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A CRITICAL REVIEW ON SARACA ASOCA (ROXB.), DE. WILD -A POPULAR MEDICINAL PLANT OF INDIA

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ABSTRACT

Asoca asoca (Roxb.), De. wild (Caesalpinaceae) is an important native plant with many traditional uses that is also referred to as Ashoka. A allusion to the bark's reputation for keeping women young and well-groomed, Ashoka means "without sorrow" in the name. Glycosides, flavanoids, tannins, saponins, alkanes, esters, and primary alcohols have all been found in the stem bark, which is mostly utilized in pharmaceuticals. The traditional usage of Saraca Asoca in medicine has been extensive for treating issues pertaining to women, including menorrhagia, leucorrhoea, hemorrhoids, abnormal uterine bleeding, and so on. Saraca asoca (Roxb.), De. Wild's phytochemistry, pharmacological profile, and therapeutic characteristics are the main areas of study focus in this review.

KEYWORDS: Saraca asoca, traditional usage, phytochemistry, etc.

INTRODUCTION

One of the oldest trees in India is Saraca Asoca (Roxb.), De. wild or Saraca indica. It is also referred to as an "Ashok briksh" or "Ashoka" and is a member of the Caesalpinaceae family. The word "without sorrow" or "that which gives no grief" describes this tree. Ayurveda is not the only ancient Indian scripture that mentions the Ashoka tree. The Ashoka tree is revered all across India, and in addition to the Ramayana, it is also cited in Buddhism and Jainism. The Ashoka tree is described in the Charaka Samhita, which is said to have been written about 1000 BC, along with its health advantages.[1]

The Ashoka tree grows in rain forests. All of India is home to it, but notably the Bengal area, Kerala, Himalaya, and the southern region. Its former range included the center Deccan

plateau and the middle region of the Western Ghats in the Indian subcontinent's western coastal zone. The Ashoka tree is a threatened species because it grows wild.[2] Although wild Ashoka trees are becoming less common in their native range, they may still be found in isolated wild settings in the foothills of the central and eastern Himalayas, the northern plains of India, and the west coast of the subcontinent close to Mumbai.[3]

The fragrant blossoms and eye-catching leaves of the Ashoka tree make it valuable. It's a lovely little evergreen tree that stands straight, with thick clusters of rich green foliage. It blooms from February to April approximately. The bright yellow Ashoka blooms become crimson just before they fade, and they are carried in thick, luscious bunches.[4]

One of the most important Ayurvedic medications for treating a variety of feminine conditions, including menorrhagia, is asha. Its bark might help a woman stay young and healthy. Saraca asoca is known as "Sita-Ashoka" by the locals and traditional healers of Chhattisgarh, and is mostly used to treat gynecological conditions. Its bark has a flavor that is sweet, astringent, and bitter. It stimulates the tissue of the ovaries and endometrium. Internal bleeding, hemorrhoids, ulcers, uterine diseases, menorrhagia—particularly those caused by uterine fibroids—meno-metrorrhagia, leucorrhea, and acne might all benefit from it. The plant has several therapeutic properties and is frequently used in Ayurvedic formulations to treat a variety of illnesses, including painful ailments, skin disorders, absorption and digestive issues, and excessive thirst.[5]

HABITAT

It may be found throughout the Indian subcontinent. The Western Ghats and Deccan plateau are thought to be the tree's original habitat. The eastern and central Himalayas are also home to it. It may grow up to 750 meters above sea level, according to reports.[6] The plant may reach up to nine meters in height and length. Across India, the plant is often found in fertile and semi-fertile regions. The tree is a member of the family Caesalpinaceae. The color of this perennial plant can vary from a deep green to a grayish green. The lenticels have opposing ridges and a round shape. Usually, the seeds have fibers and are reddish brown in color.[7]

The leaves are peripinnate, alternate, distichous, and measure 7 to 30 cm in length. The petiolule is 0.1 to 0.6 cm long, and the opposite leaflets are 4-6 pairs, narrow, elliptic-oblong, or lanceolate. The leaves are glabrous, with a raised midrib and tertiary nerves that reticulate at 7 apex and acuminate at base.[8]

Bark: The bark has a warty surface and is dark brown, gray, or nearly black. Because to the existence of rounded or projecting lenticles, the stem bark is uneven and rough. It is also channeled, smooth, and ridged transversely.[9]

Flowers: The inflorescence consists of thick corymbs that are orange in color, occasionally white and fragrant.[10]

Fruits: They are a flat, oblong, apiculate pod.[11]

TAXONOMIC POSITION

Kingdom- Plantae

Division- Magnoliophyta

Class-Magnoliopsida

Order-Fabales

Family- Caesalpinaceae

Genus-*Saraca*

Species-*asoca*

TRADITIONAL USES

Saraca asoca has been widely used in traditional medicine to treat issues connected to women, including hemorrhoids, menorrhagia, leucorrhea, and dysfunctional uterine hemorrhage. Additionally, it works well in Ayurveda to relieve congestion from the Medas Dhatus and Mamsa, particularly in cases where the Artava Srotas may include fibroids, cysts, endometriosis, leucorrhea, and excess kapha and ama. Additionally strengthening the circulatory system, the herb Ashoka is a useful treatment for arrhythmia and heart weakness. In addition to promoting urine flow, the herb Ashoka aids in the treatment of disorders that result in painful urination.[12]

Ashoka plant is useful as a uterine tonic for irregular menstrual periods and miscarriage because it strengthens the uterine muscles and endometrium. Ksheerapaka of its 6-gm bark powder should be consumed in Pradara Roga of females. It works well for all kinds of unusual vaginal secretions. Additionally helpful for uterine inertia, dysurea, urinary calculus, uterine Kannada Ashanke, and Kenkalimara discomfort is ksheerapaka. Bark paste should be administered to the painful area. To avoid gynecological diseases, women in Chhattisgarh

boil Ashoka bark in cow's milk, add sugar, and take once a day for three days. They repeat the process every three months.[13]

People with mental illnesses are recommended to bathe in the Ashoka tree's shade. The indigenous people make a unique herbal mala for mental health issues by chopping up Sita Ashok roots and giving it to the afflicted. Patients are instructed to consume the betel on an empty stomach by placing the powdered seeds into the pan. The healers prepare a decoction of the bark by boiling it in water for menorrhagia. Many more plants are added to this decoction. The patients receive this infusion on an empty stomach each morning. Bark is also boiled in milk by several healers. Additionally, the decoction is used externally for cleansing. The healers boil the bark in a solution of milk and water while treating Safed Pani (Leucorrhoea).[14]

When the Vata has agitated the nerves, Ashoka's unique analgesic qualities might be employed to soothe them. It's also stated that the herb Ashoka helps skin tone. Burning feelings on the skin can be relieved by using this plant. Additionally, it aids in the body's detoxification. Additionally useful for reducing skin allergies and naturally cleaning the blood are the plant, Ashoka.[15]

Properties and action

Rasa : Kasaya, tikta, madhura

Guna : Guru

Virya : Usna

Vipaka: Katu

Karma: Kaphapittashamaka, varnya, swarya, visa, sothaghna, kusthagahna, pramehaghna, vrsya, krimighna, stambhna, artavjannan, rasayan, sonitsthapna.

PHYTOCHEMICAL CONSTITUTENTS

The Phytochemical study show in the bark of plant presence of (-) epicatechin, procyanidin p2,11'-deoxyprocyanidin B, (+) catechin, (24, £)- 24- methyl-cholesta-5-en-3p-ol (22 E, 21£)-24- ethycholesta-5,22 dien-33-ol,(24 £)-24- ethylcholesta-5-en-3-p-ol, leucopelargonidin-3-O-p-D- glucoside, leucopelargonidin and leucocyanidin. The flower part of plant contain Oleic, linoleic, palmitic and stearic acids, P-sitosterol, quercetin, kaempferol- 3-0-P-D-glucoside, quercetin- 3-0- P-D-glucoside, apigenin- 7-0-p-D-glucoside, pelargonidin- 3, 5-diglucoside, cyanidin-3, 5- diglucoside, palmitic, stearic, linolenic, linoleic, p and y

sitosterols, leucocyanidin and gallic acid. Seed and Pod contain oleic, linoleic, palmitic and stearic acids, catechol, (-) epicatechol and leucocyanidin.[2,10,11,12] Five lignan glycosides, lyoniside, nudiposide, 5-methoxy-9-β- xylopyranosyl-(−)-isolariciresinol, icariside E3, and schizandriside, and three flavonoids, (−)- epicatechin, epiafzelechin-(4β→8)-epicatechin and procyanidin B2, together with β-sitosterol glucoside, were isolated from dried bark.[16]

PHARMACOLOGICAL ACTIVITY

ANTIMICROBIAL ACTIVITY

On an agar plate containing various organisms including Bacillus subtilis, Escherichia coli, Salmonella typhosa, and Staphylococcus aureus (plant pathogen), Saraca asoca was exposed to antibacterial activity (ethanol: water, 1:1). Negative action was displayed by Agrobacterium tumefaciens. The antibacterial activity of methanol extract against Salmonella viballerup, Shigella boydii, Escherichia coli, Vibro cholera, Shigella flexneri, and Shigella dyserteriae was evaluated on dried flower buds of Saraca asoca, and the results revealed action. On an agar plate containing Escherichia coli and Staphylococcus aureus, the antibacterial activity of Saraca asoca leaves was evaluated against ethanol (95%) and water extract. While testing for Staphylococcus aureus produced negative results, Escherichia coli was confirmed to be active. At varying doses (1000, 2000, 3000, 4000, and 5000 µg/ml), the methanolic extracts of Saraca asoca were tested against Alternaria cajani, Helminthosporium sp., Bipolaris sp., Curvularia lunata, and Fusarium sp. The extracts showed strong inhibitory action against A. cajani and, at lower doses, also shown efficacy against other fungi. The antibacterial activity of four distinct extracts from the bark of Saraca asoca was investigated against Salmonella typhi, Pseudomonas aeruginosa, Staphylococcus aureus, Bacillus cereus, K. aerogenes, Sh. Boydis, and P. vulgaris. Salmonella enteritis, Shigella sonnei, and Escherichia coli were the enteric pathogen isolates against which various extracts of Saraca asoca bark were evaluated.[17]

With the exception of the aqueous extract, all of the extracts exhibited antimicrobial activity; the methanol extract exhibited the most percentage of activity. Asoca leaves extracted in methanol and water showed high antibacterial action against Salmonella typhimurium, Pseudomonas aeruginosa, and Bacillus subtilis. Against Alternania alternative, Colletotrichum gloesporioides, and Drechlera specifera, both extracts shown notable efficacy. Using the agar well diffusion technique, the in vitro antibacterial activity of bark extracts from Saraca asoca against Staphylococcus aureus, Escherichia coli, Pseudomonas aeruginosa,

Proteus vulgaris, Bacillus aureus, and Klebsiella pneumoniae at 4 mg/ml was examined. There was a notable broad range antibacterial activity demonstrated by the ethanol and distilled water extracts. For 24-48 hours, crude extracts of Saraca asoca's leaves, flowers, and bark were tested for larvicidal action against early IV instar larvae of the vector mosquito species, C. quinquefasciatus, A. aegypti, and A. stephensi, at an initial concentration of 1,000 ppm. After 48 hours of exposure, the S. indica/asoca leaf petroleum ether extract and the bark chloroform extract showed over 50% larval mortality against C. quinquefasciatus larvae.[18]

ANTI-INFLAMMATORY ACTIVITY

The anti-inflammatory properties of Saraca asoca leaves are determined via an ethanolic extract. The most appropriate test method to screen for anti-inflammatory activity is to use the leaves of Saraca asoca to assess their anti-inflammatory activity against carrageenan-induced paw edema in animals. Paw edema is considerably reduced by the ethanolic extract of Saraca asoca ($P<0.01$). At 200 mg/kg, the plant extract exhibited strong anti-inflammatory properties. Compared to that of 10 mg/kg diclofenec, it induced 56.95% inhibition in increasing paw volume, but with a brief duration and intensity.[19]

In India, menorrhagia has been treated using dried Ashoka bark. In India, women with uterine problems are administered dried asoca bark and flower as a tonic. All disorders related to the menstrual period are also treated with the stem bark of Saraca asoca. In Sri Lanka, menorrhagia and menstruation disorders are treated using assoka bark. When given to an adult female human, ashoka bark, which is used as a uterine sedative in India, and hot water extracts stimulate the uterus in a manner akin to that of ergot, but without causing a tonic contraction. Additionally used as an emmenagogue, uterine sedative, for uterine affections, menorrhagia, and in a number of preparations for female problems.[20]

In India, bark from Saraca Asoca is used to treat menorrhagia and uterine discomfort. Dried bark from the Saraca Asoca plant is used in India as an astringent for menorrhagia, to reduce excessive uterine bleeding, and for other uterine illnesses, such as frequent abdominal menstruation discomfort. According to reports, the aqueous bark extract has two active principles: one that stimulates and the other that relaxes the guinea pigs ileum's plain muscle. It is said that the medication stimulates the uterus, increasing the frequency and duration of contractions. It has also been observed that the crystalline glycoside molecule stimulates uterine contractions.[21]

CNS DEPRESSANT ACTIVITY

Depending on their polarity, the leaves of Saraca asoca exhibit CNS depressant action in a variety of solvents, including petroleum ether, chloroform, methanol, and water. Using an actophotometer, the activity was assessed when phenobarbitone was used to induce sleep. The locomotor activity of mice was dramatically reduced by 67.33% by the extract of Saraca asoca. Thus, we deduced that Saraca asoca leaves had CNS activity.[20]

ANTIDIABETIC ACTIVITY

The anthelmintic activity of Saraca asoca leaf extract has been investigated through the use of both maceration and the Soxhlet technique of extraction, which involves the use of solvents such as ethanol and methanol. The anthelmintic activity of each extract was determined using a conventional procedure. Piperazine citrate (as a positive control) and other common anthelmintic drugs in concentrations of 1, 2.5, and 5% were produced at DMSO using the suspension obtained from both maceration and Soxhlet. Negative controls were also made. Piperazine citrate and two milliliters of each concentration of the methanolic and ethanolic fraction were separately diluted to ten milliliters with regular saline and then poured into petri plates. Nine groups of earthworms with roughly identical sizes—six in each group—were released into each Petri dish. It was discovered that the methanolic and ethanolic extracts had more anthelmintic action and were more robust than the positive control. The phytochemical constituents' glycosides, alkaloids, tannin, flavonoids, and terpenoids appear to be responsible for the anthelmintic properties of ethanolic and methanolic extracts.[21]

UTERINE TONIC ACTIVITY

In Ayurvedic medicine, Saraca asoca is highly valued for its ability to stimulate ovarian tissue and the endometrium. The study examined the estrogenic impact of U-3107 (1 mg/kg p.o.) in both normal and overiectomized rats. For a duration of 21 days, U-3107 was delivered as an aqueous solution. Uterine weight did not increase in any way under the care of the overiectomized rats. U-3107 has no progestational action and only exhibits estrogenic activity when an ovary is functioning. Menorrhagia, dysmenorrhagia, premenstrual syndrome, irregular bleeding, and impending abortion are just a few of the menstrual problems that might benefit from the usage of U-3107, a herbal medication made from several plant extracts.[22]

ANALGESIC ACTIVITY

The analgesic effect is attributed to extracts from Saraca asoca leaves. Leaf extracts in petroleum ether, chloroform, methanol, and water were analyzed to determine the presence of phytoconstituents such as alkaloids, flavonoids, sterols, glycosides, saponins, carbohydrates, and tannins. Albino mice were used in the tail immersion method and the formalin-induced pain method to assess the analgesic efficacy of the extract. One of the primary analgesic models to compare with clinical pain is the formalin test, which produces dose-dependent analgesic efficacy from petroleum ether, chloroform, methanol, and water extracts. Early in the formalin test, pain results from formalin's direct activation of sensory nerve fibers; late in the test, inflammatory mediators such as histamine, prostaglandins, serotorin, and bradykinins were responsible for the pain.[23]

LARVICIDAL ACTIVITY

The Larvicidal bioassay adheres to the WHO standard protocols for experimental treatment. To guarantee a homogenous test solution, 1 milliliter of plant extract dissolved in 100% ethanol was added to 99 milliliters of distilled water in a 150-milliliter disposable wax-coated paper cup. The mixture was then gently shaken. Subsequently, four replicates of 25 early fourth instar vector mosquito larve were added to each experiment, for a total of 100 larve for each concentration. The test containers were maintained in a photoperiod of 12 hours of darkness, at 27+/-2c and 80-90% relative humidity. Larval death was noted following a 24-hour exposure period. The tests were conducted twice. The LC50 and LC90 values of the Saraca asoca leaf pet ether extracts were 228.9–458.3 ppm, respectively, indicating larvicidal action. The bark of Saraca asoca has larvicidal action when extracted using chloroform, with LC50 and LC90 values of 291.5 and 499.3 ppm, respectively.[24]

ANTIULCER ACTIVITY

In albino rats, the aqueous solution of Saraca asoca flowers is utilized to treat stomach ulcers. The main ingredients of Saraca asoca flowers are flavonoids, fatty acids, saracadin, waxy substance, and saracasin. Thus, the Saraca asoca suspension flowers show potential antiulcer efficacy through one or more plausible mechanisms, such as endogenous gastric mucosal prostaglandin production, promotion of mucus secretion, and suppression of basal stomach secretion.[25]

ANTICANCER ACTIVITY

At concentrations of 38 mug and 54 mug, respectively, the anticancer principle derived from Saraca asoca flowers showed 50% cytotoxicity (in vitro) in Dalton's lymphoma ascites and Sarcoma-180 tumour cells, with no activity against normal lymphocytes and preferential activity for lymphocytes derived from leukemia patients.[26]

ANTIOXYTOCIC ACTIVITY

In isolated uterine preparations from rats and humans, the plant's oxytocic action was observed. A gravid or estrogen-primed uterus was more responsive to the alcoholic extract's effects. The oxytocic effect was totally inhibited by pentolinium bitartrate. Research has shown that seed extract works well against dermatophytic fungus. In vitro experiments using prepared rat uteri did not demonstrate any oxytocic action in Saraca Asoca extracts. Ashoka had already undergone two tests; the first yielded negative findings and the second, favorable results.[27]

ADULTRANT

A common adulterant of the medication is Polyalthia longifolia bark. It's called devdaru in Bengali and Hindi. It is grown in all of India's hottest regions. Ashok bark occasionally mixes with Sicalpinea pulchirena and Rohitaka bark (Afanamexis polystakis). Certain ancient ayurvedic writings state that the bark of Saraca asoca may be distinguished from other barks. "Ashok Kankelee's Hempuspasha Vanjulastamrapalavaa Pindpushpasha natastha gandhpuspo Ashoka Seetalstitakto Varnya Grahi Doshapacchitrashadahkarmishoth Vishastrizith, Kashayak.[28]

FORMULATION AND DOSAGE

- Ashokarishta : 15 - 30 ml b.i.d. / t.i.d.
- Ashokkwath : 15 - 30 ml b.i.d.
- Seed powder : 1 - 3 gm b.i.d.
- Flower powder : 1 - 3 gm b.i.d.
- Ashokghrita : 5 gm b.i.d.

CONCLUSION

The above-discussed medicinal significance of the tree clearly demonstrates that Saraca Asoca is one of the most promising botanicals with several therapeutic benefits. The antibacterial, antidiabetic, anthelmintic, CNS depressing, anti-menorrhagic, uterine tonic,

analgesic, anti-inflammatory, anti-ulcer, anticancer, larvicidal, and anti-oxytocin activity are the most significant mechanisms that likely explain the reported pharmacological effects. Future research on standardization and stability of Saraca Asoca may prove to be beneficial in demonstrating its potential as a source for the pharmaceutical sector.

CONFLICT OF INTEREST –NIL.

SOURCE OF SUPPORT –NIL.

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