone and the sprain. Authors have pointed that the medicine based on the *Litsea glutinosa* is belong to the Indian tradition used to prevent the skin inflammation to the human. *Litsea glutinosa* is used by the santal TMP to cure the fracture of bones.

Antioxidant activity of *Litsea glutinosa*:

Sharma, Gaur and Painuli (2011) identified the conservation status of some important plants of Uttarakhand in India. Herbaceous plants are playing an important role in the conservation of biodiversity. Authors have collected the various samples by using the different floras and the

manuscripts. They also have investigated that the conservation status of the endangered ones and the herbaceous type of flora. Authors have pointed that the species of *Litsea glutinosa* and its conservation status. The *Litsea glutinosa* tree and Bark has a lot of medicinal values to cure the various types of non curable diseases. Authors finally have pointed that the *Litsea glutinosa* is a rare case of herbaceous plant which has a lot of medicinal values to cure the various ailments. This type of species acts as an anti oxidant agent in the treatment of various non curable diseases.

Rumzhum, NN et.al (2013) conducted research on the antioxidant and antinociceptive properties of *Litsea glutinosa* to comprehend and justify its medicinal use in the traditional medicine constituents. They evaluated the methanolic extract from *Litsea glutinosa* to measure it's in vitro antioxidant activity. This was done by calculating the total antioxidant capacity in the extract while conducting other activities of hydrogen peroxide scavenging and nitric oxide scavenging. Also, the acetic acid stimulated writhing model of mice was tested by reducing the power test and in vivo antinociceptive effect of the methanolic extract. The observations from these activities announced the noticeable presence of the antioxidant property in the extract. This conclusion was drawn when compared with the ascorbic acid that is used as a standard acid for attaining analgesic effect. The research concluded that the attributes of antinociceptive and antioxidant have proved to be beneficiary in the traditional use of *Litsea glutinosa*.

Upadhyay (2014) studied the ethno-botanical study which includes the *Litsea glutinosa*. These plants are mostly used in the village side in order to cure the various diseases. Author has pointed that the *Litsea glutinosa* is act as an anti oxidant agent for various illness. These types of plants are operated by the inhabitants to cure the various types of ailments. Authors has pointed that the *Litsea glutinosa* is found in the range of timli forest of Uttarakhand and hence it has lot of medicinal values. Author has pointed that the *Litsea glutinosa* leaves are used in the treatment of dysentery and diarrhea.

B. Micropropagation of *Litsea glutinosa*:

Prusti A et.al (2008) conducted a preliminary phytochemical study of the ethanolic extracts of three plants regarding their in vitro antibacterial activity. These plants were collected from the tribal belt of Orissa in India. All these selected plants were gifted with ethnomedicinal uses. The three plants that were investigated are *Litsea glutinosa*, *Vitex peduncularis* and *Elephantopus scaber*. After conducting preliminary phytochemical analysis, it was found that *Litsea glutinosa* consisted of carbohydrate, alkaloid and tannin constituents. *Vitex peduncularis* consisted of flavonoid, alkaloid, tannin and saponin. Whereas, *Elephantopus scaber* comprised of saponin,

alkaloid, flavonoid, glycoside and steroid constituents. The extracts of these three plants were taken, and screening was performed of their in vitro antibacterial activity against a selected portion of urinary tract infection. This infection is home to several pathogens like Staphylococcus, Pseudomonas, etc. The obtained results confirmed that all the extracts of the three plants exhibit good inhibitory activity against all the pathogens of the urinary tract infection. The inhibitory activity of the extracts was then compared with standard antibiotics which showed that these extracts have good resistance to the infection. The antibacterial activity of the extracts showed that *Litsea glutinosa* had the highest activity against Staphylococcus pathogen and lowest activity against *P. aeruginosa* pathogen. This activity was observed due to the presence of phyto constituents in their extracts. The extract of *Elephantopus scaber* showed better resistance to infection as compared to the others.

Rabena (2010) proposed a study on propagation techniques of endangered sablot (*Litsea glutinosa*) Lour.C.B.Rob. Sablot also referred as *Litsea glutinosa* Lour.C.Rob. also referred as *Litsea sebifera* is a medium sized evergreen, woody tree, 20 to 25 metres high with cream flowers usually growing on Jan to Feb with the diameter of fruit of 10 to 15 millimeter. This study aimed at predicting the *Litsea glutinosa* growth using varied kinds of planting stocks. It was also enhanced towards the determination of former performance growth of varied stocks of planting in four soil media. Finally it targeted to suggest the most proper nursery techniques of propagation for the *Litsea glutinosa* conservation. The germination of seed was earliest after the planting in a clay foam soil type at 60 percent viability of germination. The sablot growth in length of leaves terms was bigger using clay loam. There was no essential differences on sablot young leaves width in varied kinds of soil.

Lohita et.al (2010) proposed a study on phytochemical screening and evaluation of in vitro anti bacterial activity of *L.glutinosa* bark ethanolic extract. The *Litsea glutinosa* medicinal plant's in-vitro antibacterial ethanolic extract activity were verified against multidrug resistant bacteria involving *Bacillus cereus*, *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa* separated from clinical specimen. The *Litsea glutinosa* ethanolic extract revealed antibacterial activity when contrast with Gentamicin. Phytochemical studies on *Litsea glutinosa* bark extract showed the existence of saponins, alkaloids, tannins and cardiac glycosides.

According to the study of Pradeepa (2013) antinociceptive property of *Litsea glutinosa* leaves extract was estimated by tail flick and abdominal writhing methods using mice. Acetyl salicylic acid was used as a standard reference. The leaves ethanol extract was verified at three varied concentrations 100 milligram/kilogram, 200

milligram/kilogram and 300 milligram/kilogram body weight orally. The outcomes revealed that among the three varied dosages the 300 milligram/kilogram dosage essentially indicated the nociception induced by acetic acid when contrast to 100 milligram/kilogram and 200 milligram/kilogram dosage. This study examined that the *litsea glutinosa* leaves ethanol extract has essential antinociceptive property and assisted the *litsea glutinosa* ethnomedicinal claims.

According to the study of Haque et.al (2014) the antibacterial, propagation activity and phytochemical profiles of *L.glutinosa* have been concentrated. The viable seed percentage was 70 by tetrazolium-chloride technology while rates of germination were 70, 55, 75 and 20 percent in clay loam, clay loam soil, compost and sand, compost respectively. The basal cutting propagation in clay loam soil under the sun was rapid than cuttings of apical stem. Phytochemical profiling of the *Litsea glutinosa* bark revealed the existence of several secondary metabolites involving terpenoids and steroids.

C. Genetic Variability of *Litsea glutinosa*:

Diversity of *Litsea glutinosa*:

Yan Li et.al (2011) conducted their research for the characterization of a new megastigmane diglycoside compound of *Litsea glutinosa*. The existing studies of phytochemical activity in the species of *Litsea* have determined the presence of aporphine alkaloids, butanolides, and sesquiterpenes that are structurally distinct and biologically active. *Litsea glutinosa* is believed to be an evergreen tree in China. It is also referred to as Chan Gao Shu in the country. To cure the diseases such as diarrhea and dysentery, the leaves and twigs of *Litsea glutinosa* are used as a medicinal drug and mild astringent. The roots of this tree are also utilized to fight against sprains and bruises. The previous phytochemical studies have indicated the isolation of an arabinoside, an abscisic acid derivative and lignans, aporphine alkaloids and a flavone glycoside in the tree. This study was conducted to characterize a new megastigmane diglycoside compound along with some other known compounds such as roseoside, glucopyranoside and pinoresinol. These compounds were revealed from the EtOH extract of leaves and twigs of *Litsea glutinosa*. The new compound, megastigmane diglycoside was tested and evaluated for cytotoxic activities against five tumor cell lines. This compound occurs naturally in the extracts, and its derivatives are an expanding class that is not yet tested for its medicinal properties. Several derivatives with cytotoxic effects, anti-proliferative and anticancer properties were evaluated by conducting several oxidation and glycosylation steps. The new megastigmane diglycoside compound was tested for its cytotoxic effects to find out if it can be utilized as a medicine for curing tumor. For this purpose five tumor cell lines were taken, colon cancer, hepatocellular

carcinoma, lung cancer, breast cancer and myeloid leukemia cells. The research concluded that this compound is inactive against the five tumor cell lines.

Mozaffar (2012) investigated the ethanolic extraction of *Litsea Glutinosa* (Lour.). *Litsea glutinosa* possess good analgesic activity with 76.65 percent of inhibition. The pounded seed of *Litsea glutinosa* is used to cure the boils. The bark of *Litsea glutinosa* is act as the demulcent and the astringent. The phytochemical studies of *Litsea glutinosa* includes many numbers of categories such as arabinoxylan isolation, derivative of abscisic acid, lignans, alkaloids of aporphine and flavone glycoside. Author has pointed that the *Litsea glutinosa* is belong to the species category and hence it is under the plantae kingdom. The germination of *Litsea glutinosa* is not very quick. This tree is also called as the evergreen or deciduous tree. Male flowers of *Litsea glutinosa* have imperfect petals. Leaves of *Litsea glutinosa* are arranged like a blunt and flattened above. The extraction of petroleum ether and ethanolic ether are showing the better result against *Pseudomonas aeruginosa*. Author also has pointed that the *Litsea glutinosa* has the good analgesic activity over the Diclofenac Na.

According to Parikh and Rangrez (2012), the bark powder of *Litsea glutinosa* is used in the treatment of various non curable diseases. Authors have analyzed that the bark powder reaction with the methanolic and it is further subjected to the phytochemical constituents of TLC and GC MS. *Litsea glutinosa* is mutually related with alkaloids which are abundant by the bark for the analysis TLC and GC MS. There are many numbers of tests conducted in the *Litsea glutinosa*. Some of the tests are Flavonoid, Terpenoids, Phenol, Tanin, Saponin and Glycosides. Various strategies are followed to test the diversity of *Litsea glutinosa*. Piperizine derivatives are extracted from the plants to produce pharmacological drugs. The ejaculation latency is increased to obtain the effect of aphrodisiac towards the male rats. Authors also have analyzed that the flavonoids derivatives are obtained from this *Litsea glutinosa*.

Rao, Nath and Chetty (2012) investigated the anatomical studies of *Litsea glutinosa*. Physicochemical, histological characters and micrometric determinations of *Litsea glutinosa* are investigated by the authors. Root, stem, bark and leaf of *Litsea glutinosa* are useful for the extraction of the medicine. Figure magnification is indicated by the scale bars to test the micro particles of the *Litsea glutinosa*. The ground tissues of *Litsea glutinosa* are consists of two or three layers of parenchymatous cells which are circular in shape. This *Litsea glutinosa* is consists of collateral vascular tissues where as the vascular strand is occupied the midrib portion of the structure. Authors have pointed that the *Litsea glutinosa* has the collateral xylem which is very small in shape. This portion is simply called as the Lamina of the *Litsea glutinosa*. The layer of *Litsea glutinosa* consists of

stomata and epidermal cells, venation pattern and crystal distribution. The anatomical structure of *Litsea glutinosa* is associated with the outer pith cells. The structure of pith cells are compact and it is circular in shape. Some of the anatomical characterizations of root of *Litsea glutinosa* are periderm, cortex, secondary phloem and xylem. This quantitative analysis of the *Litsea glutinosa* is useful for setting the standards for crude drugs.

Joshi and Pant (2012) studied the ethno botanical thesis of common plants among the tribal peoples. This study is useful for the health care community and development of drug in order to reduce the illness of the people. The family name of *Litsea glutinosa* is lauraceae. Authors have pointed the habit of *Litsea glutinosa* as tree and hence it is also called as Maida. The bark of the *Litsea glutinosa* is used in the treatment of bone fracture and it is considered as the rare species. Majority of plant preparation is based on their seed, fruits, leaves, flowers and bark. *Litsea glutinosa* is used in the treatment of gonorrhea and it is increasing the strength of the body. This therapy is considered as the traditional method to cure the illness.

Manna et.al (2013) studied the relationship between the helminthostachys zeylanica and the *Litsea glutinosa*. This is considered as the ancient genetic resources which contain the potential habitats and conservation resources. The *Litsea glutinosa* are growing with the temperature of 7 degree Celsius to 39 degree Celsius. Large numbers of samplings are taken by the authors from the barringtonia swamp forest in order to examine conservation and covariance analysis.

Fawa et.al (2014) studied the root suckering effect of the multipurpose tree species (MPTS). *Litsea glutinosa* is based on the natural root suckers of which its distance ranges from the 0.5 to 25 m. This *Litsea glutinosa* could establish very far from its mother tree. Authors have pointed that the height of the natural suckers are far different from the artificial suckers. Root suckering aptitude is varying between the same and different species. This root suckering capability of the *Litsea glutinosa* can be determined by the different types of genotypes. These types of vegetative propagation species are useful for the treatment of illness in the rural areas more when compared with the urban areas. Authors also have pointed that this *Litsea glutinosa* is used for the multiple usage and the services. This species are creating the conservation of bio-diversity to the required region. The natural root of *Litsea glutinosa* has the tendency to disconnect itself from the mother-tree on natural conditions.

Sannigrahi (2014) studied the effort of exploring the traditional knowledge of different species among the tribal peoples. *Litsea glutinosa* consists of leaves, barks, seeds, fruits and flowers. The tk holds the therapeutic value of which the bark of *Litsea glutinosa* is used in the treatment of body ache. The local name of *Litsea glutinosa* is harila. This

Litsea glutinosa has the reproduction capabilities and it also contains the different edaphic factors and the morphology characteristics.

Ci et.al (2008) identified the genetic variation of *Litsea glutinosa* by using the analysis of AFLP and ISSR. *Litsea glutinosa* exhibits high genetic diversity at the level of species than the other species. This category has the highest conservation priority. The genetic diversity is estimated by the Bayesian method which is considered as the rare and fragmented species. Authors have pointed that this *Litsea glutinosa* belongs to the family of lauraceae. Authors also have pointed that the Bayesian estimator of genetic variability is calculated based on the four models in order to calculate the characteristics of lauraceae family. The lauraceae family is highly fragmented due to the activity of human beings. This family has a lot of hereditary characteristics which are used as a medicine for various non curable diseases. Authors also have analyzed the breeding system based on the RAPD's which is used to indicate the out breeding of lauraceae.

Khatun, Amina et.al (2014) investigated fourteen extracts of eleven medicinal plants for their cytotoxicity. The plant that shows notable cytotoxicity can be inspected for their bioactive compounds and their mode of action. The cytotoxic compounds can be identified by isolating them those plants that exhibit significant amount of cytotoxicity. The mode of action of these plants can be clarified by applying suitable techniques. The effectiveness of the cytotoxic drugs is unpredictable and the new compounds revealed from the plants may help in the production of new drugs for preventing cancer. Among the eleven plants, the leaves of *Litsea glutinosa* showed the lowest cytotoxicity whereas the highest cytotoxicity was found in *H. spinosa* seeds. Though the leaves of *Litsea glutinosa* are traditionally used in the treatment of tumor, they had the lowest cytotoxicity activity.

D. Prevention of *Litsea glutinosa*:

Hosamath (2011) has mentioned in their study that *Litsea glutinosa* is available widely throughout India and is also referred as Laurel in English and as Medhasaka in Sanskrit belonging to the lauraceae family. The *Litsea glutinosa* bark powdered material was retrieved individually in enhancing polarity order from ethanol, petroleum ether and to finally water. After the extracts retrieval were subjected to lyophilization to acquire dry extract and preserved in aseptic condition. The *Litsea glutinosa* bark is one of the most familiar native drugs is regarded to be capable of relieving pain, better for stomach and emerging sexual dysentery. The phytochemical constituents of *Litsea glutinosa* bark revealed efficient antifungal and antibacterial activity.

According to the study of **Bhowmick et.al (2014)** two varied methods were used for testing the possible central and peripheral analgesic impacts of *Litsea glutinosa* leaves

namely acetic acid induced writhing test and hot plate test in mice respectively. The hot plate test was carried out following the Asongalem et.al (34) method. Pain reflex in response to thermal stimulus was estimated using a Le7406 hot plate. Mice were placed in 10 varied groups consists 6 mice in every group and were treated intragastrically before 30 minute of the test. Similarly the analgesic activity of crude methanolic extract was undertaken using acetic acid induced writhing model in mice. The control vehicle and standard drugs were orally administered before 30 min intraperitoneal administration of 0.7 percent acetic acid.

J. Prakasa Rao et.al, (2014) conducted a study of the medicinal plants found in the tropical forest of Maredumilli in Andhra Pradesh, India. The excessive exploitation and the collection of several plants with medicinal properties have led to their extinction. It has been revealed that 90% of the raw materials obtained from the medicinal plants are used in the herbal industries of India. The natural habitat is also exported outside India. Due to this excessive usage of such plants, the degree of threat to the natural population of medicinal plants has remarkably increased. The demand for medicinal plants in drug and pharmaceutical industries has elevated and in return lead to the over-exploitation of many species. The over and un-skilled harvesting has caused the extinction of several medicinal plants. In the Maredumilli area of Andhra Pradesh, several medicinal plants were found. *Litsea glutinosa* was among the other plants that were close to extinction. It belongs to the lauraceae family of species and is addressed as pangiachina locally. These evergreen trees are up to a height of 20 m with corky barks, aromatic leaves and globose fruits that are purple when ripe. The researchers in their study revealed its medicinal uses. The boiling of the bark of *Litsea glutinosa* is used for chest pains. Its stem barks are also utilized for treating the fracture of bones. The paste of these stem barks are also made into pills. The intake of such pills twice a day for 9 days can give relief from leucorrhoea. The researchers also proposed the dire need for organizing conservation programs to save these plants from getting extinct.

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