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Review

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## *Symplocos racemosa roxb*

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### ABSTRACT

*Symplocos racemosa Roxb* (Symplococaceae) known as Lodhra is a popular ayurvedic remedy for the treatment of various disorders mainly in the treatment of gynecological problems. The root, bark and leaves of this plant is traditionally used for the treatment of leprosy, liver complaints, uterine disorders, diarrhoea, dysentery and also in ophthalmia and conjunctivitis etc. The plant is rich in triterpenoids and various phytochemical constituents like phenols, steroids have been isolated from this plant. This review summarizes the list of phytochemical compounds isolated over the past few decades and pharmacological activities in recent years.

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### KEYWORDS

*Symplocos racemosa Roxb*;  
Phytochemical compounds;  
Pharmacological activities.

### INTRODUCTION

Natural products from plants are rich source used for centuries to cure various ailments. The use of bioactive plant derived compounds is on the rise in the world because the main apprehension in the use of synthetic drugs created by the affluent and influential pharmaceutical industries is their side effects that can be even more dangerous than the diseases<sup>[1]</sup>. On the contrary the plant derived medicines are based upon the premise that they contain natural substance that can promote health and alleviated illness. So a retrospection of the healing power of the plants and the return to natural remedies is an absolute need of our time. However a detailed investigation and documentation of plants used in local health traditions and ethno pharmacological evaluation to verify their efficacy and safety is very essential which can lead to the development of new valuable herbal drug for the treatment of various dis-

eases. In view of the widespread interest on Symplococaceae plants this work reviews the scientific information of the species *Symplocos racemosa Roxb*.

The genus *Symplocos* comprises of 300-500 species of the Symplococaceae family is traditionally used to for the treatment of diarrhoea, dysentery, eye diseases, hemorrhagic gingivitis, uterine disorders, menorrhagia<sup>[2]</sup>, bowel complaints, ulcers<sup>[3]</sup>, snake bites, malaria, tumefaction and enteritis<sup>[4]</sup>. Recently much attention has been paid to *Symplocos* species due to their diverse biological activities, particularly anti HIV activity, inhibitory activities against phosphodiesterase and anti tumor applications<sup>[5]</sup>. Among the *Symplocos* species *Symplocos racemosa Roxb* is an important plant which is used in Indian system of medicine (ISM) as a single drug or in multicomponent preparation (viz Lodhrasava). Unani medicine uses it as emmenagogue, aphrodisiac, it is a potent remedy for inflammation and clearing uterus. In this review a comprehensive account

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of the traditional uses, phytochemical constituents isolated, pharmacological activities of many recent findings are included.

### Taxonomy

Kingdom : Plantae; Subkingdom : Tracheobionta; Superdivision: Spermatophyta; Division: Magnoliophyta; Class : Magnoliopsida; Order: Ericales; Family: Symplocaceae; Genus: Symplocos; Species: Racemosa

### Common names

Lodhra, Lodh, hura, Khodai, Singen, Bhomorti, Lapongdon, Palyok.

### Vernacular names

Sans- Kodhra, Marjana, Tillaka, Hindu- Lodh, Guj- Ladar, Tel- Lodduga, Tam- Velli-lethi, Kan- Pachettu, Blalodduginamara, Mar- Lodh, Lodhra, Mal- Pachotti

### Habit and habitat<sup>[6]</sup>

It is a evergreen small tree or shrub, 6-8.5m tall, abundant in the plains and lower hills throughout north and east India, ascending in the Himalayas up to an elevation of 1,400m, southwards it extends up to chota Nagpur.it is very commonly found in the lower hills of Bengal, Asam and Burma

### Morphology

#### Leaves

Leaves are simple, alternate, dark green ,ovate or elliptic it is having serrate margin, glabrous and lanceolate, coriaceous, oblong 12.5cm × 5cm, obscurely crenate having 4 to 6 blades.

#### Bark

Small recurved pieces of varying sizes and thickness, outer surface buff to brownish, longitudinally wrinkled and bearing horizontal lenticels, inner surface brownish, rough and scaty fracture, short and granular, taste acrid and bitter.

#### Flowers

The flowers are very small which has 1.4cm diameter which appears mostly white, turning yellow, fragrant in auxiliary, simple or compound racemes, drupes purplish black, sub cylindrical, smooth, 1-3 seeded. Pedicels as long as calyx tube and stames are about 100 in number<sup>[6]</sup>.

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### Fruits

Fruits are globose or cylindrical in shape, drupe, 1 to 1.3 cm long and purplish black in colour.

### Seeds

Seeds are 1 to 3 in number.

### Wood

Yellowish white, hard (wt 865kg/cu.m), close-grained and it is durable if well seasoned.

### Microscopic description of bark

Transverse section of dried stem bark shows cork consisting of 4-12 rows of tangentially elongated cells, radial 15-45m tangential 30-60m cork cambium consist of a row of thin walled tangentially elongated cells, secondary cortex usually wide, parenchymatous, interspersed with stands of stone cells. Stone cells are rectangular to oval with numerous pits often containing prismatic crystals of calcium oxalate, non lignified pericyclic fibers upto 52 mm thick present in bark. Secondary phloem wide consisting of sieve tubes, companion cells, phloem parenchyma and stone cells. Stone cells arranged in tangential rows in concentric manner associated with crystal sheath containing prism of calcium oxalate, medullary rays mostly bi or tri serrate early uniserrate becoming wide towards outer part and consist of thin walled radially elongated parenchymatous cells, Medullary ray near stone cells become sclerosed.

### Traditional uses

Lodhra was been considered as a very useful drug in therapeutical aspect even from the ancient periods. Therefore we get the references of this particular in the great treaties like Charakasamhita, Susruthasamhita, Astangasangraha and in Yogarathnakara. All the above treatises says the useful part as its bark itself and bark is prescribed in the treatment of snake bite and scorpion sting. In the Snake bite, it is given internally in the form of Choorna or in the form of Kashaya.

### Parts used-bark and leaves

The astringent bark is used for the treatment of diarrhea, dysentery, useful in eye diseases, for spongy gum, bleeding, leprosy, liver complaints, dropsy also useful in abortions, miscarriages, for ulcers of vagina, uterine disorders, emmenagogue, aphrodisiac, inflam-

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mation in eyes and in tumors. In combination with sugar it is recommended in the treatment of menorrhagia and other uterine disorders .A decoction of it is used as a mouth wash to give firmness to bleeding and spongy gums and taken internally as a snake-bite cure<sup>[7]</sup>.

Bark powder in 20g doses thrice a day forms and ingredient of many prescriptions for bowel complaints along with Bael and Nuxvomica or Kurchi bark. In Bombay the bark is often employs in the preparation of plasters and is supposed to promote resolution of inflammatory masses and exudates. In fever, dysentery, liver complaints it is used in the form of decoction and infusion. It has been highly extolled also in the treatment of chyluria(Filarial and elephantiasis. It is one of the ingredients of a plaster used to promote maturation of boils and other malignant growths<sup>[8]</sup>.

### Action and uses in ayurveda and siddha<sup>[8]</sup>

Kasaya rasam, seethe veeryam, kapha pitta haram, lagu, grahi, onaksh ushyano in raktapittam, athisaram and pradaram.

### Action and uses in unani

Arrests uterine haemorrhages, abnormal secretions, aphrodisiac and inflammation of the eye.

### Phytochemical constituents

The genus *Symplocos* mainly contains triterpenoids, flavanoids, lignans, phenols, steroids, alkaloids and iridoids. Earlier work on the bark reported the presence of three alkaloids, viz.loutrine(present in large quantities 0.24 p.c., identical with Harman), loturine(0.06 p.c) colloturine(0.02 p.c) and quinovine or kinovine. Ash contains carbonates of soda, a large quantity of red colouring substance but not tannin<sup>[6]</sup>. It also contains glycosides, reducing sugars and phytosterols.

### 1. Teriterpenoids<sup>[2,9,10]</sup>

Triterpenoids are generally among the major effective constituents of numerous plant drugs and folk medicines for wide bioactivities e.g., cardiovascular, antitumor, antiviral, antifungal and anti-inflammatory activity. Triterpenoids compounds isolated from *Symplocos racemosa* are oleanolic acid,  $\alpha$ -amyrin,  $\beta$ -amyrin, urosolic acid derivatives, betulinic acid.

### 2. Flavanoids<sup>[3,11]</sup>

Flavanoids like symposide, epiafzelechin, 5, 7

dihydroxy-7 methoxyflavan 3,4 diol, 3-oB-D gluco furanoisde and 5,7 dihydroxy 4 7 methoxyflavan 3,4 diol, were reported from this species.

### 3. Phenols<sup>[9,10,12,13]</sup>

Seven phenolic compounds were isolated from *Symplocos racemosa*<sup>[9]</sup> these compounds showed inhibitory action against snake-venom phosphodiesterase. The compounds are Benzoyl salireposide, salireposide, symploracemoside, symplomoside, symplocomoside, symponoside, sympososide and ellagic acid.

### 4. Steroids

So far only two steroids like  $\beta$ -Sitosterol and 3-O- $\beta$ -D-glucoside were reported from this species.

### Biological activities

Earlier work on the pharmacological study, a crystalline fraction from the bark was found to inhibit the growth of *Micrococcus pyogenes va.aureus*, *E.coli* and enteric and dysenteric groups of organisms, and also to reduce the frequency and intensity of the contraction in-vitro in pregnant and non pregnant uteri of some animals. Another fraction from the bark besides showing action on uteri was spasmogenic on the various parts of GIT and could be antagonized by atropine. In another investigation bark, the presence of a white substance, a mixture of three coloured substances (m.p.245°C) was the most potent and had a depressant effect on the amphibian heart and also on the blood pressure of dogs, and relaxant effect on rabbit guts

Two flavans symposide and epiafzecechin isolated from *Symplocos racemosa* were reported to posses antifibronolytic activity<sup>[3]</sup>. The phenolic glycoside isolated was reported to posses inhibitory activity against phosphodiesterase<sup>[12]</sup> Some other species of *Symplocos* are reported to posses anti HIV<sup>[14]</sup> and anti proliferative effects<sup>[15]</sup>.

### Patent drugs

The patent drugs of Lodhra are, Evon Syrup- used in premenstrual syndrome, Ashowin- used in menstrual disorders, Gynocare- used in menometrorrhagia, Asholin- used in Amenorrhoe, Purabhi- used in case of infertility

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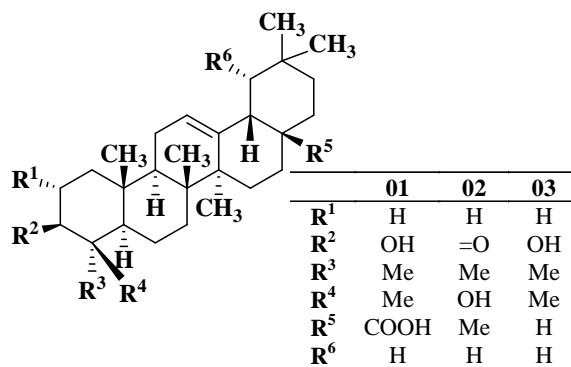
## CONCLUSION

In recent years emphasis of research has been on utilizing traditional medicines that have long proven history of treating various ailments. In this regard a thorough extensive literature survey revealed that many biological important constituents were isolated from *Symplocos racemosa* like triterpenoids, phenols, flavanoids and steroids which posses anti fibronolytic activity and inhibition of phosphodiesterase activity. Recently much attention has been focused on the genus *Symplocos* due to their vast biological activites. However much more attention should be focused on *Symplocos* further studies need to be carried out to explore *Symplocos racemosa Roxb* for its potential in preventing and treating various diseases.

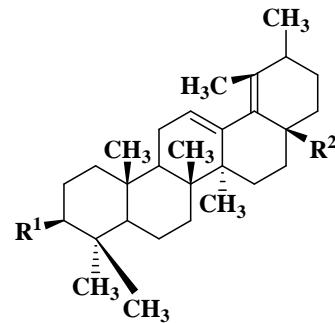
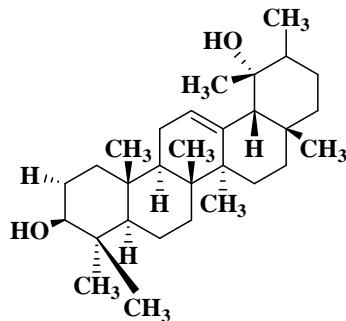
### Phytochemical constituents isolated from *symplocos racemosa Roxb*<sup>[5]</sup>

S.no.	Compounds isolated	Ref.
<b>Triterpenoids</b>		
1.	Oleanolic acid	[1]
2.	24-Hydroxyolean-12-en-3-one	[1]
3.	$\beta$ -Amyrin	[1]
4.	$\alpha$ -Amyrin	[3]
5.	28-Hydroxy-20 $\alpha$ -ursa-12,18(19)-dien-3 $\beta$ -yl acetate	[1]
6.	3-oxo-20 $\alpha$ -ursa-12,18(19)-dien-28-ioc acid	[1]
7.	Betulinic acid	[10]
<b>Flavanoids</b>		
8.	Sympaside	[3]
9.	(-)Epiafzelechin	[3]
10.	5,4'-Dihydroxy-7-methoxyflavan-3,4-diol 3-O- $\beta$ -D-glucofuranoside	[11]
11.	5,7-Dihydroxy-4'-methoxyflavan-3,4-diol 3-O- $\beta$ -D-glucofuranoside	[11]
<b>Phenols</b>		
12.	Benzoyl slireposide	[9]
13.	Salireposide	[9]
14.	Symploracemoside	[12]
15.	Symplomoside	[12]
16.	Symplocomoside	[13]
17.	Sympnoside	[13]
18.	Symplososide	[13]
19.	Ellagic acid	[10]
<b>Steroids</b>		
20.	$\beta$ -sitosterol	[3]
21.	$\beta$ -Sitosterol 3-O- $\beta$ -D-glucoside	[9]

## Triterpenoids



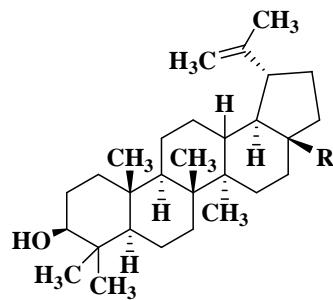
### 4. $\alpha$ -Amyrin



(5) R<sup>1</sup> =  $\beta$ -AcO, R<sup>2</sup> = HOCH<sup>2</sup>

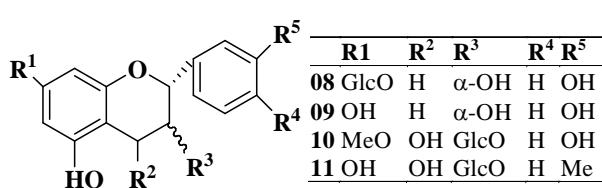
(6) R<sup>1</sup> = =O, R<sup>2</sup> = COOH

(7) Betulinic acid

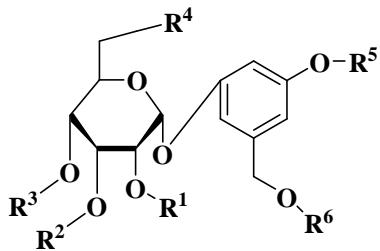


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## Flavanoids

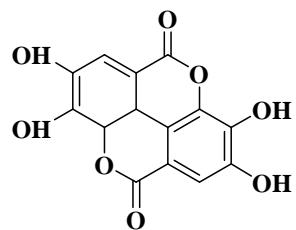


## Phenols

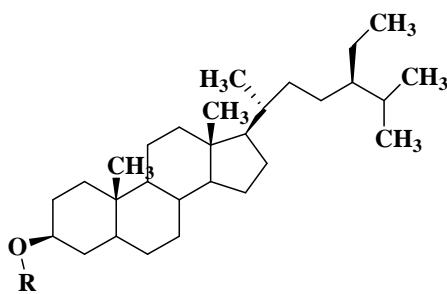


R <sup>1</sup>	R <sup>2</sup>	R <sup>3</sup>	R <sup>4</sup>	R <sup>5</sup>	R <sup>6</sup>
H	PhCO	H	H	H	PhCO
H	H	H	H	H	PhCO
H	PhCO	3,4-(MeO) <sub>2</sub> C <sub>6</sub> H <sub>3</sub>	H	H	PhCO
Me	Glc	H	H	H	PhCO
H	H	H	PhCO	H	2-OH-3-COOH-C <sub>6</sub> H <sub>3</sub>
H	4-OH-C <sub>6</sub> H <sub>4</sub> CO	H	H	H	PhCO
PhCO	H	H	H	H	PhCO

## 19. Ellagic acid



## Steroids



20. R = H

21. R = Glc

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