



**INVITRO ANTI-LICE ACTIVITY OF HYDRO ALCOHOLIC AND
ETHYL ACETATE EXTRACTS OF *ALSTONIA SCHOLARIS* (L.) R.Br.**

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ABSTRACT

Introduction: Due to their phytochemical components, medicinal plants can be employed in a variety of ways. The chemicals that are naturally found in plants are known as phytochemicals. Due to their numerous medical applications and lack of side effects compared to pharmaceutical chemicals, phytochemicals are becoming more and more popular nowadays.

Objective: The goal of the current study was to investigate the anti-lice properties of *Alstonia scholaris* (L.) R.Br. hydroalcoholic and ethyl acetate extracts. **Materials and Methods:** The

diffusion method was used to test the pediculocidal activity on filter paper. **Results:** Alkaloids, saponins, tannins, and carbohydrates were found in the hydro alcoholic and ethyl acetate extracts after qualitative analysis. In the current work, a unique strategy for eliminating human head lice has been examined using plant extracts from *Alstonia scholaris* (L.) R.Br. This plant may be able to prevent or eradicate head lice in a manner similar to that of a standard medicine.

There are no dead lice in control. **Conclusion:** As a result, it may be concluded that hydro alcoholic extract exhibits comparable anti-head-lice activity to that of prescription medication.

Keywords: Filter paper diffusion, phytochemicals, anti-lice activity, *Alstonia scholaris* (L.) R.Br.

INTRODUCTION

Different bioactive phytochemicals that are produced by plants fall into two categories: primary and secondary

metabolites. Proteins, carbohydrates, amino acids, and chlorophyll are examples of primary metabolites, while terpenoids,

polyphenols, and alkaloids are examples of secondary metabolites. Secondary metabolites are substances created by plants to interact with diseases, herbivorous animals, insects, and the environment, rather than being essential for the plant's immediate existence. The plant is protected from environmental stress, pathogen attacks, and insect pest attacks by secondary metabolites like alkaloids, glycosides, flavonoids, steroids, saponins, and terpenoids. Since ancient times, plants have been used as a source of medicine due to the existence of these bioactive phytochemicals. Today, these substances play a significant role in all global medicines and serve as the basis for the development of new drugs [1].

Apocynaceae family member *Alstonia scholaris* Linn. R.Br. is indigenous to India. It grows wildly everywhere, including in deciduous and evergreen forests as well as on plains [2]. In children worldwide between the ages of 3-12 years, head lice or head lice infection is a widespread issue [3]. There are still a lot of places in the globe where head lice are widely distributed. In Jordan, head lice affect 26.6% of the students in elementary schools. When compared to the Chinese tribe, which has a prevalence of 4.6%, head lice are more common among the Indian and Malay ethnic groups—28.3% and 18.9%, respectively. In contrast, head lice have not yet become a widespread problem in school-

age children in Indonesia. The human scalp is the home of the ectoparasite known as hair lice. The presence of head lice might be symptomatic or asymptomatic. Itching will be present in many patients in a symptomatic state. The need of safe yet effective alternative therapies for eliminating head lice is highlighted by the tendency for resistance and hazardous dangers. In Indonesia, a few families use anti-lice medications or insecticides to treat head lice without following safety precautions [4].

MATERIALS AND METHODS

Collection and Authentication

The leaves and stem barks of the *Alstonia scholaris* Linn. R. Br. were obtained from the area around Kodad town in the Suryapet district of Telangana State, India. An official specimen voucher was kept at the college herbarium when the authenticity of the plant material was established. Equal amounts of the stem and leaf barks were shade-dried, pulverised, and stored in airtight containers. The powdered material was employed in the extraction procedure.

Extract preparation

The extraction of the plant powder was done by using the ultrasonication process with ethyl acetate and hydro alcoholic solvents. The extraction of *Alstonia scholaris* Linn. R. Br. powder (leaves and stem barks equal mixture)

conducted by using ACZET Pvt. Limited, ultrasonic cleaner, model CUB 2.5, Sr.no 2019 10003 with electronic timer, quick degassing and heating. In the UAE, a volumetric flask containing the plant powder sample and the solvent—first with ethyl acetate, then with 70% ethanol in water and a solvent to sample ratio of 10:1—are placed in a temperature-controlled ultrasonic bath and sonicated for four hours at a temperature below 100°C (usually 60°C). In order to maintain the sample to solvent ratio during the extraction, this mixture was covered with aluminium foil to prevent evaporation. Following extraction, the extract is concentrated and separated from plant debris using muslin cloth that has been folded twelve times. The percentage yield, color, consistency was determined. The extracted product was used for phytochemical screening and anthelmintic activity [5].

SCREENING FOR PHYTOCHEMICALS

Alstonia scholaris Linn. R. Br. extracts were subjected to a qualitative phytochemical screening process using standard methods [6-8].

EVALUATION OF ANTI-LICE ACTIVITY

One hour after the lice were collected, the in-vitro experiments were initiated. A bioassay using filter paper diffusion was conducted. A filter paper disc (Whatman No. 1) was cut to the interior diameter of a Petri dish and placed in petri

plates after carefully selecting lice under a dissecting microscope. All three concentrations (10%, 20%, and 30%) were examined. Each group of the four test organisms, each containing ten lice, was put on a filter paper at the base of a Petri plate and left open. The lice and filter paper were covered with 2 ml of each test sample. Group A served as the control and received 2 ml of distilled water. 2 ml of hydro alcoholic extract at varying strengths were given to Group B (the test group). 2 ml of ethyl acetate extract at different concentrations were given to Group C (the test group). 2 ml each of Benzoyl benzoate 25% (v/v) in concentrations of 10%, 20%, and 30% were administered to Group D (standard drug).

For one hour, all of the Petri plates were left alone in a dark room with a humidity of at 26 ± 0.5 and $70\pm 1\%$. The dishes were removed after an hour, treated with 2 ml of distilled water, and then placed back inside the chamber at the conditions mentioned earlier. The plates were examined under a dissecting microscope for any lice movements after 18 hours, and the absence of any movement was taken as proof that the lice were dead. Triplicates of every therapy were given. The criteria for determining whether or not a lice was still alive were quite severe and precise; if any small indication of life, such as antennal movements or slight leg movements, were

observed (with or without stimulation by a forceps), the lice were considered to still be alive. If there were no vital signs at all, the lice were believed to be dead [9, 10].

RESULTS & DISCUSSION

Organoleptic characters (Table 1)

Preliminary phytochemical screening

The preliminary phytochemical analyses were carried out using the methods

described above, and the hydroalcoholic and ethyl acetate extracts of *Alstonia scholaris* Linn. R.Br. were discovered to include phytochemicals such as alkaloids, glycosides, tannins, and saponins. The results are presented in Table 2.

Anti lice activity evaluation (Table 3)

Table 1: *Alstonia scholaris* Linn. R.Br. organoleptic characters

S. No.	Property	Hydroalcoholic extract	Ethyl acetate extract
1	Colour	Greenish black	Dark green
2	Odour	Characteristic	Characteristic
3	Consistency	Sticky	Powder
4	% Yield	7 g	3.6 g

Table 2: Results of Preliminary phytochemical screening of *Alstonia scholaris* Linn. R.Br.

S. No.	Chemical constituents	Hydroalcoholic extract	Ethyl acetate extract
1	Alkaloids	++++	+++
2	Glycosides	+	Absent
3	flavonoids	Absent	Absent
4	Tannins& Phenolic Compounds	+	+
5	Saponins	+	+
6	Steroids	Absent	Absent
7	Amino acids	Absent	Absent
8	Proteins	Absent	Absent
9	Carbohydrates	Absent	+

Note: ++++ = Abundantly, +++ = Moderately, + = Small amount present

Table 3: Results of anti-lice activity of *Alstonia scholaris* Linn. R.Br.

S. No.	Sample	Concentration (%)	Average mortality (%)
1	Control (Distilled water)	-	-
2	Benzyl benzoate (Standard)	10%	49%
		20%	69%
		30%	88%
3	Hydroalcoholic extract (Test)	10%	36%
		20%	50%
		30%	76%
4	Ethyl acetate (Test)	10%	25%
		20%	39%
		30%	53%

Alstonia scholaris R. Br hydro alcoholic and ethyl acetate extracts' colour, consistency, and yield % are shown in Table 1. All of the extracts shown concentration-dependent action at (10%, 20%, and 30%), however the hydro alcoholic extract showed higher mortality rates and was very

comparable to the reference medication benzyl benzoate. The lowest anti-lice activity of ethyl acetate extract at different doses is shown in Table 3.

In the development of innovative and useful medications in contemporary medicine, medicinal plants play a key role.

Alkaloids, glycosides, tannins, and saponins were discovered in the hydroalcoholic and ethyl acetate extracts of *Alstomia scholaris* (equal amounts of leaves and stem barks). These plant's compounds enhance its therapeutic and medical capabilities. To maintain hair clean and healthy, everyone should practise good hair hygiene. The human head louse, or *Pediculus humanus capitis*, is an obligatory ectoparasite that causes pediculosis capitis. *Pediculus capitis* is treated by manually removing the louse or by using synthetic shampoos and drugs. However, these treatments can sometimes irritate the scalp and cause hair damage, so non-toxic alternatives are required. In the current study, a novel approach to controlling human head lice has been developed using plant extracts. This plant may be able to prevent or eradicate head lice in a manner similar to that of a prescription medicine. There are no lice that have died in control. According to this study's findings, hydro alcoholic extract has comparable anti-head-lice activity to standard drug.

CONCLUSION

The foundation for research into novel anti-lice compounds from medicinal plants was created by patterns of increasing treatment resistance against head louse caused by pediculocidal drugs. The head louse *Pediculus humanus capitis* was evaluated in this work using extracts of *Alstomia scholaris* at different doses. For

testing the possible pediculocidal efficacy of ethanol and ethyl acetate extracts, filter paper diffusion was used. The results showed that whereas ethyl acetate extract had only low pediculocidal effects, hydro alcoholic extract had excellent anti-lice action. According to the results of this investigation, the hydroalcoholic and ethyl acetate extracts of *Alstomia scholaris* contain the active ingredients necessary for antilice activity. The type of solvent employed and the quantity of plant material utilised have a significant impact on the phytochemicals that can be accurately predicted. Results may vary depending on the extraction method and solvents used.

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CONFLICT OF INTREST

The authors have no competing interests to disclose.

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