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Phytochemical screening of *Saraca asoca* (Roxb.), De. Wild

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Abstract
Saraca asoca (Roxb.), De. Wild is an indigenous plant with lots of traditional importance belonging to the family Caesalpiniaceae. These are the wonderful herb that claims to cure several diseases according to ayurvedic medicine. The dried flowers leaves and bark were treated against five different solvents such as Acetone, diethyl ether, Distilled water, Ethanol and Petroleum benzene. The present study revealed that the various phytochemical components such as carbohydrates, flavonoids, saponins, phenols, tannins, glycosides and steroids, are present in the bark, leaves and flower.

Keywords: *Saraca asoca*, Phytochemicals, ayurvedic medicine

1. Introduction
Asoka is one of the most legendary and sacred trees of India. Asoka tree, universally known by its binomial Latin name *Saraca asoca* (Roxb.), De. wild or *Saraca indica* belonging to family Caesalpiniaceae. It is an ever green tree. It is also known as Kankeli (Sanskrit), Ashoka (Assamese), Ashoka (Bengali), Ashoka (Gujarati), Ashoka (Hindi), Ashokadamara (Kannada)Ashok (Kashmiri), Asokam (Malayalam), Ashok (Marathi), Ashoka (Oriya), Ashok (Punjabi), Asogam (Tamil), Ashokapatta (Telugu). Ashoka is one of the sacred plants of Hindus, and is especially sacred to the Hindu God of Love, Kamadeva, for whom it is worshipped every year on December 27; it is mentioned in Hindu mythology as the Ashoka tree, beneath which the Indian philosopher and founder of buddhism, Gauthama Siddhartha (c.563 - 483 B.C) was said to have been born under this tree. The aim of the present study is to provide complete information about the medicinal & phytochemical importance of the *Saraca asoca*. Classification (Biswas *et al*., 1972) [1]

Fig 1: Habit of *Saraca asoca* (Roxb.), De. wild

Kingdom	:	Plantae
Division	:	Magnoliophyta
Class	:	Magnoliopsida
Order	:	Fabales
Family	:	Caesalpiniaceae
Genus	:	*Saraca*
Species	:	*asoca*

It is distributed in evergreen forests of India up to an elevation of about 750 meters. It is found throughout India. Specially 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 Palakkad district,

Thrisur, Kollam and Kannur districts (Warrier *et al*., 2000) [2]. Saraca asoca has many uses mainly in the medicine to treat the women gynecological disorders, in all types of abnormal discharges per vagina, in uterine inertia, uterine pain, urinary calculus, dysurea, etc. Saraca asoca (ashoka) plant contains the presence of glycoside, flavonoids, tannins and saponins (Pradhan *et al*., 2009) [3]. It is used as spasmogenic, oxytocic, uterotonic, and antibacterial, anti-implantation, anti-tumour, anti progestational, anti-estrogenic activity against menorrhagia and anti-cancer agent. The plant is useful in dyspepsia, fever, burning sensation, colic, ulcer, menorrhagia, leucorrhoea, pimples, etc (Srivastava *et al*.,1988) [4] Saraca asoca dried bark has been used for menorrhagia in India (Middelkoop 1986, Bhandary *et al*.,1995) [5, 6] In India Saraca asoca dried bark as well as flower is given as a tonic to ladies to treat Uterine disorders. Saraca asoca stem bark also used in case of all disorder associated with the menstrual cycle (Kumar *et al*., 1980, Middelkoop and Labadie, 1985) [7, 8]. Ashoka is blood purifier & used in all skin diseases, ammenorhea, dysmenorrhea menopause, menorrhagia, painful menstruation blood circulation and purification, cancer, diarrhea, dysentery, edema, heart disease, hepatitis, herpes, jaundice, joint pain, kidney and gall stones, paralysis, skin problems, rheumatoid arthritis, obstructions in urinary passages (Nadkarni,1994) [9].

Materials and Methods

Collection of the Plant Material

The fresh flowers, bark and leaves of *Saraca asoca* were collected in the month of February 2016 from the Mercy College campus, Palakkad. The collected plant materials were brought to the laboratory on the same day

Extraction of Plant Material

Plant samples were washed with water and air–dried at room temperature for 7 days, oven – dried at 40 °C to remove the residual moisture. The dried flowers leaves and bark were powdered using a mixer grinder and stored in air-tight container for future use. Five different solvents such as Acetone, diethyl ether, Distilled water, Ethanol and Petroleum benzene were used for extraction. About 1 gm of the plant samples were added respectively into the test tubes containing with 5 ml solvents, and were extracted at room temperature.

Qualitative Phytochemical Analysis

The extracts in all the 5 solvents of leaves and flower were tested for the presence of biological compounds by using following standard methods (Sofowra A., 1993, Trease G.E *et al.*, 1989. Harborne J.B *et al.*, 1973) [10, 11, 12].

Test for Carbohydrates

- **Fehling's test**

Equal volume of Fehling A and Fehling B reagents were mixed together and 2ml of it was added to crude extract and gently boiled. A brick red precipitate appeared at the bottom of the test tube indicated the presence of reducing sugars.

- **Benedict's test**

Crude extract when mixed with 2ml of Benedict's reagent and boiled, a reddish brown precipitate formed which indicated the presence of the carbohydrates.

- **Iodine test**

Crude extract was mixed with 2ml of iodine solution. A dark blue or purple coloration indicated the presence of the carbohydrate.

Test for Phenols and Tannins

Crude extracts were mixed with 2ml of 2% solution of $FeCl_3$. A blue–green or black coloration indicated the presence of phenols and tannins.

Test for Flavonoid

- **Alkaline reagent test**

Crude extracts were mixed with 2ml of 2% solution of NaOH. An intense yellow color was formed which turned colorless on addition of few drops of diluted acid which indicated the presence of flavonoids.

Test for Saponins

Crude extracts were mixed with 5ml of distilled water in a test tube and it was shaken vigorously. The formation of stable foam was taken as an indication for the presence of saponin.

Test for Glycosides

- **Liebermann's test**

Crude extracts were mixed with each of 2ml of chloroform and 2ml of acetic acid. The mixture was cooled in ice. Carefully concentrated H_2SO_4 was added. A colour change from violet to blue to green indicated the presence of steroidal nucleus, i.e., glycone portion of glycoside.

- **Salkowski's test**

Crude extracts were mixed with 2ml of chloroform. Then 2ml of concentrated H_2SO_4 was added carefully and shaken gently. A reddish brown color indicated the presence of steroidal ring, i.e., glycone portion of the glycoside.

- **Keller-kilani test**

Crude extracts were mixed with 2ml of glacial acetic acid containing 1-2 drops of 2% solution of $FeCl_3$. The mixture was then poured into another test tube containing 2ml of concentrated H_2SO_4. A brown ring at the inter phase indicated the presence of cardiac glycoside.

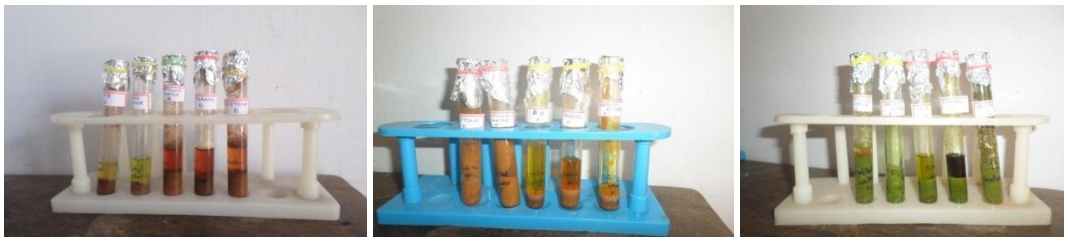
Results and Discussion

Phytochemical analysis conducted on the *Saraca asoca* leaves, bark and flower extracts revealed the presence of constituents which are known to exhibit medicinal as well as physiological activities. Preliminary phytochemical screening of the bark of *Saraca asoca* was done with Petroleum benzene, water, ethanol, diethyl ether and acetone. Primarily acetone extract showed the presence of steroids, carbohydrates, phenols and glycosides; diethyl ether extract contain carbohydrate, glycosides and steroids; petroleum ether extract contains carbohydrates, glycosides, saponin and steroids; ethanol extract contain glycosides, steroids, and saponins. Steroids, carbohydrates, glycosides, saponin etc were present in distilled water (Table 1). In the bark of *Saraca asoca* maximum phytochemical screening was done in acetone extract. The Phytochemical study conducted by Aditya *et al*., 2013 [13] shows the presence of various chemical constituents of Ashoka Bark. Acetone dissolves many hydrophilic and lipophilic components plants used, is miscible with water, is volatile and has a low toxicity to the bioassay used. It is a very useful extractant, especially for antimicrobial studies where more phenolic compounds are required to be extracted. A study reported by Das *et al*., 2010 [16] revealed that extraction of tannins and other phenolics was better in aqueous acetone than in aqueous methanol.

The higher activity of the ethanolic extracts as compared to the aqueous extract can be attributed to the presence of higher amounts of polyphenols as compared to aqueous extracts. It means that they are more efficient in cell walls and seed degradation which have unpolar character and cause polyphenols to be released from cells. More useful explanation for the decrease in activity of aqueous extract can be ascribed to the enzyme polyphenol oxidase, which degrade polyphenols in water extracts, whereas in methanol and ethanol they are inactive. The higher concentrations of more bioactive flavonoid compounds were detected with ethanol 70% due to its higher polarity than pure ethanol. By adding water to the pure ethanol up to 30% for preparing 70% ethanol the polarity of solvent was increased (Bimakr.,2010) [17]. Additionally, ethanol was found easier to penetrate the cellular membrane to extract the intracellular ingredients from the plant material (Wang 2010) [14]. In the flower maximum results such as carbohydrates, phenols, flavanoids, saponins, glycosides and steroids were seen in ethanol in the present study (Table 2). Saponins were observed in water, ethanol and acetone. Flavanoids were seen in all the five extracts. In petroleum benzene the least number ie., flavanoids, phenols, glycosides and steroids were reported.

Water is universal solvent, used to extract plant products with antimicrobial activity. Though traditional healers use primarily water but plant extracts from organic solvents have been found to give more consistent antimicrobial activity compared to water extract. Also water soluble flavonoids (mostly anthocyanins) have no antimicrobial significance and water soluble phenolics are important only as antioxidant compound.

Cowan (1999) [15] reported that ether is commonly used selectively for the extraction of coumarins and fatty acids. In the present study of leave extract, Carbohydrates, phenols, glycosides and steroids have been reported from acetone extract. In petroleum benzene carbohydrates, flavanoids and phenolic compounds have been observed. In ethanol, carbohydrates, saponins and glycosides; in water phenols, saponins and glycosides; and in diethyl ether phenol, flavanoids, saponins, glucosides, phenolic compounds and steroids have been reported (Table 3). The extracts were subjected to preliminary phytochemical analysis using standard chemical methods which mainly revealed the presence of carbohydrates, flavonoids, tannins and saponins.



a) Bark **b) Flower** **c) Leaves**

Fig 2: Phytochemical Screening in Different Solvents

Table 1: Qualitative phytochemical analysis of *Saraca asoca* bark sample

Sl. No.	Name Of The Test	Acetone	Diethyl Ether	Petroleum Benzene	Ethanol	Water
1	Carbohydrate					
	A) Fehling's Test	-	-	-	-	+
	B) Benedicts Test	+	+	+	+	+
	C) Iodine Test	+	-	-	-	-
2	Phenols & Tannins Test Ferric Chloride Test	+	-	-	+	-
3	Flavanoids Test Alkaline Reagent Test	-	-	-	-	-
4	Saponin Test Froth Foam Test	-	-	+	+	+
5	Glycosides					
	A)Libermann's Test	-	-	-	-	-
	B) Salkowski Test	+	+	+	+	+
	C) Keller Kilani Test	+	+	-	+	+
6	Phenolic Compounds Test	+	-	-	+	+
7	Steroid	+	+	+	+	+

Table 2: Qualitative phytochemical analysis of *Saraca asoca* flower sample

Sl. No.	Name Of The Test	Acetone	Diethyl Ether	Petroleum Benzene	Ethanol	Water
1	Carbohydrate					
	A) Fehling's Test	-	+	-	+	+
	B) Benedicts Test	-	-	-	+	-
	C) Iodine Test	-	-	-	-	-
2	Phenols & Tannins Test Ferric Chloride Test	+	+	-	+	-
3	Flavanoids Test Alkaline Reagent Test	+	+	+	+	+
4	Saponin Test Froth Foam Test	+	-	-	+	+
5	Glycosides					
	A)Libermann's Test	-	+	-	-	+
	B) Salkowski Test	+	-	-	+	-
	C) Keller Kilani Test	+	-	+	-	+
6	Phenolic Compounds Test	+	-	+	-	+
7	Steroid	-	+	+	+	-

Table 3: Qualitative phytochemical analysis of *Saraca asoca* leaf sample.

Sl. No.	Name Of The Test	Acetone	Diethyl Ether	Petroleum Benzene	Ethanol	Water
1	Carbohydrate					
	A) Fehling's Test	-	+	-	+	-
	B) Benedicts Test	+	-	-	+	-
	C) Iodine Test	-	+	+	+	-
2	Phenols & Tannins Test Ferric Chloride Test	+	-	+	-	+
3	Flavanoids Test Alkaline Reagent Test	-	+	+	-	-
4	Saponin Test Froth Foam Test	-	-	+	+	+
5	Glycosides					
	A)Libermann's Test	+	-	+	-	+
	B) Salkowski Test	-	-	+	+	+
	C) Keller Kilani Test	+	-	+	-	+
6	Phenolic Compounds Test	+	+	+	-	-
7	Steroid	+	-	+	-	-

The present study revealed that the various phytochemical components such as carbohydrates, flavonoids, saponins, phenols, tannins, glycosides and steroids, are present in the bark, leaves and flower of *Saraca asoca*. Ashoka have many medicinal uses and is a nontoxic traditional medicinal plant.

Conclusion

Numerous medicinal therapies treat their patients with herbal medicines for its extraordinary influence, though relatively little knowledge about their mode of action is available. In the Ayurvedic system of medicine, herbal extracts instead of purified compounds have been used since centuries because many constituents with more than one mechanism of action are considered essential for the required holistic therapeutic action. Ashoka is one of the most legendary and sacred trees. *Saraca asoca* is highly regarded as an universal panacea in the ayurvedic medicine. It is one of the universal plant having medicinal activities and is the source of various types of compounds. The present study revealed that the various phytochemical components such as carbohydrates, flavonoids, saponins, phenols, tannins, glycosides and steroids, are present in the bark, leaves and flower of *Saraca asoca*. Ashoka have many medicinal uses and is a nontoxic traditional medicinal plant. The use of phyto compounds of Asoka against diseases is a challenge in the development of modern drug discovery. This versatile plant is the source of various types of compounds. In the present scenario many plant are used to treat many diseases. But *Ashoka* is ancient and reliable source of medicine so Ashoka is used in many pharmacological activities. It has many uses like to treat skin infections, CNS function, genitor-urinary functions. As the global scenario is now changing towards the use of nontoxic plant product having traditional medicine use, development of modern drug from *Saraca asoca* should be emphasized for the control of various diseases. The present work can serve as a valuable source of information and provide appropriate standards to establish the quality of this plant material in future prospective study.

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