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Preliminary Phytochemical Screening and Antidermatophytic Activity of *Ailanthus Excelsa* against Human Pathogenic Fungi

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ABSTRACT

Herbal remedies are very common all over the world and herbal medications are dispensed by apothecaries. Herbal remedies are seen by some as a treatment to be preferred to chemical medications which have been industrially produced. The medicinal values of plants are dictated by their phytochemical and other chemical constituents. Medicinal herbs have been an essential part of human society since the civilization started. They are boon of nature to cure a number of ailments of human beings. In the present study phytochemical screening for the presence of various phyto compounds of *Ailanthus excelsa* using Acetone Chloroform, n-Hexene & Distilled water has been carried out and was assayed for *in-vitro* antidermatophytic activity against human pathogenic fungi viz: *Microsporum gypseum* & *Trichophyton mentagrophytes.* Results obtained revealed that maximum eight phytocompounds among nine tested, has been observed in the Chloroform solvent extract followed by seven by Acetone & n-Hexene and the least six by aqueous extract. Further the antidermatophytic activity against human dermatophytes has revealed the Inhibition in the mycelial weight of test organisms, and the maximum 57.14% inhibition has been observed in the mycelial weight of *Trichophyton mentagrophytes* at 2:5 concentration ratio, whereas the maximum 34.88% inhibition ion *Microsporum gypseum* has further being observed. In the present study it has been observed that *Trichophyton mentagrophytes* is susceptible among the pathogens whereas *Microsporum gypseum* is resistant to the selected plant species extract.

Key words: Herbal remedies, Phytocompounds, Susceptible & Resistant.

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INTRODUCTION

The phytochemical research based on ethnopharmacological information is generally considered an effective approach in the discovery of new anti-infective agents from higher plants. About 20,000 plant species or 8% of the total number of plants in the world are native or grow in the Peruvian Amazonia. However, probably less than 1% has been studied for their chemical composition and medicinal use [1].

Over the past decade, medicinal and scientific knowledge on the role of various nutrients in specific disease processes has advanced at an accelerating pace and create an exciting and explosive new area of research, resulting in increasing number of potential nutritional products with medical and health benefits. The majority of these health promoting foods are from plants, hence the term phytochemicals, is often used to indicate the disease preventing compounds available from them. Plants are potent biochemicals and have been components of phytomedicine since times immemorial; man is able to obtain from them a wondrous assortment of industrial chemicals.

Plant based natural constituents can be derived from any part of the plant like bark, leaves, flowers, roots, fruits, seeds, etc [2] i.e. any part of the plant may contain active components. The beneficial medicinal effects of plant materials typically result from the combinations of secondary products present in the plant. The medicinal actions of plants are unique to particular plant species or groups are consistent with this concept as the combination of secondary products in a particular plant is taxonomically distinct [3]. Hence in the current study, the phytochemical screening & *In-vitro* antifungal activity of *Ailanthus excelsa* was carried against dermatophytic fungi i.e, *Microsporum gypseum* and *Trichophyton mentagrophytes* in order to evaluate its application in alternate medicines.

MATERIALS AND METHODS

Collection of plant material and preparation of solvent extract

The aerial part (leaves) of the *Ailanthus excelsa* Roxb., (Pl. Corom. 1: 24, t. 23. 1795) was collected early in the morning. They were cut into small pieces and were washed under running tap water, then with the distilled water, air dried and homogenized to fine powder and 25 g of this powder of plant was taken separately with 150 ml each of Acetone Chloroform, n-Hexene & Distilled water in the soxhlet apparatus which was run up to 24 – 36 hrs/ or till the green colour of the plant material disappeared. After which the extracts were collected and stored at 4^{o}C in airtight bottles till the analysis was performed.

Preliminary Phytochemical analysis [4-5]

The Phytochemical analysis for the presence of phytocompounds like Alkaloids, Tannins, Saponins, Glycosides, Phenols, Flavonoids, Anthraquinones Terpenoids, Steroids and Phlobatanins were determined by procedures methods and outlined by Trease & Evans, 1996 and Harbourne, 1998.

Preparation of Medium [6]

Sabouraud Dextrose Broth medium (SDB) was prepared by dissolving Dextrose and Peptone in the ratio 40:10 in distilled water (1000 ml), the pH of the solution was adjusted to 5.6 and then sterilized for 15 min at 15 lb pressure in an autoclave.

Microorganisms used

Microsporum gypseum & *Trichophyton mentagrophytes* were taken as experimental organisms for studying antifungal nature of the plant sample.

Antifungal Assay [7]

The Dry Mycelial weight method as described by Chandrasekaran *et al.*, 2004, was adopted for evaluating antifungal nature of selected plant extracts, during antifungal assay.

Screening for antifungal activity

The *in vitro* tests were carried out to measure the effects of the leaf extracts on mycelial growth of experimental organism. To every 25ml of sterile Sabouraud dextrose Broth medium in Erlenmeyer flasks, 5ml of the plant extract of each plant were added separately. The solution in each flask was gently swirled and was again sterilized in an Autoclave. The flasks were inoculated with 8mm inoculum-disc of each experimental organism and incubated at 28±1 °C for 10 days.

RESULTS AND DISCUSSION

Preliminary Phytochemical screening of *Ailanthus excelsa* for the presence of Phytocompounds is represented in Table 1. The table 1 depicts the presence of phytocompounds in various solvent extracts, and the maximum number of phytocompounds has been observed in Chloroform extract and reveals the presence of Alkaloids, Anthraquinones, Flavonoids, Glycosides, Phenols, Saponins, Steroids & Tannins except Terpenoids.

Whereas the presence of Alkaloids, Flavonoids, Phenols, Saponins, Steroids, Tannins & Terpenoids and Alkaloids, Anthraquinones, Flavonoids, Saponins, Steroids, Tannins & Terpenoids in Acetone & n-Hexene solvent extracts respectively. However the presence of only Alkaloids, Anthraquinones, Flavonoids, Glycosides, Steroids & Tannins in aqueous extract has

been observed.

Table 1. Preliminary Phytochemical screening of *Ailanthus excelsa* for the presence of Phytocompounds.

Phytocompound	Aqueous	Acetone	Chloroform	n- hexane
Alkaloids	+	+	+	+
Anthraquinones	+	-	+	+
Flavonoids	+	+	+	+
Glycosides	+	-	+	-
Phenols	-	+	+	-
Saponins	-	+	+	+
Steroids	+	+	+	+
Tannins	+	+	+	+
Terpenoids	-	+	-	+

Percentage inhibition in the mycelial weight of *Ailanthus excelsa against Microsporum gypseum & Trichophyton mentagrophytes* is represented in Table 2. The Table reveals the percentage inhibition in the mycelial weight of test organism. And the maximum 57.14% has been observed at 2:5 ratio against *Trichophyton mentagrophytes*, followed by 53.06% & 42.85% at 1:4 & 1:5 ratio respectively.

Table 2. Percentage inhibition in the mycelial weight of *Microsporum gypseum & Trichophyton mentagrophytes against treatment with Ailanthus excelsa.*

S. No.	Microorganism used	Conc. of plant extract/ratio	Control weight in mgs.	Treated growth in mgs.	Percentage loss/inhibition(C-T/C × 100)
1.	*Microsporum gypseum*	1:5	43	34	20.93
		1:4	43	30	30.23
		2:5	43	28	34.88
2.	*Trichophyton mentagrophytes*	1:5	49	28	42.85
		1:4	49	23	53.06
		2:5	49	21	57.14

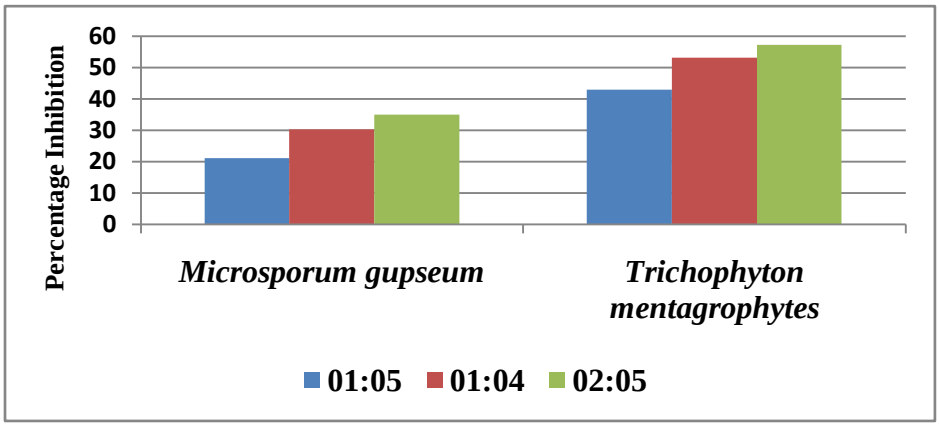

Figure 1. Percentage inhibition in the mycelial weight of Microsporum gypseum & Trichophyton mentagrophytes against treatment with Ailanthus excelsa.

Whereas the maximum 34.88% has been observed at 2:5 ratio against *Microsporum gypseum*, followed by 30.23% & 20.93% at 1:4 & 1:5 ratio respectively.

CONCLUSION

*Ailanthus excels*a is widely used in Ayurveda and evidence based phytotherapy. Several quassinoids from Simaroubaceae are designated as potent antimalarial especially against the chloroquine-resistant *Plasmodium falciparum.* The bark is employed as an anthelmintic, expectorant, antispasmodic, and antipyretic remedial. Indigenous preparations seem to be effective in the treatment of worm infections and to possess high antifertility and abortifacient activities. Moreover, antifungal and antibacterial activities were described. For instance, chloroform extracts obtained from stem barks of it showed fungistatic and fungicidal activity. In addition, the ethyl acetate fraction from the dried stem bark of this plant inhibits the growth of different bacterial strains, including *Bacillus subtulis, Salmonella typhi, Pseudomonas aeruginosa, Escherichia coli* and *Pseudomonas cichorii* [8]. In the present study the antifungal activity of the plant has been validated and may be used in specific herbal formulation in treating various skin diseases due to dermatophytic fungi after adequate lab testing.

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