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Periliminary phytochemical analysis of *Alangium salvifolium* ethyl acetate, ethanol and petrolium ether extracts

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Abstract
Medicinal plants contain various bioactive compounds that are of great importance for individual and community health. The present study was carried out to determine the phytochemical constituents and thin layer chromatography profile of *Alangium salvifolium* seed extracts. *Alangium salvifolium* is an Indian medicinal plant with a wide variety of medicinal plant species. Phytochemical screening was performed using different qualitative methods and TLC profiling was performed using different solvent systems of different polarity. The qualitative phytochemical determination by chemical assay reflects the presence of alkaloid, flavonoid, phenol terpenoids. TLC profiling of these plants was carried out using different solvents of *Alangium salvifolium* plant seed extracts and showed different Rf values. The results of the present study suggest that the plant *Alangium salvifolium* seed is a rich source of various plant secondary metabolites. These can be successfully researched further for the isolation and identification of active biochemical substances with curative properties.

Keywords: Phytochemicals, TLC, medicinal plant, secondary metabolites

Introduction
People have always been fascinated by naturally occurring substances from prebiotic, microbial, plant and animal sources. Various plant extracts from different parts of plants have been used in ancient remedies, perfumes, food flavourings and other household products. Active ingredients found in plants include alkaloids, steroids, tannins, glycosides, resins, phenols, and flavonoids in each of their individual parts. (Hassan *et al*., 2021) [1]. The combination of these chemical agents gives the plant its therapeutic and medicinal properties. (Vijayalakshmiet *et al*., 2013) [2] In Ayurveda, a variety of medicinal herbs are used in India to achieve therapeutic effects and for other traditional medicinal procedures. In our country, a variety of medicinal herbs that are commercially important are grown or collected for ethnomedicine. Most diseases, including cancer, inflammation, thyroid disease, diabetes, asthma, anti-inflammatory and analgesic, hepatitis, nephritis, chest discomfort, fever and cough in pneumonia, bronchitis and arthritis, are treated with the use of a medical plan. This is made feasible by the wide range of phytochemicals and biological processes that are found in medicinal plants. (Jagarwal *et al*., 2021) [3].

In this study, we decided to extract compounds from the plant extract and investigate the main ingredients contained in it. Find out what new bioactive compounds of the plant have potential. Thin layer chromatography (TLC) is one of the new state-of-the-art methods that provides rapid information about natural substances. In the pharmaceutical field, this chromatographic technique is widely used. Most applications are found in drug purity testing, reference standards, stability samples, and key intermediates throughout the drug development process. Primary non-volatile chemicals are separated using the basic chromatographic technique of thin layer chromatography (TLC). In the search for various physiological properties of plant material, TLC-based screening techniques often focus on therapeutic plants. For rapid screening of plant material, thin layer chromatography has proven to be an efficient technique. (Neeharika Srivastava *et al*., 2012) [4].

One of the medicinal plants, *Alangium salvifolium*, was used as a research sample in this study. *Alangium salvifolium* has long been revered as one of nature's most valuable remedies. It belongs to the Alangiaceae family and has the popular name "sage-leaved

Alangium". *Alangium salvifolium* has long been used to treat a variety of diseases. In Ayurvedic and Siddha medicine, its roots, leaves, stems and bark are used to cure a variety of diseases. *Alangium salvifolium* is claimed to contain a number of biologically active constituents. It has a wide range of biological effects, including anti-diabetic, anti-ulcer, analgesic, anti-inflammatory, antimicrobial, antioxidant, anti-arthritic, diuretic, antifertility, anthelmintic, anti-epileptic and antifungal, etc. It is used in traditional Indian medicine. Due to the increasing demand for chemical diversity in screening activities, the search for therapeutic substances from natural products and other considerations, the interest in edible plants has expanded globally. (Mani *et al*., 2011; Sasidharan *et al*., 2011) [5, 6].

Materials and Methods

Procurement of Experimental Plant

The healthy seeds of *Alangium salvifolium* plant were collected during May from the garden of Ayurveda Ashtang Kendra Indore, Madhya Pradesh, India. All plant seeds washed well with fresh water and dried under the shad at room temperature. The seeds were powdered and collected in sterile container for further process.

Sequential Extraction of plant

Collected sample *Alangium salvifolium* seeds powder form were taken and placed in a thimble of soxhlet apparatus. extraction was carried out using organic solvent ethyl acetate, ethanol, petrolium ether for 8-10 hours and 40-60 degree temperature of the heating manthle were adjusted. After the extraction process, the extract of sample was filtered and concentrated to dryness. Extract were collected in air tight container and percentage yield was calculated. (Alebiosu C. O. *et al*., 2015) [7].

Phytochemical screening of successive Extracts

The ethyl acetate, ethanol, petrolium ether extract were subjected to phytochemical tests was performed to identify presence or absence of different phytochemicals in extract of *Alangium salvifolium* seeds by using standard procedure to identify the components, Alkaloids, Flavonoids, phenol, Terpenoids (Valentin Hilaire *et al*., 2022) [8].

Chemical reagents

All chemicals used in this study were purchased from Hi media Laboratories Pvt. Ltd, SRL Pvt. Ltd. LOBA Chemie, and SD Fine -chem Ltd (Mumbai, India). All chemicals used in this study were of analytical grade.

Thin layer chromatographic studies

Thin Layer Standard methods were utilized for the chromatography of extracts, which is primarily used to identify the types of phytoconstituents present. TLC is a crucial analytical tool for classifying, identifying, and estimating several categories of natural materials. In this method, the solute migrates differently between a stationary phase and a mobile phase to separate the various components. The adsorption phenomenon is the foundation of TLC. In this chromatography, the stationary phase's surface is crossed by the mobile phase, which contains the dissolved solutes. In early TLC, polar and non-polar solvents were chosen as the mobile phase. Then, in preliminary TLC, combinations of several polar and non-polar solvents were used as the mobile phase. the plant extract were with different solvents. Each extract applied on - pre coated TLC plate of silica gel 60 F254 pre coated with layer thickness of 0.2 dmm by using Capillary tubes. Drawing a light line on the plate and Dots to know the place of each extract applied on the Plate. After using each mobile phase the TLC plate Were air dried and spots on TLC plats were visualised with spraying reagent Iodine observed under ultra violet light. Detection and calculation of retention factor (R_f) values were Calculated for different sample. (Barker *et al*., 2016) [9].

Results

The general preliminary phytochemical screening of the extract revealed the presence of various secondary metabolites such as alkaloids, flavonoids, phenol and terpenoids. The results of the phytochemical tests are shown in Table 1. All of these Phytochemical have been used since ages because of the antioxidant, anti-inflammatory, anti-cancer properties due to various secondary metabolites that are synthesized in all part of plant. This investigation reveals the presence of various important phytochemical in different extracts of plant.

Table 1: Preliminary phytochemical screening for extracts of seed of *A. salvifolium*

Solvent Used	Alkaloids	Flavonoids	Phenol	Terpenoids
Ethyl acetate	+	+	+	+
Ethanol	+	+	+	+
Petrolium ether	+	+	+	+

Thin layer chromatography studies

The result of TLC profiling of the extracts of *Alangium salvifolium* showed the presence of different components using different solvent systems. Chloroform: methanol (9.5:0.5) TLC of the ethyl acetate extract of the seeds of *Alangium salvifolium* showed the presence of 2 spots with R_f values of 0.40 and 0.57, respectively, while the ethanol extract with the same solvent showed 3 spots with R_f values of 0.20, 0.53, and 0.73, respectively. The petrolium ether extract showed no stain. n Hexane: Acetic acid (7:3) TLC of ethyl acetate extract of *Alangium salvifolium* seeds showed the presence of 2 spots with R_f value of 0.13 and 0.24, respectively, while ethanol extract with the same solvent showed 3 spots with R_f value of 0.13, 0.24 and 0.26, respectively. No stain was found with petroleum ether extract. N-hexane: Ethyl acetate: acetic acid. (2.5:2:0.5) TLC of ethyl acetate extract of *Alangium salvifolium* seeds showed the presence of 4 stains with R_f value of 0.86, 0.88, 0.91 and 0.93 respectively with ethanol extract by same solvent showed 2 spots having R_f value of 0.84, 0.88 Respectively. With petroleum ether extract shows 1 spot having R_f value 0.84.

Discussion

The result of the preliminary phytochemical screening of the extract showed the presence of the tested constituents alkaloids, flavonoids, phenol and terpenoids. These constituents are responsible for most of the pharmacological activities of the plants. In the present study, phytochemical screening of all extracts showed the presence of secondary metabolites. A mixture of solvents with different polarity in different ratios can be used to separate the pure compound from the plant extract. The proper selection of the solvent is the most important. Important aspect in the separation of the

components. The selection of a suitable solvent system for a particular plant extract can only be achieved by analyzing the R_f values of compounds in different solvent systems. This difference in R_f values provides a very important clue for understanding their polarity and also helps in selecting a suitable solvent system for separation of pure compounds. A compound is soluble in the solvent in which it migrates upward. TLC profiling of all three extracts gives Impressive results, the profiling of TLC give impressive result that directing towards the presence of number of phytochemical. Various phytochemical gives different R_f value in different solvent system. This variation in R_f value of phytochemical provides clue indicating the presence of a range of phytochemical It was observed that among all three solvents.

Conclusion

Seening the result of phytochemical analysis it can be concluded that The Herbal plant *Alangium salvifolium* an excellent source of many secondary metabolites of medicinal plant that can be used in traditional medicine to treat disease. Further detailed isolation and characterization of active constituents of *Alangium salvifolium* is ongoing.

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