Original Article

Phytochemical Screening & Phenol Quantification Of *Alangium Salvifolium*

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Abstract

Purpose: Many different human ailments have historically been treated using medicinal plants. The objective of this work was to quantitatively measure the concentration of phenol in various solvent leaf extracts of *Alangium salvifolium* and screen the qualitative estimate of primary and secondary metabolites.

Methods: Phytochemical screening and total phenolic quantification of different extracts of *A. salvifolium* were done by standard procedures.

Results: The extracts of *A. salvifolium* in petroleum ether, acetone, and distilled water include a range of primary and secondary metabolites. The total quantification of phenol was analyzed in three extracts of *Alangium* and compared in terms of catechol equivalent. Its therapeutic efficacy could be caused by the presence of secondary metabolites.

Conclusion: To evaluate the potential of A. *salvifolium* for the treatment of different ailments, further research into the plant is required.

Keywords: *Alangium salvifolium*, Medicinal plant, Phenol, Secondary metabolites

INTRODUCTION

Since the beginning of time, people have utilized medicinal plants to cure a variety of illnesses. The natural herbal ingredients, their mode of administration, the requirements of the person, and their specific treatment conditions are the only factors that determine whether or not Ayurvedic medications are safe. Secondary metabolites are beneficial to a host's ability to perform crucial tasks including competition, protection, and interspecies interactions but are not essential for existence. Numerous biological activities, such as antiviral, anti-inflammatory, vasodilating, and antiallergenic properties, are shown by phenolics [1].

The Alangiaceae family of flowering plants includes *Alangium salvifolium (L.f)*, often referred to as sage-leaved Alangium. Ankolam, Ankola, Akola, and Alanji are some of its other well-known names in Malayalam, Kannada, Hindi, and Tamil, respectively. *A. salvifolium* is a small deciduous tree with lovely white fragrant blooms that may be straggly or spinous at times. When young, the wood is orange-yellow and has an olive-brown bark. It may be used for ornamental work because of its strong, fine-grained texture and as a good fuel. The leaves are oblong-lanceolate, simple, and alternating. It produces scented white blooms with green buds. The flower's petals often fold backward, showing the many stamens and visible linear stigma. The fruits have a berry-like shape and are red [2].

In this work, we explore and contrast phenol quantification in petroleum ether, acetone, and distilled water extract of *A. salvifolium*, as well as the phytochemical examination of these extracts. We also screened the anthelmintic activity of acetone, petroleum ether, as well as distilled water, and extract of *A. salvifolium* against the Indian earthworm *Pheretima Posthuma*.

MATERIAL AND METHODS

Plant extract preparation

A. salvifolium was taken and dried in the shade. A mixer grinder was used to powder the dry plant material. Soxhlet extraction was performed for the extraction. An appropriate solvent was used to dissolve the extracts, resulting in a concentration of 1mg/ml. By using the proper dilution, the working solutions of the extracts were produced.

Physico-Chemical Analysis

At Amala Ayurvedic Hospital in Thrissur, physical and chemical characteristics including total ash, moisture content, extractive values, and acid-insoluble ash were assessed using the accepted techniques used by the Indian pharmacopoeia.

Phytochemical Analysis
For primary and secondary metabolite analysis with conventional techniques, the extract was dissolved into distilled water [3].

Total phenolic content
Using an equivalent amount of distilled water, the Folin-Ciocalteu reagent was diluted to 1N to estimate the total phenols. In a 25ml test tube, 1ml of the same was mixed into 1ml (1mg/1ml) of the extract, followed by 2ml of sodium carbonate. For precisely one minute, the solvent was heated in a bath of boiling water. With distilled water, the blue color was diluted to a volume of 25ml. The Labtronics NT290 Spectrophotometer was used to calculate the amount of light transmittance at 725nm. The standard curve produced with catechol was used to determine total phenol [4].

Anthelmintic Activity
In vitro, anthelmintic activity was assessed using adult earthworms (*Pheretima Posthuma*) [5]. Earthworms that had been identified were taken from Kerala Agricultural University at Mannuthy. Before conducting the tests, all of the test solutions (100mg/ml) and the reference drug solutions were newly prepared. Observations were recorded throughout the test period, up to 4 hours, for the death and paralysis of worms. A period of paralysis was reported when no movement of any kind could be seen unless the worms were agitated vigorously. After determining that the worms did not move when agitated vigorously, the time for the death of the worms was documented.

RESULTS AND DISCUSSION
Physico – Chemical Analysis
The powder characteristics of *A. salvifolium* were studied. Ash values, including water-soluble ash, acid-insoluble ash, and total ash were also taken at the Amala Ayurvedic Hospital in Thrissur and are shown in Table 1 along with other physicochemical characteristics.

Phytochemical analysis of different *Alangium salvifolium* extracts
Phytochemical screening was also done with various extracts of *A. salvifolium*. The extraction was carried out with distilled water, petroleum ether, as well as acetone. In the present study, petroleum ether extract shows the presence of carbohydrates, sugar, protein, phenol, alkaloids, tannin, steroids, and saponins. Acetone extract contains carbohydrates, sugar, fructose, protein, saponin, alkaloids, steroids, and tannin. Water extract indicates the presence of carbohydrates, sugar protein, phenol, steroids, and tannin (Table 2).

Quantification of phenol in different extracts of *Alangium salvifolium*
The Folin-Ciocalteu spectrophotometric technique is used. It involves the quick oxidation of phenols with an alkali, often sodium carbonate, to produce a significant phenolate ion concentration. The total phenolic content of the hot water extract of the spices was represented as microgram (µg) catechol equivalents (CE)/µg of extract since catechol is one of the polyphenol components. Table 3 displays the total phenol content of several A. salvifolium preparations. The phenolic content in Petroleum ether is 14 CE/1µg and that of acetone is 26CE/1µg. Using the catechol standard curve, distilled water extract had the greatest phenolic concentration (54CE/1µg of extract) (Table 3).

Anthelmintic activity of different *A. salvifolium* extracts
The anthelmintic activity of extracts of *A. salvifolium* was studied using the standard drug Albendazole against the Indian earthworm *Pheretima Posthuma*. This was investigated by monitoring how long it took earthworms to become paralyzed and then die. The earthworm becomes paralyzed and dies after 60min and 196min, correspondingly, in 25mg/ml of the common medicine albendazole (Plate 3 d). The period for earthworm paralysis and death in 50mg/ml of albendazole was shown to be 34 minutes and 97 minutes, respectively (Table 4).

The time for *Pheretima Posthuma's* paralysis and death in 100mg/ml of petroleum ether was discovered to be 16 minutes and 123 minutes, correspondingly. The duration for Pheretima Posthuma's paralysis and death in 100mg/ml of acetone was discovered to be 13min and 129min, correspondingly. The anthelmintic property of the distilled water extract of *A. salvifolium* was analyzed in the present study, paralysis occurred within 38 minutes and death within 168 minutes (Plate 3 e).

A significant group of commercially significant plants, medicinal and aromatic plants serve as the primary source of raw materials for fragrances, medicines, cosmetics, and tastes. Traditional reports have noted that the physicochemical analysis of *A. salvifolium* leaves exhibits a range of biological actions like anticancerous, antidiabetic, anti-inflammatory, and diuretic effects [6]. The different successive extract was collected from the present-day study of *A. salvifolium*. Different extracts have been subjected to preliminary phytochemical screening, which exhibited the presence of protein alkaloids, carbohydrates, steroids, saponins, tannins, and phenolic compounds. The good medicinal plant *A. salvifolium* has a large number of bioactive compounds. Siddha, Ayurveda, and other ancient medicine systems have utilized almost every aspect of this plant for the treatment of numerous maladies. The plant was cited as having potential effectiveness against peptic ulcers, diabetes, inflammation, and arthritis in the contemporary scientific literature [7].
The common medication albendazole was used to study the anthelmintic effects of several *A. salvifolium* extract extracts. The main consequence of albendazole is to lead to flaccid paralysis of the worm, which leads to peristalsis-induced worm

expulsion. They may move by means of ciliary motion. The mucilaginous layer of an earthworm is made up of complex polysaccharides. Any deterioration of the mucopolysaccharide membrane exposes the outer layer, which limits its range of motion and may result in paralysis. Since worms have no way to store energy and must eat practically constantly to satisfy their metabolic demands, all anthelmintic medicines effectively kill worms by starving them; doing this for 24h or less is enough to kill the majority of adult parasites. Another potential mode of action is that they attach to glycoprotein on the cuticle of the parasite or to tree proteins in the host animal's digestive system, which results in death [8].

The *A. salvifolium* plant has a fair price and is used in Ayurveda to cure several ailments. *A. salvifolium* has been the subject of research, however, the pharmaceutical industry has not yet derived a medicine from this plant.

CONCLUSION

The present study of *Alangium salvifolium* provides a scientific base for its use in folklore remedies. Therefore, quantifying these metabolites will facilitate the discovery of novel and potent plant-based medications as well as the scientific validation of current traditional practices.

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Table 1. Powder characteristics of *Alangium salvifolium*

Sl No	Parameters	Observation
1.	Colour	Greenish
2.	Odor	Characteristic
3.	Taste	Bitter
4.	Moisture content	7.16%
5.	Total ash	12.14%
6.	Acid soluble ash	3.24%
7.	Water soluble ash	5.21%

Table 2. Phytochemical Constituents of different extracts of *Alangium salvifolium*

Phytochemical Constituents	Test	Extracts		
		Petroleum ether	Acetone	Distilled water
Primary metabolites				
Carbohydrates	Molish	++	++	+++
Sugar	Benedicts	+++	+++	+++
Fructose	Seliwanoff	-	+	+
Starch	Iodine	-	-	-
Protein	Biuret	++	++	+++
Secondary metabolites				
Saponin	Foam Test	++	++	-
Phenol and Tannin	Ferric chloride	+	+	++
Phenol	Folin Test	+	+	+++
Alkaloids	Meyer's test	++	+	-
Steroids	Salkowski	++	++	++

+ indicates the intensity of occurrence of the compound tested.
- Absence of metabolite

Table 3. Quantification of phenol present in different extracts of *Alangium salvifolium*

Sl No	Extract	O. D	Average (µg/µl)	Phenol concentration (µg/µl CE)
1.	Petroleum ether	0.067 0.075 0.073	0.071	14
2.	Acetone	0.147 0.144 0.116	0.135	26
3.	Distilled water	0.275 0.271 0.282	0.276	54

Table 4. Effect of Anthelmintic activity of different extracts of *Alangium salvifolium*

Sl No	Group	Concentration (mg/ml)	Paralysis (min)		Death (min)	
1.	Albendezole	25	62 58	60 ± 2.82	197 195	196 ± 1.41
		50	35 32	33.5± 2.12	96 97	96.5±0.70
2.	Petroleum ether	100	17 15	16± 1.41	122 125	123.5± 2.12
3.	Acetone	100	15 11	13± 2.80	121 136	128.5± 10.60
4.	Distilled water	100	37 38	37.5± 1.4	168 167	167.5± 0.70