**Salacia** SpS - A Potent Source of Herbal Drug for Antidiabetic and Antiobesity Ailments: A Detailed Treatise

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**ABSTRACT**

Medicinal plants are used since ancient times for treating several human ailments. *Salacia* sps belong to family Celastaceae have prominent place in plant based medicine because it is used in management of diabetes and obesity. *Salacia* sps contain salacinol, katanol, mangiferin are active principles which inhibit α-glucosidase enzyme and slow down the absorption of glucose in intestine. *Salacia* sps possess many therapeutic properties like antiobesity, antidiabetic etc. It is used as ingredient in functional food with availability of a range of formulation owing to its safety and assured efficacy. Extensive research is underway in several laboratories to unravel its therapeutic potentials. Further *Salacia* sps are facing ruthless exploitation leading to the danger of extinction, if not conserved. This review brings out scientific developments in understanding the potential of *Salacia* sps as a promising herbal drug, for the benefit of mankind.

**Keywords:** Medicinal plant, *Salacia* sps, antidiabetic, antiobesity

**INTRODUCTION**

From ancient times medicinal plants are used to treat many disease like diabetic, obesity malaria, chronic fever, cold, cough, diarrhea, arthritis, skin diseases etc. diabetic become global disease before it was rich man disease restricted to western countries but presently it is found all over the world. Diabetes is chronic metabolic disorders that have an effect on human body in terms of physical, psychological and social health. The prevalence of diabetes is anticipated to be up to 4.4% in 2030, and also the incidence was found to be high in China, USA and India. Chemical synthesis drugs are used in management of diabetic due to ill effect on human body. Medicinal herbs have been employed with in the treatment of diabetic mellitus. The ethno botanic information reports anti diabietic property in nearly 1000 plants. *Salacia* –a member of Celastaceae family is one of the medicinal plants extensively used to treat numerous ailments viz. hypoglycemic, inflammation, hypolipidomic, diabetic etc. *Salacia* is called ‘Ponkoranti’ in Ayurvedic. *Salacia* sps are widely distributed in Sri Lanka, India, China, Vietnam and Malaysia is used from thousands of years in ancient medicines notably for the treatment of polygenic syndrome. *Salacia* sps hold a strong place among antidiabetic herbs and prominent ones being, *S. reticulate* and *S. oblonga*. It has been in use for control of diabetes through food supplement formulation in countries like India, Japan, China and Korea. The Genus *Salacia* carries with it 422 sps of them the potential sps namely *S. reticulate* is an endangered one in India and hence needs protection and multiplication strategies for sustainable use as herbal drug. Some of the *Salacia* sps viz., *S. lembbachii*, *S. fifrisepala*, *S. mamba*, *S. oblonga*, *S. chinensis* and *S. miegei* also figure in the IUCN red list.

Ethnopharmacology of *Salacia* sps

The *Salacia* plant is also called *Saptchakra* in Ayurveda. The plant is additionally used as a remedy for Type 2-diabetes within the Siddha system of medication. The medicinal property is attributed to its intestinal α-glucosidase inhibitory activity. α-Glycosidase inhibitors retard the digestion and hence absorption of saccharides within the gut that stops the rise in glucose concentration. A potent natural α-glucosidase inhibitor known as kotalanol was isolated from *Salacia* which show an inhibitory activity against disaccharide than salacinol and acarbose. Within the Ayurvedic system, roots and stems of *S. reticulata*, or *S. oblonga* are used for the treatment of rheumatism, gonorrhea, skin diseases, and notably as a particular remedy for early-stage polygenic disorder. In Thailand, the stem of *S. chinensis* is historically used as anti diabetic drug and additionally as a laxative.

Beneficial effects

Antidiabetic effects

Karunayaka et al., observed reduction in blood aldhoxeose upon administration of extracts of *S. reticulata*, which persisted up to five hours, suggesting its anti diabetic potential. A study of hydro alcoholic extract of *S. reticulata* at the dose of 500mg/kg per orally, reduced the blood serum aldhoxeose level considerably, when compared to the management cluster in corticosteroid evoked hypoglycaemia model. A water soluble fraction

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(25-100mg/Kg per orally) from roots and stems of S. reticulata powerfully restrained elevated blood serum aldohexose level with the administration of sucrose or malt sugar\textsuperscript{15}. In a study with animal model of type II polygenic disease, magniferin an active ingredients of Salacia and its glucosides resulted in reduction in blood aldohexose levels at a dose of 30mg/Kg per os for 2 weeks. This treatment considerably improved hyperinsulenenemia, evidently magniferin might decrease blood sugar by decreasing endocrine resistance as hypothesized by Ichiki et al.\textsuperscript{16}. The S. prenoides of root bark tested against alloxan induced diabetic rats showed anti diabetic property\textsuperscript{17}. Similarly alcoholic extract of roots of S. macroperma in alloxan-diabetic rats, also exhibited antidiabetic activity\textsuperscript{18}. The root bark of S. oblonga from chloroform eluted fraction of the petroleum ether extract showed hyperglycemic activity (60% and 76%, respectively) in albino rats\textsuperscript{19}. The antidiabetogenic activity of methanolic extract from the stem of S. chinensis showed its potent anti-hyperglycemic effect in sucrose or malt sugar loaded rats\textsuperscript{20}. Yoshikawa et al.\textsuperscript{21} found that a water soluble fraction (25-100 mg /kg p.o) from the roots and stems of S. reticulata, powerfully restrained the elevation in rat’s blood serum aldohexose levels, when administered with sucrose or malt sugar. Salaritin has been isolated from S. reticulata extract that effectively inhibits enzyme that catalyzes the breakdown of dietary starch to easy sugars; there by doubtlessly inhibiting starch digestion. Shimoda et al.\textsuperscript{22} investigated the result of aqueous extract from S. reticulata on postprandial sugar levels in rats and in humans, in a dose dependent administration. The extract powerfully restrained the activities of α-glucosidases. Its addition restrained the activity of alpha-amylose (Ic\textsubscript{50} 35μg/ml) however not that of β – glucosidase. The relative inhibitory effects of S. reticulata extract against partially purified α-glucosidase from the rat small intestine was as follows: sucrose isomaltase (Ic\textsubscript{50} 15μg /ml); maltase (Ic\textsubscript{50} 7μg /ml). KK –Ay mice subjected to an exercise program and treated with orally administered mangiferin (30mg/ml) for 2 weeks, showed higher lipid profiles than mice subjected to the exercise program and receiving an identical placebo. Krishnakumar et al.\textsuperscript{23} have evaluated both antioxidant and anti diabetic activity employing a streptozotocin induced rats by oral administration of petroleum ether extract of S. oblonga at 250 mg/kg of body weight. S. oblonga extracts considerably prevented the streptozotocin-induced hyperglycaemia and hypoinsulinaemia. Further Sellamuthu et al.\textsuperscript{24} have reported an experiment on Streptozotocin induced Wistar strain male rats by oral administration of mangiferin (40mg/kg b.wt/day) and glibenclamide (600μg/ b.wt/day) to screen for carbohydrates metabolizing enzymes viz., Hexokinase, Lactate dehydrogenase and Pyruvate kinase. The antidiabeticigenic activity of methanolic extract from the stem of S. chinensis showed its potent anti-hyperglycemic result in oral sucrose or malt sugar loaded rats\textsuperscript{25}. The S. oblonga, S. reticulata collected in India, Sri Lanka respectively were found to indicate symptom effects in oral sucrose and maltose-loaded rats and α-glucosidase repressing activities against disaccharidase, maltase and isomaltase\textsuperscript{26,27} Giron et al.\textsuperscript{28} have studied the results of S. oblonga extract on aldohexose uptake in cell cultures of differentiated L6-myotubes and 3T3-adipocytes. According to them, magniferin, the bioactive compound of the S. oblonga extract, increased the expression of GLUT4 aldohexose transporters and their translocation to the cell wall in L6-myocytes and 3T3 adipocytes, there by stimulating aldohexose uptake by the cells. S.oblonga extract and magniferin could exert antidiabetic drug impact by increasing aldohexose transporter 4-mediated aldohexose expression and translocation in muscle cells. These effects in all probability mediate through in dependent two pathways that are involving 5’-AMP activated macromolecule enzyme and peroxisome proliferated activated receptor-PPAR. According to Wolf and Weisbröde\textsuperscript{29} the salacinel extract did not show any histopathological changes in male Sprague- Dawley rats. Petroleum ether extract of the root of S. oblonga was studied in STZ diabetic rats and antilipid peroxidative activity of constant was studied in the cardiac tissue. Koga et al.\textsuperscript{30} have recently studied the duct gland enzyme repressing (PLI) activity of leaf extracts (aqueous, 60 and 99.8 (v/v)% EtOH) of S. reticulata. Anti obesity and cardiovascular effects vis a vis diabetic complications The liquid extract of kathala himbutu (Local name for Salacia in Sri Lanka) roots has been reported to suppress weight gain and perirenal fat accumulation in male Sprague-Dawley rats which are administered a high fat diet\textsuperscript{31}. It is been reported that its extract can decrease the fat accumulation and additionally will increase the O\textsubscript{2} consumption in mice\textsuperscript{32}. Huang et al.\textsuperscript{33} investigated that chronic oral administration of the S. oblonga root extract reduced the internal organ triacylglycerol and carboxylic acid formation. Further the same group reported that the water extract of S. oblonga modulated the internal organ angiotensin II kind one receptor (AT1) expression in Zucker diabetic fatty rats. Yoshikawa et al.\textsuperscript{34} have reported that methanolic and hot water extracts of roots and stem of S. reticulata and isolated compounds have showed hepatoprotective and antioxidant activity once tested on CCl\textsubscript{4} treated rats. S. reticulata methanolic and hot water extracts considerably suppressed body fluid glutamic oxaloacetic transferase (GOT) and glutamic pyruvic transferase (GPT) at a dose of 400mg/kg. Li et al.\textsuperscript{35} observed the improvement of interstitial and perivascular fibrosis within the hearts in the Fat Zucker treated rats with the liquid extract of S. oblonga. The extract exhibited a postprandial glycemic activity and additionally improved the internal organ complications in this model. Akase et al.\textsuperscript{36} found that S. reticulata extract has exceptional potential to stop fat and associated metabolic disorders as well as metabolic syndromes. Li et al.\textsuperscript{37} demonstrate that a water extract containing mangiferin from the roots of S. oblonga improves cardiac fibrosis in type 2 diabetic animals. Inhibition of postprandial hyperglycaemia by S. oblonga was thought to play a vital role in facilitating the delay in onset
complications caused by polygenic disorder related to cardiovascular disease. Li et al.,35 reported that S. oblonga root extract have anti-diabetic and anti-besity property, it improves excess cardiac triglycerol accumulation and suppress the increase in cardiac fatty acid oxidation by decreasing fatty acid uptake in cardiocytes, there by regulating cardiac PPAR-α-mediated transcription of fatty acid metabolic genes in diabetic and fat animals. Huang et al.,36 studied the effect of chronic oral administration of the water extract of S. oblonga roots to Zucker diabetic fatty (ZDF) rats, a genetic model of type 2 diabetes. They also demonstrated that mangiferin together with accelerator antidepressants and non-accelerator antioxidants repressing activity. Flammang et al.,39 studied on genotoxicity testing of a S. oblonga extract for analysis of blood sugar management exploitation customary tests counseled by America bureau for food ingredients and is reported as safe and may be administered in genotoxicity assays. Im et al.,40 used the plant to treat diabetic patients in India and SriLanka. They concluded that mangiferin present in the Kothala himbutu (a local name for Salacia sps in SriLanka) regulated the gluconeogenic gene in the liver and may responsible for lowering the glucose level in diabetic rats. Sellamuthu et al.,41 showed that mangiferin reduces hyperglycemia and associated oxidative complications in STZ-induced diabetic rats, reduce the aldolhexose level, and enhanced antioxidants markers together with accelerator and non accelerator antioxidants dysfunction. They jointly reveal that mangiferin encompasses protective effects against liver and urinary organ in STZ-induced diabetic experimental rats via decreasing the amount of oxidant markers and improvement in antioxidant systems.

Clinical trails
Jayawardena et al.,42 have reported that Herbal tea containing S. reticulata given to the patients with kind diabetes.

Table 1: Other biological activities related to Salacia plants

<table>
<thead>
<tr>
<th>Biological activity</th>
<th>Extract type</th>
<th>Model system</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypolipidemic activity</td>
<td>The powder extract of S. oblonga</td>
<td>White albino Wistar female Rats aluminium (200 mg/kg and 400 mg/kg)</td>
<td>(45)</td>
</tr>
<tr>
<td>Anti-hypertriglyceremic activity</td>
<td>Aqueous root extract of S. oblonga</td>
<td>Laying hens (1 gm/100gm SOR extract (w/w))</td>
<td>(46)</td>
</tr>
<tr>
<td>Antidiabetic and inhibitor activity</td>
<td>S. reticulata extracts of S. oblonga bark or core root extracts</td>
<td>In vitro assay Wistar male Alloxan (50mg/kg)</td>
<td>(47)</td>
</tr>
<tr>
<td>Antidiabetic activity</td>
<td>S. oblonga water extracts</td>
<td>Obese zucker Rats (100mg/kg)</td>
<td>(48)</td>
</tr>
<tr>
<td>Antidiabetic activity</td>
<td>S. macroasperma roots extracts</td>
<td>Rabbits and alloxon induced albino rats (200 mg/kg )</td>
<td>(49)</td>
</tr>
<tr>
<td>α-Glucosidase inhibition activity assay</td>
<td>S. chinensis whole plant extract</td>
<td>In vitro assay</td>
<td>(50)</td>
</tr>
<tr>
<td>Antidiabetic Activity</td>
<td>Mehani (polyherbal Formulation)</td>
<td>Wistar strains of male albino rats (100μg/ml)</td>
<td>(51)</td>
</tr>
<tr>
<td>Antioxidant and Antidiabetic Activity</td>
<td>Salacia sps plant extract</td>
<td>Male Wistar albino rats STZ induced diabetic rats. (300 mg/kg.bw)</td>
<td>(52)</td>
</tr>
<tr>
<td>Determination of triglyceride content in liver</td>
<td>Aqueous-ethanolic extract of Salacia oblonga root;</td>
<td>Nitric Oxide Radical Scavenging (100 – 500 microgram/ml)</td>
<td>(53)</td>
</tr>
<tr>
<td>Anti-hyperglycemic activity</td>
<td>Methanolic extract of Salacia fruticosa</td>
<td>Wistar albino adult male rats (125 mg/kg and 250 mg/kg, p.o).</td>
<td>(54)</td>
</tr>
<tr>
<td>Antidiabetic Activity</td>
<td>Mangiferin isolation from aqueous solution of S. chinensis of root</td>
<td>Male adult Wistar rats(40mg/kg b.wt/day)</td>
<td>(55)</td>
</tr>
</tbody>
</table>
Table 2: List of patents based on Salacia

<table>
<thead>
<tr>
<th>Title</th>
<th>Patent no</th>
<th>Inventors</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triterpenoid compound for the Treatment of diabetes</td>
<td>US 5691386</td>
<td>Wayne D. Inman, Michael John Reed</td>
<td>69</td>
</tr>
<tr>
<td>Compound with α-glucosidase Inhibiting action and method for Producing the same</td>
<td>US 6,376,682 B1</td>
<td>Johoji Yamahara</td>
<td>70</td>
</tr>
<tr>
<td>Formulations of alpha-amylase inhibitors with alpha-glucosidase</td>
<td>US 7,553,502 B2</td>
<td>Ezio Bombardelli, Groppello cairol, Paolo Morazzoni, Cesare Ponzione, Massimo Ronchi.</td>
<td>71</td>
</tr>
<tr>
<td>Inhibitors useful in the treatment of diabetic and obesity</td>
<td></td>
<td>Smith Conrad Anton, Masanori Asada, Yuzo Kawahara, Shinichi Kitamura.</td>
<td>72</td>
</tr>
<tr>
<td>Novel substance having Alpha-glucosidase inhibiting activity and food containing the Same</td>
<td>US 2007/0037870 A1</td>
<td>Pedrosa Jose Lopez, Martin Manuel Manzano, Cabrera Ricardo Rueda</td>
<td>74</td>
</tr>
<tr>
<td>Methods for delaying progression of diabetes using salacia oblonga extract</td>
<td>WO 2011163183 A3</td>
<td>Pedrosa Jose Lopez, Martin Manuel Manzano, Cabrera Ricardo Rueda</td>
<td>77</td>
</tr>
<tr>
<td>Body weight gain suppressing composition and food product comprising the same</td>
<td>US 2012/0276081 A1</td>
<td>Yuhtaka ueda</td>
<td>80</td>
</tr>
<tr>
<td>Glycosidase inhibitors and methods of synthesizing same</td>
<td>US 6,455,573 B1</td>
<td>B. Mario Pinto, Blair D. Johnston, Ahmad Ghavami</td>
<td>81</td>
</tr>
</tbody>
</table>

II polygenic disorder diabetes mellitus as assessed by HbA1C, showed a statistically important fall in HbA1C compared to a rise in HbA1C with the placebo cluster, thereby demonstrating the efficacy of the tea as safe treatment for Type II polygenic disorder. A trial placebo-controlled study performed in Japan reported that glucose level is reduced considerably in humans with Type 2 polygenic disorder, receiving S. reticulate extract as a part of their diet, as compared to plain subjects receiving a matching placebo. In the disaccharide tolerance test conducted on human volunteers to be administered 200 mg po. S. reticulate extracts, five minutes before disaccharide loading of 50g, considerably suppressed postprandial hyperglycaemia and effectively demonstrated its antidiabetic property. The liquid extracts of Kothalahimbutu roots and stems are prevented and reduced postprandial hyperglycaemia the fasting plasma level of aldohexose. Flammang et al.,(39) clarify that S. oblonga holds potential as a natural methodology to mitigate the glucose response for patients with polygenic disorder by inhibiting the activity of intestinal α-glucosidase. Singh et al.,(43) studied the antidiabetic property of S. chinensis in diabetic CKD patients. The thirty stable diabetic CKD patients were randomised into two team; team A and B have fifteen patients each. Team A received 1gm S. chinensis two fold daily and team B placebo. They measured a kidney function: body fluid creatinine and creatinine clearance; markers of epithelial tissue dysfunction: Interleukin-6 and serum Homocysteine, and lipids profile were measured at baseline and through follow-up for half a year. They reveal that S. chinensis has lipid lowering properties, significantly reducing lipid levels. S. chinensis conjointly reduced homocysteine and IL-6 levels in diabetic CKD patients.
suggesting necessary role in modulating CKD risk factors in these patients. *S. chinensis* could also be given as drug within the diabetic patients because it controls post-prandial hyperglycaemia, treats obesity and modulates cardiac risk factors. Offer et al., 53 showed that *S. reticulata* with vitamin D3 had a potential to decrease weight and fat. They investigated in forty patient’s consisting of 8 men (average age between 30-60 years) physically active, with a BMI 25-45. The patients were divided into 2 teams A and B. As per the weight, BMI and body composition; and administered one capsule (S. reticulata 20μg with Vit D3 1.6 μg corresponding to 64 IU). However B team took further an additional capsule at 3 times once after meals. A considerable decrease in body weight and fat and weight within four weeks was observed (4.5% and 1.4% in B and A team respectively).

**Formulations**

Sivaparakasam et al., 56 prepared a drug called “Kadal” for diabetes mellitus in Siddha system. It contains roots and bark of *S. chinensis*, and triphala. Testing of *Kadal* for 25 type 2 Diabetic patients and the formulation showed antihyperglycemic effect. Formulation by name, “Glycoscia” was reportedly developed by three botanists in 200757 and utilized in the D’Adamo Clinic. It contain *S. oblonga* a root bark -300 mg, red sage root (*Savina miltiorrhiza*)-75mg, quercentin-50mg, Maitake mushroom (from *Grifola frondosa mycelia* -50mg, trans-resveratrol-50 mg (from *Polygonum cuspidatum*) and different ingredients conjointly used similar to vegetable polysaccharide, L-Leucine and silicon oxide. This drug was used to treat inflammation, hypoglycaemia and peripheral hormone sensitivity. Blood serum sterol and triglycerides; chronic complications of polygenic disorder similar to retinopathy, peripheral pathology and cataracts.

Faizal et al., 58 have evaluated ayurvedic medication ‘Rajanyamalakadi’ (manufacture By Bphra Drug Laboratories). Every pill contains 500mg: *S. oblonga* -250 mg, *C. longa* -125 mg, *E. officinalis*-125 mg given to the diabetic patients in a medical camp in the Ayurveda Hospital in Ernakulam. Rajanyamalakadi (500 mg) prescribe as a vital antidiabetic drug with hypolipidemic and inhibitor effects probably because of the presence of terpenoids or curcuminoids or polyphenols or flavonoids. Radha et al., 59 developed a capsule called Kadalahzini (contain 1 gm *S. reticulata* bark powder). They observed the treatment resulting in reduction in glucose, glycosylated Hb, total steroid alcohol, cholesterol, VLDL steroid alcohol and triglyceride levels as compare to control group B. They concluded that long term consumption *S. reticulata* may benefit the diabetic patients. Rajalakshmy et al., 60 studied the qualitative associated quantitative aspects of an opposing diabetic flavoring drug *Diajith*. *Diajith* is Ayurvedic formulation containing roots of *S. reticulate*, rhizomes of *Curcuma longa*, fruits of *Tribulus terrestris* and *Emblica officinalis*. They analysed 3 batches of the merchandise and did a phytochemical fingerprint profile as an attempt to standardize protocol to formulation. Shivaprasad et al., 61 developed a product referred to as SALCITAL-Plus at R&D center, Olive Bioscience Pvt Ltd Tumkur. Which contain a polyphenolics compounds like mangiferin. Oda et al., 62 released a product called Metabharier used as functional food to prevent diabetic and obesity in patients. Basha et al., 63 formulated mehani which contains 5 ingredients *Salacia oblonga*, *Emblica officinalis*, *Trigonella foenumgracus*, *Curcuma longa* and *Tinospora cardiofolia*. The mehani showed a good antidiabetic property.

**Food ingredient formulations**

The thin boundary between food and drugs has been exploited, and designer foods have recently emerged as big business in functional food markets63. Currently *Salacia* sps are extensively consumed in Japan and US and different countries as a food supplement for preventive and diabetics management64. *S. oblonga* is has been used as food ingredient for several years for management of high glucose levels in India, Sri Lanka and Korea.4. Nakata et al65 showed that *Salacia* lipopolysaccharide tea not only reduced fasting plasma glucose level, but also effectively improved beta-lipoprotein values. Thus, it is anticipated that *Salacia* lipopolysaccharide tea are going to be used as a preventive food for lifestyle-related diseases, like polygenic disease, obesity, and dyslipidemia. Balaji et al66 prepared a formulation containing equal ratio of *Asparagus racemosus*, *Emblica officinalis*, *Salacia oblonga*, *Syzygium aromaticum*, and *Tinospora cordifolia*.they tested the formulation on type 2diabetic rats. They reveal that formulation had antidiabetic, antiobesity and antioxidant property due to phenolics and other secondary metabolites present in it. Sajeeth et al67 demonstrated that polyherbal formulation ESF/AZ/250 and ESF/AZ/500 containing eight ingredients such as *Aerva lanata*, *Aegle marmelos*, *Ficus benghalensis*, *Catharanthus roseus*, *Bambusa arundinaceae*, *Salacia reticulate*, *Syzygium cumini* and *Eruca sativa*. These formulation were given to the *Streptozotocin* induced rats. This study revealed that ESF/AZ/500 formulation has highest antidiabetic and antioxidant activity compared to ESF/AZ/250 formulation because of higher dose.

**CONCLUSION**

*Salacia* sps have been used as plant based medicine for many diseases from ancient time in many countries like India, Japan, Sri Lanka, USA etc. To treat diabetic, obesity, malaria, cold, caught arthritis etc. *Salacia* sps contain several phytochemicals like Salacinol, katanol, mangiferin etc which exhibit beneficial effect as therapeutics. Especially, Salacinol and Katanol are used to treat hyperglycemia. Their administration reduces body weight by reducing calorie intake by inhibiting the α-glucosidase enzyme responsible for disassembling complex dietary carbohydrates, such as starch into glucoside. This phenomena would lead to reduction in the absorption of glucose in the intestine. Salacinol and Katanol have potential to become lead compounds due to their ability to up and down regulation of the gene in humans in specific disorders. They can also be considered in food ingredients and functional food formulations.
offering significant desired benefits. It provides an opportunity to formulate value added herbal products through a range of formulations. Accordingly several herbal products are found in market with different brand names owing to it efficacy for the health benefits and also being safe to consume. The wealth of information on the health and medicinal properties of Salacia spp could lead to its utility as a potential herbal drug for many diseases. Thus opening the way for new class of hypoglycemic drug in near future. But recent problem is Salacia spp becoming endangered, deserves attention for conservation and propagation in a sustainable manner.

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