

PREPARATION AND EVALUATION OF ANTIFUNGAL CREAM OF *AILANTHUS EXCELSA*

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ABSTRACT

Mahadung and Mahanimb are popular names for *Ailanthus excelsa* (Simaroubiaceae). The vast *Ailanthus excelsa* tree, which originated in China, is referred to as the "Tree of Heaven." It is used as an antispasmodic, bronchodilator, gout, rheumatism, dysentery, asthma, and bronchodilator. astringent, diabetes, cancer, appetizer colic pain, cough, and refrigerant. Additionally, the extract has strong antibacterial and antifungal properties and is used to treat wounds and skin eruptions. A mechanical grinder was used to powder the dried material. Maceration extraction will be used to remove the powder. Ethanol and water (hydroalcoholic 70:30) were the solvents employed. Alkaloids, terpenoids, flavonoids, and quassinoids are phytochemicals. Numerous recognized pharmacological actions, such as antifungal, anti-inflammatory, antibacterial, and antiasthmatic effects, are caused by these substances. Lecithin, cetostearyl alcohol, liquid paraffin, water, glycerine, methyl paraben, and propyl paraben extract were added in different amounts (e.g., 2%, 4%, 10%, 15%) to create a cream basis. *Ailanthus excelsa* extract was used in this work to formulate a herbal antifungal cream. To make sure the formulation was suitable for topical application, physicochemical characteristics including pH, appearance, viscosity, spreadability, and skin irritation potential were assessed.

KEYWORDS: *Ailanthus excelsa*, Herbal antifungal cream, Maceration, Hydroalcoholic extract, Phytochemicals, Antifungal activity.

INTRODUCTION

Oil in water (o/w) or water in oil (w/o) semisolid emulsions that are meant for external application are referred to as creams.^[1] Cream is categorized as an emulsion of water and oil. Its primary function is to stay at the application site for an extended amount of time. It is applied to the outside or superficial portion of the skin. A skin cream's purpose is to shield the skin from various environmental factors and weather conditions while also providing a calming effect. Cleansing, cold, foundation, vanishing, night, massage, hand, and body creams are among the several kinds.^[2] For millennia, people have used herbal creams as natural treatments for a variety of skin conditions and cosmetic needs. Herbal creams, which are made from plant-based substances, provide a comprehensive approach to skincare by utilizing the healing qualities of botanical extracts to feed, shield, and revitalize the skin.^[3]

AILANTHUS EXCELSA

Mahadung and Mahanimb are popular names for *Ailanthus excelsa* (Simaroubiaceae). Known as the "Tree of Heaven," *Ailanthus excelsa* is a vast tree that originated in China. This plant's many components are frequently utilized in traditional medicine to treat a wide range of illnesses.^[4] It is indigenous to India. This hardwood tree may grow up to 35 meters in height and 90 centimeters in diameter.^[5] It is used as an antispasmodic, bronchodilator, gout, rheumatism, asthma, dysentery, and bronchodilator. astringent, diabetes, cancer, appetizer colic pain, cough, and refrigerant.^[6]

Additionally, the extract has strong antibacterial and antifungal properties and is used to treat wounds and skin eruptions.^[7]

- **Botanical Name:** *Ailanthus excelsa*
- **Kingdom:** *Plantae*
- **Family:** Simaroubaceae
- **Genus:** *Ailanthus*
- **Species:** *A. excelsa*
- **Order:** Sapindales
- **Common Names:** Tree of Heaven, Mahadung, Maharukh, Mahanimb, Aralu.^[8]
- Alkaloids, terpenoids, flavonoids, and quassinoids are examples of phytochemicals. Numerous recognized pharmacological actions, such as antifungal,^[9] anti-inflammatory, antibacterial, and antiasthmatic effects, are caused by these substances.



Ailanthus excelsa leaves

FUNGAL INFECTION

Among all the microorganisms that may infect humans, fungal diseases are among the least studied and comprehended. However, given that fungal illnesses kill nearly 2 million people each year and injure billions more, their total impact on human health is startling.^[10] A fungal infection is a condition that affects the skin, nails, hair, or internal organs that is brought on by fungus entering and growing within the body.^[11,12] It can be severe, particularly in those with compromised immune systems, or moderate, like athlete's foot.^[13]

METHODS AND MATERIALS

Plant assembling and Authentication: We gathered fresh *Ailanthus excelsa* leaves at the Jaipur National University SADTM Campus in Jaipur, Rajasthan.

Drying and preparing the crude medicine for extraction: After being cleaned with fresh water, the verified leaves were left to dry for 15 to 20 days in the sun's shade. A mechanical grinder was used to coarsely ground the dried plant leaves. For later usage, the powder was kept in an airtight container.^[14,15]



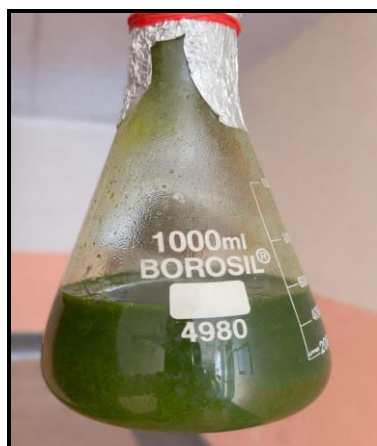
Drying of leaves.



Weighing of grind powder.

Filtration and Extraction

The gathered plant material was cleaned and allowed to dry in the shade for ten to fifteen days. A mechanical grinder was used to powder the dried material. Maceration extraction will be used to remove the powder. Ethanol and water (hydroalcoholic 70:30) were the solvents to be used.^[16]



Maceration



Filtration



Extract

Preliminary Phytochemical Screening

The extract was subjected to qualitative phytochemical tests to identify: Alkaloids, Flavonoids, Tannins, Saponins.^[17]

Evaluation test Preliminary Phytochemical Analysis of *Ailanthus excelsa*

Sr. No.	Test	Result	Inference
01.	Alkaloid Test: filtrate was treated with few drops of mayer reagent (potassium mercuric iodide). ^[18]	yellow cream colour precipitate	Alkaloid present
02.	Flavonoid Test: ^[19] 1ml of the extract & 2ml of ammonia solution Was added	yellow colour	Flavonoid present
03.	Tennin Test: ^[20] 2ml of extract treated with 10% ferric solution & shake vigorously	observe the blue or greenish colour	Tannin present
04.	Saponin Test: ^[21] take 5 ml test solution & 15-20 ml distilled water in a measuring cylinder shake vigorously for 15-30 sec	positive present foam layer that last <15 min	Saponin present



Phytochemical analysis

The extract's in vitro antifungal activity

- Aspergillus niger is the kind of fungus.
- The Agar Well Diffusion Method was used.
- Different concentrations of extract solutions were made.
- The zone of inhibition was quantified and contrasted.
- The extract's antifungal potential was validated by the results.^[7]



Agar Well Diffusion Method

Cream Formulation and Development:^[22,23,24,25,26,27]

- A cream base was made with:
- Oil phase: liquid paraffin, cetostearyl alcohol, and lecithin
- Water, glycerine, methyl, and propyl parabens are in the aqueous phase.
- Different concentrations of extract (e.g., 2%, 4%, 10%, 15%)

Procedure:^[28]

1. Weigh each component according to its quantity.
2. An oily phase that contains lipophilic compounds, such as lecithin,^[29] cetostearyl alcohol,^[30] and liquid paraffin.^[31]
3. A hydrophilic material in an aqueous phase (water, glycerin,^[32] preservative.^[33,34]).
4. They were heated individually at 60°C in a water bath.
5. 5. Until the mixture congealed at room temperature, the aqueous phase was progressively added to the oily phase while continuously stirring.

The extract was applied to the final cream. Finally, the perfuming agent will be used to create a pleasing scent.

Formulation of cream

INGREDIENT	(F1)	(F2)	(F3)	(F4)	ROLE
Lecithin	0.3 g	0.3 g	0.3 g	0.3 g	Emulsifier
Cetostearyl alcohol	0.2 g	0.2 g	0.2 g	0.2 g	Stabilizer
Liquid paraffin	0.7 g	0.7 g	0.7 g	0.7 g	Emollient
Glycerin	0.5 g	0.5 g	0.5 g	0.5 g	Humectant
Methyl paraben	0.02 g	0.02 g	0.02 g	0.02 g	Preservative
Propyl paraben	0.005 g	0.005 g	0.005 g	0.005 g	Preservative
<i>Ailanthus excelsa</i>	2%	4%	10%	15%	Antifungal
Distilled water	q.s	q.s	q.s	q.s	Vehicle

Preparation of cream





Post- Formulation Evaluation of cream:^[35,36,37] The prepared formulation will be assessed for: Physical appearance: The cream's colour, smell, pearsence, roughness, and grading were used to assess its appearance.

pH measurement: A standard buffer solution was used to calibrate the pH meter. A digital pH meter was used to measure the pH of about 0.5 grams of cream that had been weighed and dissolved in 50 milliliters of distilled water.



Determination of pH

Viscosity: The formulation's viscosity was measured using a Brookfield or Ostwald viscometer at 100 RPM with spindle number 7 at 25°C. The average of the three readings was noted after the measurements were taken in triplicate.



Determination of Viscosity

Spread ability: The degree to which the topical treatment spreads when applied to the skin's afflicted areas can be used to describe spread ability. The spreading value of the formulation also affects its medicinal efficacy. A 2-gram sample was sandwiched between two glass slides, and they were squeezed together for five minutes with a 1000-gram weight to create a uniformly thick film. After adding 10 grams of weight to the pan, the top plate was pulled using a thread that was fastened to the hook. The time it takes for the upper glass slide to travel 10 cm across the lower plate is noted. The following formula may be used to determine the spreadability(S):

$$S = m \times L/T$$

S - spreadability,

m -weight attached to the top glass slide,

L- for length moved on a glass slide, and

T- for time taken.

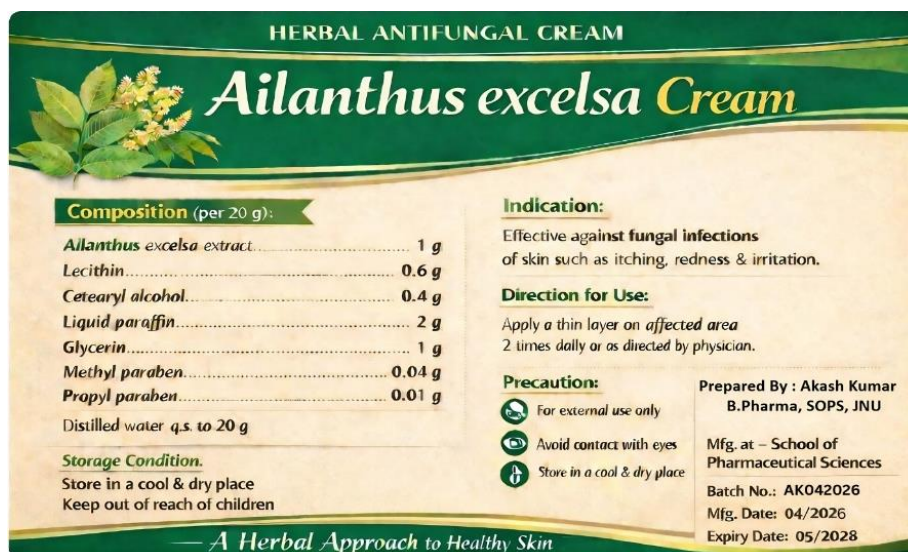
$$50 \times 5.50 \div 60 = 4.58 \text{ gm/sec}$$

Washability: To test the washability of the cream, a tiny amount was applied to the hand and then rinsed with tap water. This implies that the creams have strong rinse-off qualities, which is crucial for comfort and ease.

Testing for irritation: A 1 cm² area was marked on the dorsal surface of the left hand. The cream was gently applied to ensure uniform coverage, and the application time was meticulously recorded for accurate assessment. Any indications of irritating effects, erythema, or edema were closely monitored and reported after intervals of up to 24 hours. On the dorsal surface of the left hand, mark the region. This test aids in determining whether the cream formulation may cause skin irritation or sensitivity.^[8]

Phase separation: The prepared cream was stored away from light in a covered container between 25 and 100 °C. Phase separation was then examined for 24 hours throughout the course of 30 days. Any alteration in the phase separation was noted and verified. The results showed that there was no phase separation in any of the formulations.

Labelled Container: "labelling" refers to any labels and other written, printed, or graphic material on an item's immediate container as well as on or in any package or wrapper that it is encased in, with the exception of outside shipping containers. The portion of the labelling on the immediate container is referred to as the "label."^[38]



Labelling.



Final Product.

RESULT

Preliminary Phytochemical Analysis

Preliminary phytochemical test of *Ailanthus excelsa* Leaves

Sr. No.	Phyto-constituents	Name of the test	<i>Ailanthus excelsa</i> ethanolic leaves Extract
01.	Alkaloid	Mayer's reagent	+
02.	Flavonoid	Ammonia solution	+
03.	Tennin	Ferric chloride solution (10%)	+
04.	Saponin	Distilled water	+
('+' for Present)			

Post-Formulation Evaluation of Cream

Evaluation test	F1	F2	F3	F4
Physical appearance	Smooth	Smooth	Smooth	Smooth
pH	5.12	5.15	5.08	5.10
Viscosity	11000 cps(centipoise)	10000	90625	120400
Spread ability	Good	Good	Good	Good
Washability	Easy	Easy	Easy	Easy
Irritancy	No irritation	No irritation	No irritation	No irritation
Phase separation	No	No	No	No

CONCLUSION

The effective formulation and assessment of a herbal antifungal cream including *Ailanthus excelsa* extract is reported in this study. The proposed formulation's appropriate pH, viscosity, spreadability, and homogeneity were among the physicochemical characteristics that demonstrated its acceptability for topical application.

Ailanthus excelsa has medicinal potential as a natural antifungal agent, as evidenced by the produced cream's notable antifungal activity against specific fungus strains. The presence of bioactive phytoconstituents such flavonoids, tannins, and alkaloids may be responsible for the reported activity.

Additionally, the formulation demonstrated adequate stability with no appreciable changes in its physical properties, indicating acceptable compatibility between the excipients and the extract.

In an overview, the results of this investigation provide support to the possibility of a herbal cream based on *Ailanthus excelsa* as a secure, reliable, and efficient substitute for the treatment of superficial fungal infections. To confirm its effectiveness and safety in human applications, more pharmacological and clinical research is necessary.

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