



JOURNAL OF BIODIVERSITY AND CONSERVATION

A review on ethno-botanical, phytochemical and pharmacological activity of state plant of Odisha *Saraca asoca*

Milan Mahapatra¹, Somanath Routray¹, Sweta Mishra² and Gyanranjan Mahalik^{1*}

¹Department of Botany, School of Applied Sciences, Centurion University of Technology and
Management, Odisha, India

²Ambika Prasad Research Foundation, Odisha, India

Email-Id: gyanranjan.mahalik@cutm.ac.in

ARTICLE INFO

Article History

Received: 12 September 2019

Received in revised form: 2 October 2019

Accepted: 22 November 2019

Keywords: *Ethnobotany, Saraca asoca, Indigenous, Panpharmacon, Leucorrhoea*

ABSTRACT

Saraca asoca (Roxb) Willd. commonly known as “Ashoka” belongs to the family *Caesalpinaceae* is an essential primeval plant having countless conventional importance. The scientific study of indigenous or traditional cognizance of plants and their religious, medical and practical uses is called as “Ethno-botany”. Ashoka has been considered as a global panpharmacon in Ayurvedic contexts of ancient India. Almost every part of this plant is used in pharmaceuticals. It has predominantly been used for gynecological complications like leucorrhoea, dysfunctional uterine bleeding and also for bacterial infections, skin problems, cardiac and circulatory issues. Comprehensive ethno-botanical practices of *S. asoca* have instigated to accessibility of various commercial formulations. Here, we will emphasize on the ethnobotanical usage of this worthy plant of our state and explore its exceptional pharma-benefaction.

INTRODUCTION

The dependency of humankind on plants and natural resources for quotidian requirement which include health interest is a chronicle from the beginning of human civilization. India has always been

considered as medicinal garden of the world because it has been offered with broad treasure of medicinal plants. Odisha, a state in eastern India has extensive biodiversity of plant resources. Ashoka tree is one of the

prime plants of our state which stands tall in terms of medicinal values and other practical purposes. The scientific name of Ashoka is *Saraca asoca* belonging to the family Caesalpiniaceae. Ashoka tree has a prosperous place in socio-cultural customs and has been worshipped as a sacred plant in Hindu tradition (Pradhan et al. 2009). Ashoka is extensively seen in the evergreen forests of India. It is found especially in the states of Odisha, West Bengal, Assam, Karnataka, Tamil Nadu, and Andhra Pradesh (Murthy et al. 2008). It is also broadly distributed in the Western Ghats as well as central zones of Deccan Plateau (Bhalero et al. 2014). Ashoka is an endangered species. It is a deciduous and medium sized plant reach to a height of 7-10 m. It flaunts a profuse branching pattern with deep green leaves spreading in dense bunches. Ashoka is admired for its gorgeous foliage and bright orange-yellow fragrant flowers which turn red prior to wilting. Dark brown barks are channeled, transversely ridged and rough due to presence of projecting lenticels (Sharma et al. 2005). Ashoka is a notable medicinal plant used as an Ayurvedic drug for the therapy of various feminine problems such as menorrhagia. The bark of this plant is effective against internal bleeding, ulcers, hemorrhoids, leucorrhoea, uterine disorders & pimples. The Ayurvedic formulation is exclusively used in improving appearance of body, dealing with pain, boosting digestion and assimilation.

Morphological characteristics

Leaves: Leaves are compound, alternate, paripinnate, distichous having 4-6 pairs of leaflets. Leaves are 7-30 cm long and dark green coloured.

Bark: The Ashoka bark is grey or dark brown in colour. Bark and stem are rough

due to presence of projecting lenticels. Bark is channeled & transversely ridged.

Flowers: Ashoka bears bright orange-yellow fragrant flowers in paniculate corymbs.

Fruits: The fruit of *S. asoca* is about 10-20 cm long & 3 cm wide which is reddish coloured when fully ripe it turns black. The fruit is oblong, apiculate & curved pod. Each pod consists of 4-10 seeds.

Bioactive compounds

The Phytochemical study shows the presence of various chemical constituents. Bark contains catechols, sterol, tannins, flavonoids, glycosides, leucopetargonidin and leucocyanidin (Ghanshyam et al. 2013). Dried bark contains five lignin glycosides, lyoniside, nudiposide, 5-methoxy-9- β -xylopyranosyl (-) isolariciresinol, icariside E3 and schizandriside and three flavonoids epicatechin, epiafzelechin-(4 β →8)-epicatechin and procyanidin B2, together with β -sitosterolglucoside (Pradhan et al. 2009). The stem contains quercetin, amyryne, ceryl alcohol and beta sterol (Anonymous 2004). Four anthocyanin pigments are isolated from flowers; beta and alpha sitosterol are isolated from fixed oil of flowers (Rastogi et al. 1990). Seed and Pod contains oleic, linoleic, palmitic and stearic acids catechol, (-) epicatechol and leucocyanidin (Ghanshyam et al. 2013; Table 1).

Ethno-botanical uses

S. asoca holds a sacred place in Indian traditions. Ashoka is an exclusive traditional drug for women related issues such as Menorrhagia, Leucorrhoea, bleeding hemorrhoids. Ashoka herb plays a vital role in making a healthy circulatory system and beneficial curative in cardiac weakness. It also relieves from miserable urination. It is a convincing drug for uterine muscles and useful for irregular menstrual cycles &

miscarriage. 6 gm of Bark powder of Ashoka called as 'Ksheerapaka' consumed in Pradara Roga of women. Ksheerapaka is so productive in uterine pain, dysuria. Women of Western Odisha boil the Bark in cow milk and take it once for three days & redo after three months to avoid Gynecological issues. Married Hindu women consume Ashoka flower buds on 'Ashoka Shasthi day' to shield their child

from sorrow and desolation. Persons tackling with mental illness are suggested to take bath under the shade of Ashoka tree. The Bark is essential for curing dysentery, piles, ulcers, pimples. Leaves having blood purifying qualities consumed for stomach problems. Dried flowers are solely used for Diabetes & Syphilis. Ashoka herb is applied to boost skin complexion and also impedes skin allergies.

Table 1: Bioactive compounds reported from plant parts of *S. asoca*

Plant Part	Phytoconstituent
Flower	Oleic, linoleic, palmitic and stearic acids, sitosterol, quercetin, kaempferol, quercetin, apigenin-7-O-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.
Seed and Pod	Oleic, linoleic, palmitic and stearic acids, catechol, (-) epicatechol and leucocyanidin.
Leaves	alkaloids, steroids, flavonoids, tannins, saponins, terpenoids, polyphenolics, glycosides and carbohydrates

Pharmacological activity of *S. asoca*

Various Research groups in India explored the effective medicinal properties of *S. asoca*. It possesses numerous pharmacological properties like antimicrobial, anticancer, antimenorrhagic, antioxidant, hypolipidemic effect, larvicidal activity, antidiabetic, uterine tonic activity, cardioprotective activity etc.

Antimicrobial activity

The methanolic, ethanolic, acetone & aqueous extracts of bark, dried flower buds and leaves of Ashoka possess the antibacterial properties which have been tested negative against many morbidic bacteria such as *Bacillus subtilis*, *E. coli*, *Salmonella typhosa*, *S. typhi*, *P. vulgaris*, *B. cereus*, *Vibrio cholerae*, *S. enteritis*, etc (Shirolkar et al. 2013). This plant is a great

resource for future antibiotics against harmful bacteria. Antifungal activity of methanolic and aqueous extracts of *S. asoca* found very effective against *Alternaria alternate*, *Colletotrichum gloeosporioides*, *Alternaria cajani*, *Bipolaris sp.*, *A. fumigates*, etc (Dabur et al. 2007).

Anti-inflammatory activity

Numerous transcription factors like NF-KB, Ap-1, GATA-1 are inhibited by the anti-inflammatory properties shown by ethanolic and methanolic extract of leaf, bark and root of *S. asoca* (Saha et al. 2012).

Anti-diabetic activity

For the therapy of Diabetes, dried powder of Ashoka bark is consumed with milk twice a day.

Anti-ulcer activity

The anti-ulcer property by the aqueous extract of *S. asoca* flowers inhibits basal gastric secretion and stimulates mucus secretion (Maruthappan & Shree 2010; Melo et al. 2006)

Anti-arthritis activity:

Extract of *S. asoca* have the potential to lower the lysosome enzyme level and reinstate the normal histological structure of joints.

Cardio protective activity

The ethanolic extracts of Ashoka show cardio protective activity which shields the cardiac tissue from infiltration. It is also responsible for purification of blood.

Uterine- tonic activity

S. asoca has proved to be most effective drug for its stimulating property on the endometrium and ovarian tissue. Various plant extracts used to formulate U-3107 herbal preparation applied against feminine disorders like menorrhoea, premenstrual syndrome, dysmenorrhoea (Mitra et al. 1999).

CONCLUSION

Saraca asoca is one of the significant botanical which is considered as a global catholicon for its extensive therapeutic properties. It is predominantly used in various phytochemical, experimental & clinical research purposes. Cell culture techniques of Ashoka are required to probe various features of its metabolite production. It has been proved to be the foremost traditional drug. However, precise research should be required to explore its full pharmacological potential to establish it as an exemplar drug.

REFERENCES

Bhalerao SA, Verma D, Didwana VS and Teli NC. (2014). *Saraca asoca*

(Roxb.), de. Wild: an overview. *Annals of plant sciences*. 3(7): 770-775.

Dabur R, Gupta A, Mandal TK, Singh D D, Bajpai V, Gurav AM and Lavekar GS. (2007). Antimicrobial activity of some Indian medicinal plants. *African Journal of Traditional, Complementary and Alternative Medicines*. 4(3): 313-318.

Ghanshyam Y, Vipin KG, Nishi T and Pragati K. (2013). Locomotor activity of methanolic extract of *Saraca indica* bark. *A in Biol Re*. 7: 01-03.

Haines HH. *The Botany of Bihar and Orissa*, 6 parts London. Botanical Survey of India, Calcutta (Rep. Edn.1961) (1921-25), 1921.

Maruthappan V and Shree KS. (2010). Antiulcer activity of aqueous suspension of *Saraca indica* flower against gastric ulcers in albino rats. *Journal of pharmacy research*. 3(1): 17-20.

Melo JR, De Araujo GKM, Da Luz MM. P., Da Conceicao SA, Lisboa FA., Moraes-Santos T and Cunha-Melo, JR. (2006). Effect of acid secretion blockade on acute gastric mucosal lesions induced by *Tityus serrulatus* scorpion toxin in anaesthetized rats. *Toxicol*. 48(5): 543-549.

Mitra SK, Gopumadhavan S, Venkataranganna MV, Sarma DN K and Anturlikar SD. (1999). Uterine tonic activity of U-3107 a herbal preparation in rats. *Indian J. Pharmacol*. 31(3): 200-203.

Murthy SM, Mamatha B and Shivananda T. N. (2008). *Saraca asoca*-an endangered plant. *Biomed*. 3(3/4): 224-228.

- Pradhan P, Joseph L, Gupta V, Chulet R and Arya H. (2009). R Verma, Bajpai A. *Saraca asoca* (Ashoka): A Review. J Chemical and Pharmaceutical Research. 1(1): 62-71.
- 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. 1(1): 62-71.
- Rastogi R P, Mehrotra BN, Sinha S, Pant P. and Seth R. (1990). Compendium of Indian Medicinal Plants: 1985-1989 (Vol. 4). Central Drug Research Institute and Publications & Information Directorate, New Delhi.
- Saha J, Mitra T, Gupta K and Mukherjee S. (2012). Phytoconstituents and HPTLC analysis in *Saraca asoca* (Roxb.) Wilde. International Journal of Pharmacy and Pharmaceutical Sciences. 4(1): 96-99.
- Saxena H O and Brahmam M. (1994). The Flora of Orissa, Vol. 1-4. Bhubaneswar: RRL.
- Sharma PC, Yelne MB and Dennis TJ. (2005). Database on medicinal plants used in ayurveda, vol. 3, central council for research in Ayurveda and siddha. New Delhi, 332.
- Shirolikar A, Gahlaut A, Chhillar AK and Dabur R. (2013). Quantitative analysis of catechins in *Saraca asoca* and correlation with antimicrobial activity. Journal of pharmaceutical analysis. 3(6): 421-428.

