

PHARMACOGNOSTICAL AND PHYTOCHEMICAL SCREENING, TLC OF AILANTHUS EXCELSA EXTRACTS

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ABSTRACT

This study is important and lays down parameters for standardization and authentication of medicinal plants with the help of which adulteration and substitution can be prevented. All the parameters to be evaluated for pharmacognostical study such as organoleptic characters, macroscopic study, microscopic study, powder study, and physicochemical analysis (moisture content, loss on drying, ash values, extractive values), phytochemical analysis, chromatographic studies are enlisted along with their importance.

INTRODUCTION

WHO has evolved guidelines to support the member states in their efforts to formulate national policies on traditional medicine and to study their potential usefulness including evaluation, safety, and efficacy. In India, traditional medicine is governed by the Drugs and Cosmetics Act, 1940 and the provisions of the Act are implemented by the state governments. The first Indian National Health Policy 1983 claims that India is the richest source of herbs and the drugs should be standardized. The department of AYUSH, Government of India, launched a central scheme to develop standard operating procedures for the manufacturing process to develop pharmacopoeial standards for Ayurvedic preparations. The Regulation for herbal drug products in Europe and the United States are more stringent than in India.

Plants have an almost limitless ability to synthesize substances mainly secondary metabolites, of which at least 12,000 have been isolated, a number estimated to be less than 10 % of the

total. These substances serve as plant defense molecules against predation by microorganisms, insects, and herbivores in many cases. Further, some of which may involve plant odor (terpenoids), pigmentation (tannins and quinines), and flavor (capsaicin). However, several of these molecules possess medicinal properties. *Ailanthus excelsa* (Simaroubaceae) is commonly known as Mahanimba. *Ailanthus* is a genus of trees belonging to the family of Simaroubaceae; the genus is native from East Asia south to northern Australasia. Its Hindi name is maharuk *Ailanthus excelsa* is a fast-growing tree and is extensively cultivated in many parts of India in the vicinity of villages. It is cultivated as an avenue tree for its deep shade and can be used for ant-erosion purposes. (Anonymous, 1956). *Ailanthus excelsa* is a large deciduous tree, 18-25 m tall; trunk straight, 60-80 cm in diameter; bark, light grey and smooth become grey-brown and rough on large trees, aromatic, slightly bitter. Leaves alternate, pinnately compound, large, 30-60 cm or more in length; leaflets 8-14 or more pairs, long-stalked, ovate or broadly lance-shaped from the very unequal base, 6-10 cm long, 3-5 cm wide, often curved, long-pointed, hairy gland; edges coarsely toothed and often lobed. *Ailanthus excelsa* is a plant of haven They are fast-growing trees growing to 25–45 m tall, with spreading branches and large (40–100 cm). The small yellows to greenish flowers are borne on branched panicles. They turn reddish later and eventually brown. They stay on the tree for a long time. The fruit is a samara drawn out into a long wing with the seed in the middle. The wood is finely grained and satiny. *Ailanthus excelsa* has antibacterial activity against different types of bacterial strains The stem of *Ailanthus excelsa* J. J. SHAH and A. M. BABU (Simaroubaceae) may develop vascular occlusions and gum-resin cavities in the xylem as a response to injury and infection. It has been isolated for the first time from this plant in recent years. They have paid attention, showing promising antitumor, antiviral, antimalarial, antileukemic, and antifeedant properties. The bark has been used in Asian and Australian medicine to counteract worms, excessive vaginal discharge, malaria, and asthma.

Ailanthus is a genus of tall, lofty trees, distributed in Indo-Malaya, China, Japan, and Australia. The genus is noted for its antidiarrheal and anti-dysenteric properties. Different species of the genus are *Ailanthus glandulosa* in the Malay Peninsula and China, (leaflets very coarsely toothed at the base and filaments several times exceeding the anther), *Ailanthus excelsa* in India (leaflets coarsely toothed and filaments shorter than anthers) and *Ailanthus malaria* in Indo-china (leaflets entire and filaments larger than anthers *Ailanthus excelsa* (Simaroubaceae) is commonly known as “Mahanimba” due to its resemblance with the neem tree (*Azadirachta indica*). The term *Ailanthus* is from cilantro which means “Tree of Heaven”

and is the name for one of the species in the Moluccas, while in Latin excel means tall. The plant is known by different names like the tree of heaven in English, Carducci, aralavo in Gujarati, mark, Ghoda karanji, and aakashneem, and are in Hindi, peruvagai in Tamil, and peddamanu in Telgu. It is a fast-growing tree extensively cultivated in many parts of India in the vicinity of Villages. The tree is indigenous to central and southern India and is distributed in Madhya Pradesh, Gujarat, some coastal districts of Andhra Pradesh, Ganjam, and Puri districts of Orissa. The plant is known for its high commercial and economic importance. Plants are the richest source of organic chemicals on the earth Most the medicinal plants were used in Indian traditional medicine to cure various diseases. The indigenous system of medicine namely Ayurveda, Unani, and Siddha, has existed for several centuries. In India, about seventy percent population resides in the villages and these people depend on herbal medicine to cure ailments. Nature has bestowed a rich botanical wealth with its diversity in varied topography and changed agro-climatic conditions in different parts of the country The world is looking toward India for new drugs to manage various challenging diseases because of its rich biodiversity of medicinal plants and abundance of traditional knowledge to cure different diseases.

MATERIALS AND METHODS

Chemicals

Ethyl Acetate, Chloroform, Water, Methanol Ethyl Acetate, n-Hexane, ethanol, Acetone. Ethyl alcohol chloroform and another organic solvent used obtained from my college and market Bareilly.

RESULTS AND DISCUSSION

The leaf has an acute and slightly curved apex, lanceolate shape, pinnate venation, lanceolate shape, and irregularly toothed margin. The size of the leaf is 20-30 cm long and 5-10 cm wide, respectively.

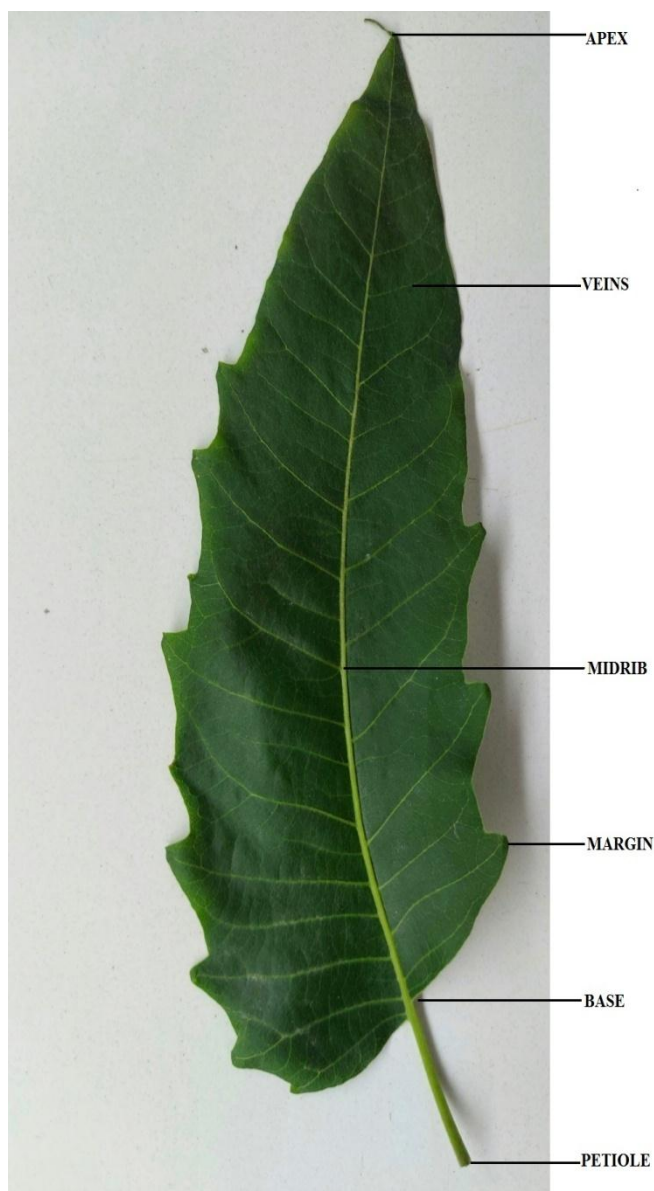


Fig. 1: Leaf of *Ailanthus excels.*

MICROSCOPIC STUDIES

Leaf microscopy

Transverse sections through the midrib showed an upper and lower, single-layered epidermis that was externally covered with a thick, striated cuticle, a few epidermal cells on both lower and upper surfaces 3 to 4 layers of sclerenchymatous cells are observed. Parenchymatous cells that were thin-walled and isodiametric to circular. Intracellular spaces were present in ground tissue and composed of collateral and open vascular bundles. The xylem consisted mostly of vessels and tracheids, and a strip of cambium was present between the xylem and phloem tissues. Pericyclic fibers were also present along with the phloem and parenchymatous zone. The lamina, which was dorsiventral with the mesophyll, was

differentiated into a palisade and spongy tissue. The upper and lower epidermises were covered externally with a thick, striated cuticle. Below the upper epidermis were three rows of elongated, closely arranged, palisade parenchyma. Spongy parenchyma tissues were almost radially elongated with intracellular spaces. Central cells were irregular in shape; pericyclic fibers and vascular bundles were also present scattered in this region Lamina of *Ailanthus excelsa* leaves shows Upper epidermis, lower epidermis, rosette crystals, Palisade cells, Granular trichomes, Anomocytic stomata observed, lignified covering trichomes

Table No.: Vein islet and vein termination number.

Vein islet number	35
Vein termination number	44

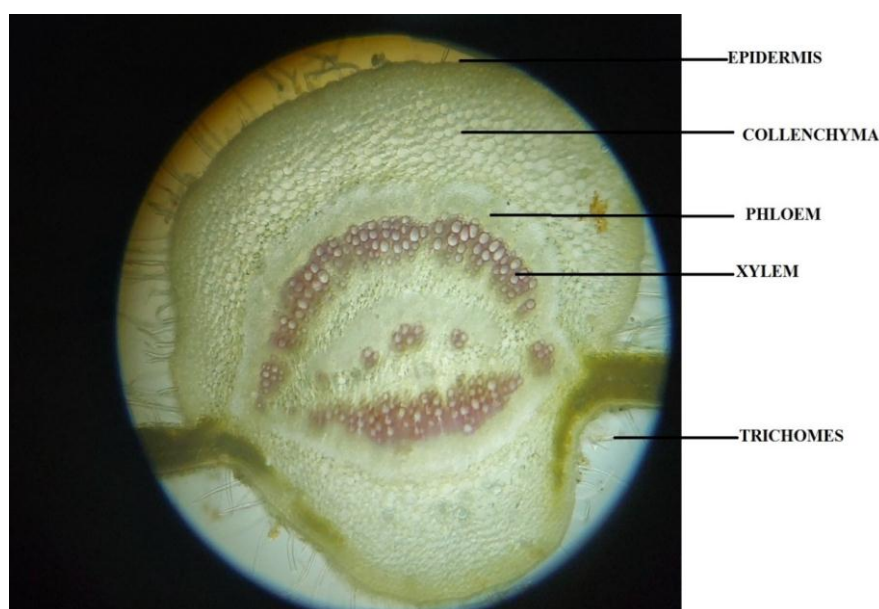


Fig. T.S views of the leaf of *Ailanthus excelsa*.

Powder microscopy

The leaves of *Ailanthus excelsa* were crushed into fine powder. The powder was then sieved out and examined by proper staining and some diagnostic characters were observed with the help of a compound microscope. ie.

Multicellular bent thick-walled covering and multicellular head and stalk glandular trichomes, cluster and rosette calcium oxalate crystals, lignified, narrow, pointed end fibers are observed.

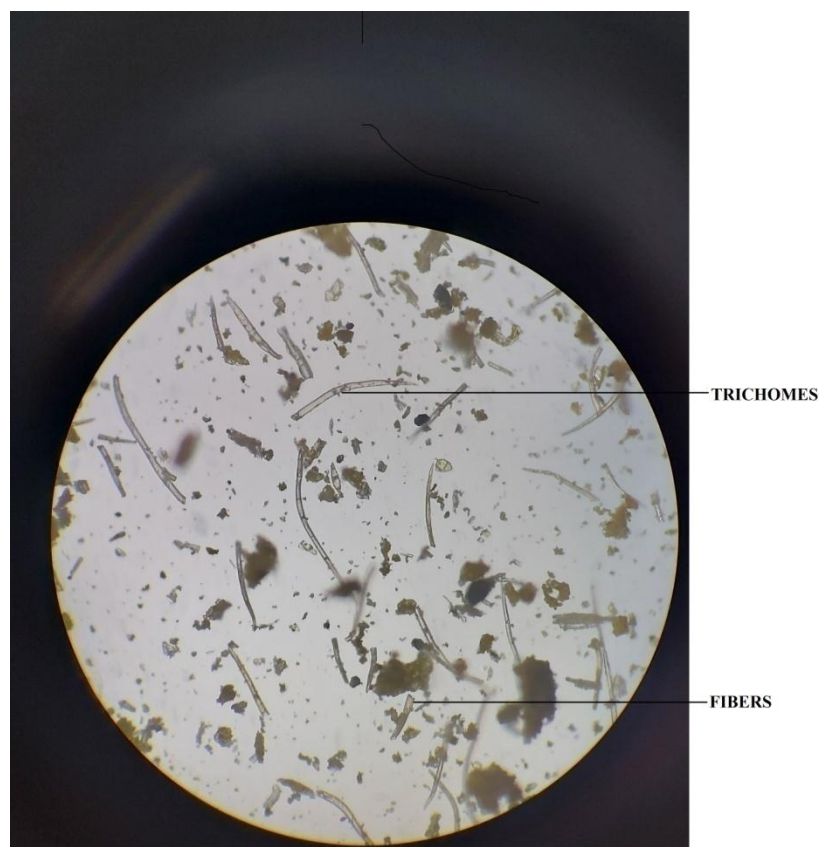


Fig. Powder Microscopy.

Powder analysis

Loss of drying

Table: % LOD of *Ailanthus excels.*

Plant part	LOD
Leaves	1.29%

Ash value

Table: Ash value of *Ailanthus excels.*

Plant part	Total ash	Acid insoluble ash	Water-soluble ash
Leaves	12.5%	10.5%	1.5%

Extractive value

Table: Ethanolic and water-soluble extractive value of *Ailanthus excels.*

Plant part	Alcohol soluble	Water-soluble
Leaves	5.75%	19%

Extraction

300 gm powder extract with hydroalcoholic solvent and yield of 23 gm extract observed.

Phytochemical studies

Table: The result of preliminary phytochemical screening revealed the presence of phytoconstituents in.

S.No.	Chemical constituents	Hydroalcoholic extract
1	Test for carbohydrate	+
2	Test for alkaloids	+
3	Test for Glycosides	++
4	Saponins	++
5	Phytosterols	+
6	Phenols	+
7	Tanin	-
8	Flavanoids	-
9	Proteins & amino acid	-

Thin Layer Chromatography

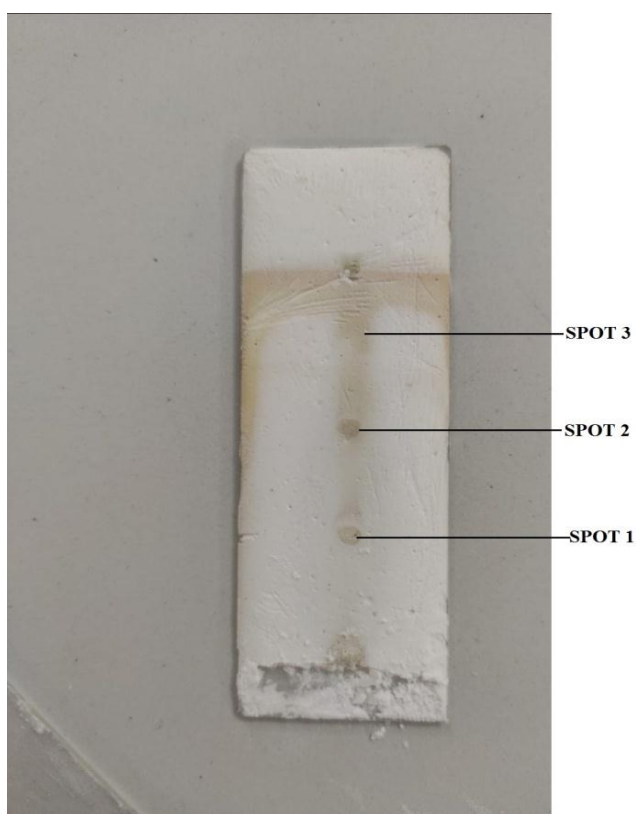


Fig. TLC profile of leaf *Ailanthus excelsa*.

Table of TLC profile of leaves of *Ailanthus excelsa* in the hydroalcoholic extract.

Extract	Solvent system	No. of Spots	Rf Value
Hydro Alcoholic	Ethyl Acetate, Chloroform, Water, Methanol (Ratio-5:3:1:1)	Spot 1 (Dark Green)	0.30
		Spot 2 (Light Green)	0.57
		Spot 3 (Brown)	0.80

CONCLUSION

Therefore, detailed macroscopic characters, microscopic characters, ash value, extractive value, LOD, and phytochemical tests were performed in the present study.

The pharmacognostic studies showed macroscopic characters i.e. acute and slightly curved apex, lanceolate shape, pinnate veinations, and irregularly toothed margin. The size of the leaf is 20-30 cm long and 5-10 cm wide.

The T.S of the leaf shows some diagnostic characteristics i.e. single layer epidermis with cuticle, multicellular and unicellular covering trichomes and a few trichomes are granular multicellular are observed, calcium oxalate crystals also observed in powder microscopy.

Ash represents inorganic matters including drugs. The present study indicates that 12.5%, acid insoluble ash 10.5%, and water-soluble ash 1.5%.

LOD of leaves powder of *Ailanthus excelsa* 1.29%. The maximum water-soluble extractive value was found to be 19% and alcohol soluble extractive value was 5.75%. The preliminary phytochemical screening revealed the presence of alkaloids, glycosides, and saponins.

The Thin Layer Chromatography was performed and three spots are observed with Rf values of 0.30, 0.57, and 0.80.

These Results are justified are the use of the plants in traditional medicine for the different diseases treatment of infections and more studies can be concluded that are plant *Ailanthus excelsa* these plants are morphology phytochemical screening and TLC And more studies of the plants.

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