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Saraca asoca (Roxb.) Willd. : Vulnerable tree species of Odisha, India

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ABSTRACT

Plants play a major role for human survival on earth as it provides food, clothing materials, shelter, medicine, etc. to the mankind. But due to over exploitation of plants, many of them come under different categories of threats. Among them, *Saraca asoca*, which comes under the category of vulnerable threat tree species, is now found limited to certain urban patches of Bhubaneswar, Odisha. Many reports and traditional knowledge have indicated the importance of its medicinal properties and is linked in the treatment of several diseases and disorders primarily for gynecological disorders. Keeping the above importance and its threat level, an attempt has been taken to gather the reported information and availability of this plant in the urban areas of Bhubaneswar. Survey was made during the month of January 2018 to March 2018 to locate the said species. It was observed that, it is planted in most of the gardens and educational campuses of the study area which showed a positive step towards the conservation of this vulnerable tree species.

INTRODUCTION

Saraca asoca is a medicinally important and globally vulnerable plant species found in the evergreen forest of India in general and Odisha in particular. It belongs to the family Caesalpinaceae. It is popularly known as “Asoka”, is a Sanskrit word which means “Without Sorrow” or which gives no grief. It is mentioned in Hindu mythology

as the Ashoka tree, beneath which the Indian philosopher and founder of Buddhism, Gautama Siddhartha was said to have been born under this tree (Pradhan et al. 2009). It is one of the most legendary and sacred trees of India and is valued for its attractive foliage and fragrant flower. It is a beautiful, small, erect evergreen tree, with deep green leaves growing in dense clusters. Its flowering season is around February to April

(Mohan et al. 2016). It has diverse vernacular names such as kankeli (Sanskrit), Ashoka (Assamese), Ashoka (Bengali), Ashoka (Gujurati), Ashoka (Hindi), Ashokadamara (Kannad), Ashoka (Kashmiri), Ashokam (Malayalam), Ashok (Marathi), Ashoka (Oriya), Ashok (Panjabi), Asogam (Tamil), Ashokapatta (Telugu) (Saxena & Brahman 1995). This tree is indigenous to Indian subcontinent and extensively grown in Western coastal region and Central Deccan Plateau regions (Bhalerao et al. 2016). This small tree has become threatened mainly due to the loss of its habitat. It has been classified as 'Vulnerable' in the IUCN list of threatened species. It is a small evergreen tree which has a high religious significance. It is primarily (bark) used in the treatment of female reproductive problems. In general, it is the best female tonic (Athiralakshmy et al. 2016; Divya et al. 2017). Keeping the all above importance in view, an attempt has been taken to collect the medicinal values from the literature & local survey and richness of the species in urban areas of Bhubaneswar, Odisha. The present study highlights the importance of a vulnerable tree species and brings attention towards its conservation in urban areas.

MATERIALS AND METHODS

The survey was made to locate the *Saraca asoca* tree in the urban areas of Bhubaneswar. A total of six gardens in the urban locality of the Bhubaneswar town were studied as sample sites. Longitudes, latitudes and altitudes were recorded. The information on *Saraca asoca* from local people were noted through a Passport Data Form. Plant parts were collected for further experimental work. Soxhlet method and percolation were adopted to obtain the plant extracts (Tiwari et al. 2011). The plant parts of experimental plant were collected and dried at room temperature under shade and were

powdered (Figure 2) after drying using mechanical devices. The powdered material of the experimental plant was kept in thimble and extraction was carried out using the Soxhlet apparatus. The residues were collected and left for air drying and dried crude extracts were stored in refrigerator for further experimental work. Phytochemical analyses were carried out on different extracts of different plant parts using standard procedure to identify the bioactive compounds (Trease & Evans 1989; Sofowara 1993; Tiwari et al. 2011).

RESULTS AND DISCUSSION

Urban forest plays an important role in the conservation of biodiversity. The greater the biodiversity, the greater is the opportunity for new discoveries. The resources available in the forest are not only helpful to maintain an ecological balance but also provide the food, medicines and day to day requirements for the nearby population (Figure 1). The present work is based on field survey and experimental works in the laboratory. It was observed that maximum number of plants (*Saraca asoca*) planted in Dhauli road among 6 studied areas (Table 1). Results revealed that about 13 associate species were enumerated (Table 2). Many researchers reported the medicinal and pharmacological properties of *Saraca asoca* (Table 3). The curative properties of selected plant parts date back to early civilization (Misra et al. 2013; Kumar et al. 2013). Modern research might not accept these practices without clinical validation of the claims. These curative healing plants probably contain certain bioactive compounds or secondary metabolites which might be responsible for the curative properties of these plants. Therefore the qualitative and quantitative analysis of phytochemicals was carried out to substantiate with the claims. Based on the informations collected on

the medicinal values of the *Saraca asoca* from study area and literature, an attempt was made to justify the rationale behind the claims and to identify the presence of bioactive components in leaves extract through qualitative tests. The extracts of selected *Saraca asoca* were analyzed to know the presence of the metabolites in them. The phytochemical screening revealed that they have diverse metabolites as listed in **Table 4**. The secondary metabolites presents in most of the extracts of leaves were tannin, saponin, flavonoids etc.

CONCLUSION

Saraca asoca has since been used as a traditional medicine. With the support of the current status of the study analysis of this plant including its physicochemical properties, toxicity studies, antimicrobial studies, it can be stated that this plant can go through the next level of medicine with minimal or no side effects. This can be a next level of research for fighting the current scenario of antibiotic resistance. Therefore, even if this plant is already been common in urban areas, it would be an important step to conserve this plant in the urban areas along with the knowledge of its values provided. It is also highly recommended that the plant *Saraca asoca* must be promoted and planted in garden and urban vicinity to conserve it for future generation.

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Table 1: *Saraca asoca* in the selected locations of Bhubaneswar

Collected site	Number of plants	Geographical location	Elevation (MSL)
Dhauili Road	15	20 ⁰ 11' 48.0" N 85 ⁰ 50' 36.2" E	10 m
AshokaStamb	8	20 ⁰ 11' 21.8" N 85 ⁰ 50' 32.5" E	20 m
Tribal Museum	6	20 ⁰ 16' 59.4" N 85 ⁰ 48' 25.4" E	52 m
Khandagiri	3	20 ⁰ 15' 46.3" N 85 ⁰ 47' 11.5" E	67 m
Udaigiri	6	20 ⁰ 15' 46.9" N 85 ⁰ 47' 07.2" E	70 m
Mukteswar Temple campus	8	20 ⁰ 14' 33.4" N 85 ⁰ 50' 24.9" E	4 m

Table 2: Associate tree species of *Saraca asoca*

Botanical Name	Local Name	Status
<i>Alastonia scholaris</i>	Chatyana	LC
<i>Azadirachita indica</i>	Nemo	LC
<i>Lagerstroemia parviflora</i>	Salora	LC
<i>Mimusops elengi</i>	Baula	LC
<i>Pongamia pinnata</i>	Karanja	LC
<i>Putranjiva roxburghii</i>	Poilundia	LC
<i>Strychnos nux-vomica</i>	Kochila	LC
<i>Syzygium cumini</i>	Jamukoli	LC
<i>Terminalia arjuna</i>	Arjuna	LC
<i>Terminalia bellirica</i>	Bahada	LC
<i>Wrightia tinctoria</i>	Koruan	LC
<i>Xantolis tomentosa</i>	Kanta Baula	LC
<i>Cassia fistula</i>	Sunduri	LC

(LC: Least Concern)

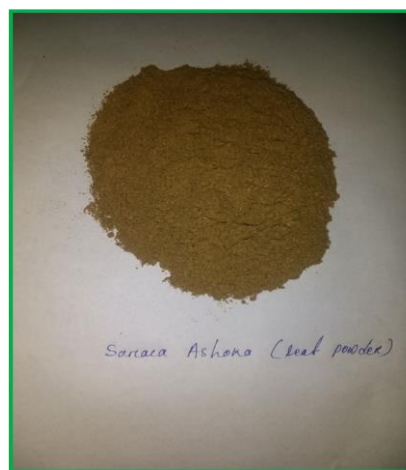
Table 3: Traditional therapeutic values of *Saraca asoca*

Plant parts	Uses	Source(s)
Leaf	Inflammation	Bhalerao et al. (2016)
Root	Paralysis	Pradhan et al. (2009)
Bark	Gynaecological disorders, Menorrhagia	Bhalerao et al. (2016), Divya et al. (2017)
Stem	Antioxidant	Athiralakshmy et al. (2016)
Flower	Uterine tonic, Hemorrhagic dysentery, diabetes	[1]
Seed	Kidney stone	[2]

(1: www.greencleanguide.com, 2: www.healthymminute.in)

Table 4: Phytochemical Test of selected experimental plant parts

Plant name	Plant Parts	Solvent	Photochemical detected
<i>Saraca asoca</i>	Leaves	Acetone	Tannin, Flavonoids, Saponin, phenolic compounds
		Methanol	Tannin, Saponin, Flavonoids, Terpenoid, Glycosides
		Water	Tannin, Saponin, Phenolic compounds.

**Figure 1:** Plant parts of *Saraca asoca***Figure 2:** Powder of *Saraca asoca* leaves