



A Review Article on Phytochemical Investigation and Pharmacological Activity of Various Parts of *Dalbergia Sissoo*.

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ABSTRACT

Current study discussing the ethnobotanical importance of the different part of the plant *Dalbergia sissoo* its pharmacological activity and various formulation. Nature is like a treasure of medicine. From last thousands year nature give us several type of medicines which we use for the treatment of different type of diseases and valetudinarism. *Dalbergia sissoo* is one the most crucial/significant plant with full of medicinal attribute. *Dalbergia sissoo* (Fabaceae) has reported to possess different type pharmacological activity such as antinociceptive activity, anti-coagulant activity, antibacterial activity, anti-inflammatory activity, memory enhancing activity, antiulcer activity, nephro-protective activity, anti-spermatogenic activity, analgesic activity, antipyretic activity, antitermitic activity, antilithiatic activity, antidiabetic activity, anthelmintic activity, immunomodulation activity and so on. This study divulging the medicinal important and all pharmacological action of the different part of the plant *Dalbergia sissoo*.

Keywords: *Dalbergia sissoo*, pharmacological activity, medicinal important, ethnobotanical, valetudinarism.

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INTRODUCTION

In nature there are several plants are exist which are highly effective to treat different type of diseases. Drugs that are obtained from plants are used in traditional methods of treating the diseases worldwide. *Dalbergia sissoo* belongs to Fabaceae family of flowering plants which is popularly known as 'Indian Rose Wood'/'Shisham'.¹ 300 out of 25 species of dalbergia are found in India. Various species of Dalbergia are significant timber trees, assess for their decorative and fragrant wood, rich in aromatic oils. Dalbergia generic name credit to Swedish brothers, Nils and Carl Dalberg, they lived during 18th century.² They are grow dexterously on porous soil containing sand, pabbles and boulders.³ Dalbergia distributed throughout the India mainly in Bihar, Bundelkhand and Central India. *Dalbergia sisso* is very essential plant species for afforestation program because of extremely good growing property.⁴ *Dalbergia sissoo* is broadly used in folk medicine for several diseases. Several biologically active compounds have been isolated from *Dalbergia sissoo* such as flavones, isoflavones, quinines and coumarins. Delbergia also contains tectoridin, caviunin-7-O-glucoside, iso-caviunin, tectorigenin, dalbergin, bio-CHANIN-A, and 7-hydroxy4-methylcoumarin. The heartwood gave 3,5-dihydroxy-trans-stibene

biochanin A, dalbergichromene, dalbergenone and iso-dalbergin5.⁵

Botanical description- Shisham is reproduce by seeds, it is caducous tree(fig.1). The height of sisso is up to 25m. with grey – yellow trunk and 2-3 m in diameter but usually smaller. Leaves are 15 cm. long and ovate and five alternate leaflets with fine point tip leathery in texture. They are broad. And flower are whitish to pink in colour, fragrant and length is about 1.5cm. When it grown in open it's trunk in crowded it's pods contain approx 4-5 bean shaped seeds.⁶ They produce sucker by the help of taproot and various roots which present on surface. There are some bacteria present on node of roots which makes the plant able to fix the atmospheric nitrogen. When leaves decompose they increase soil fertility by providing extra - nitrogen , iron , organic carbon, potassium.¹

Table 1: Taxonomical classification of *Dalbergia sissoo*

Kingdom	Plantae
Class	Magnoliopsida
Sub family	Foboideae
Species	D. sisso
Scientific name	<i>Dalbergia sissoo</i>
Genus	<i>Dalbergia sissoo</i>



Figure 1: *Dalbergia sissoo* plant



Geographical Distribution²

Exotic Range – Afghanistan, Bangladesh, Bhutan, Pakistan, India

Native Range – Kenya, Sudan, Thailand, Us

Chemical constituent- Leaves contain isoflavone-o-glycoside

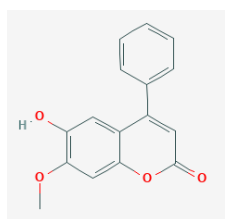
Stem barks contain dalberginone, dalbergin, methyl dalbergin.²

Flowers have biochenin A, 4- dimethyl tectorigenin, and 7-O-methyl tectorigenin.

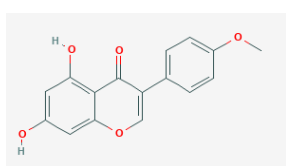
Green pods consist of Mesoinisitol, 7-O-methyl tectorigenin.

Heartwood contain dalbergin , Nordalberginon ¹

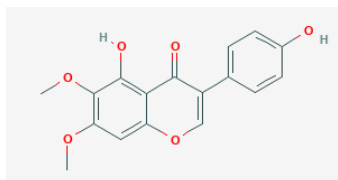
It is concluded that the Qualitative phytochemical analysis of the ethanolic extract delbergia sissoo bark contained carbohydrates, phenolic compounds, flavonoids and tannins.⁷



Dalbergin



Biochenin A



7-O-methyl tectorigenin

Table 2: Vernacular name ²

Hindi	Shisha , sissoo , sissu
English	Indian rose wood ,bombay black wood
Manipuri	Sissu
Sanskrit	Aguru , shinshpa
Tamil	Gette , nukku kattai , sissuti
Spanis	Sissu
Bengali	Sitral , sisu
Thai	Du- khaek
Nepali	Sisso

Uses –

Different parts of *Dalbergia sisso* have traditional uses to treat various diseases such as:

Seeds: *Dalbergia sissoo* seed oil is used in the treatment of blue itching, burning on the skin, and scabies.(Fig 2)

**Figure 2:** *Dalbergia sissoo* seeds

Bark: Powdered bark and leave decoction used to treat gonorrhea. Leprosy can be treat by bark decoction (Fig. 3)

**Figure 3:** *Dalbergia sissoo* bark

Sisso nectar: Sisso nectar is used in treatment of various feve.¹

Leaves: Warmth leave tie on breast reduce the breast swelling, paste of approx 10 leaves with palm candy help to reduce the copious menstruation, leave decoction also used treat pimple.(Fig 4)

Leaves are mainly used as an antipyretic, anthelmintic, analgesic²

**Figure 4:** *Dalbergia sissoo* leaves

According to Ayurveda– Leaf juice are used in eye ailment.

Wood and bark are used abortifacient, anthelmintic, antipyretic, aperitif, refrigerant, expectorant, aphrodisiac Anti-inflammatory effect , Skin ailment.⁸

Table 3: *Dalbergia sissoo* marketed preparation/product

S.NO.	Product Name	Content/Ingredient	Manufacturer	Uses
1	Reunion Tablet	<i>Dalbergia sissoo</i> extract Cissus Quadrangularis extract	Pharmanza herbal	bone fractures, weak bones, and joint pain Accelerates the healing of fractures and bone disorders
2	Bonefix- Forte tablet	Cissus Quadrangularis, Withania Somnifera, <i>Dalbergia sissoo</i>	Swastik life sciences	diabetes, high cholesterol, hemorrhoids bone health
3	<i>Sheesham churna</i>	<i>Dalbergia sissoo</i> leaves	Planet Ayurveda,	Maintains the healthy body weight
4	Safi Natural blood purifier	<i>Dalbergia sissoo</i> , Sana, Revand Chini, Neem, Chiraita and Tulsi.. etc	Hamdard Laboratories India	Purifies blood Improves digestion Cures acne Beautifies skin

Phytochemical Screening⁶

The various extract of the *Dalbergia sissoo* plant were subjected to phytochemical investigation which shows the presence of various pharmacological active components.

Alkaloids, carbohydrate, Flavonoids, Glycoside, triterpenoids and steroids are present while Protein and amino acids, Tannin and phenolic compound, triterpenoids and steroids were absent. (Table 4)

Table 4: Phytochemical screening

Plant part	Extract	Pharmacological activity reported	Reference
Bark	Ethanolic	Antinociceptive Activity	9
Bark	Aqueous And Alcoholic Extracts	Anti-Coagulant Activity	10
Leaves	Citric Acid, Ethanol, Methanol, Pet Ether Extracts	Antibacterial Activity	6
Bark	Ethanolic	Anti-Inflammatory Activity	7
Leaves	Ethanolic	Memory Enhancing Activity	11
Bark	Ethanolic	Antiulcer activity	12
Leave	Ethanolic	Nephro-Protective Activity	13
Stem Bark	Ethanolic	Anti-spermatogenic activity	14
Bark	Ethanolic	Analgesic Activity	15
Leave	Ethanolic	Antipyretic Activity	16
Wood	Ethanolic:Toluene	Antitermitic Activities	17
Leave	Ethanolic	Antilithiatic Activity	18
Leave	Ethanolic	Antidiabetic Activity	19
Bark	Ethanolic	Anthelmintic Activity	20
Leave	Methanolic	Immunomodulation Activity	21

Table 5: Pharmacological Activity

Plant part	Extract	Pharmacological activity reported	Reference
Bark	Ethanolic	Antinociceptive Activity	9
Bark	Aqueous And Alcoholic Extracts	Anti-Coagulant Activity	10
Leaves	Citric Acid, Ethanol, Methanol, Pet Ether Extracts	Antibacterial Activity	6
Bark	Ethanolic	Anti-Inflammatory Activity	7
Leaves	Ethanolic	Memory Enhancing Activity	11
Bark	Ethanolic	Antiulcer activity	12
Leave	Ethanolic	Nephro-Protective Activity	13
Stem Bark	Ethanolic	Anti-spermatogenic activity	14



Bark	Ethanollic	Analgesic Activity	15
Leave	Ethanollic	Antipyretic Activity	16
Wood	Ethanollic:Toluene	Antitermitic Activities	17
Leave	Ethanollic	Antilithiatic Activity	18
Leave	Ethanollic	Antidiabetic Activity	19
Bark	Ethanollic	Anthelmintic Activity	20
Leave	Methanollic	Immunomodulation Activity	21

Antinociceptive Activity

Phytochemical screening and antinociceptive activity of ethanolic extract of *Dalbergia sissoo* (Roxb.) bark has been conducted by Mohammad Asif et al in 2011. Extract doses, 300 and 500 mg/kg not showed any response to alter the pain but at the dose range of 1000 mg/kg showed significant effect at 1hr. It is investigated that flavonoids was present in *Dalbergia* species and antinociceptive activity might be possible due to presence of flavanoid.⁹

Anti-Coagulant Activity

Phytochemical screening and anti-coagulant activity of aqueous and alcoholic extracts of *Dalbergia sissoo* bark has been conducted by Wadeka Jyoti B et al in 2017. In vitro anti-coagulant activity of *Delbergia sissoo* extract were carried out by Quick's method at concentration of 100, 200 and 500 mg per dl. And the result was shown that clot lysis is increased as the concentration of sample is increased. From this study it is concluded that *Delbergia sissoo* have the anti-coagulant activity.¹⁰

Antibacterial Assay

Phytochemical screening and antibacterial activity of citric acid, ethanol, methanol, pet ether extracts of *Dalbergia sissoo* leaves has been conducted by H K I Singh Parmar et al in 2014. The different concentrations (2µg/ml, 5µg/ml, 100µg/ml) of *Delbergia sissoo* extracts were tested for antibacterial activity. Citric acid extract of *Dalbergia sissoo* was the most effective concentration due to it gave the Zone of inhibition.⁶

Anti-Inflammatory Activity

Phytochemical screening and anti-inflammatory activity of ethanolic extracts of *Dalbergia sissoo* bark has been conducted by Mohammad Asif et al in 2009. The different concentrations (300, 500, 1000mg/kg) of *Delbergia sissoo* extracts was tested for anti-inflammatory. Ethanolic extract of *Dalbergia sissoo* bark had the most potent anti-inflammatory activity at dose 1000mg/kg.⁷

Memory Enhancing Activity

Phytochemical screening and memory enhancing activity of ethanolic extracts of *Dalbergia sissoo* leaves has been conducted by Sayanti Sau et al in 2015. The different concentration of ethanolic leaf extract of *Dalbergia sissoo* (ELDS) (300, 450 and 600 mg/kg) was investigated for memory enhancing activity in mice. From this study was

concluded that ELDS increased the memory and learning activity in brain in animal.¹¹

Antiulcer Activity

Phytochemical screening and Antiulcer activity of ethanolic bark extract of *Dalbergia sissoo* (EBED) has been conducted by Sanjay Raj Baral et al in 2016. The different concentration of ethanolic bark extract of *Dalbergia sissoo* (EBDS) (250 and 500 mg/kg) was tested for antiulcer activity and from this study it is concluded that the Ethanolic Bark Extract of *Dalbergia Sissoo* is more potent antiulcer agent than leaf extract in their previous study and this activity is the result of some mechanism such as reduction in gastric acid secretion, antioxidant action, mucoprotection or gastric cytoprotection attributed by the presence of various secondary metabolites.¹²

Nephro-Protective Activity

Phytochemical screening and Nephro-Protective Activity of ethanolic leave extract of *Dalbergia sissoo* (ELDS) has been conducted by Rahul Saxena et al in 2016. Ethanolic leave extract of *Delbergi Sissoo* at different concentration (100 and 200mg/kg) was tested for nephroprotective activity. From this study it seemed that *Dalbergia sissoo* leave extract is capable to improve the kidney function against Gentamicin-induced nephrotoxicity.¹³

Anti-Spermatogenic Activity

Phytochemical screening and Anti-spermatogenic activity of ethanolic extract of *Dalbergia sissoo* Roxb. stem bark has been conducted by Neeru Vasudeva et al in 2011. In-vitro and In-vivo studies was carried out for anti-spermatogenic activity of ethanolic bark extract of *Delbergi Sissoo* at different concentration 1,3,5,10,20 mg/ml and 200mg/kg body weight respectively. This study concluded that ethanolic bark extract of *Dalbergia sissoo* exerted dose-dependent sperm immobilizing effects which is due to reduce motility and disrupt the membrane architecture of the sperm cell.¹⁴

Analgesic Activity

Phytochemical Investigation And Analgesic Activity Of Ethanolic Extract Of *Dalbergia sissoo* (Roxb.) bark has been conducted by Mojahid-ul-Islam et al in 2012. Ethanolic extract of *Dalbergia sissoo* at different dose 300 500 and 1000 mg/kg was tested for analgesic activity. This study concluded that *Dalbergia sissoo* bark extract exhibit marked analgesic activity.¹⁵



Antipyretic Activity

Phytochemical Investigation And Antipyretic Activity Of Ethanolic Extract Of *Dalbergia sissoo* (Roxb.) leave and bark has been conducted by Mamta Bhattacharya et al in 2016. At the different concentration of Ethanolic Extract of *Dalbergia sissoo* 300, 500, 1000mg/kg was tested for Antipyretic Activity. In conclusion, the present study demonstrated that *Dalbergia sissoo* ethanol extract of bark (1000mg/kg) has marked significant antipyretic activities.¹⁶

Antitermitic Activities

Phytochemical Investigation And Antitermitic Activities Of Ethanol: Toluene(2:1) Extract Of *Dalbergia sissoo* (Roxb.) wood has been conducted by Hassan Babar et al in 2016. Phytochemical investigation of Shisham reported the presence of alkaloids, carbohydrates, saponins, stilbenes, glycosides and steroids. Ethanolic:Toluene Extract of *Dalbergia sissoo* at the different concentration of (1.25, 2.5, 5.0, 7.5, and 10.0 mg/ml) was tested for antitermitic activity. The results of this study showed a positive correlation between extractive concentration and termite resistance.¹⁷

Antilithiatic Activity

Antilithiatic Activity and Phytochemical investigation of Ethanolic Extract of *Dalbergia sissoo* leave has been conducted by Bijauliya Rohit Kumar et al in 2018. At the different concentration of Ethanolic Extract of *Dalbergia sissoo* 100, 200mg/kg was tested for Antilithiatic Activity. The extract dose caused reduction of calcium, oxalates, phosphorus and creatinine in blood serum level. This study concluded that ethanol extract has marked antilithiatic effect.¹⁸

Antidiabetic Activity

Antidiabetic Activity and Phytochemical investigation of Ethanolic Extract of *Dalbergia sissoo* leave has been conducted by Pankaj Singh Niranja et al in 2010. At the different concentration of Ethanolic Extract of *Dalbergia sissoo* 250 and 500mg/kg was tested for Antidiabetic Activity. This study concluded that *Dalbergia sissoo* posses hypoglycemic action as it cause the significance reduction in blood glucose level.¹⁹

Anthelmintic Activity

Anthelmintic Activity and Phytochemical investigation of Ethanolic Extract of *Dalbergia sissoo* bark has been conducted Nitinkumar Upwar et al in 2011. Various concentrations of ethanolic extract of *Dalbergia sissoo* (10, 20, 50 mg/ml) was tested for anthelmintic activity. This study concluded that ethanolic extract of *Dalbergia sissoo* Roxb. bark have potent antihelmintic activity.²⁰

Immunomodulation Activity

Immunomodulation Activity and Phytochemical investigation of Methanolic Extract of *Delbergia Sissoo* leave has been conducted by Dixit Savita et al in 2018. Methanolic Extract of *Delbergia sissoo* DPPH free radical

scavenging activity and Nitric oxide radical scavenging activity was performed at different concentration (200-1000microgram/ml). This study concluded that *Delbergia Sissoo* possess antioxidant property and showed action as immunomodulator.²¹

CONCLUSION

This study is the evident that the different part of *Dalbergia sissoo* plant have various pharmacological action and abundant properties to treat diverse diseases. The main important thing about this plant is that it has less side effect even administered at high dose. Different type of formulations are also present in market.

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