ISSN 0976 – 3333

Available Online at www.ijpba.info

**International Journal of Pharmaceutical & Biological Archives 2014; 5(4): 1- 8**

**REVIEW ARTICLE**

# A Review on Recent Developments in the Research Area of *Dalbergiasissoo*

**Sayanti Sau*[1], Mukund Handral[2]**

[1]*P.G. Scholar, Department of Pharmacology, PES College of Pharmacy, 50 Feet road, Hanumanthanagar, Bangalore – 560050, Karnataka, India*
[2]*Assistant Professor, Department of Pharmacology, PES College of Pharmacy, 50 Feet road, Hanumanthanagar, Bangalore – 560050, Karnataka,India*

Received 02Apr 2014; Revised 22Jul 2014; Accepted 03Aug 2014

## ABSTRACT

In many developing countries, a large proportion of the population relies on traditional practitioners and their armamentarium of medicinal plants in order to meet health care needs.

In traditional medicinal plants, *Dalbergiasissoo*belonging to the family Fabaceae, an extremely popular plant is used to provide services to the landscape and environment and is commonly employed in agro-forestry. Various species of *D. sissoo*,are praised worldwide for their decorative and fragrant wood. Traditionally the tree has been used as expectorant, antipyretic, anthelmintic, aphrodisiac, abortifacient, emeticsetc. Very few herbal medicines have been explored for their scientific studies and proven for their efficacy and safety whereas many of them are still being used for traditional or holistic reasons.

The present review summarizes scientifically proven medicinal uses of *Dalbergiasissoo*, in past 15 years. The bark of *Dalbergiasissoo* has been proven to have antioxidant, anti nociceptive, antidiabetic and gastro protective activity.The leaves were shown to be effective in gonorrohea, pyresis, inflammation and pain. Recently leaves have also been reported to have neuroprotective and anti-osteogenic effect. The oil obtained from the seeds has been used to cure skin diseases. The powdered wood on external application was found to be effective against leprosy.

Past studies of *Dalbergiasissoo* does not provide enough evidence about its safety and efficacy.Thus, further investigation on *Dalbergiasissoo* has to be taken in account for the assessment of toxicity, safety and efficacy including the determination of other pharmacological and clinical effects of its active ingredients.

**Key words:** *Dalbergiasissoo*, Medicinal plant, Phytochemistry, Uses.

## INTRODUCTION

Medicinal plants have been recognized and used throughout human history. Plants have the ability to synthesize a wide variety of phytochemical compounds that are used to accomplish significant biological functions.[1]Herbal drugs are used in traditional methods of treating the diseases worldwide. Several types of medicinal plants exist in the nature and effective in several diseases. [2]Herbal medicine is a victory of popular therapeutic diversity. In recent times there has been a tremendous increase in the use of plant based health products in developing as well as developed countries, resulting in an exponential growth of herbal products worldwide. [3]

In order to obtain a cure for various illnesses, to experience new sensation, these plants have been fascinating since ancient times. This enables herbal medicines to be as effective as conventional medicines from last 15 years. The use of herbs to treat disease is almost universal among non-industrialized societies and is often more affordable than purchasing expensive modern pharmaceuticals.

Many species of *Dalbergia*are important timber plant, valued for their decorative and often fragrant wood, rich in aromatic oils. The most renowned of these are the Rosewoods, so-named because of the fragrance, but several other valuable woods are yielded by the genus. The generic name Dalbergia honors the Swedish brothers Nils and Carl Dalberg, who lived in the 18th century. The plant is native to India; it is the state plant of Punjab (India). The genus consists of

***Corresponding Author:**Sayanti Sau, **Email:**sayanti4712@gmail.com

300 species among which 25 species occur in India. The temperature in its native range averages 10 - 40 °C, but varies from just below freezing to nearly 50 °C. It can withstand average annual rainfall of 500 to 2,000 mm and droughts of 3–4 months. Soils range from pure sand and gravel to rich alluvium of river banks, sissoo can grow in slightly saline soils. Seedlings are intolerant of shade. [4]

The plant has many reputed medicinal properties and has been used culturally. Various medicinal plants have been used for years in daily life to treat diseases all over the world. The present review is, therefore, an effort to given detailed survey of the literature *Dalbergiasissoo*. [5] Hence there is ongoing search for newer therapeutic products for same plant parts for the treatment in other fields and to assess its toxicity, safety and efficacy data. Even in areas where modern medicine is available, the interest on herbal medicines and their application have been increasing in recent years.

## TAXONOMICAL CLASSIFICATION[4]

Domain: Eukaryota
Kingdom: Plantae
Division: Magnoliophyta
Phylum: Tracheophyta
Class: Magnoliopsida
Order: Fabales
Family: Fabaceae
Tribe: Dalbergieae
Genus: *Dalbergia*
Species: *D. sissoo*
Binomial name: *Dalbergiasissoo*DC.

## NATURAL HABITAT

Abundant moisture and lack of competition is the key to its successful regeneration; it is therefore found in riverine environments where sunlight and moisture are plentiful. It is associated with *Pinusroxburghii,Acacia catechu* and *Shorearobusta*. *D. sissoo*is adapted to a seasonal monsoon climate and a dry season of up to 6 months.

## GEOGRAPHIC DISTRIBUTION

Native: Bangladesh, Bhutan, India, Malaysia. [5]
Exotic: Cameroon, Cyprus, Ethiopia, Ghana, Indonesia, Iraq, Israel, Kenya, Mauritius,Nigeria, Sudan, Tanzania, Thailand, Togo, United States of America, Zimbabwe.[5]

## BOTANICAL DESCRIPTION

*Dalbergiasissoo*is a medium to large plant of about 25 meters high with grey-yellow trunk, longitudinal crack, and downcast twig (**Figure 1**).
Leaves are leathery, pinnately compound, with about five alternate leaflets. Leaf stalk (petiole) measures about 15 cm long, each leaflet widest at the base to 6 cm long with a fine pointed tip.
Flowers are whitish to pink, fragrant, nearly sessile, up to 1.5 cm long and in dense clusters 5 - 10 cm in length (**Figure 2**).
Pods are oblong, flat, thin, strap-like 4 - 8 cm long, 1 cm wide and light brown. They contain 1 - 5 flat bean-shaped seeds 8 - 10 mm long(**Figure 3**).
They have a long taproot and numerous surface roots which produce suckers. Young shoots are downy and drooping, established stems with light brown to dark grey bark up to 2.5 cm thick, shed in narrow strips, large upper branches support a spreading crown. The plant has ability to fix nitrogen from the atmosphere through bacteria located in nodules present in the root system. The leaf litter that accumulates and decomposes also contributes to soil fertility by adding additional nitrogen, potassium, iron, manganese, and organic carbon. Propagation is done by seeds and also by root suckers. Various parts of the plant are used as medicines. [4]

**Fig 1:*Dalbergia sissoo* tree**

**Fig 2: *Dalbergia sissoo* Flowers**

**Fig 3: *Dalbergia sissoo* Seeds**

## TRADITIONAL USES

**Uses:** It is used for aphrodisiac, abortifacient, expectorant, anthelmintic and antipyretic, emesis, ulcers, leucoderma, dysentery, stomach troubles and skin disease. The extract of *D.sissoo*leaves showed antioxidant activity, almost two times higher than other commonly used antioxidants like Selenium and vitamin E. [6]

**Ayurveda:** Leaf juice is used as eye ailments. The wood and bark is used as abortifacient, anthelmintic, antipyretic, aphrodisiac, expectorant, refrigerant, anal disorders, blood diseases, burning sensations,dysentery, dyspepsia, leucoderma and skin ailments. [5]Leaf extract has been used to treat sore throats, heart problems, dysentery, syphilis, and gonorrhea.[6]

**Yunani:** The wood is used for blood disorders, burning sensations, eye and nose disorders, scabies, scalding urine, stomach problems and syphilis.The alterative wood is used in India for boils, eruptions, leprosy and nausea.[5]

In India and Nepal rural people use *Dalbergiasissoo*leaves to treat animals suffering from non-specific diarrhea.Herbal preparation of *Dalbergiasissoo*and *Daturastramonium*with cow urine can be used as a potent antiseptic preparation for prevention and treatment of chronic bacterial infections. People use twigs of sissoo to clean their teeth, root is astringent. [4]

Various parts of *Dalbergiasissoo*are traditionally used in treating different diseases and are mentioned below:

**Seeds:** Sissoo oil is used to treat blue itching, burning on the skinand scabies.[7]

**Leaves:** Finely ground paste of *Dalbergiasissoo*leaves and palm candy taken in the morning improves profuse menstruation. Leaves decoction is beneficial in painful micturition, to cure boils and pimples. 10-15 ml juice (leaves) taken thrice in a day helps in eliminating pus in urine and in treating jaundice. The leaves warmed and tied on breast, and consuming the decoction of the leaves removes swelling of the breast.[7]

**Bark:** Powdered bark or decoction of the leaves is useful in gonorrhea. Decoction of the bark and leaf is also beneficial treatment in leprosy. Decoction of sissoo bark is made with water and it should be boiled till the liquid reduces to half volume. The juice of bark consumes for forty days every morning for treating of leprosy. [7]

**Sissoo nectar:** Sissoo nectar is boiled with water and milk together until only milk remains. The mixture consumes 3 times a day to cure any type of fever. [7]

## CHEMICAL CONSTITUENTS

**Leaves:**Sissotrin and Isoflavone-O-Glycoside. [8]

**Flowers:**Biochanin A, Tectorigenin, 7, 4-Dimethyl Tectorigenin and 7-O-Methyltectorigenin.[8]

**Green pods:**Meso-Inisitol, 7-O-Methyltectorigenin and 4´-Rhamnoglucoside. [8]

**Mature pods:**Isocaviumin, Tectorigenin, Dalbergin, BiochaninA, 7-Hydroxy-4-Methyl Coumarin, 7-O-Glucosides of Tectorigenin, Caviunin and Tannins.[8]

**Stem bark:**Dalberginone, Dalbergin, Methyldalbergin, 4-Phenylchromene, Dalbergichromene and Isotectorigenin. [8]

**Heartwood:**Dalbergin, Nordalbergenones, Dalbergichromene 3, 5-Dihydorxytrans- Stilbene, Biochanin A, Allylphenol of Latifolin Type – Dalbergiphenol and Fixed Oil.[8]

**Phytochemistry of *Dalbergiasissoo*:**

By using Silica gel column chromatography and Spectral analysis isoflavones, biochanin-A, muningin, sissotrin, amyrin, stigmasterol were isolated from aerial parts of *Dalbergiasissoo*Roxb, 13 fatty acids were identified. The alcoholic leaf extract showed inhibitory effect on motility of rabbit duodenum, analgesic, antipyretic activity.[9]Farag and his co-authors isolated isoflavone glycoside, biochaninA, tectorigenin from methanolic extract of leaves of *Dalbergiasissoo*using Reverse phase liquid chromatography on ODS.[10] From the methyl acetate extract of root bark of *Dalbergiasissoo*, Reddy *et al.* have reported to isolate new chalcone, hydroxyl chalcone, isoflavone, methyl

isoflavone, biochaninA, dehydroamorphigenin.[11] Several water soluble polysaccharides were reported to isolated leaves of *Dalbergiasissoo*by Gel permeation chromatography, Paper chromatography, Gas liquid chromatography which further revealed the presence of Rhamnose, galactose, glucuronic acid in leaf extract. [12] The extract of heartwood of *Dalbergiaodorifera*of same genus found to contain sesquiterpenes 1 & 2 which are having strong antiplatelet and poor antithrombic activity. [13]

The stem-bark of *Dalbergiosissoo*has yielded the known compounds dalbergenone, dalbergin and methyl dalbergin and a new 4-phenyl chromenedalbergichromene. Its structure has been determined as 7-mahoxy-6-hydroxy-4-phenyl chrom-3-ene by spectral and degradative experiments. Reinvestigation of the heartwood shows that in addition to the known compounds the plant also contains dalbergichromenenordalbergin and isodalbergin as minor constituents. [14]

*D. sissoo*is most valued not only for the durability of its timber but also for its resistance to attack by insects and micro-organisms. They have provided a large number of neoflavonoid and isoflavonoid derivatives. The neoflavonoids can be placed under 5 major groups as follows: 4-phenylcoumarins, dalbergiquinols, dalbergiquinones and brazilins. Largest group among neoflavonoids and contains a number of complex derivatives. There are only a few compounds with substituents in the 4-phenyl ring. The presence of isoprene units and their incorporation into new rings leads to the complexity of products; such compounds are present in oil seed in *Dalbergia* woods species. [15]

A new isoflavoneglucoside from the mature pods of *Dalbergiasissoo*has been isolated and identified as caviunin 7-0-gentiobioside, i.e. the 7-gentiobioside of 5,7-dihydroxy-6,2',4',5'-tetramethoxyisoflavone. The ethanolic extract was column chromatographed (Si gel). The EtOAc-MeOH (4: 1) eluate contained, in addition to the polymeric impurities, a compound which gave dim red fluorescence. It was obtained in pure form by precipitation with in ethanol and methanol (1: l). [16]

A new isoflavonediglucoside, isocaviunin 7-0-gentiobioside has been isolated from *Dalbergiasissoo*. On Silica gel TLC with solvent systems $CHCl_3$,-MeOH (7:3); and EtOAc-MeOH (1: 1) it showed on exposure to iodine vapours a single yellow colour spot which on keeping changed to green. Hydrolysis with sulphuric acid yielded glucose and an aglycone. The molecules were characterized by UV and NMR spectroscopy.[17]

Thirteen rosewood (*Dalbergia*) species produced a purple quinonemethide pigment in the callus that was apparently identical between the species. The pigment was first purified from *D. retusa* cell culture and its structure was elucidated by mass, infrared, and detailed 1H and 13C NMR and NOE spectroscopic studies including 2D experiments (COSY, NOESY, HMQC, and HMBC). [18]

Two isoflavone glycosides, biochanin A 7-O-[b-d-apiofuranosyl-(1-5)-b-dapiofuranosyl-(1-6)-b-d-glucopyranoside] and tectorigenin 7-O-[b-d-apiofuranosyl-(1-6)-bd- glucopyranoside], were isolated from *Dalbergiasissoo*using reverse phase liquid chromatography using ODS column. Their structures were elucidated on the basis of UV and NMR spectral and chemical evidence.[10]

From the methyl acetate of root bark of *Dalbergiasissoo*extract a chalcone, 2,3-dimethoxy-40-g,g-dimethylallyloxy-20-hydroxychalcone (1) and an isoflavone, 7-g,g-dimethylallyloxy- 5-hydroxy-40-methoxyisoflavone (2) together with a known flavone, 7-hydroxy-6-methoxyflavone (3), a known isoflavone, biochanin A (4) and a known rotenoid, dehydroamorphigenin (5) were isolated by silica gel as stationary phase with solvents like n-hexane and ethyl acetate in gradient step method. The structures of compounds 1–5 were elucidated on the basis of spectral and chemical studies. [19]

Several water soluble polysaccharides were reported to isolate from leaves of *Dalbergiasissoo*by gel permeation chromatography, paper chromatography, gas liquid chromatography which further revealed the presence of rhamnose, galactose, glucuronic acid in leaf extract. [20]

## RECENT DEVELOPMENTS IN THE RESEARCH AREA OF *DALBERGIA SISSOO*(**Table 1**)

**Table 1: Recent developments in the research area of *Dalbergia sissoo***

| Year | Author | Parts used | Extract | Uses |
|---|---|---|---|---|
| 2000 | Hajare*et al*. | Leaf | Alcoholic extract | Antipyretic & analgesic activity [21] |
| 2000 | Ansari *et al*. | Oil | Oil | Anti-larvicidal activity [22] |
| 2001 | Hajare*et al*. | Leaf | Ethanolic extract | Anti-inflammatory activity [23] |

| | | | | |
|---|---|---|---|---|
| 2006 | Brijezh*et al*. | Different parts | Decoction of dried leaves | Anti-diarrhoeal effect [24] |
| 2006 | Shazia*et al*. | Leaf | Aqueous extract | Use as cosmetics [38] |
| 2008 | Adenusi*et al*. | Different parts | Aqueous and ethanolic extract | Anti-mollusicicidal activity [25] |
| 2010 | Pankaj*et al*. | Leaf | Ethanolic extract | Anti-diabetic activity [26] |
| 2010 | Mallinath*et al*. | Seed | Ethanolic extract | Antipyretic & analgesic activity [27] |
| 2011 | Nayan*et al*. | Stem bark | Methanolic extract | Antioxidant activity [28] |
| 2011 | Vasudeva*et al*. | Root bark | Ethanolic extract | Antispermatogenic activity [29] |
| 2011 | Hood *et al*. | Different parts | Petroleum ether, Carbon Tetrachloride, Benzene and Ethanolic extract | Anthelmintic activity [30] |
| 2011 | Asif*et al*. | Bark | Ethanolic extract | Antinociceptive activity [32] |
| 2012 | Preety*et al*. | Leaf | Ethanolic extract | Anti-osteogenic activity [31] |
| 2012 | Pund*et al*. | Bark | Ethanolic extract | Anti-diabetic activity [33] |
| 2012 | Kharkwal*et al*. | Heartwood | - | Anti-termite activity [34] |
| 2012 | Khedgikar*et al*. | Leaf & Pods | Butanol-soluble standardized fraction | Anti-osteopenia effect [36] |
| 2013 | Muhammad *et al*. | Stem bark | Methanolic extract | Gastro protective action [35] |
| 2014 | Swaroop*et al*. | Leaf | Ethanolic extract | Neuroprotective action [37] |

**Antipyretic and analgesic activity:**

The analgesic and antipyretic activities of alcoholic extract of *Dalbergiasissoo*leaves was studied using writhing test, hot plate and tail clip method in mice. It showed significant reduction in pain and fever in all models after administration of alcoholic leaves extract. [21]

**Anti-larvicidal activity:**

Studies were carried out to evaluate the growth inhibitor, repellent action & anti larvicidal action of *D. sissoo*oil against *Aedesaegypti*, *Anopheles stephensi*and *Culexquinquefasciatus* under laboratory conditions. The oilalso showed strong repellent action when oil was applied on exposed parts of human volunteers. They were protected from mosquito bites for 8±11 h. The protection obtained with sissoo oil was comparable to that with commercial Mylol oil consisting of di-butyl and dimethyl phthalates. [22]

**Anti-inflammatory activity:**

The leaf ethanolic extract of 90 % showed significant inhibition against carrageenan, kaolin and nystatin-induced paw oedema. It reduced the weight of granuloma induced by a cotton pellet. It also showed an inhibitory action on dye leakage in acetic acid-induced vascular permeability test in mice. It was devoid of ulcer genic effect on the gastric mucosa of rats in acute and chronic tests. So it is used preferably in sub-acute and chronic models of inflammation devoid of any side effect on gastric mucosa layer. [23]

**Anti-diarrheal effect:**

Antibacterial, antiprotozoal and antiviral activities of *Dalbergiasissoo*was performed by agar dilution method, tube dilution method, and neutral red uptake assay respectively. Cholera toxin (CT) and Escherichia coli labile toxin assayed by gangliosidemonosialic acid receptor ELISA. The decoction had showed significant antidiarrheal effect by reducing virulent bacterium. [24]

**Anti-mollusicicidal activity:**

The crude aqueous and ethanolic extracts from different parts of *Dalbergiasissoo*were evaluated against egg masses and adults of *Biomphalariapfeifferi* the snail intermediate host of *Schistosomamansoni* in Nigeria. Only the ethanolic extracts of the fruits and roots showed significant activities against the adult snails and their egg masses while all other extracts demonstrated weak molluscicidal and ovicidal activities. [25]

**Anti-diabetic activity:**

This research was performed to characterize the hypoglycaemic effect of ethanolic extract of *Dalbergiasissoo*L. leaves in alloxanized diabetic rats. The ethanolic extract of *Dalbergiasissoo*leaves was administered 250 and 500mg/kg orally to normalrats. The high dose was found to be more effective dose in oral route and it was found to decrease BloodGlucose level. The result indicates the potential antihyperglycemic nature of the extract. It is also much effective than the standard drug Glibenclamide. [26]

**Antipyretic and analgesic activity:**

The peripheral analgesic activity of sisam seed extract (SSE) was studied using acetic acid induced writhing in mice and by Randall-Selitto assay in rats. Further, the central analgesic activity of SSE was studied by tail-clip test and hot plate method in mice. The antipyretic activity of SSE was studied in Brewer's yeast model by inducing pyrexia in rats. The results showed significant decreased writhing movements in mice by acetic acid-induced writhing test and significant increase in the pain threshold capacity in rats in Randall-Selitto assay and the reaction time in hot-plate test but not in tail-clip test for analgesic activity. Moreover, it also showed significant activity in rats by using Brewer's yeast model. [27]

**Antioxidant activity:**

The antioxidant activity of the *Dalbergiasissoo*stem bark extracts was measured by in vitro chemical analyses involving the assays of (1) 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical scavenging activity (2) ferric ion reducing power (3) ferrous ion chelating activity and (4) Au nanoparticle formation potential. So the study provides scientific evidence for high antioxidant activity of this plant by showing significant reduction Reactive Oxygen species generation. [28]

**Anti spermatogenic activity:**

A dose-dependent and time-dependent effect of ethanol extract of *Dalbergiasissoo*root bark on sperm motility and sperm viability was observed. Ethanol extract at a concentration caused complete immobilization within 3 minutes. The extract resulted in a significant decrease in weight of the testis and epididymis. It showed significant decrease in sperm motility and sperm count in the epididymis. [29]

**Anthelmintic activity:**

The various extracts of *Dalbergiasissoo*Roxb.include ethanol, benzene, petroleum ether, carbon tetrachloride were used in different concentrations for in-vitro testing of anthelmintic potency by determination of time of paralysis and time of death of worm. The standard used in this studies Piperazine citrate. The result of indicates *Dalbergiasissoo*potentiate to paralyze and caused death of earthworm after some time. [30]

**Anti-osteogenic activity:**

One new isoflavoneglucoside, caviunin 7-O-[b-D-apiofuranosyl-(1-6)-b-D glucopyranoside] and a new itaconic derivative, (E)-4-methoxy-2-(3,4-dihydroxybenzylidene)-4-oxobutanoic acid along with series of isoflavones and flavonols with their glucosides and a lignanglucoside were isolated from the ethanolic extract of *Dalbergiasissoo*leaves. All compounds were assessed for osteogenic activity in primary calvarial osteoblast cultures. Some compounds showed increased alkaline phosphatase activity and mineralization thus indicates in significant osteogenic activity. [31]

**Antinociceptive activity:**

The ethanolic extract of the plant bark of *Dalbergiasissoo*was investigated using tail flick method on Wistar rats. The antinociceptive activities of all doses were compared with that of aspirin. The extract showed significant and dose dependant activity due presence of flavonoids. [32]

**Anti-diabetic activity:**

The anti-diabetic effect of ethanolic extract of *Dalbergiasissoo* bark was investigated in alloxan (AL) induced diabetic rats. The low and high doses caused significant reduction in blood glucose levels in all the models. *D. sissoo* also showed significant increase in body weight and glycogen content in liver of AL-induced diabetic rats while there was significant reduction in the levels of serum triglyceride and total cholesterol. It also showed significant improvement in the pancreas of AL-induced diabetic rats. The antidiabetic effect was compared with glibenclamide, a well-known hypoglycaemic drug. [33]

**Anti-termite activity:**

Theanti-termite activity of heartwood of *Dalbergiasissoo*was investigated. It was concluded that the plant extracts can be used as an alternative for synthetic pesticides for termite control commercially [34]

**Gastro protective action:**

This study was conducted to evaluate the antiulcer effects of *D. sissoo* stem bark methanol extract (DSME) against the diclofenac sodium-induced ulceration in rats. The results of this study showed that DSME exhibits a potential gastro protective activity probably due to its antioxidant and cytoprotection ability. [35]

**Anti-osteopenia effect:**

The aim of this study was to evaluate the skeletal effects of an extract made from the leaves and pods of *Dalbergiasissoo* (butanol-soluble standardized fraction [BSSF]) on ovariectomized rats, a model for postmenopausal osteopenia. [36]

**Neuroprotective action:**

This research was performedin 3- Nitropropionic acid induced neurotoxic rats to characterize the neuroprotective effect of ethanolic extract of *Dalbergiasissoo*leaves. The ethanolic extract of *Dalbergiasissoo*leaves was administered 300 and 600mg/kg orally to neurotoxic rats. These results suggest that ethanolic extract of *Dalbergiasissoo*leaves may have potential therapeutic value in various neurological disorders, probably by its antioxidant, anti-inflammatoryand estrogenic properties. [37]

**Use as cosmetics:**

**Shazia Sultana *et al***conducted a survey of district Chakwal, Pakistan on indigenous knowledge of folk herbal medicines by the women. This survey described that, crushed leaves were boiled in water

and the filtrate obtained is used to wash hair for removing dandruff and for growth of hair. [38]

## CONCLUSION

*Dalbergiasissoo* has been used therapeutically and socially for several years. The study gives a brief overview of phytochemistry of the plant. The recent study showed that it has Neuroprotective activity, Gastro protective activity, Anti-osteopenia activity, Anti termite activity and several other activities which are already scientifically proved. In recent years, ethno - medicinal studies has received much consideration towards *Dalbergiasissoo*. It possesses various Pharmacological activities to be conducted to explore the unexploited prospective of the plant.

## ACKNOWLEDGEMENT

We would like to thank Mr. MukundHandral, Associate Professor, PES College of Pharmacy, Bangalore, for his constant support and encouragement.

## REFERENCES

1. http://en.wikipedia.org/wiki/Medicinal_plants
2. Avinash S, Anant M, Sourabh G. A review on medicinal plant which may effective in the treatment of ulcer or which show anti ulcer activities. Int J of Biopharm&Toxicol Res 2012;2(1):266-76.
3. Saurabh S, Pradeep S et al. *Achyranthesaspera* - An important medicinal plant: A review. J Nat Prod Plant Res 2011;1(1):1-14.
4. Bharath M, Laxmi E, Sudhakar K, Chinna M. *Dalbergiasissoo* DC. - An important medicinal plant. Int J of Res in Pharm and Chem 2013;3(2):385-8.
5. Mamta B, Archana S,Chhaya R. *Dalbergiasissoo*- An important medical plant. J of Med Plants Studies 2014;2(2):76-82.
6. Mukhtar HS, Irum M, Salik NK. Medicinal importance and association of pathological constraints with *Dalbergiasissoo*. Pak J Phytopathol 2010;22(2):135-8.
7. Hari SL, Sanjay S. Ethnomedicinal uses of *Dalbergiasissoo*Roxb in Jharkhand. Int J of Ayurvedic and Herbal Med 2012;2(1):198:201.
8. *Dalbergiasissoo* [online]. 2012 Dec 9; Available from: URL: http://en.wikipedia.org/wiki/Dalbergia_sissoo.
9. Sarg T, Ateva AM, Ghani AA, Badr W, Shams G. Phytochemical and Pharmacological studies of *Dalbergiasissoo* growing in Egypt. Pharm Biol 1999;37(1):54-62.
10. Farag SF, Ahmed S, Terashima K, Takaya Y, Niwa M. Isoflavanoid glycosides from *Dalbergiasissoo*. Phytochem 2001;57(8):1263-8.
11. Reddy RV, Reddy PN, Khalivulla IS, Bhaskarreddy MV, Gunasekar D, Blond A et al. O-Prenylated flavonoids from *Dalbergiasissoo*. PhytochemLett 2008;1:23-6.
12. Vikas R, Vineet K, Soni PL. Structure of the oligosaccharides isolated from*Dalbergiasissoo*Roxb. Leaf polysaccharide. CarbohydrPolym 2009;78(3):520-5.
13. Yi Tao, Yi Wang. Bioactive sesquiterpenes isolated from the essential oil of *Dalbergiaodorifera*. T Chen Fitoterpia 2010;81(5):393-6.
14. Mukerjee SK, Saroja T, Seshadri TR. Dalbergichromene, A new neoflavonoid from stem-bark and heartwood of *Dalbergiasissoo*. Tetrahedron 1971;27:799-803.
15. Seshadri TR. Polyphenols of Pterocarpus and Dalbergia woods. Phytochem 1972;11:881-98.
16. Sharma A, Chibber SS, Chawla HM. Caviunin 7-O-Gentiobioside from *Dalbergiasissoo*pods. Phytochem 1979;18:1253.
17. Sharma A, Chibber SS, Chawal HM. Isocaviunin 7-Gentiobioside, A new isoflavone glycoside from *Dalbergiasissoo*. Phytochem 1980;19:715.
18. Czako M, Marton L. A heartwood pigment in Dalbergia cell cultures. Phytochem 2001;57:1013-22.
19. Ramireddy V, Reddy NP, Khalivulla SI, Mopuru V et al. O-Prenylated flavonoids from *Dalbergiasissoo*. Phytochem 2008;1:23-6.
20. Rana V, Vineer K, Soni PL. Structural characterization of an acidic polysaccharide from *Dalbergiasissoo*Roxb. leaves. CarbohydrPolym 2012;90(1):243-50.
21. Hajare SW, Chandra S, TandanSK et al. Analgesic and Antipyretic activities of

*Dalbergiasissoo* leaves. Indian J Pharmacol 2000;32:357-60.
22. Ansari MA, Razdan RK, Tandon M, Padma V. Larvicidal and repellent actions n of *Dalbergiasissoo*Roxb. oil (F.Leguminosae) oil against mosquitoes. Bio ResourTechnol 2000;73:207-11.
23. Hajare SW, Chandra S, Sharma J, Tandan SK, Lal J et al. Anti-inflammatory activity of *Dalbergiasissoo* leaves. Fitoterpia 2001;72:131-9.
24. Brijezh S, Dazwanl PG, Tetall P, Antla NH, Birdi TJ. Studies on *Dalbergiasissoo*(Roxb) leaves: Possible mechanism(s) of action in infectious diarrhoea. Indian J Pharmacol 2006;38(2):120-4.
25. Adenusi AA, Odaibo AB. Laboratory assessment of molluscicidal activity of crude aqueos and ethanolic extract of *Dalbergiasissoo* parts against *Biomphalariapfeifferi*. Travel Med Inf Dis 2008;6:219-27.
26. Panakaj SN, Dharmendra S, Kiran P, Jain SK. Antidiabetic activity of ethanolic extract of *Dalbergiasissoo*leaves in alloxan-induced Diabetic rats. Int J Cur Pharm Res 2010;2(2):24-7.
27. Mallinath HH, Hosamani KM and Ahmed L. Phytochemical and pharmacological studies of ethanol extract of *Dalbergiasissoo* seeds: an approach for the in-vivo Analgesic and antipyretic activities. Int J Pharma Bio Sci 2010;1(4):273-80.
28. Nayan R, Rajibul AL,Ismail SK, Deepa K, Ghosh T et al. A detailed study on the antioxidant activity of the stem bark of *Dalbergiasissoo*Roxb, an Indian medicinal plant. Food Chem 2011;126:1115-21.
29. Vasudeva N, Manisha V. Anti-spermatogenic activity of ethanolic extract of *Dalbergiasissoo*Roxb. stem bark. J Acupunct Meridian Stud 2011;4(2):116-22.
30. Hood MM, Tembhurne SV, Sakarkar DM. Antihelmentic activity of different extracts of *Dalbergiasissoo*Roxb. on Indian adult earthworms. Der PharmaChemica 2011;3(2):142-6.
31. Preety D, Raju C, Vikram K, Gautam J, Priyanka K et al. Constituents of *Dalbergiasissoo*Roxb. leaves with osteogenic activity. Bio Org Med ChemLett 2012;22:890-7.
32. Asif M, Kumar A. Phytochemical investigation and evaluation of antinociceptive activity of ethanolic extract of *Dalbergiasissoo* (Roxb.) bark. J Nat SciBiolMed 2011;2(1):76-9.
33. Pund KV, Neeraj SV, Rajendra TG, Vilas KM. Antidiabetic evaluation of *Dalbergiasissoo* against alloxan induced diabetes mellitus in wistar albino rats. J Nat Prod Plant Resour 2012;2(1):81-8.
34. Kharkwal H, Joshi DD, Kharkwal A, Panthari P et al. Anti-termite activity of heartwood of *Dalbergiasissoo*Roxb. Ex.Dc. Asian Pac J of Biomed 2012:2-(4)1-4.
35. Muhammad IK, Muhammad RK. Gastroprotective potential of *Dalbergiasissoo* Roxb. stem bark against Diclofenac-induced gastric damage in rats.Osong Public Health and Research Perspectives 2013;4(5):271-7.
36. Khedgikar, Vikram, Gautam, Jyoti, Kushwaha, Priyanka et al. A standardized phytopreparation from an Indian medicinal plant (*Dalbergiasissoo*) has antiresorptive and bone-forming effects on a postmenopausal osteoporosis model of rat. Menopause 2012;19(12):1336-46.
37. Swaroop VS, Suddhasatwa B, Mukund H. Neuroprotective evaluation of leaf extract of *Dalbergiasissoo*in 3-Nitropropionic acid induced neurotoxicity in rats. Int J of PharmaSci and Drug Res 2014;6(1):41-7.
38. Shazia S, Mir Ajab K, Mushtaq A, Muhammad Z. Indigenous knowledge of folk herbal medicines by the women of district Chakwal, Pakistan. Ethnobotanical Leaflets 2006;10:243-53.