

Recent Advances, Innovative Aspects, Botanical Description of Therapeutic Medicinal Plants and Different Applications

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Abstract

Different medicinal plants have been used for treating the large number of inflammatory diseases. Among them, most of the diseases are causing the lethal effects on human body and there is need for controlling the infectious diseases due to their amazing effects. Medicinal plants contain phytoconstituents such as flavonoids, steroids, glycosides, saponins, tannins, epigallocatechin (EGC), essential oils, hematoxylin, phenolic glycosides, saponins, carbohydrates, and proteins. It also reportedly has a variety of pharmacological effects, including those that are anti-diabetic, CNS- depressant, cardioprotective, anti-bacterial, anti-menorrhagic, anti-hyperglycemic, and anti-cancer. *Saraca indica* is revered as a potent antibacterial and anti-inflammatory properties help to keep bacteria out of the urinary tract, which also lessens pain and inflammation. To fully explore the therapeutic potential of this plant and develop it into a standard drug, more in-depth clinical research does, however, seem worthwhile.

Keywords: Tannins, carbohydrates, CNS-depressant, cardioprotective, anti-hyperglycemic.

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INTRODUCTION

Different medicinal plants have been used for treating the large number of biological targeting diseases. Among them, most of the diseases are causing the lethal effects on human body and there is need for controlling the infectious diseases [1-3]. Despite the fact that there is little information on the exact mechanism of action of herbal medicines, many medical treatments use them to treat their patients due to their amazing effects. Since various elements with several mechanisms of action are seen as necessary for holistic therapeutic activity, herbal extracts rather than purified chemicals have been employed in the past. Medicinal tree, which has been used from ancient times is one of its most fabled and significant trees used for the treatment of infectious diseases [4, 5].

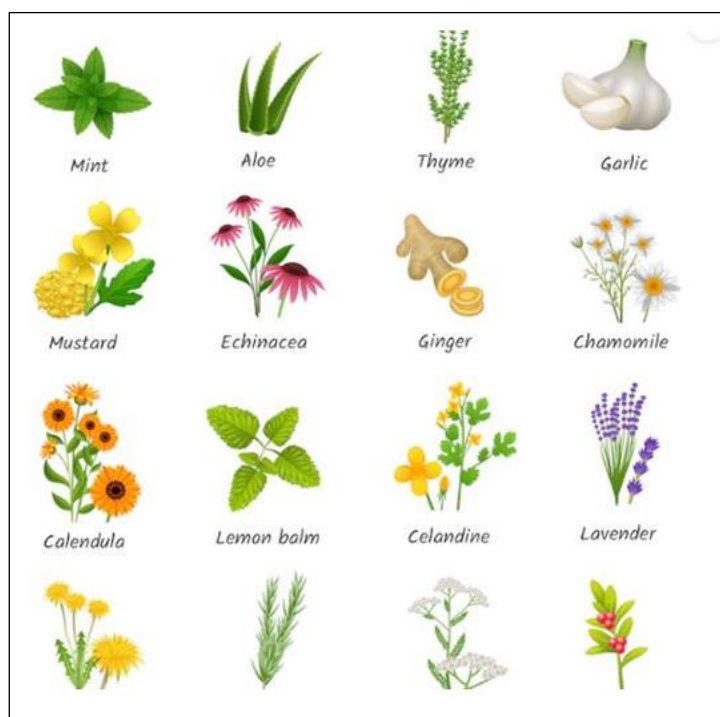
Various pharmaceutical herbals and biologically active compounds are used for therapeutic purposes of high risk infectious diseases. These includes the bioactive compounds that posses the anticancer and antibacterial activities. The medicinal tree, also known by its binomial Latin names *Saraca asoca* (Roxb.) or *Saraca indica*, is a member of the Caesalpiniaceae family [5, 6] and is native to Kerala, West Bengal, regions of southern India, and the Himalayas up to an altitude of 750 m. It is also found in other parts of Asia, including parts of Africa and the Middle East. It is a tiny, spreading evergreen tree that grows to a height of 7–10 m. Its bark is warty and dark brown, on the verge of becoming gray. It has parpinnate, 15-20 cm long leaves with leaflets that are 6-12 cm long, oblong, and firmly subcoriaceous, and fragrant, polygamous apetalous blooms that are yellowish orange to crimson in color [5-7].

Table 1: Shows the novel aspects and botanical description of medicinal

| Medicinal Plant/Constituent | Function/Compound | Actions |
|-----------------------------|---|--------------------------------|
| Medicinal plants role | Number of biological infectious diseases. | Biological and pharmacological |
| Phytoconstituents | Saponins, tannins, epigallocatechin (EGC), essential oils | Biological and pharmacological |
| Other compounds | hematoxylin, phenolic glycosides, saponins | Biological and pharmacological |
| Biological Activities | Anti-diabetic, CNS-depressant, cardioprotective, anti-bacterial, anti-menorrhagic, anti-hyperglycemic, and anti-cancer. | Biological and pharmacological |

Different bioactive compounds are responsible for their bioactivities. These are glycosides, flavonoids, tannins, and saponins are said to be present in *S. asoca*'s stem bark. It is used as a spasmogenic, oxytocic, uterotonic, antimicrobial, and antidyskinetic agent. Furthermore, antiprogestational and antioestrogenic action against menorrhagia has been reported. Despite the fact that this plant's seeds are often discovered

dispersed among trees without being put to any specific purpose, a thorough review of the literature shows no adequate investigations on their pharmacological activity. Hence, its include evaluating the pharmacognostic potential of *S. asoca* seed acetone extract, as well as establishing physiochemical parameters, screening preliminary phytochemical data, and determining the extract's antipyretic potency [7-10].

**Fig. 1: Shows the morphological description of medicinals**

Herbal medicines possess the variety of activities chemical constitutes responsible for their biological and pharmacological activities necessary for controlling the different diseases. The use of herbal treatments was routine in the old medical system known as Ayurveda. The Asoka tree is one of the native plants with significant traditional value is Medicinal, or *Sarraca asoca* (Roxb), which is a member of the Legume family's Caesalpinaceae subfamily [1, 7, 9]. It is an evergreen tree of medium height. The goal of the current study is to highlight the detailed botanical description, phytochemical components, therapeutic applications, and pharmacological research. According

to reports, *saraca asoca* contains phytoconstituents such as flavonoids, steroids, glycosides, saponins, tannins, carbohydrates, and proteins. It also reportedly has a variety of pharmacological effects, including those that are anti-diabetic, CNS-depressant, cardioprotective, anti-bacterial, anti-menorrhagic, anti-hyperglycemic, and anti-cancer [11-13].

Natural herbal medicines are used for controlling the infectious diseases that are spreading all around the world due to the high risk of infections and microbial resistance. In-depth knowledge regarding the *Saraca asoca*'s medicinal and pharmacological

significance is highly important [14-16]. Herbal and tropical based medicines are effective for the relief of infectious and inflammatory diseases. These are also effective since the long period of time due to their action on the living systems and thus effective for the human body as therapeutic purposes. Typically, medicinal bark is utilized as a cure in exercising. The bark is sour and bitter; cooling; astringent to the intestines; alexiteric; anthelmintic; demulcent; emollient; treating tumors, enlargement of the stomach; colic; piles; ulcers; bloody discharges from the uterus; menorrhagia; beneficial in fractures of the bones; improves complexion. The bark is primarily used in menorrhagia and is often used in uterine conditions. In urinary discharges, the seeds are helpful [17-20].

Medicinal plants are highly effective due to the presence of bioactive compounds responsible for their pharmacological action. Burma, Sri Lanka, and the Malayan Peninsula have all seen notable discoveries of *Sarraca asoca*. It is often found in India's northern regions, including the Khasi Hills of Assam, West Bengal's hilly regions, the Western Ghats, and West Bengal. It was also present in the Andaman Islands, Eastern Bengal, Western Peninsula, Burma, Central and

Eastern Himalaya, Western Peninsula, and Malaysia are where the tree is found. In evergreen woods up to a height of roughly 750 meters, it is widely distributed across the Indian Subcontinent. The seeds are used for its reproduction. A wet, well-drained soil is what the plant likes. For the boom of plants, red laterite alluvial soil is thought to be very suited [21, 22]. With temperatures of 35 to 40 degrees Celsius, it forecasts for an annual rainfall range of 2000–4000 mm. Top boom is used for deep, wet soil, particularly near water sources. Fire and ice damage are possible. It's not good for coppicing. The tree prefers light to medium shade. Throughout the months of February through April, the plant produces mature seeds, which may fall to the ground and be collected. It takes roughly twenty days for seeds to germinate after being soaked in water for twelve hours and put on long beds. For topic planting, plants between half a year and 365 days old are employed. For the growth of the plant, 10 kg of farmyard manure per tree each year is beneficial. During the warmer season, the vegetation will be watered. The bark of trees is removed after 20 years of growth. Selling sprouts requires doing it during the rainy season [23-26].

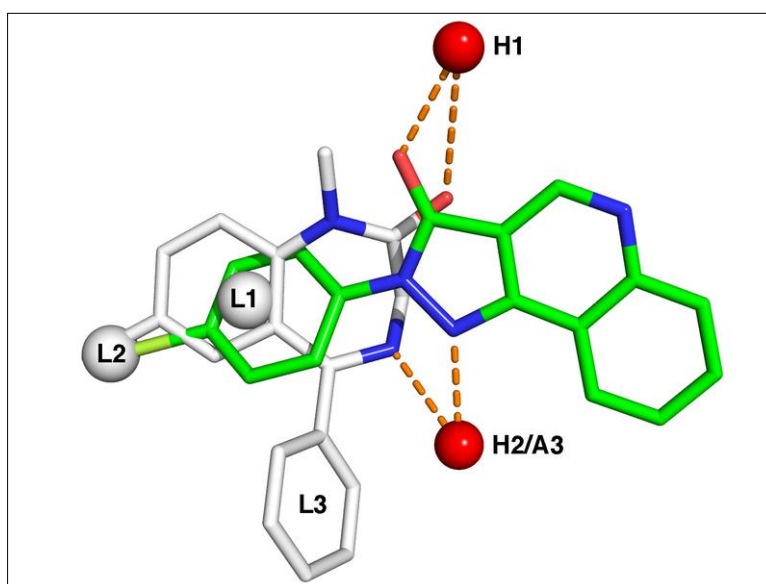


Fig. 2: Shows the 3D-structure of medicinal plant responsible for their biological activities

Medicinal Photochemistry

Medicinal plants are used for the biological evaluation of some active herbs used for the metabolic and hepatic diseases. These include chemicals. Several compounds, including (+)-catechins (CA), (+)-epicatechin (EC), and (-)-epigallocatechin (EGC), essential oils, hematoxylin, phenolic glycosides, saponins, and a good amount of gallic acid, procyanidin B2, leukocyanidin and epigallocatechin-3-O-gallate (EGCG), kaempferol, octacosanol, have been reported from the plant. Both meals made from plants and herbal medications include a lot of these chemicals. Catechins are well-known flavonoids for their

antioxidant properties as well as their application in the symptomatic management of several gastrointestinal, respiratory, and vascular illnesses. A vast variety of chemicals, such as glycosides, tannins, flavonoids, steroidal glycosides, saponins, carbohydrates, and proteins, are revealed by chemical examination of bark, roots, leaves, and flowers. Tannins, catechols, flavonoids, and sterols are also present in the bark. Saponins, leukocyanidins, leukopelargonidin, sugars, alkaloids, and glucosides [20-24].

The flower contains sitosterol, flavonoids, flavone glycosides, anthocyanins, and fixed oil.

According to reports, the seeds contain a variety of fatty acids including oleic, linoleic, palmitic, and stearic acids, as well as gallic and ellagic acids, quercetin-3-O-L-rhamnoside, kaempferol 3-O-L-rhamnoside, amylin,

and ceryl alcohol. The pods also contain these same fatty acids as well as amylin and ceryl alcohol. The stem included amylin, kaempferol 3-O-L-rhamnoside, quercetin, and quercetin 3-O-L-rhamnoside [22-25].

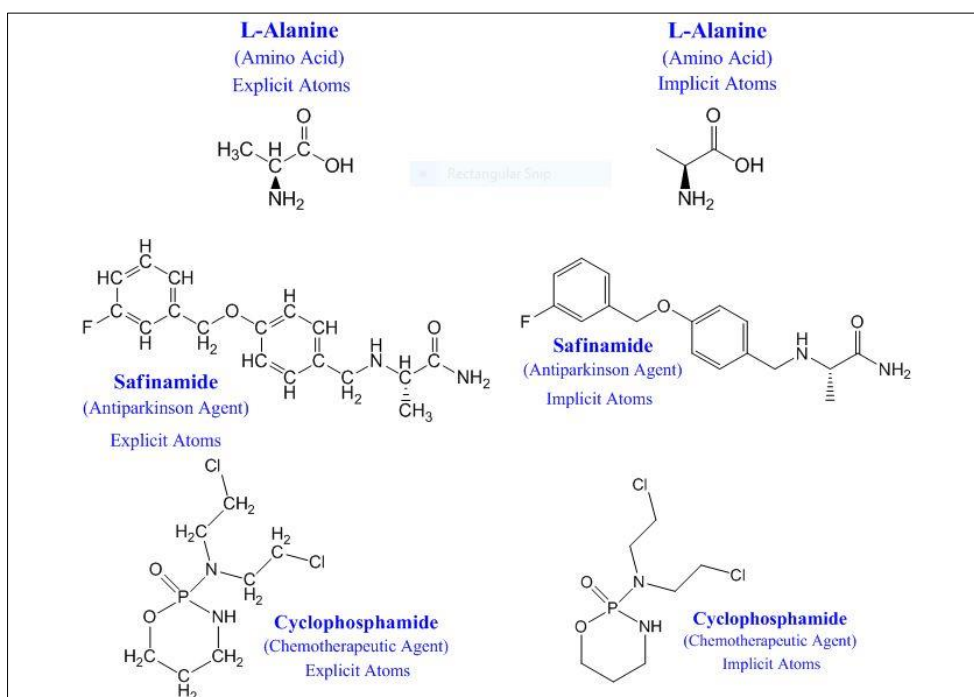


Fig. 3: Shows the bioactive compounds in the medicinal plants

Action against Pathogenic Bacterial strains

Medicinal plants have some potential against the bacteria due to which, they are widely used for the treatment of bacterial diseases. A bacterial-reduction effort using the disc diffusion technique, the antibacterial activity of methanolic and acetic extracts of *Saraca asoca* against *E. coli* and *B. subtilis* with zone of inhibition about 6 mm diameter. For gram-positive bacteria, the sequence of action is bark, flower, and leaf for gram-negative bacteria, and flower, bark, and leaf for gram-positive bacteria [26-28].

Role against Fungal Pathogens

Some of the biological active medicinal plants have some potential against the fungi due to which, they are widely used for the treatment of fungal diseases. Different studies revealed the evidence of their antifungal activity. *Saraca asoca* methanolic and acetic extracts showed for their ability to inhibit the growth of fungi using the disc diffusion method. There are two different species of aspergillus: *Aspergillus niger* and *Aspergillus fumigatus*. On test organism seeded plates, 6 mm filter paper discs were placed that had been impregnated with acetic and methanolic extracts. Both *Aspergillus niger* and *Aspergillus fumigatus* were used as the testing organisms. Distilled water that had been autoclaved was used as the control. After a 24-hour incubation at 28°C, the results were represented by the zone of inhibition. The zones were measured in millimeters. The increase in the size of the

plants' leaves was largely attributed to *Aspergillus niger*. *Aspergillus niger* is used for medicinal commercial propagation on a large scale. To make medicinal medications, these fungi are used [28, 29].

Antimenorrhagic Action

A lot of medicinal plants have some potential against the treatment of metabolic diseases. Indians have traditionally employed the dried bark of *Saraca asoca* to treat menorrhagia. In the event of uterine disorders, dried bark and the flowers are given to women as a tonic. All menstrual cycle-related disorders can be treated with the stem bark of *S. asoca*. Menstrual irregularities and menorrhagia are treated in Sri Lanka with *S. asoca* bark. As a uterine sedative, the bark of *S. asoca* is used in India. In contrast to ergot, hot water extract administered to adult female humans stimulates the uterus in a similar way. However, tonic contraction is not produced. Moreover, it is used in the treatment of menorrhagia, as an emmenagogue, as a sedative for the uterus, and for uterine diseases, in addition to being a component of various preparations for treating female reproductive system malfunction [30, 31].

Active against a variety of Cancers

Some of the biological active medicinal plants have some potential against the cancers due to which, they are widely used for the treatment of cancer treatment. With no activity against normal lymphocytes and preferential activity for lymphocytes derived from

leukemia patients, the anticancer principle from *Saraca asoca* flowers demonstrated 50% cytotoxicity (in vitro) in Dalton's lymphoma ascites and Sarcoma-180 tumor cells at concentrations of 38 µg and 54 µg, respectively [32, 33].

Anthelmintic activity is present in *S. indica* leaves. An anthelmintic effect was shown in a dose-dependent manner in both the methanolic and ethanolic extracts of *S. indica*. The leaf extracts from *S. indica* exhibits analgesic properties. Exercises that lower blood sugar and fight free radicals the antihyperglycemic and antioxidant properties of *S. asoca* (Roxb.) de Wilde leaves are evident [19-22]. Exercise for heart protection. A cyclophosphamide-induced cardiotoxicity was tested against the cardioprotective effects of an alcoholic extract of *Saraca indica* bark. The status of cardiac biomarkers, ECG, oxidative enzymes, and lipid profile in cyclophosphamide-induced cardiotoxicity were significantly (p 0.05) improved by treatment with *Saraca indica*. The cardioprotective effect of *Saraca indica* is supported by histopathological reports, biochemical analysis, and electrocardiograms (ECG). This effect may be linked to antioxidant activity [34-36].

Action against Diabetes

Rats with normal blood sugar levels and diabetic rats produced with streptozotocin were used to test the hypoglycemic effects of methanolic bark extracts from *Saraca indica* Linn. The extract demonstrated a notable hypoglycemic activity at a dose of 400mg/kg administered orally [37-39].

Several studies point to the use of medicinal bark powder as a helpful component in managing benign as well as malignant cancers and tumors, particularly breast, ovarian, and uterine cancers, even though it is not the only treatment option. Due to its high concentration of cyclic hexapeptides and quinones, medicinal actively aids in the management of histiocytic lymphoma, myeloid leukemia, and other cancerous conditions. It also actively fights cancer cells in the colon, breast, and liver [1, 9, 11]. Some of the biological active medicinal plants have some potential against the inflammation due to which, they are widely used for the treatment of infectious diseases. Due to medicinal anti-arthritis and anti-inflammatory qualities, arthritis-related pain, swelling, and inflammation can be effectively relieved. It is also used to treat arthritic conditions, other inflammatory conditions, painful muscle spasms, and sore muscles because it is a natural vasodilator and Vata-pacifying herb. Rheumatoid arthritis, also known as Amavata in Ayurveda, is a painful condition caused by abnormal Vata doshas and joint proliferation. Application of a powdered paste made from the bark of the plant is very effective in treating it. Furthermore, because Shandhivata or osteoarthritis is brought on by Ama buildup in the

bones, it is also effective in treating this condition [11, 18, 19].

Other Applications

Some of the biological active medicinal plants have some potential against the infection in the digestive tract due to which, they are widely used for the treatment of digestive tract diseases. This common herb, also known as Arsha in Ayurveda, is widely used for preventing and treating piles because it is a potent laxative. It is essential for facilitating the easy exit of the stool from the intestines by softening the stool. It lessens burning and discomfort associated with piles. As a result, anal fissure, bleeding, or the protrusion of a mass from the anus is prevented. It also relieves pressure on the lower part of the intestines. Additionally, it aids in colon cleaning and increases intestines' resistance to damage. For piles, mix 14 to 12 of medicinal powder with water and take it after meals [20, 22, 28].

Urinary distension, urinary incontinence, renal stones, and painful urination are all conditions that medicinal is extremely effective in preventing and treating. In ayurvedic medicine, the plant *Saraca indica* is revered as a universal cure-all. The herb's potent antibacterial and anti-inflammatory properties help to keep bacteria out of the urinary tract, which also lessens pain and inflammation when urinating [36-40].

CONCLUSION

It is conclude that some of the medicinal plants are highly effective for therapeutic evaluation of different disease. Their action rate in different disease is still lacking and needed to further explore at the cellular level. One of the many plants with universal medicinal properties is this one. Due to Medicinal therapeutic potential, it has been widely used to treat a variety of diseases. The bark, leaves, flowers, and seeds of this adaptable plant have medicinal value. It is also a source of many different kinds of compounds. Medicinal is a venerable and trustworthy source of medicine that is used in numerous pharmacological processes like anti-cancer, anti-menorrhagic, anti-oxytoxic, and anti-microbial activity. It also has extensive uses in Ayurveda, Unani, and homeopathy. Most of the claims made by traditional medicines have been validated by scientific studies. For the management of various diseases, *saraca asoca* should be highlighted. To fully explore the therapeutic potential of this plant and develop it into a standard drug, more in-depth clinical research does, however, seem worthwhile.

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