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Bio-active Compounds and Medicinal Potential of Ashoka Tree: A Scientific Review

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ABSTRACT

The Ashoka tree, is also scientifically called Saraca asoca (Roxb. ex DC.), is a known plant in traditional Indian medicine and culture. It belongs to the Caesalpinioideae subfamily within the Fabaceae family. This evergreen shrub is native to Southeast Asia and the Indian subcontinent. Morphologically, the Ashoka tree is recognized by its dark green, pinnately compound leaves, densely arranged hanging branches, and a straight, column-like trunk. The tree is particularly notable for its bright orange-red flower clusters, which form dense corymbs and typically bloom between February and April. The flowers are zygomorphic and bisexual, producing abundant nectar and relying on insect pollination, which plays a significant role in its reproductive process.

Keywords:- *Salubrious, Dravyaguna, Ashoka, Saracaasoca, and Ayurveda*

INTRODUCTION

Long before the prehistoric era, people used plants for medical treatments. Ayurveda, the traditional medical system, is still widely practiced for several reasons. The use of plant-based medicines has become more popular due to factors such as increasing population, limited supply of drugs, high costs of treatment, side effects of synthetic drugs, and the growing resistance to existing drugs for infectious diseases. One of India's oldest and most respected trees is the Ashoka. The World Health Organization (WHO) estimates that 80% of people around the world still rely on herbs and traditional medicines for their primary healthcare needs.

The Asoka plant, scientifically known as Saraca asoca Roxb., is highly regarded in Indian medicine for its various medicinal properties. The bark of the Ashoka tree is traditionally used to treat a range of gynecological conditions. According to folklore, the flowers of the plant, when prepared as milkshakes, syrups, or Tambuli (a type of food preparation), are not only beneficial for gynecological issues but also for gastritis, acne vulgaris, skin disorders, facial discoloration, and other ailments. As a result, many formulations have been developed based on these traditional uses and the scientific analysis of the plant's physicochemical and phytochemical properties. Therefore, pharmacological and analytical studies have been conducted on different parts of the Ashoka plant to explore their medicinal potential.[1]

VERNACULAR NAMES :

1. Sanskrit- Kankeli ,asoka; Gandhpushpa
2. English- Asoka tree
3. Hindi- Ashoka ,Anganpriya
4. Marathi- Ashoka
5. Bengali – Ashoka ,oshoka
6. Gujrati- Asupala ,Ashopalav
7. Teluga – Asok
8. Tamil & mal – Aspgam
9. Cannad – Asokada, Kankelimara
10. Panjabi – Ashoka [2]

BOTANICAL FEATURES

Morphological Characteristics:-

1. Leaves

- Type: Evergreen tree with compound leaves.
- Arrangement: Paripinnate (leaves in pairs along the rachis).
- Leaflets: 4–6 pairs per leaf, oblong-lanceolate, with entire margins.
- Color: Young leaves are reddish or copper-colored, turning dark green on maturity.
- Texture: Smooth, glossy surface.
- Venation: Pinnate venation.
- Size: Leaflets can range from 6 to 12 cm in length.

2. **Flower**

- Color: Bright orange to red, turning deeper red with age.
- Arrangement: Dense, axillary clusters (corymbs) that bloom in bunches.
- Shape: Small, tubular, and fragrant; each flower lacks petals but has colorful sepals.
- Size: Each flower is about 1.5–2 cm in diameter.
- Bloom Time :Generally, from February to April in India.
- Attractants: Highly attractive to been and butterflies due to fragrance and color.

3. **Fruit**

- Type: Legume (pod)
- Shape: Oblong, flat
- Size: 10–25 cm long
- Color: Initially green, turning dark brown when mature
- Seeds: 4–8 flat, hard seeds inside

4. Bark

Grey brownish coloured, smooth and Transverselylenticellate, sometimes

covered by Lichens of ash white colour.

5. Identification

Sample of crude drugs were identified by checking following parameters like: pH (1% w/v solution): 5 to 7, loss on drying: NMT 5%w/w, moisture content NMT 5% w/w, and volatile oil content are not available. Thin layer chromatography assay was performed tannins were NLT 30 % w/w11 determined.[3]

Microscopical characters:

Bark: A cross-sectional view of the stem bark shows the periderm consisting of a thick layer of cork, a narrow, radially flattened cork cambium, a wide secondary cortex containing one or two continuous layers of stone cells along with many areas of sclereids, and parenchymatic tissue that includes yellow masses and prismatic crystals; the secondary phloem consists of phloem parenchyma, sieve tubes along with their companion cells, and phloem fibers that are grouped together, as well as crystal fibers.

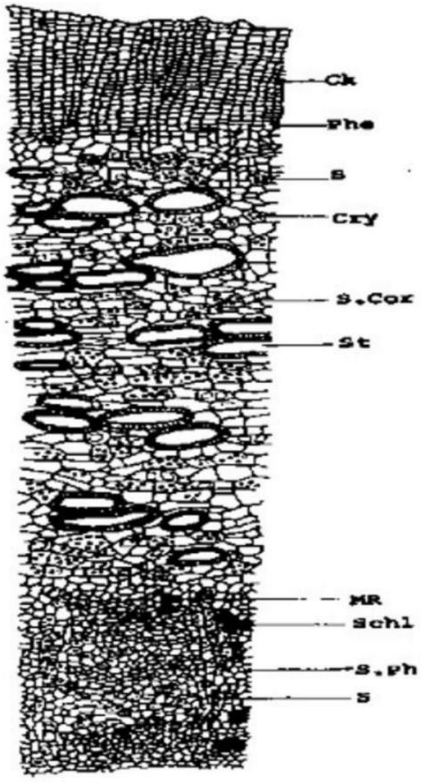


Fig.1:- *Enlarged Portion of T.S of Bark of Saracaasoca*

Stem: The transverse part of the stem is round. The surface has small, raised lenticles that are shaped either spherical or oval. The epidermis has a thin cuticle and is only one layer thick. Beneath this, five to six layers of cork are visible.

The cortex consists of 12 to 16 layers. In the middle of the cortex, three to five layers of stone cells are clearly visible. Just above this, the phloem area is clearly visible and contains tannin cells. The cambium has two to three layers and is very transparent. The xylem area is mostly made up of tracheids and a few vessels.

There is a large amount of primary xylem. A noticeable pith is present, which is made up of parenchyma cells

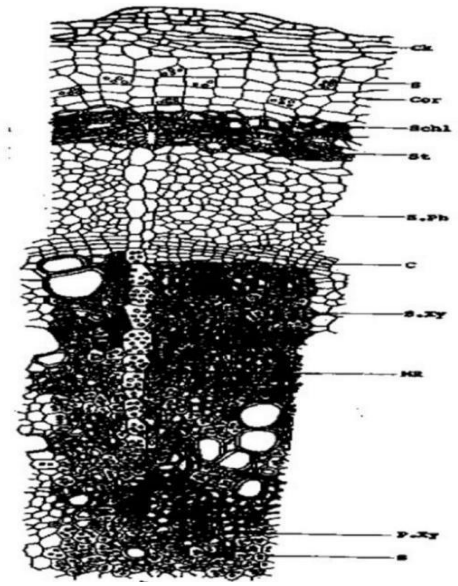
with thin walls.

Root: The root appears to be fairly round when viewed in a transverse section. The outermost layer is cork, which consists of eight to ten layers of thick-walled, tangentially elongated cells. Phellogen is not distinct. Within the cork region, two separate zones of secondary cortex can be identified.

The upper zone is made up of five to seven layers of thin-walled parenchyma cells, some of which contain small, spherical starch granules. Beneath this, there are three to five layers of mechanical cells. The innermost layers consist of stone cells, while the outermost layer is schlerenchymatous. After this supporting area, there is a wide zone of primary and secondary phloem. The cells in this region are polygonal, thin-walled, and parenchymatous. Below the bast zone, four to six layers of cambium are clearly visible.

In the secondary xylem region, the arrangement of tracheids, vessels, and parenchyma cells is unusual, with tracheids and xylem parenchyma alternating in patches.

Fig.2:-*A Enlarged Portion of Root of T.S of Saracaasoca*



Powder Characters:- Ashoka bark powder is brown in color. Under a microscope, it contains some tracheids, a large quantity of fibers, stone cells, parenchyma cells, sieve tube fragments, and many unidentified cells.[4]

HEALTH BENEFITS OF ASHOKA IN OUR DAILY USE :-

Menstrual Health & Uterine Support:

Raktapradar, or excessive menstrual blood secretion, is also known as menorrhagia, or severe monthly bleeding.

This condition is caused by an aggravated Pitta dosha. Ashoka helps regulate menorrhagia or heavy menstrual bleeding and balances an aggravated Pitta. Its Sita (cold) qualities are responsible for this.

A. Boil the bark of the Ashoka tree in water until the volume of the water is reduced to one-fourth of its original amount.

B. Strain the Ashoka kwath and store it in a bottle.
C. Use eight to ten tablespoons of this Ashoka kwatha**.**
D. To prevent menorrhagia or heavy menstrual bleeding, add the same amount of water and drink it preferably after lunch and dinner.

Piles

In Ayurveda, piles are referred to as Arsh and are caused by a sedentary lifestyle and poor diet.

This leads to an impairment of all three doshas, with Vata being the most affected. Constipation arises from a low digestive fire due to an aggravated Vata. This causes the veins in the rectum area to swell, leading to pile bulk. Ashoka balances Vata, which reduces the swelling of pile mass. Ashoka's Sita (cool) properties also help reduce burning and discomfort in piles. It lessens the burning sensation in the anus and has cooling properties.

A. Use one-fourth to one-half teaspoon of Ashoka powder.
B. Mix it with water or honey.
C. For best results, take it after meals.[5]

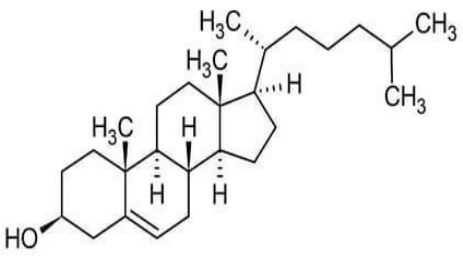
Phytochemical study:

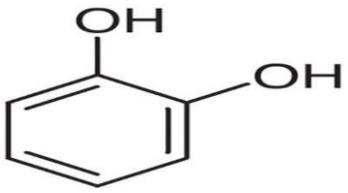
Saraca asoca (Roxb.) was subjected to phytochemical and HPTLC investigation by Jayita Saha and Taniya Mitra, among others. Wilde. The chloroform, ethanol, methanol, and water extracts from the flowers had experimental yields of 1.80%, 11.90%, 15.10%, and 22.0 percent, respectively. Whereas the alcohol-soluble extractive values demonstrated the presence of polar molecules, the water-soluble extractive values revealed the presence of sugars, acids, and inorganic compounds. Carbohydrates, tannins, flavonoids, saponins, glycosides, proteins, and steroids were all present in the methanol and ethanol extracts. While the water extract had carbs along with tannins, flavonoids, saponins, and steroids, the chloroform extract solely contained carbohydrates. A methanolic extract of the leaves and flowers verified the presence of gallic acid using HPTLC. Gallic acid was initially discovered in Saraca asoca leaves. reported by Jayita Saha et al. Since leaves are available throughout the year and flowers are seasonal, the presence of gallic acid in leaves is significant.

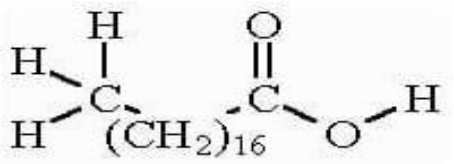
1. **Bark:** Tannin 6%, catechol, catechin, epicatechin, essential oil, haematoxylin, ketosterol (melting point 25°), crystalline glycoside, saponin (C10H2O14), calcium (C6H10O), leucocyanidin, leucopelargonidin, proanthocyanidin.
2. **Flower:** B-sitosterol, quercetin, kaemferol glycoside, cyanidin, palmitic, stearic, linolenic, linolenic, linoleic, leucocyanidin, gallic acid, anthocyanins.
3. **Pod:** Catechol, epicatechol, leucocyanidin.
4. **Seed:** Oleic, linoleic, palmitic, stearic acid.[6]



Leucocyanidin R = OH
Leucopelargonidin R = H







$C_{18}H_{36}O_2$

THERAPEUTIC USES IN TRADITIONAL MEDICINE

1. Ayurveda and Traditional Uses:

Due to its various therapeutic benefits, the Ashoka tree has been extensively used in Ayurveda and other traditional medical systems.

Different parts of the plant, including the stem, bark, flowers, and seeds, are used for medicinal purposes.

The bark of the Ashoka tree has several significant medicinal uses, such as:

1. **Astringent:** It is well-known for its strong astringent properties.
2. **Uterine sedative:** It helps in cases like menstrual pain by acting as a sedative for the uterus.
3. **Uterine tonic:** It strengthens the muscles of the uterus by functioning as a tonic.
4. **Styptic:** It helps stop bleeding and is beneficial for conditions like heavy menstrual bleeding.

Janosia Ashoka in Homoeopathy:

In homoeopathic medicine, Janosia Ashoka, also known as Jonesia Ashoka, has a broad range of effects, particularly on the female reproductive system.

It is used to treat conditions such as metrorrhagia (abnormal uterine bleeding) and amenorrhea (absence of menstruation). Key homoeopathic indications include:

1. **Headaches:** Often linked to uterine issues, these include sensitivity to light and headaches on one side.
2. **Gastric problems:** These include excessive nausea, constipation, and cravings for sweets and acidic foods.
3. **Female reproductive health:** This covers heavy menstrual flow, irregular or delayed periods, menstrual cramps, ovarian pain before menstruation, and an irritable bladder.
4. **Sleep disturbances:** These involve dreams experienced during travel.
5. **Back pain:** It is characterized by pain that originates from the spine and extends down to the thighs and abdomen.[7]

CONCLUSION

In Ayurvedic medicine, Saraca asoca is considered a universal cure-all. It is one of the ubiquitous plants with therapeutic properties. Many different kinds of chemicals are derived from this adaptable plant. Many plants are currently used to cure a wide range of illnesses. However, because ashoka is a traditional and trustworthy source of medicine, it has numerous pharmacological purposes in Ayurveda, Unani, and homeopathy, including anti-cancer, anti- menorrhagic, anti-oxytoxic, and anti- microbial properties.

Skin infections, CNS functioning, and genitor-urinary activities are only a few of its numerous applications. Since the use of nontoxic plant products in traditional medicine is becoming more prevalent worldwide, The creation of contemporary medications from Saraca asoca should be prioritized in order to manage a variety of illnesses.

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