



Review Article

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***Salacia oblonga* Wall:  
An endangered plant of immenses pharmaceutical value**

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**ABSTRACT**

*Salacia* species have been used in the traditional Ayurvedic system of medicine for the treatment diabetes. *Salacia oblonga* is one of the important medicinal plant of genus *Salacia*. This plant has numerous medicinal properties, viz. the root bark of *Salacia oblonga* is used for the treatment of rheumatism, gonorrhoea and skin diseases. Different parts of this plant have various biological activities which are owing to the presence of important phytochemicals such as mangiferin, salcinol, kotanol, with proven biological activities.

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**INTRODUCTION**

Indian system of medicine is one of the most ancient systems of traditional medicine and past 5000BC it has been practiced to offer natural ways to treat many diseases (1). Isolated pure compounds from the plant extracts, herbal extracts and herbal combinations have played important role in the prevention and management of diseases, especially in problematical chronic conditions.

*Salacia* species (Family: *Celastraceae*) are widely distributed in Sri Lanka, India, China and other Southeast Asian countries, and many plants from this genus (e.g., *S. reticulata*, *S. oblonga*, and *S. prinoidea*) have been used for thousands of years in traditional medicines. *Salacia* species has been used for the treatment of diabetes, obesity, rheumatism, gonorrhoea and asthma (2, 3). Several reports from animal studies have described *Salacia* species having hypoglycemic activity, including *S. oblonga* (4, 5), *S. macrosperma* (6), *S. prinoidea* (syn. *S. chinensis*) (7) and *S. reticulata* (8-10). Further in human studies, hypoglycemic activity of herbal preparations containing *Salacia* species have also been reported (11-13). Deepa 2004 (14) reported that ethyl acetate extracts of stem and leaf of *S. beddomei* showed very good antimicrobial activity against different human pathogens. Earlier reports revealed that *Salacia* species plays an important role in the management of diabetes by various mechanisms like inhibition of protein kinase, activation of PARP  $\gamma$  and inhibition of  $\alpha$  glycosidase enzyme (15).

One of the important medicinal plant from genus *Salacia* is *Salacia oblonga*. It is also known as saptrangi and ponkoranti. *S. oblonga* has long tradition of use for thousands of years as an Indian ayurvedic herb. Major use of *S. oblonga* is in Diabetes. *S. oblonga* bind to the intestinal enzymes responsible for breakdown of carbohydrates in the body. These enzymes called alpha-glucosidases, turn carbohydrate in to glucose, the sugar that circulate throughout the body. If the enzyme bind to the herbal extracts of *S. oblonga* rather than to carbohydrate then less glucose gets in to the blood stream resulting in low blood glucose level and insulin. Presence of various phytochemicals viz. salcinol, kotanol and mangiferin from *S. oblonga* extracts have proven biological activities. Salcinol and kotanol have shown antidiabetic activities. Mangiferin is one of the major active components in tubers of *Salacia* species

including *Salacia oblonga*. It has variety of pharmacological activities including antioxidant, antimicrobial, cytoprotective, antidiabetic and immunomodulatory activities (16-20). It is also present in the other medicinal plants such as *Mangifera indica*, *Folium prrosiae*, *Swetia chirata* and *Rhizoma anemarrhenae* (21).

### Botanical Description

*S. oblonga* is a large woody climbing shrub with hairless cylindrical branchlets, densely sprinkled with lenticels. The leaves are arranged on the stem opposite (phyllotaxy) with a leaf stalk of about 5-10 mm in length. The leaves are hairless, oblong in shape, 7-15 x 3-5 cm in size and possess lateral nerves in 7-9 pairs. The base and apex of the leaf are acute and the leaf margins are toothed (round or saw like). It produces flowers and fruits from December to May. Flowers are bisexual, greenish yellow in color and arranged in axillary clusters of 3-6 together with small stalks. Its fruits are drupes and are sub-globose or pear shaped and 5-6 cm in diameter. When ripe, the fruit is orange red in color with 1-6 angled seeds embedded in a fleshy pulp. *S. oblonga* is distributed in South India and Sri Lanka, the Western Ghats in Maharastra, Tamil Nadu, Kerala, Goa and Karnataka. It is rarely seen in the Eastern Ghats of Andhra Pradesh. In Kerala it is fairly common in Thrissur, Kollam and Idukki districts, in Karnataka in Kodagu district, in Tamil Nadu it is reported only from Coimbatore, Tirunelveli and Nilgiri hills.



Fig. 1 *Salacia oblonga* plant growing in its natural habitat in Western Ghats, India

Phytochemicals were identified from *S. oblonga* ethyl acetate-soluble extracts after normal phase and reverse-phase silica gel column chromatography and HPLC analysis (22). It was reported to contain active principles viz, Kotalagenin 16-acetate (1), 26-hydroxy-1,3-friedelanedione (2), maytenfolic acid (3), 3b,22a -dihydroxyolean-12-en-29-oic acid (4), 19-hydroxyferruginol (5), lambertic acid (6), and (2)-49-Omethylepigallocatechin (7), salacinol (8), kotalanol (9), dulcitol (10), galactinol (11), 3-O-a -D-galactopyranosyl(1→6)-O-b -D-galactopyranosyl- sn-glycerol (12), raffinose (13) and stachyose (14) (Fig 2).

### Medicinal properties

#### Anti-inflammatory activity

The root bark powder of *Salacia oblonga* and leaf powder of *Azima tetraacantha* has anti-inflammatory activity. The test was carried out on male albino rats using carrageenan-subjected acute inflammation and cotton pellets causing chronic inflammation methods. In the chronic inflammation, these crude drugs inhibited transudative, exudative and proliferative components and lowered the lipid peroxide content of exudates and liver, gamma-glutamyl transpeptidase activity in the exudate of chronic inflammation. The increased acid and alkaline phosphatase activity and decreased serum albumin in cotton pellet granulomatous were normalized with these drugs. These drugs showed their activity by anti-proliferative, anti-oxidative and lysosomal membrane stabilization (23).

#### Hypoglycemic and antioxidant activities

The petroleum ether extract from root bark (SOB) of *Salacia oblonga* Wall significantly inhibited the streptozotocin-induced hyperglycemia and hypoinsulinaemia which indicated that the SOB extract possesses anti-

diabetic activity. The antioxidant activity of enzymes such as superoxide dismutase, catalase, GSHPxase and GSSGRase was showed to be increased in the heart tissue of STZ diabetic rats treated with SOB. These results indicated that the SOB extract possesses anti-oxidative activity in streptozotocin diabetic rats (24).

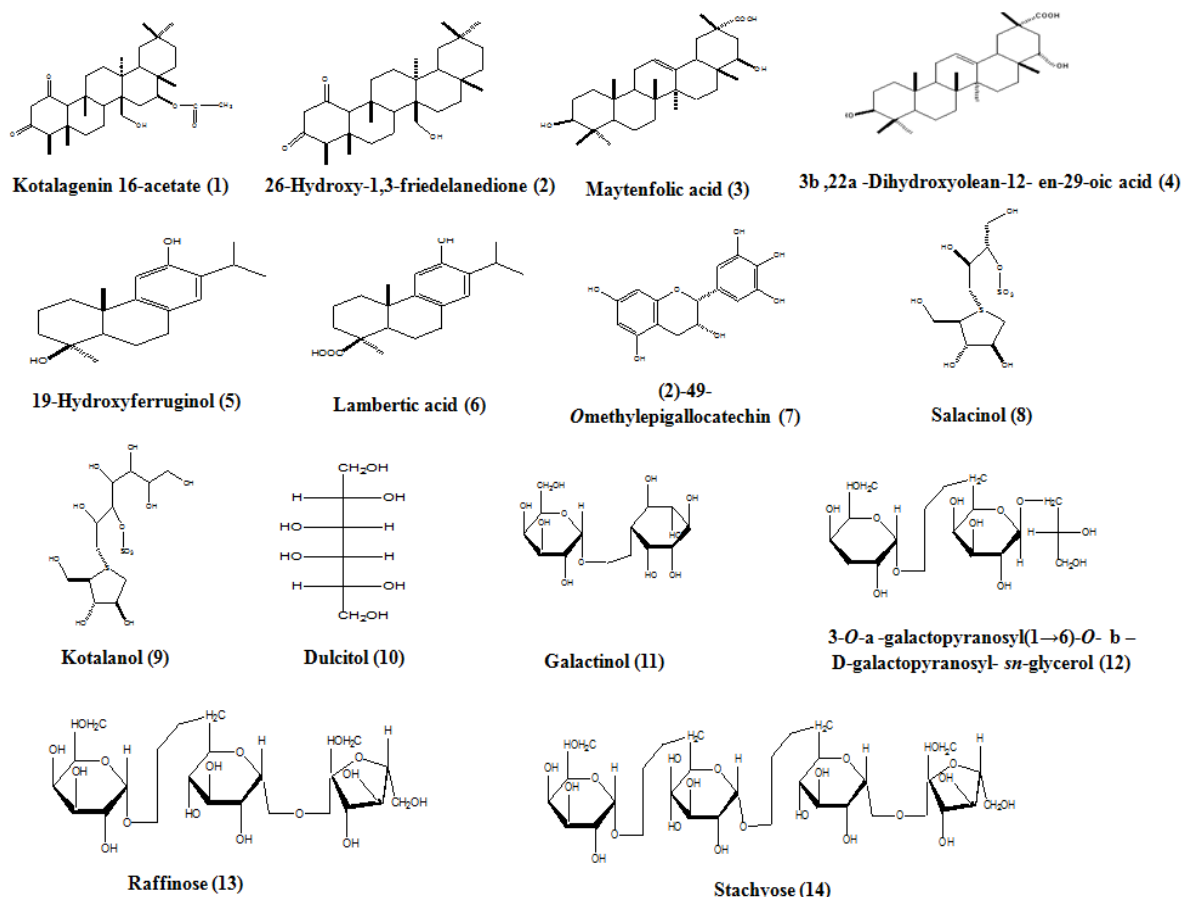


Fig. 2 Chemical constituents of *Salacia oblonga* (1-14)

### Inhibition of Cardiac fibrosis and Anti-hyperglycemic activity

The effect of *Salacia oblonga* aqueous extract on cardiac fibrosis inhibition in type 2 diabetes rat model OZR (obese Zucker rat). The interstitial and perivascular fibrosis in the hearts of the OZR were improved by the extract through chronic administration. The extract exhibited the postprandial glycaemic activity, which develops cardiac complications of OZR. The aqueous extract of *Salacia oblonga* has anti-hyperglycemic activity. The extract was evaluated by using the obese Zucker rat (OZR). The extract resulted in the decrease in plasma glucose level in non fasted OZR and extract also showed small activity in the fasted animal which indicates that *Salacia oblonga* has postprandial glycaemic activity because of inhibition of  $\alpha$ -glucosidase enzyme (25).

### Postprandial glycemia

The extract of *Salacia oblonga* has postprandial glycaemic activity by clinical randomized crossover study of 43 healthy subjects. Subjects were fed the following meals on separate days after overnight fasting: control (C; 480 mL of a study beverage containing 82 g of carbohydrate, 20 g of protein, and 14 g of fat), Control + 1000 mg of *S. oblonga* extract (S). Postprandially, finger stick capillary plasma glucose levels were measured for 180 min. Results showed that the baseline-adjusted peak glucose response was not different across meals. The changes in plasma glucose areas under the curve (0 to 120 min and 0 to 180 min, respectively) compared with C were -9% and -11% for AA ( $P > 0.05$  each), -27% and -24% for S ( $P = 0.035$  and 0.137). This confirms that *Salacia oblonga* extract is a promising nutraceutical ingredient that decreased glycemia in this study (12).

### Acute-glycemic Activity

The herbal extract of *Salacia oblonga* has anti-glycemic activity by clinical testing. Diabetes was induced in healthy adults by high carbohydrate meal. Sixty-six patients were evaluated for diabetes in this study. Result showed that *Salacia oblonga* extract significantly lowered the postprandial positive area under the glucose curve and the adjusted peak glucose response. The herbal extract significantly decreased the postprandial insulin response, lowering both the positive area under the insulin curve and the adjusted peak insulin response (26)

### Nephroprotective activity

Ethanol extract of *Salacia oblonga* has nephroprotective activity, extract was evaluated on rats and nephrotoxicity was induced by Acetaminophen (APAP). APAP produces liver and kidney necrosis in mammals at high doses which showed that APAP significantly increases the levels of serum urea, creatinine, and reduces levels of uric acid concentration. The extract reduced these by increasing anti-oxidative responses as proved by biochemical and histopathological contents and suggested that the extract of *Salacia oblonga* possesses nephroprotective activity (27).

### Anti-microbial Activity

The ethyl acetate extract of *Salacia oblonga* plant parts such as root, stem and leaf have displayed enormous anti-microbial activity (28). The extracts were evaluated against pathogenic strains of gram positive and gram negative bacteria. The evaluation was carried out by using gram positive bacteria such as *Staphylococcus epidermidis*, *Enterococcus faecalis*, *Bacillus subtilis* and gram negative bacteria *Escherichia coli*, *Salmonella typhi*, *Klebsiella pneumoniae*, *Enterobacter cloacae*, *Pseudomonas aeruginosa*. Extract of *Salacia oblonga* have shown good activity towards all the pathogenic bacteria. The inhibition of growth of bacteria in the acidic EtOAc extract were measured to assess the antimicrobial activity. The ethanolic extracts of *S. oblonga* aerial and root extracts exhibiting antibacterial activity against various human pathogens (29).

## CONCLUSION

The demand of *Salacia oblonga* greatly increases in the past few years for its immense therapeutic potentials. Available data clearly says that a broad spectrum of pharmacological properties of this plant.

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