



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

“Formulation And Evaluation Of Argemone Mexicana Gel For Antifungal Activity”

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ABSTRACT:

The adding frequency of fungal skin infections has led to a growing demand for natural and effective antifungal treatments. Argemone Mexicana deduced from the rhizomes of the grandiloquent nut sedge factory, is known for its potent antifungal, antimicrobial, anti-inflammatory parcels. This study aims to formulate an antifungal Gel incorporating Argemone Mexicana painting, using its remedial benefits to give a natural volition for treating common fungal skin infections, similar as athlete's bottom, ringworm, and dermatophyte- related conditions. The Gel expression consists of Argemone Mexicana as the active component, blended with a moisturizing base that includes aloe vera gel, emulsifying agents, and other skin- nutritional factors to enhance immersion and give soothing relief. The gels effectiveness is estimated grounded on its antifungal exertion, skin comity, and overall stoner experience. primary results suggest that the Argemone Mexicana painting- grounded antifungal gel provides a promising, natural result for managing fungal skin infections, offering both remedial and moisturizing benefits. farther studies are demanded to assess long- term efficacy and safety. Fungal skin infections, similar as athlete's bottom, ringworm, and candidiasis, are common dermatological conditions that frequently bear effective antifungal treatments. While synthetic antifungal gel and specifics are extensively available, there's a growing interest in natural druthers due to enterprises about side goods and long- term operation. Argemone Mexicana, generally known as Satya nashi, has long been used in traditional drug for its remedial parcels, including its potent antifungal, antimicrobial, anti-inflammatory goods. The essential oil painting uprooted from the rhizomes of Argemone Mexicana contains active composites that have been shown to inhibit the growth of colourful fungi and pathogens. This study focuses on the expression of an antifungal gel exercising Argemone Mexicana gel painting as the primary active component. The thing is to develop a cream that combines the antifungal parcels of Argemone Mexicana painting with a soothing, moisturizing base to enhance skin mending and comfort. The expression includes Argemone Mexicana as the crucial antifungal agent.

KEYWORDS : Argemone Mexicana Extraction, Antibacterial, Antifungal, Formulation, Skin Infection, Antimicrobial, Efficiency.

INTRODUCTION:

Fungal skin infections, including conditions like athlete's foot, ringworm, and candidiasis, are common dermatological issues that can cause discomfort, itching, and inflammation. While conventional antifungal treatments, such as Gel and oral medications, are widely used, concerns about their side effects and the increasing resistance to synthetic antifungal agents have led to a rising demand for natural alternatives. Argemone Mexicana, also known as Satya Nashi, is a plant traditionally used for its medicinal properties in various cultures. The oil extracted from its rhizomes has demonstrated significant antifungal, antimicrobial, and anti-inflammatory effects, making it a promising natural solution for treating skin infections.¹

This study focuses on the formulation of an antifungal Gel incorporating Argemone Mexicana Gel, aiming to provide an effective and gentle alternative to chemical-based treatments. The Gel formulation combines the antifungal properties of Argemone Mexicana Gel with skin-soothing and moisturizing ingredients like aloe vera, creating a product that not only targets fungal pathogens but also helps to relieve skin irritation and maintain hydration. This approach offers a dual-action solution: combating fungal infections while promoting skin healing and comfort. The development of this Gel has the potential to meet the growing demand for natural and safe skincare treatments, offering an effective remedy for common fungal skin conditions.²

Skin infection is the common reason for discussion in primary and in dermatological practice. Cases with skin conditions constitute about 15 of the aggregate out cases in a general sanitarium and utmost children will have a skin infection at some time. People who play close contact sports like justice, football, wrestling, rugby etc. are also susceptible, anyhow of age. It's primarily caused by aspergillus Niger, candida albicans. Ringworm is the antifungal infection of the skin in humans. Fungi are the organism that survive by feeding on shops or beast body. These fungi set up the stylish in skin that's wettish, hot and retired from the light.³

Argemone Mexicana Linn is a fantastic weed has wide spread distribution in numerous tropical and sub-tropical countries Argemone Mexicana Linn belongs to the family of Papaveraceous. Different types and effective composites were quantitatively conformed. These composites were alkaloids, flavonoids, glycosides, saponins, tannins, phenol, lignin, etc., which show themhigh efficacy by which they belong to medicinal factory order. The Argemone Mexicana Linn excerpt exerts a number of pharmacological conditionings like antioxidant exertion similar to free radical scavenging exertion of ascorbic acid 8 antimalarial exertion anti-helminthic, anti-inflammatory, crack mending, antibacterial, antifungal conditioning.^{4,5}

The ideal of this study is to screen the excerpt of Argemone Mexicana splint for antibacterial and antifungal exertion; and formulate the excerpt into transferosome gel using Carbopol 934 as gelatinizingagent.



Fig: Argemone Mexicana Plant ⁶

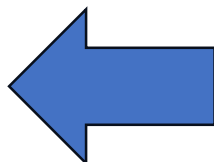
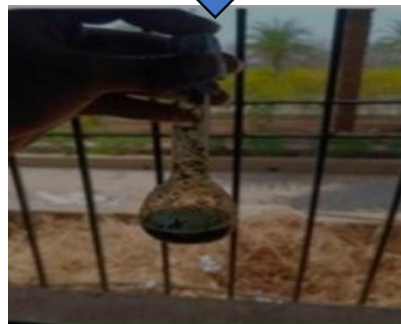
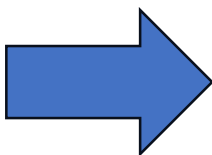
Scientific Classification	
Kingdom:	Plantae
Clade :	Tracheophytes
Clade :	Angiosperms
Clade :	Eudicots
Order :	Ranunculales
Family :	Papaveraceae
Genus :	Argemone
Species :	A.mexicana

METHODOLOGY:

Preparation OF Herbal Extract:

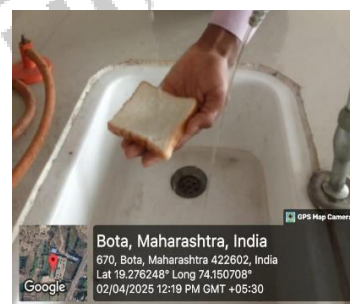
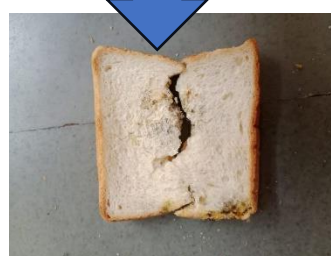
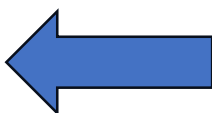
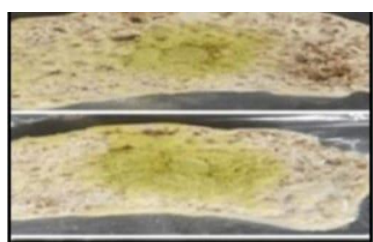
The Cold of Maceration Process Is used for Preparation of herbal extract:

1. Leaves of argemone Mexicana are collected and washed with distilled water.
2. After that leaves are shaded dried for 14 to 15 days&then powdered the dried material separately.
3. 30 gm of powdered leaves are soaked in 100 ml of 99.99% v/v ethanol and kept for maceration for about 3 to 4 days with occasional shaking.
4. After a couple of days filter the content of conical flask by using filter paper in the beaker and transfer the content into china dish.
5. Take the china dish over over the boiling water bath to evaporate the sample and dried the ethanolic content completely.
6. After drying remove the china dish from the water bath you can see the solvent is completely evaporate and ethanolic extract completely dried.
7. Then add sufficient quantity of dil.HCL to dissolve this dried residue, after dissolving the dried residue filter all the content from china dish by using the filter paper and collect the liquid extract below into the beaker.
8. Here, the extract of argemone mexicana is ready for further the test for Alkaloids.⁷

**Final Extract****Powder Extract in Ethanol**

Screening of Argemone Mexicana leaf extract for antifungal activity:

- Take a slice of bread. Sprinkle some water on both sides of bread slice.
- Place a bread slice in a container closed it and wait for 3 to 5 days.
- After 5 days we can observe cluster of tiny plants on bread slice, mould (Aspargillus) is a type of the fungi that grow on bread.
- After growing the fungus on bread add extract on the bread.
- After adding our extract of argemone mexicana wait for a 2days
- The results come after 2 days shows our extract is able to kill the fungus and having antifungal activity.⁸

**Piece Of Bread****Spraying of Water onto Bread****Antifungal Activity of Bread****Formulation of Mould**

Antifungal activity by using agar medium:-

Antifungal activity was determined by using the potato dextrose agar medium.

- The potato dextrose agar medium will be prepared according as follows: 100ml –water and agar- 2.8 gram
- After the sterilization by using autoclave these prepared agar kept for 24 hours to make sure that agar was not contaminated.
- The sterile medium 10 ml was poured into the 9 cm Petri plates.
- This medium was allow to cool in the sterile condition and allow to inoculated the with the cultural test fungi.
- Agar cup of 5 mm diameter was made in the plates with the help of sterile borers.
- Different concentrations of 20,40 and 100 mg/ml of the extracts were prepared by the stock solution made using the 1g of the extract into a measuring cylinder and make it up to 10ml of distilled water.
- Each dilution of 100µl was added into the potato dextrose agar plates where already inoculated test fungi.
- These all plates were incubated at 35°C for 1 day.
- Ketoconazole was used as an reference for determine sensitivity of each fungal species tested.
- Clearly seen the absence of fungal growth were recorded.⁹

Preparation of Argemone Mexicana leaves extract in Gel formulation:

Gel preparation:

1. **Weighing:** Weight the concentrated extract, Carbopol 934, glycerine, and tea.
2. **Dispersion:** disperse the Carbopol 934 in distilled water to form a uniform gel.
3. **Addition of extract:** Add the concentrated Argemone Mexicana extract to the gel and mix well.
4. **Addition of glycerin and TEA:** Add glycerin and TEA to the gel and mix until homogeneous.
5. **Preservation:** Add a preservative (e.g. methylparaben) to prevent microbial growth.
6. **PH Adjustment:** Adjust the PH of the gel to around 5.5-6.5 using TEA.

MODALING AND ANALYSIS:

The quantity Ingredient is shown below:

Ingredients	Formulation 1	Formulation 2	Role
Argemone Mexicana leaves extract	2 ml	4 ml	API
Carbapol 940	2.5 gm	2.5 gm	Gelling Agent
Glycerin	20 ml	20 ml	Humectant
Methylparaben	1 gm	1 gm	Preservative
Triethanolamine	15 ml	15 ml	pH Adjuster
Purified Water	Upto 100 ml	Upto 100 ml	Solvent /Base

Quality Control and Testing:

- 1. Viscosity Testing:** The viscosity of the final cream is measured using a viscometer to ensure it has the proper thickness for smooth application and spreading.
- 2. pH Measurement:** The pH of the cream is measured using a pH meter. The ideal pH for a skin Gel should be between 4.5 and 5.5, ensuring compatibility with the skin's natural pH.
- 3. Microbial Testing:** Microbial tests are performed on the final product to ensure that it is free from harmful bacteria, fungi, and other contaminants, confirming the effectiveness of the preservative system.
- 4. Stability Testing:** The Gel undergoes stability testing to determine its shelf-life, ensuring that it remains effective and safe for use over time. Samples are stored at different temperatures and humidity conditions, and periodic assessments are made on the appearance, texture, and efficacy of the product.

Evaluation of Antifungal Efficacy:

- 1. In Vitro Antifungal Testing:** The antifungal activity of the Argemone Mexicana Gel-based cream is evaluated using the agar well diffusion method. Fungal strains like *Trichophyton rubrum*, *Candida albicans*, and *Microsporum canis* are cultured, and the Gel is applied to the agar plates to observe its ability to inhibit fungal growth. The zone of inhibition is measured to assess the effectiveness of the Gel in killing or inhibiting the growth of these fungal pathogens.
- 2. Clinical Evaluation (if applicable):** A clinical trial or patch testing is performed to evaluate the gel's efficacy and safety in human subjects. A sample group of individuals with fungal infections (e.g., athlete's foot, ringworm) applies the cream for a predetermined period. Observations are made on symptoms such as itching, redness, and lesion size, along with any side effects or allergic reactions.
- 3. Skin Compatibility Testing:** Skin irritation tests (patch tests) are carried out to ensure that the cream is safe for all skin types, including sensitive skin. Any signs of irritation, redness, or allergic reactions are monitored.¹⁰

Result And Discussion:

Argemone Mexicana is an annual herb, growing up to 150cm with a slightly branched tap root. Its stem is branched and usually extremely prickly. It exudes a yellow juice when cut. It has showy yellow flowers. Leaves are thistle-like and alternate, without leaf stalks (petioles), toothed and the margins are spiny. The grey-white veins stand out against the bluish-green upper leaf surface. The stem is oblong in cross-section. Flowers are at the tips of the branches (are terminals) and solitary, yellow. Fruit is prickly oblong or ovoid capsule. The seeds are very numerous, nearly spherical, covered in a fine network of veins, brownish black and about 1mm in diameter.

Results Of the Alkaloids Tests:

Sr. No.	Test	Result
1	Drangendroffs Test	+
2	Hangers Test	+
3	Wagner's Test	+

Physical observation of gel:

Sr. No.	Parameter	Formula F1	Formula F2
1.	Color	yellowish White	Yellowish White
2.	Odor	Pleasant	Pleasant
3.	Texture	Smooth	Smooth
4.	State	Semisolid	Semisolid

Washability Test:

Sr. No.	Formulation	Washability
1	F1	Easily Washable
2	F2	Easily Washables

Sensitivity Observation Test:

Sr. No.	Formulation	Irritant Effect	Erythema	Edema
1	F1	NO	NO	NO
2	F2	NO	NO	NO

Conclusion:

In conclusion, the Argemone Mexicana-based antifungal cream demonstrates strong antifungal efficacy, excellent skin compatibility, and a favorable safety profile, making it a promising natural alternative to synthetic antifungal treatments. Its effectiveness in treating common fungal skin infections, combined with its ability to soothe and hydrate the skin, positions it as a valuable option for individuals seeking a gentle, plant-based solution for their skincare needs. The results of this study pave the way for future research and development of natural antifungal products and highlight the growing potential for plant-based treatments in the wellness industry.

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