



Monographic Study of *Saraca Asoca* (Roxb.) Willd.: An Ornamental Tree in Moradabad District of U.P.

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Abstract: Before the invention of modern synthetic drugs, plants and the components of them were used all over the world to treat a wide range of illnesses. The indigenous Indian tree *Saraca asoca* (Roxb.) willd, also known as Ashoka and a member of the Caesalpiniaceae family, is significant and has several therapeutic uses. Herbal treatments are routinely employed in the Indian traditional medical system known as Ayurveda. One of India's most revered and significant trees, Asoka is also grown for its decorative potential in addition to its therapeutic benefits. The current study's objective is to concentrate on the in-depth botanical description, ecology, phytochemical components, and numerous purported pharmacological actions and ethnobotanical uses.

Key Words: Ayurveda, phytochemistry, pharmacological activity, *Saraca asoca*, Moradabad.

I. INTRODUCTION

One of the most significant trees in India is *Saraca asoca* (Roxb.), sometimes referred to as "Sita Ashok" and a member of the Caesalpiniaceae family. The word "without sorrow" or "that which gives no grief" is "Ashok." The Ashoka tree has been mentioned in a number of the earliest Indian writings in addition to Ayurveda (Jain, 1968). The Ashoka tree is revered as a sacred tree throughout India since it is mentioned in the texts of Buddhism and Jainism in addition to the Ramayana. Ayurvedic text Charaka Samhita, thought to have been written in 1000 BC, discusses the Ashoka tree and its therapeutic properties (Satish *et al.* 2014). The Ashoka tree grows in rain forests. In India, it typically grows as a wild tree as well as an ornamental tree in fertile and semi-fertile places. Its original distribution was in the western coastal region of the Indian subcontinent, in the middle of the Deccan plateau, and in the middle of the Western Ghats. Throughout a woman's active reproductive cycle, it is one of the most significant plants that is frequently used to treat bleeding disorders (Mohd. Abu Bin *et al.*, 2017, Sushma, 2021). Tribes and rural communities in India use its components extensively for the treatment of a variety of human illnesses.

II. VERNACULAR NAMES

It is known as Kankeli (Sanskrit), Ashoka (Assamese, Hindi, Gujrati, English, Oriya and Urdu), Ashokadamara (Kannada), Oshok (Bengali), Ashok (Kashmiri, Marathi and Punjabi), Asokam (Malayalam), Asogam (Tamil) and Vanjulamu (Telugu).

Fig.1 *Saraca asoca*

III. SYSTEMATIC POSITION

Kingdom: Plantae
 Clade: Tracheophytes
 Clade: Angiosperms
 Clade: Eudicots
 Clade: Rosids
 Order: Fabales
 Family: Fabaceae
 Genus: *Saraca*
 Species: *asoca*

Popular Synonyms: *Saraca indica* Sensus Bedd., non L., *Jonesia asoca* Roxb.

IV. TAXONOMICAL DESCRIPTION

It is a large tree may be 6-9 meters in height with glabrous branches. Leaves are paripinnate, 15-20 cm long, leaflets 6-12, oblong or oblong lanceolate, corky at the base, petioles very short, stipules intra-petiolar, completely united. Flowering and fruiting take place from March to July. Inflorescence is dense corymb. Flowers are yellow when young but become orange then crimson with age. These are axillary, sessile and corymbose. Calyx are petaloid, tubular, changing from yellow to orange and red, segments 4 with imbricate aestivation. Petals are absent. Stamens 7-8, much exserted, anthers purple, versatile, give a hairy appearance to the flower clusters. Ovary is hairy, style is curved, long with capitate stigma. Pods are black, flat and leathery of 10-25 cm x 3.5-5 cm size. Seeds 4-8, ellipsoid-oblong and compressed. Floral morphology and HPTLC fingerprint profile of *Saraca* Bark is dark brown or grey or black with warty surface (Mishra and Vijayakumar, 2015).

V. ECOLOGY AND DISTRIBUTION

It can be found all over India, as well as in Sri Lanka and the Indo-Malaysian region. Ashoka trees are commonly found in India's Western and Eastern Ghats, as well as the sub-Himalayan regions, up to a height of 750 metres. It can be found near river streams and prefers to thrive in damp deciduous and semi-evergreen forests. A yearly rainfall of 2000–4000 mm is necessary for the growth of red lateral alluvial soil (Devan *et al.*, 2021). Due to its attractive foliage and fragrant blossoms, it is raised as an avenue tree (Pradhan *et al.*, 2009).

VI. HISTORICAL AND MYTHOLOGICAL ALLUSION

The sacred Ashoka tree holds a special place in various Indian folk and socio-cultural traditions on the Indian subcontinent. According to Buddhist mythology, Lord Gautama Buddha was born in a garden at Lumbini, which

is located in southern Nepal, under the calming Ashok Vriksh. In Indian epics, the holy Ramayana also made an important reference to Ashoka, it states that Shri Hanumana first encountered Maa Devi Sita in the Ashoka Vatica (a garden of Ashoka trees), while sitting beneath an Ashok Vriksha, a location that is said to be located in contemporary Sri Lanka (Randhawa,1964).

VII. CHEMICAL COMPONENTS

Saraca asoca extract include flavonoids, glycosides, saponins, tannins, esters, alkanes, and primary alcohols. Strong uterotonic, antibacterial, anti-implantation, spasmogenic, oxytocic, anti-tumor, anti-progestational, antiestrogenic activity against menorrhagia, and anti-cancer qualities come naturally to it. Due to its endowment with these qualities, Ashoka is highly significant in the treatment of a variety of illnesses, such as rheumatic arthritis, bleeding, diabetes, rheumatoid arthritis, skin infections, liver problems, stomach difficulties, jaundice, fever, allergy, asthma, indigestion, constipation, and diarrhoea. In addition, it works well to treat a wide range of gynecological issues and hormonal imbalances, including menopause, menstrual disorders, dysmenorrhea, amenorrhea, leucorrhoea, and yeast infection. (Mishra et al.,2013, Borokar & Pansare, 2017).

VIII. PHARMACOLOGICAL ACTIVITY

1.Anti-Diabetic Activity- For the treatment of diabetes, dried *S. asoca* powder is taken with milk, or a decoction of Ashoka bark is given twice daily (Preethi *et al.*, 2010, Bisht *et al.*, 2017).

2.Anti-Microbial Activity-Different extracts (Chloroform, methanol, aqueous and ethanolic) of *S. asoca* stem bark have been evaluated for antibacterial and antifungal activity against different bacterial strains such as *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus cereus*, *Klebsiella pneumoniae*, *Proteus mirabilis*, *Salmonella typhimurium* and *Streptococcus pneumoniae* and the fungi, *Candida albicans* and *Cryptococcus albidus*. Methanolic extract was discovered to have the strongest antibacterial and antifungal activity of all the extracts (Kulkarni, 2018).

3.Anti-Cancer Activity -With no activity against normal lymphocytes but preferential activity for lymphocytes derived from leukaemia patients, the anti-cancer principle from *S. asoca* flowers showed 50% cytotoxicity (In-vitro) in Dalton's lymphoma ascites and Sarcoma-180 tumour cells at concentrations of 38 g and 54 g, respectively (Choudhary *et al.*, 2021).

4. Anthelmintic Activity- *S. asoca's* leaves exhibit anthelmintic action. The anthelmintic activity of *S. asoca's* methanolic and ethanolic extracts was dosage dependant. antipyretic and analgesic properties Extract from *S. asoca* leaves exhibited analgesic properties. According to Sarojini *et al.* (2011), *S. asoca* leaves demonstrated anti-oxidant and anti-hyperglycaemic properties.

5.Cardio Protective Activity -Alcoholic *S. asoca* bark extract was tested for its cardioprotective properties against cyclophosphamide-induced cardiotoxicity. In cyclophosphamide-induced cardiotoxicity, treatment with *S. asoca* considerably (p 0.05) corrected the status of cardiac biomarkers, ECG, oxidative enzymes, and lipid profile. According to histopathological studies, biochemical tests, and ECG results, *S. asoca* has cardioprotective properties that may be due to its anti-oxidant activity (Swamy *et al.*, 2013, Borokar &Pansare, 2017).

6.CNS Depressant-According to research by Jana *et al.* (2010), *S. asoca* leaves have been shown to have anti-depressant effects on the central nervous system.

7. Analgesic and Anti-Pyretic Activities- Extract from *S. asoca* leaves exhibited analgesic properties. (2012) Bhadauria *et al.* When tested on rats with yeast-induced pyrexia, the acetone extract of *S. asoca* seeds shown a strong antipyretic activity at both dose levels (300 mg/kg and 500 mg/kg) (Sasmal *et. al.*, 2012).

8. Anti-Hyperglycemic and Anti-Oxidant Activities- According to Kumar et al. (2013), the leaves of *S. asoca* (Roxb.) Willd. demonstrated anti-hyperglycemic and anti-oxidant properties. Study by Pal *et al.* (2014) discovered that the antioxidant property of both fresh and dried flower extracts may advance human health status and stay away from many diseases.

9. Anti-Menorrhagic Activity- Analgesic activity was seen in a *S. asoca* leaf extract. Bhadauria *et al.* (2012). When tested on rats suffering from yeast-induced pyrexia, the acetone extract of *S. asoca* seeds showed a strong antipyretic activity at both dose levels (300 mg/kg and 500 mg/kg) (Sasmal *et. al.*, 2012). *S. asoca* bark is used

as a uterine sedative. A study showed that hot water extract administered to human adult females stimulates the uterus similar to ergot, but without producing tonic contraction. It is also used in treating menorrhagia, as an emmenagogue, uterine sedative, uterine affections as well as used in several preparations related to dysfunction of the female reproductive system (Baranwal,2014).

IX. ASHOKA AYURVEDIC INDICATIONS

Ayurvedic writings and periodicals have repeatedly cited Ashoka for a variety of reasons, including: Anulomana (improves breathing), Vamana (prevents nausea and vomiting), Pachana (helps in digestion), Sonisthapana (treats bleeding), Chakushya (treats eye problems), Garbhaprada (treats infertility), Mehahara (treats urinary tract disorders), Kshayajit (treats tuberculosis), Prameha (manages diabetes), Hikkanigrahana (controls [hiccups](#)), Hridaya (treats heart problems), Kantya (relieves sore throat), Jvara (useful in fever), Kasahara (Relieves [cough](#)), Gulmajit (useful in abdominal tumours), Pandu (treats anaemia), Sangrahini (treats diarrhoea), Kustha (treats skin disorders), Kamala (prevents jaundice), Kanthya (improves voice), Arsha (treats piles) etc. (Ayurvedic Pharmacopoeia of India, 2001).

X. ETHANOBOTANICAL USES

Dried root of *S. asoca* is used for the treatment of paralysis and hemiplegia. Paste of roots is useful in broken bones, inflammations, ulcers and skin diseases. It acts as a blood purifier. It is used in eczema, psoriasis, dermatitis, and herpes. It helps to relieve pruritis, scabies and tinea pedis. Bark of the tree rejuvenates the skin tone. Root is also used in amenorrhoea. It dissolves oxalic stones present in kidney. It is useful in dysmenorrhoea and endometriosis. Its decoction is used in rickets and calcium deficiency. Dried flowers of *S. asoca* are used to treat diabetes. Decoction is used for the treatment of dysentery. Fluid extract of *S. asoca* flowers is used to treat haemorrhagic dysentery. Bark of the tree is used to treat internal piles, scorpion bite. *S. asoca* is used to purify blood. The leaves and bark are used to get rid of worms in stomach (Anitha *et. al.*, 2008, Begum *et. al.*, 2014).

XI. CONCLUSION

According to the ayurvedic medical system, *S. asoca* is regarded as a universal cure-all. It is a significant plant with therapeutic properties. This plant is a source of several kinds of active substances and is widely utilised in ayurveda, unani, and homoeopathy. It is also used in a variety of pharmacological activities like anticancer, anti-menorrhagia, and anti-microbial activity. This tree aids in the treatment of skin infections, CNS function, and genitourinary processes. The creation of contemporary medications derived from *S. asoca* should be encouraged for the control of various ailments given the changing nature of the world and the usage of non-toxic plant products used in traditional medicine. Studies on *S. asoca*'s standardisation and stabilisation can be conducted in the future, which will undoubtedly contribute to establishing it as a powerful source in pharmaceutical industry.

CONFLICTS OF INTEREST

There are no conflicts of interest, according to the authors.

REFERENCES

- [1]. Anitha, B., Mohan R., Athiperumalsami T. and Suthaa S. 2008. Ethnomedicinal plants used by the Kanikkars of Tirunelveli District. Tamil Nadu, India to treat skin diseases. Ethnobotanical leaflets, 12(1): 245-260.
- [2]. Ayurvedic Pharmacopoeia of India. 2001. Govt. of India, Ministry of Health and Family Welfare, Depart. of Ayush, vol. 1, part 1, pp. 17-18. <http://www.saraca-indica.com>
- [3]. Baranwal, Vandana. 2014. Asoka: Herbal Boon to Gynecological Problems: An Overview of Current Research. Ayurveda Journal of Health, 12 (4): 58-62.
- [4]. Begum, S.N., Ravikumar, K., Ved, D.K. 2014. 'Asoka'—an important medicinal plant, its market scenario and conservation measures in India. Current Science, 107(1): 26–28.
- [5]. Bhadauria, P., Arora, B., Sharma, A. N. and Singh, V. 2012. A Review on *Saraca indica*. Plant: IRJP, 3(4): 82.

- [6]. Bisht, A., Irshad, S., Rawat, A.K.S. and Dwivedi, H. 2017. Pharmacognostical studies on *Saraca asoca* (Roxb.) Willd. flower. *Tropical Plant Research*, 4(1): 153–160.
- [7]. Borokar A.A, Pansare, T. A. 2017. Plant profile, phytochemistry and pharmacology of Ashoka (*Saraca Asoca* (Roxb.), De. Wilde) – A Comprehensive Review. *JAHM*, 7(2): 2524–2541.
- [8]. Choudhary, A., Elumalai, P., kumar, S., Lakshmi, T. and Roy, A. 2021. Anti-Cancer Effects of *Saraca asoca* Flower Extract on Prostate Cancer Cell Line. *Journal of Pharmaceutical Research International*, 33(62B): 330-338, Article no. JPRI.77811
- [9]. Cowen, D. V. 1984. *Flowering Trees and Shrubs in India*, Sixth Edition. Bombay, Thacker and Co. Ltd. p. 5.
- [10]. Devan, A.S. and Warriar, R.R. 2021. *Saraca asoca* – morphology and diversity across its natural distribution in India. *Int. J. Complement Alt. Med.*, 14(6):317–323. DOI: 10.15406/ijcam.2021.14.00578.
- [11]. Jain, S.K. 1968. *Medicinal Plants*. National Book Trust, New Delhi, 1968: 124.
- [12]. Jana, G., Verma, S., Sen, R., Chakraborty S. and Sachan, A. 2010. Pharmacological Evaluation of *Saraca indica* Leaves for Central Nervous System Depressant Activity in Mice. *Journal of Pharma science research*, 2(6): 338-343.
- [13]. Kulkarni, Rasika Vilas. 2018. *Saraca asoca* (Ashoka): A Review. *World Journal of Pharmaceutical Research*, 7(19): 536-544.
- [14]. Kumar, S., Narwal, S., Kumar, D. and Singh, G. 2013. Evaluation of Antihyperglycemic and Antioxidant Activities of *Saraca Asoca* (Roxb.) De Wild Leaves in Streptozotocin Induced Diabetic Mice. *Asian Pacific Journal of Tropical Disease*, 2(3): 170-176.
- [15]. Mishra A, Kumar A, Rajbhar N. 2013. Phytochemical and Pharmacological Importance of *Saraca indica*. *IJPCS*, 2(2):1009-1013.
- [16]. Mishra, S.B. and Vijayakumar, M. 2015. Floral morphology and HPTLC fingerprint profile of *Saraca asoca* (Roxb.) De Wilde (Caesalpiniaceae): A consecrated tree of India. *Int Lett Nat Sci.*,43: 54–62.
- [17]. Mohan, C., Rama Devi, B., Manjula, P. and Prathibha Devi, B. 2014. Phytochemical investigations and micropropagation of *Saraca indica* (Roxb) Willd. *J. Ind. Bot. Soc.*, 93(1&2): 42–49.
- [18]. Mohd. Abu Bin Nyeem, Mohammad Sadul Haque, Md. Obaydul Haq, Mohd Nuruzzaman, Helal Uddin, BM Rabiul Islam. 2017. Ashoka (*Saraca indica*) as women friendly plant: A review. *National Journal of Advanced Research*,3(2): 03-07.
- [19]. Pal, Tapan K., Bhattacharyya, S. and Dey Ankita 2014. Evaluation of antioxidant activities of flower extract (fresh and dried) of *Saraca indica* grown in West Bengal. *Int. J. Curr. Microbiol. App. Sci.*, 3(4): 251-259.
- [20]. Pradhan, P., Joseph, L., Gupta, V., Chulet, R., Arya, H., Verma, R. and Bajpai, A. 2009. *Saraca asoca* (Ashoka): A Review. *Journal of Chemical and Pharmaceutical Research*, 01 (1):62-71.
- [21]. Preethi, F. and Pricilla, K. 2010. Hypoglycaemic activity of *Saraca indica* L. barks. *Journal of Pharmacy Research*, 3(3): 491.
- [22]. Randhawa M.S., 1964. *The Cult of Trees and Tree Worship in Buddhist-Hindu Scripture*, New Delhi: All India Fine Arts and Crafts Society, p. 8.
- [23]. Sarojini, N.S., Manjari, A. and Kanti, Chakraborti. 2011. Phytochemical Screening and Anthelmintic activity study of *Saraca indica* Leaves Extracts. *International Research Journal of Pharmacy*, 2: 194-197.
- [24]. Sasmal, S., Majumdar, S., Gupta, M., Mukherjee, A. and Mukherjee, P.K. 2012. Pharmacognostical, phytochemical and pharmacological evaluation for the antipyretic effect of the seeds of *Saraca asoca* Roxb. *Asian Pacific Journal of Tropical Biomedicine*, 2(10):782-786.
- [25]. Satish A. Bhalerao, Deepa R. Verma, Vinodkumar S. Didwana, Nikhil C. Teli. 2014. *Saraca asoca* (Roxb.), De. Wild: An overview. *Annals of Plant Sciences*,770-775.
- [26]. Sushma, L.P. Yadava 2021. Potential Use of *Saraca asoca* in the Management of Artavadushti w.s.r. to Menstrual Disorders in Modern Era. *International Journal of Ayurveda and Pharma Research*, 2021,9(9):69-73. <https://doi.org/10.47070/ijapr.v9i9.2076>
- [27]. Swamy, V.N., Patel, U.M., Koti, B.C., Gadad, P.C., Patel, N.L. and Thippeswamy. 2013. Cardioprotective effect of *Saraca indica* against cyclophosphamide induced cardiotoxicity in rats: A biochemical, electrocardiographic and histopathological study. *Indian J. Pharmacol*, 45(1): 44-48.