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Pharmacognostical study of Saraca asoca (Roxb.) or Monoon longifolium

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ABSTRACT: Monoon longifolia (Ashoka) has been used in the traditional system of medicine to cure various disorders. The use of plant extracts and isolated compound/s has provided basis in the preparation of modern pharmaceutical medicines. M. longifolia is a lofty evergreen tree, native to India and has been known to possess anti-ulcer, anti-inflammatory, antioxidant, antimicrobial and antifungal activities. The preliminary studies of M.longifolia leaf have been performed to investigate its potentialities. The preliminary phytochemical evaluation of various extracts indicated that the Bark and seed are rich source of alkaloids, tannins, phenols, flavonoids and carbohydrates. This study provides fundamental data on the availability of various chemical constituents present in M. longifolia leaf and bark. Loss on drying and moisture content experiments was carried out to know the presence of volatile organic matter.

Keywords: Phytochemical parameters, Monoon longifolia Bark and leaf.

I. INTRODUCTION:

Plant and plant products are being used as a source of medicine since long. According to the World Health Organization, more than 80% of the world's population, mostly in poor and less developed countries depend on traditional plant-based medicines for their primary health care needs.[1] Medicinal plants are nature's gift to human beings to lead a disease-free, healthy life. It plays a vital role in preserving our health. India is one of the most medico culturally diverse countries in the world, where the medicinal plant sector is part of a time-honored tradition that is respected even today.

Traditions are dynamic entities of unchanging knowledge. Traditional medicine is in an evolutionary process as communities and individuals continue to discover new techniques that can transform practices.[3] Ethnopharmacology and drug discovery using natural products remain important issues in the current target-rich, lead-poor scenario.[4] Many modern drugs have their origin in ethnopharmacology. However, despite technologic advances, the drug discovery process is facing a major innovation deficit that is adversely affecting the pharmaceutics industry.

Monoon longifolium belonging to family (Annonaceae) is native to the drier regions of India and is locally known as “Ashoka” and is commonly cultivated in India, Pakistan, and Sri Lanka. P. longifolia, although an ornamental tree, finds its reference in Indian medicinal literature owing to its popular Hindi name Ashoka.[7] Ashoka (Latin name: Saraca asoka (Roxb) De Wilde) is also a Sanskrit name in Ayurveda of a drug used for the treatment of uterine disorders.[8] However, the bark of M. longifolia is available as one of the adulterant and used as Ashoka due to its easy availability in nature.

1.2 Plant Profile: Saraca asoca (Roxb.)is the most ancient tree of India, generally known as a “Ashokbriksh”, botanist known as a Saraca asoca (Roxb.) it’s also called false ashoka,

- Kingdom: Plantae
- Division: Magnoliophyta
- Class: Magnoliopsida
- Order: Magnoliales
- Family: Annonaceae
- Genus: Monoon
- Species: M. longifolium

Figure: Ashoka, Saraca asoca (Roxb.)Bark and leaves

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Geographical source: It is distributed in evergreen forests of India up to an elevation of about 750 meters. It is found throughout India. Especially in Himalaya, Kerala, Bengal and whole south region. In Himalaya it is found at Khasi, Garo and Lussi hills and in Kerala region it is found in Patagiri, Kaikatty&Pothundi of Palakkad district, Thrisur, Kollam and Kannaur districts [21]

1.3 Chemical constituent: Saraca asoca is reported to contain glycoside, flavonoids, tannins and saponin. [22]

Plant Part	Phytoconstituent
Flower	Oleic, linoleic, palmitic and stearic acidssitosterol, quercetin, kaempferol, quercetin, apigenin- 7-0-p-D-glucoside, Pelargonidin- 3, 5-diglucoside, cyanidin-3, 5-diglucoside, palmitic, stearic, linolenic, leucocyanidin and gallic acid.
Bark	Procyanidin, epicatechin, 11'- deoxyprocyanidin B, catechin, leucopelargonidin and leucocyanidin.
Leave's	Glycosides, lyoniside, nudiposide, 5-methoxy- 9-β-xylopyranosyl, isolariciresinol, and schizandriside, and three flavonoids, epicatechin, epiafzelechin-(4β→8)-epicatechin and procyanidin B2, together with β-sitosterol glucoside
Seed and Pod	Oleic, linoleic, palmitic and stearic acids, catechol, (-) epicatechol and leucocyanidin

1.4 Pharmacological activity:[17-18]

1. Saraca asoca was subjected to antibacterial activity (ethanol: water, 1:1) on agar plate with different organisms such as Bacillus subtilis, Escherichia coli, Salmonella typhosa, Staphylococcus aureus, (plant pathogen).
2. Anticancer Activity: The anticancer principle from Saraca asoca flowers indicated 50 percent cytotoxicity (in vitro) in Dalton's lymphoma ascites and Sarcoma-180 tumour cells at a concentration of 38 mug and 54 mug respectively, with no activity against normal lymphocytes but preferential activity for lymphocytes derived from leukaemia patients.
3. Antihemorrhagic Activity: Saraca asoca dried bark has been used for menorrhagia in India. In India Saraca asoca dried bark as well as flower is given as a tonic to ladies in case of uterine disorders. Saraca asoca stem bark also used to treat all disorder associated with the menstrual cycle.
4. Antioxytocic Activity: Oxytocic activity of the plant was seen in rat and human isolated uterine preparations. Estrogen primed or gravid uterus was more sensitive to the action of the alcoholic extract. Pentolinium bitartrate completely blocked the oxytocic action. Seed extract is found effective against dermatophytic fungi.
5. CNS depressant activity: The leaves of Saraca asoca shows CNS depressant activity in various solvent such as petroleum ether, chloroform, methanol and water respectively depending upon their polarity.
6. Antidiabetic activity: Dried powder of the plant Saraca asoca is taken with milk or decoction of Ashoka, Saraca asoca (Roxb.) bark is taken twice a day for the treatment of diabetes
7. Analgesic activity: Saraca asoca leaves extracts are accountable for analgesic activity. The leaf extracts like petroleum ether, chloroform, methanol and water were investigated for Phytoconstituents like sterols, glycosides, saponins, carbohydrates alkaloids, flavonoids, tannins, protein etc.

1.5 Collection of the plants and authentication: Plant material used various plant parts (bark, flowers and leaves) of S. asoca were collected from the Botanical garden, school of pharmacy chouksey engg. College bilaspur. The collected plant materials were identified and voucher department of botany guru ghasidas vishwavidhyalaya bilaspur c.g.

1.6 Extraction of the selected plants: Plant samples (bark, flowers and leaves) were washed with distilled water and air dried at room temperature for 7-10 days, then oven-dried at 40 0C to remove the residual moisture. The dried plant parts were pulverized and stored in air-tight containers at 4 0C for future use. 50 g of powdered samples of bark, flowers and leaves were extracted

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with methanol by soxhlation method at 60 to 80 0C. The three filtrates were separately concentrated in water bath at 40 0C and evaporated under reduced pressure.

1.7 Preliminary morphology study: Macroscopic features Flowers of Saraca asoca orange or orange-yellow in colour, aromatic, astringent in taste, found in dense axillary corymbs inflorescence. Hermaphrodite flowers, 2.5–3.5 cm in length. Ovate bracts and 2 sub acute bracteoles, appearing like a calyx.

1.8 Phytochemical Analysis The phytochemical parameters namely loss on drying and moisture content were determined to find out volatile matter, total ash content, acid soluble matter and water soluble matter were determined as per the standard procedures to investigate the essential and non-essential elements with insoluble silicates. Air shade dried and pulverized seed material (1g), was kept in contact with various solvents (non polar to polar) at room temperature for twenty four hours. Solvents are recovered under reduced pressure to achieve quantitative extraction. Identification of various phytoconstituents such as alkaloids, phenolic compounds and tannins, flavonoids, carbohydrates and sugar were performed using standard protocols 8, which help to isolate active metabolites.

II. RESULTS AND DISCUSSION:

2.1 Orgnoleptic properties:
Color: Green
Odor: characteristic
Taste: slightly bitter
Plant Size: 15-20M
Shape: columnar
Powder solubility

2.2 The phytochemical analysis shows the acid insoluble matter is 13.09 %(Table 1). The values for successive solvent extractions are recorded (Table 2) and it indicates that percent extractive value increase from non polar to polar solvents. The preliminary phytochemical analysis (Table 3) reveals that the alkaloids are present in polar solvents while steroids, tannins, phenols and flavonoids are found to be major active components present in non polar to polar solvents. Flavonoids are group of polyphenolic compounds which influence the radical scavenging, inhibition of hydrolytic and oxidative enzymes. The phenols, tannins, flavonoids and alkaloids are complex moieties present in P.longifolia seed extracts shows higher potentialities towards antioxidant properties.

S.no	Parameter	value
1.	Moisture contain	7.8%
2.	pH	5.20%
3.	Loss on drying	12.1%
4.	Total ash	2.87%
5.	Acid-insoluble matter	13.0%
6.	Water-soluble matter	12.08%

Table 1: Analysis of phytochemical parameters

S.no	Extracts	Percentage Value
1.	Hexane	7.4
2.	Ethyl acetate	7.6
3.	Acetone	9.0
4.	Ethyl alcohol	9.8
5.	Methyl alcohol	9.9
6.	Aqueous	13.0

Table 2: Extractive values

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S.no	Chemical Constituents	Bark extracts				
		Hexane	Ethyl acetate	Acetone	Ethyl alcohol	Methyl alcohol
1.	Alkaloid	-ve	-ve	+ve	+ ve	+ ve
2.	Steroid	+ ve	+ ve	+ ve	+ ve	+ ve
3.	Tannin	+ ve	+ ve	+ ve	+ ve	+ ve
4.	Phenol	+ ve	+ ve	+ ve	+ ve	+ ve
5.	Flavonoid	+ ve	+ ve	+ ve	+ ve	+ ve
6.	Starch	- ve	- ve	+ ve	+ ve	+ ve
7.	Protein	-ve	- ve	+ ve	+ ve	+ ve

+ ve = positive , + ve = negative

Table 3: chemical constituent

2.3 Acute toxicity test: Acute toxicity study of acetone extract of the seeds of S. asoca was carried out on healthy Swiss albino mice following OECD guideline 423. A single oral dose of the extract was administered orally at the level of 100 mg, 300 mg, 500 mg, 700 mg and 1 000 mg/kg body weight respectively to the 5 groups containing 6 mice each. These groups were observed for any signs of toxic symptoms, behavioural changes, locomotion, convulsions and mortality for 1, 2, 4, 8 and 24 h and further for a period of 14 days. During this period, their activity levels and behaviour patterns were closely watched and meticulously noted.

2.4 In Vivo Study: Virgin female spiny mice (n = 14) aged 12-16 weeks were sampled through daily vaginal lavage for 2 complete reproductive cycles. Stage-specific collection of reproductive tissue and plasma was used for histology, prolactin immunohistochemistry, and enzyme-linked immune or bent assay of progesterone (n = 4-5/stage of the menstrual cycle). Normally distributed data are reported as the mean ± SE and significant differences calculated using a 1-way analysis of variance. Non-normal data are displayed as the median values of replicates (with interquartile range) and significant differences calculated using Kruskal-Wallis test.

2.5 Analgesic activity: The ethanolic extract of Saraca asoca did not exhibit any statistically significant ($p > 0.05$) analgesic effect in hot plate test of white albino mice. This was determined by analyzing data using one way ANOVA followed by Dennett's post hoc test. However, the data shows that the dose dependent effect reached 72.57% at 180 minutes and 37.67% at the 60 minutes at the doses of 500 and 250 mg/kg-body weight respectively.

III. CONCLUSION:

The therapeutic efficacy of M. longifolia extensively used in Indian System of Medicine has been established through modern testing and evaluation (preclinical and clinical trials) in different disease conditions. These studies place this indigenous drug as a novel candidate for bioprospection and drug development for the treatment of diseases, such as cancer, infectious diseases, diabetes, and various inflammatory conditions. The medicinal applications of this plant and the countless possibilities for investigation still remain in relatively newer areas of its function. Hence, phytochemicals of these plants will enable to exploit its therapeutic use.

Saraca roxb has been greatly used as traditional medicine for women related problems, such as menorrhagia, leucorrhoea, bleeding haemorrhoids, dysfunctional uterine bleeding etc.Thus it may be concluded that the extract of bark of Saraca asoca has potential in managing irregular menstruation and anomalous vaginal discharge, especially several gynaecological conditions.

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