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# Pharmacognostic evaluation and physio-chemical analysis of *Alstonia scholaris* bark

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**ABSTRACT**

The plant *Alstonia scholaris* has been used in different system of traditional medication for the treatment of diseases and ailments of human beings. It is reported to contain various alkaloids, flavonoids and phenolic acids. It has been reported as antimicrobial, antiamoebic, antidiarrhoeal, antiplasmodial, hepatoprotective, immunomodulatory, anti-cancer, antiasthmatic, free radical scavenging, antioxidant, analgesic, anti-inflammatory, anti-ulcer, anti-fertility and wound healing activities. There are also reports available for the traditional use of this plant for its cardiotonic, anti-diabetic and anti-arthritic properties. Many isolated constituents from *Alstonia scholaris* lack the reports of pharmacological activities, which support its further pharmacological studies. It is considered as one of the best Indian medicinal Herb. An attempt has been made to highlight the medicinal bark through the pharmacognostic studies. Priminary identification of phytoconstituents was performed.

**Key words:** *Alstonia scholaris,* Pharmacological studies, phytochemical studies.

## INTRODUCTION

Pharmacognosical analysis of medicinal herbs remains challenging issues for analytical chemists, as herbs are a complicated system of mixtures. Unlike synthetic drugs, herbal medicine is a complicated system of mixtures. Thus, the Methods of choice for identification of 'botanical drug' are mainly intended to obtain a characteristic fingerprint of a specific plant that represent the presence of a particular quality defining chemical constituents. Alstonia scholaris invites attention of the researchers worldwide for its pharmacological activities ranging from antimalarial to anticancer activities. Alstonia scholaris Linn. R.Br. belongs to family Apocynaceae[1], (English- Devil tree, Hindi- chhattiyan, saitan ki jat, Sanskrit- saptaparna) grows throughout India, in deciduous and evergreen forests, also in plains, is a moderate to large sized evergreen tree grows upto 30m in height, leaves 5-7 in a whorl, elliptic oblong, obtuse & petiolate, flowers small greenish white found in umbellate cymes. Fruits follicles about 50cm long contain papillose seeds with hairs on each end. The wood has been used for school blackboards, hence the name 'scholaris'. The bark is official in the Indian, British and French Pharmacopoeias. The bark is bitter astringent, acrid, thermogenic digestive laxative anthelmintic febrifuge antipyretic depurative galactagogue stomachic, cardiotonic. It is helpful in fevers, malarial fevers, abdominal disorders diarrhorea dysentery dyspepsia asthama & tumours. The *Alstonia* species are rich in alkaloids, steroids and triterpenoids and these substances may be responsible for the toxicity *Alstonia scholaris*[3]. Alkaloids: alstonidine, alstonine, alstovenine, chlorogenic acid, chlorogenine, ditain, ditaine, ditamine, echicaoutchin, echicerin, echiretin, echitamine, echitein, echitenin, echitin, porphyrine, porphyrosine, reserpine, venenatine, villalstonine pleiocarpamine, *O*-methylmacralstonine, macralstonine *O*-acetylmacralstonine, villalstonine, macrocarpamine, corialstonine and corialstonidine, and triterpenoids: lupeol linoleate, lupeol palmitate and alpha-amyrin linoleate were reportedly present in the stem bark of *A. scholaris* (1), (4). Other

alkaloids that had been isolated are nareline methyl ether, nareline ethyl ether, 5-epi-nareline ethyl ether, picrinine, scholaricine and scholarine-N(4)oxide, 12-methoxyechitamidine (5), 19-hyroxytubotaiwine (6), 19-epischolarine, $N_b$-methyl$N_a$- metylburnamine, vallesamine $N_b$-oxide and 6,7-seco-19,20-epoxyyanggustibobine B (7), 19,20-[E]-vallesamine, angustilobine, B-N4-oxide, 20(S)-tubotaiwine and 6,7-seco-angustilobine[8] . The seed of alstonia scholaris contains hallucinogenic indole alkaloids, which are alstovenine, venenatine, chlorogenine, reserpine, ditamine and echitamine. The seeds also contain chlorogenic acid. This paper reports the preliminary phytochemical & physiochemical investigation of powdered bark of alostonia scholaris.

## MATERIAL AND METHODS

Herbal medicine is a triumph of popular therapeutic diversity. Almost in all the traditional medicine, the medicinal plants play a major role and constitute the backbone for the same. In order to make sure the safe use of these medicines, a necessary first step is the establishment of standards of quality, safety and efficacy**.** The barks of Alstonia scholaris linn were collected from the Botanical garden. The barks were dried under normal environmental condition, the dred plant material is marcerated and packaged in a plastic container. The powdered material is subjected to physio-chemical studies such as Total ash, water soluble ash, acid insoluble ash, sulphated ash, alcohol soluble extractive, water soluble extractive, ethaer soluble extractive, moisture content, refractive index & phyto-chemical studies such as Alkaloid, flavanoid, saponin, glycosides, terpenoides, carotenoids, tannins, steroids, anthraquinone, fixed oil, volatile oil, fatty oil, carbohydrates, protein, lipid, starch, lignin) Physiochemical Investigation is performed according to official procedure under pharmacopocial guidelines. (Pharmacopoeial Laboratory for Indian Medicines Protocol for testing: *Ayurvedic, Siddha & Unani* medicines) & phytochemical parameters are determined as described by Trease and Evans (2002).

**Table 1: Result of physo-chemical parameters for bark of *Alstonia scholaris***

| Parameters | Alstonia scholaris |
|---|---|
| Total ash | 2.48 % |
| Water soluble ash | 2.06 % |
| Acid insoluble ash | 0.40 % |
| Sulphated ash | 0.0084 % |
| Alcohol soluble extractive | 14.68 % |
| Water soluble extractive | 34.12 % |
| Moture content | 0.062 mg/ml |
| Refractive index | 1.435 |

**Table 2: Result of phyto-chemical investigation for bark of *Alstonia scholaris***

| Test | Observation | Result |
|---|---|---|
| Alkaloids | | |
| Mayer | + ve (cream colour) | Present |
| Dragendroff | + ve (red – brown colour) | |
| Saponins | | |
| Frothing test | + ve (no frothing) | Absent |
| Emulsion test | + ve (no emulsion) | |
| Tannins | | |
| $FeCl_3$ test | + ve (green colour) | Absent |
| Vanillin – HCL test | + ve (no red colour) | |
| Anthraquinones With NaOH | Blood red colour appeared | Present |
| Flavonoids / polyhenols $FeCl_3$ | + ve (dusky green colour) | Present |

## CONCLUSION

Standardization of herbal drugs is a topic of great concern. They are subject to variability as derived from heterogeneous sources. This variability can have both advantage and disadvantages effect. The main disadvantages are that the activity of the material may vary and that inferior material may be produced. *Bedolilata* is an *Ayurvedic* herb known for its antiarthritic, antihelminthic, hepatoprotective, antispasmodic activity and various medicinal properties. So the efforts were made to provide the scientific data to standardize the plant material for further studies.

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