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"*Saraca Asoca*: A Scoping On The Phytoconstituents, Bioactive Compound And Their Therapeutic Effects"

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Abstract:

Saracaasoca (Roxb.) De. Wild., commonly known as Ashoka and classified under the family Caesalpinaceae, is renowned for its traditional and pharmacological significance. In light of the growing preference for natural remedies over synthetic drugs due to their minimal side effects, medicinal plants like Ashoka are receiving increased attention. Traditionally, Ashoka has been employed in managing conditions such as dysentery, colic, piles, biliousness, dyspepsia, and ulcers. It is also recognized for its central nervous system (CNS) depressant effects and its role in addressing irregular menstrual cycles. The plant is a rich source of bioactive compounds, including glycosides, flavonoids, tannins, and saponins, which exhibit promising therapeutic and diagnostic potential. Extracts derived from its leaves, flowers, fruits, and bark have demonstrated antimicrobial, anti-inflammatory, anti-menorrhagia, antidiabetic, anthelmintic, and analgesic activities. This review highlights the medicinal applications, phytochemical composition, and pharmacological attributes of Saracaasoca, underscoring its importance in contemporary healthcare systems.

Keywords: Saraca asoca; plant extracts; herbal medicine , pharmacognostic features

Introduction:*Saracaasoca* [Roxb.] Willd., commonly referred to as Ashoka, holds immense cultural, historical, and medicinal significance in India. This tree is deeply revered in Ayurvedic practices and is also regarded as sacred in Nepal and Sri Lanka. References to S. asoca can be found in ancient Indian epics such as the Ramayana, as well as in Buddhist and Jain scriptures [1,2]. It is a small, evergreen species predominantly distributed in the rainforests of the Indian subcontinent, including regions such as the Himalayas, Kerala, and Bengal. However, due to increasing awareness of its therapeutic potential, coupled with its slow growth rate and unsustainable harvesting practices, the natural population of S.

asoca has experienced a significant decline. Consequently, it is now classified as a vulnerable species by the International Union for Conservation of Nature (IUCN) [3].

The medicinal utility of S. asoca primarily stems from its bark, which exhibits diverse pharmacological properties, including astringent, alexiteric, anthelmintic, demulcent, and emollient effects. Furthermore, its seeds are valued for treating urinary discharges. The phytoconstituents of S. asoca are reputed for their efficacy in addressing various ailments such as dyspepsia, polydipsia, blood disorders, biliousness, fatigue, tumors, colic, hemorrhoids, ulcers, abnormal uterine bleeding, and menorrhagia [4,5]. Thus, sustainable management practices are imperative for preserving this valuable botanical resource.

Traditional Uses :

The bark of S. asoca is a potentially therapeutic substance employed in treating dysentery, colic, piles, biliousness, dyspepsia, and ulcers. The leaves of the plant have been reported to demonstrate blood-purifying properties. Juice obtained from S. asoca leaf extracts is often mixed with cumin seeds to offer relief from stomach aches. The flowers of S. asoca are often triturated in water and are used to treat hemorrhagic dysentery. Dried flowers are administered as a management strategy for diabetes. S. asoca is utilized in developing medications for ailments associated with menstruation, such as leucorrhoea, dysfunctional uterine bleeding, and menorrhagia. Furthermore, the herb affects the endometrium and uterine muscles and may serve as a potent uterine tonic against irregular menstrual cycles [24].

Plant Part	**Phytoconstituent**
Bark	Catechin
Bark	Epicatechin
Bark	Leucocyanidin
Bark	Procyanidin
Bark	11'deoxyprocyanidin B
Bark	Glycosides
Bark	Isolariciresinol
Bark	Lyoniside
Bark	Nudiposide
Bark	Procyanidin B2
Bark	Schizandriside
Bark	B-sitosterol glucoside
Bark	5-methoxy-9-6-xylopyranosyl
Dried Bark	Apigenin-7-0-p-D-glucoside
Dried Bark	Cyanidin-3,5-diglucoside
Dried Bark	Gallic acid
Dried Bark	Kaempferol
Dried Bark	Linolenic acid
Dried Bark	Linoleic acid
Dried Bark	Oleic acid
Dried Bark	Palmitic acid
Dried Bark	Pelargonidin-3,5-diglucoside
Dried Bark	Quercetin
Dried Bark	Sitosterol
Dried Bark	Stearic acid
Flower	Catechol
Flower	Leucocyanidin
Flower	Linoleic acid
Flower	Oleic acid
Flower	Palmitic acid
Flower	Stearic acid

Seed and pod	Catechin
Seed and pod	Epicatechin
Seed and pod	Leucocyanidin
Seed and pod	Procyanidin
Seed and pod	11'deoxyprocyanidin B
Seed and pod	Glycosides
Seed and pod	Isolariciresinol
Seed and pod	Lyoniside
Seed and pod	Nudiposide
Seed and pod	Procyanidin B2
Seed and pod	Schizandriside
Seed and pod	B-sitosterol glucoside
Seed and pod	5-methoxy-9-6-xylopyranosyl

Antimicrobial Properties The antibacterial and antifungal activities of S. asoca have been validated through in vitro studies. Methanolic and aqueous extracts of its stem bark exhibited inhibitory effects against pathogens such as Bacillus subtilis, Pseudomonas aeruginosa, Cryptococcus albidus, and Candida albicans. The effectiveness of these extracts has been attributed to the presence of flavonoids, alkaloids, and terpenoids, which interfere with microbial metabolism.

Anti-Inflammatory and Anti-Arthritic Activities

Ethanolic extracts of S. asoca have demonstrated significant antiinflammatory effects, reducing rheumatoid arthritis symptoms in animal models. By lowering lysosomal enzyme levels and inhibiting transcription factors such as AP-1, these extracts reduce pro-inflammatory cytokines, restore joint structure, and improve overall health.

Anticancer Potential

Studies indicate that S. asoca possesses promising anticancer properties. Flavonoid fractions of its flowers have shown selective cytotoxicity against
Dalton’s ascites and Sarcoma-180 tumor cells while sparing normal cells.

Additionally, compounds like catechin, epigallocatechin, and polyphenols have been identified for their roles in suppressing cancer cell proliferation and inducing apoptosis.

Antidiabetic Activity

Traditional remedies for diabetes include decoctions prepared from S. asoca bark and leaves. Scientific investigations revealed that its extracts inhibit α-glucosidase and α-amylase enzymes, reduce blood glucose levels, and improve lipid profiles in diabetic animal models. The plant has also shown the potential to enhance pancreatic and renal health while managing complications associated with diabetes.

Anti-Ulcer and Cardioprotective Effects

Aqueous and alcoholic extracts of S. asoca have demonstrated protective effects against pyloric ligation and aspirin-induced gastric ulcers. These properties are attributed to its phytochemicals, including tannins and flavonoids, which enhance mucosal protection and inhibit gastric secretions.

Conclusion

The *S. asoca* tree holds a revered status in ancient Indian texts, often regarded as a **sacred plant** and a **universal remedy**. Since the advent of **Ayurveda**, it has been extensively used for the treatment and management of **gynecological disorders**. Beyond its traditional applications, *S. asoca* demonstrates a wide range of **pharmacological properties**, including **antibacterial**, **uterotonic**, **anticancer**, **anthelmintic**, **antioxidant**, **hypolipidemic**, and **anti-ulcer** activities, further solidifying its reputation as a **panacea**.

The plant is rich in **phytochemicals**, such as **glycosides**, **oleic acid**, **linoleic acid**, and **palmitic acid**, along with several **organic compounds**, which contribute to its diverse therapeutic potential. Given the growing interest in **plant-based medicines** and their extracts for treating various health conditions, *S. asoca* stands out as a promising source for the development of **modern drugs** and **plant-derived bioactives** due to its broad spectrum of pharmacological activities.

In today's era of modern medicine, where **natural remedies** with **minimal toxicity** are highly valued, *S. asoca* emerges as an exceptional candidate for drug discovery and formulation. However, to fully harness its therapeutic potential, **comprehensive research**—including **in vitro**, **in vivo**, and **clinical studies**—is essential to validate its **efficacy**, **safety**, and **potency** in treating and managing various ailments

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