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# Formulation and Evaluation of Argemone Maxicana Linn Leaves as Antifungal Cream

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**Abstract**: The aim of this study was to evaluate the antifungal activities of Ethanolic leaf extract of Argemone Mexicana then formulate the best extract as topical semisolid preparation (Cream). The extract were subjected to qualitative tests, by screening the phytoconstituents present in extracts, and qualitative tests by evaluation of antimicrobial activity using agar diffusion method. This evaluation of antibacterial were done against standard bacterial strain (E.colli) respectively and standard fungal strain (candida albicans) respectively. Phytochemicals screening shows the presence of Alkaloids (S-scoulerine, Berberine). The present study suggest that ethanolic leaf extract exhibit more potent than the methanolic leaf extract. Also the best formula for cream selected which confirmed all the requirement for quality control tests for product (pH, Colour, Odour, texture, Sensitivity, Homogeneity and assay)...

Keywords: Argemone Mexicana Linn, Antibacterial Activity, Antifungal Activities, Phytochemical Analysis, Cream Formulation

#### NEED OF INVESTIGATION:-

The need for investigation into antifungal creams arises from several important considerations:

1. Resistance Development

Fungi, like bacteria, can develop resistance to antifungal agents. Overuse or misuse of creams can lead to treatment failure.

Investigating resistance patterns helps in developing more effective formulations.

2. Safety and Side Effects

Long-term use or improper application can cause skin irritation, thinning, or allergic reactions. Clinical trials and safety studies are needed to ensure products are safe for all skin types.

### 3. Efficacy Against Different Fungal Species

Not all antifungal creams work equally well against all fungi (e.g., Candida, Tinea, Aspergillus). Research helps in tailoring creams to target specific infections effectively.

4. Formulation Improvements

New delivery systems (e.g., liposomal, nano-formulations) can enhance penetration and reduce side effects.

Investigations help optimize drug absorption and stability.

5. Combination Therapies

Studying the effect of combining antifungal agents with anti-inflammatory or antibacterial ingredients may provide better outcomes.

6. Treatment of Recurrent or Chronic Infections

Some fungal infections are persistent and hard to treat. Investigation can reveal more about recurrence causes and prevention.

OBJECTIVE:

To evaluate the antifungal activity of Argemone Mexicana Linn. Leaf extract and formulate it into a topical cream for the treatment of fungal infections.

The Argemone maxicana leaves is to explore their medicinal properties, particularly their ability to treat various cream including skin condition, infection, and even cancer.

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#### **I. INTRODUCTION**

Skin infection are the common reason for consultation in primary and in dermatological practice. Patients with skin diseases constitute about 15% of the total out patients in a general hospital and most children will have a skin infection at some time. People who play close contact sports like cricket, football, wrestling, rugby etc. are also susceptible, regardless of age. It is 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 plants or animal body. This fungi found the best in skin that is moist, hot and hidden form the light. Argemone Mexicana linn is a road sided plant available abundantly in all parts of India. It is belonging to the family papaveraceae and extensively distributed throughout the subtropical and tropical regions of the world. Fungi that causes skin problems mostly live in the upper top layer of the skin, dead parts of the skin, and moist areas of body, under arms and under breasts. On the other hand fungi can cause a serious infections diseases that can be more hazards. They penetrate into skin and cause itching, swelling and other such type of the symptoms to the body. Fungal infection at one place of the body can show its reaction to elsewhere for example. A person suffering from infection between toes may develop a reaction on the fingers or hands after contacting to that part. The fingers or hands after contacting to that part. The dermatophytes, Microsporum canis, trichophyton, epidermophyton are mostly responsible for such types of infectious problems. Clinical differentiation of such dermatophytes is not an easy task. To treat such diseases a special clinical care is required by a physician. This study has been designed to screen argemone Mexicana Linn. A member of family papaveraceae for its antibiotic properties and its positive effects against pathogenic bacteria and fungi. Argemone Mexicana has number of health benefits like hepatoprotective activity, antioxidant activity, analgesic activity, antibacterial and antifungal activity, anthelmintic activity, anticancer activity. The whole plant is good tonic as purative. The flowers are bitter, digestive, astringent, and stomachic. The root are useful in guinea- worm infection, skin diseases, leprosy. It possess antifungal activity and used in the treatment of fungal infection. Hence the present study was undertaken with the aim of exploring the antifungal activity of Argemone Mexicana linn.

### **DRUG PROFILE:**

• ARGMONE MEXICANA Synonym: Mexicana poopy Family:- Papaveraceae Biological Source: It is obtained from the leaves of plant Active constituent: Alkaloid berberine Chemical structure :



USES : - Argemone maxicana having the property of antifungal , wound healing. - Its anti-inflammatory properties can help reduce inflammation and microbial infection.

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### **EXCIPIENT PROFILE**

• Beeswax

Chemical Formula :- C15H31COO30H61 Chemical Structure :-



Uses :-

- Emollient: Beeswax helps to lock in moisture, soothe dry skin, and provide a protective barrier.
- Thickening agent: Beeswax can help thicken creams and lotions, improving their texture and stability.
- Emulsifier: Beeswax can help stabilize emulsions, allowing oil and water to mix together smoothly.
- 4. Moisturizing: Beeswax contains vitamin A and other nutrients that can help moisturize and nourish the skin.

#### • Borax

Chemical Formula :- Na2[B4O5(OH)4].8H2O Chemical Structure :-



Uses :-

- Borax can prevent bacterial contamination in cosmetic product.
- Borax can help to regulate ph level in formulation.
- It is also used as thickening agent improve the texture of cream.

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White soft paraffin:-Chemical Formula:- CnH2n+2 Chemical Structure :-



Uses :-

- Skin protection: White soft paraffin helps protect the skin from dryness, irritation, and cracking.
- Moisturizing: It helps keep the skin hydrated, reducing discomfort and improving skin health.
- Comfort: White soft paraffin can help reduce discomfort and pain associated with rheumatoid arthritis..

Liquid Paraffin Chemical Formula :- CnH2n+2. Chemical Structure :-



Uses :-

- It is used in treatment of dry skin.
- It works by preventing water loss from skin.
- It is a emoillent that softens skin.

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• HARD PARAFFIN Chemical Formula :- CnH2n+2. Chemical Structure :-



Uses :-

- It is used For to give the texture to the the product.
- It is also used as emollient.

#### PLAN OF WORK:

- 1) Literature Survey
- 2) Selection of Herbal drug
- 3) Determine Active Constituent of Herbal drug
- 4) Selection of Excipients
- 5) Selaction of Material and Equipments
- 6) Preparation of Formulation

### LITERATURE SURVEY:

1) Afroz Alam $\Box$  et al, (2020) Among the huge floral diversity many plants are considered wild or weed with no economical value, hence, somewhat neglected. Argemone mexicana L., is one such wildly growing weed in almost all the regions of Rajasthan. This herb can thrive well without any special attention because of its combatant genomic ability to produce defensive phytochemicals under stress conditions. These phytochemicals also have ample medicinal importance and other uses

2) Jayapal Sharath, et al, (2022) The naturally available herbs are used for medicinal purpose to promote health. The leaves of Argemone mexicana is one such herb used against different ailments. However, studies involving the characterization of different solvent extracts of the leaves and its antioxidant as well as antiandrogenic properties were limited. Aim: The present study aimed to characterize A.

3) Neha S. Nagare, et al (2023) .This herb can develop well without any special attention because of its defensive genomics ability to produce defensive phytochemicals under stress condition.Argemone Mexicana L. belonging to family papaveraceae is widely distributed plant in tropical and subtropical region of world.In India it is found on road side across field and water bodies.Argemone Mexicana L.is regarded as one of the most significant plant species in Indian traditional system of medicine.

#### 4) Mahendra S. et al, (2023)

The aim of this study was to evaluate the antifungal activities of Ethanolic leaf extract of Argemone Mexicana then formulate the best extract as topical semisolid preparation (Cream). The extract were subjected to qualitative tests, by

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screening the phytoconstituents present in extracts, and qualitative tests by evaluation of antimicrobial activity using agar diffusion method. This evaluation of antibacterial were done against standard bacterial strain (E.colli) respectively and standard fungal strain (candida albicans) respectively. Phytochemicals screening shows the presence of Alkaloids (S-scoulerine, Berberine).

### MATERIAL AND METHOD :

Preparation of Herbal Extract:

The cold maceration process is used for preparation of herbal extract:

1. Leaves of Argemone mexicana are collected and washed with distilled water.

2. After that the leaves are shade dried for 14 to 15 days, and then powdered the dried material separately.

3. 30 gm of powdered leaves are soaked in 100 ml of 99.9% v/v Ethanol, and kept for maceration for about 3  $\times$ 

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 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 is 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 paer and collect the liquid extract below into the beaker.

8. Here, the extract of argemone mexicana is ready for further the test for Alkaloids.



Test for alkaloids:

Dragendorff's test:

By adding 1 mL of Dragendorff's reagent to 2 mL of extract, an orange red precipitate was formed, indicating the presence of alkaloids.



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Hangers Test:-

2 mL of extract were treated with few drops of Hager's reagent. A yellow precipitate was formed, indicating the presence of alkoids.

Wagner's test:

Add few drops of Wagner's reagent in test tube containing 1mL of extract a brown coloured precipitate indicates the presence of alkaloids.



Preparation of Argemone Maxicana leaves extract in cream formula

First step :

Preparation of oily phase:-

Bees wax, white soft paraffin, liquid paraffin, hard paraffin and borax are accurately weighted and melted in porcelain dish by keeping in hot water bath. The temperature is maintained between 65oC-70oC. of oily phase.

Second step :

Preparation of aqueous phase:-

Water is heated and the temperature of the phase was maintained at 65-70oC.

Third step :

Development of cream formulation:-

Aqueous phase is slowly added into the oily phase at 65-70oC and mixed for 10 to 15 minutes. The prepared herbal extract is added into the above part slowly when temperature reached to 40oC and mixed until it get cold. The pH of cream is kept between 5to 7

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Fig . Formulation of Cream

### MATERIAL AND METHOD

The quantity ingredients is shown below:

SR. NO	Ingredients	Formulation 1	Formulation 2	Formulation 3
1	White soft paraffin	10gm	9gm	11gm
2	Hard paraffin	7 gm	6.5gm	8 gm
3	Bees wax	4.5 gm	3 gm	5 gm
4	Liquid paraffin	45 gm	43gm	48 gm
5	Borax	0.2 gm	0.1gm	0.2gm
6	Argemone Maxicana leaves extreact	1ml	1 ml	1 ml
7	Perfume	qs	qs	qs
8	Water	Up to 100 gm	Up to 100 gm	Up to 100 gm

### EVALUATION OF FORMULATION

Evaluation of Mexicana leaves:

Characteristics and morphology of the argemone Mexicana leaves tested visually.

Phytochemical analysis of the leaf extract:

The leaf extract of the argemone Mexicana were analysed the presence of alkaloids, reducing sugar according to standard methods.



S-scoulerine, berberine, sanguinarine is found to be the alkaloids

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Evaluation of Cream:

Quality control of finished product

Physical evaluation: Different physiological test are performed on prepared topical test visually for there color, homogeneity, consistency, spreadability and phase separation. The pH was measured in each cream, using a pH meter, which was calibrated before each use with standard buffer solutions at pH 4, 7, 9. The electrode was inserted in to the sample 10 min priors to taking the reading at room temperature. The pH of a topical preparation should be within the pH range corresponding to the pH of the skin, namely, 4.5- 6.5.

Measurement of Viscosity: The viscosity of formulated creams was measured by Brook field Viscometer LVD using spindle S 94 at varying speed and shear rates. The measurements were done over the range of speed setting from 0.10, 0.20, 0.30, 0.40 and 0.50 rpm in 60 s between two successive speeds as equilibration with the shear rate ranging from 0.20 s-1 to 1.0 s-1. Viscosity determinations were performed at room temperature. Measurements of pH:-

Measurements of PH:- The pH of the antifungal cream was determined using digital pH meter. The most accurate common method for measuring pH by using lab device called a probe and meter, or simply a pH meter. The probe consist of a glass electrode through which a small voltage is passed. The meter is voltmeter, measure the electronic impedance in the glass electrode and displays pH units instead of volts.

Formulation 1 = PH 6

### RESULT

Result of Alkaloids test

Sr.NO	Test	Result
1	Drangendoff's test	+
2	Hanger's test	+
3	Wagner's test	+

Physical Observation

Sr.No	Parameter	F1	F2	F3
1	Colour	Greenish white	Greenish white	Greenish white
2	Odour	Pleasant	Pleasant	Pleasant
3	Texture	Smooth	Smooth	Smooth
4	State			

#### RESULT

Antifungal activity of the Argemone mexicana extracts:

In the present study, alcoholic extract of Argemone mexicana leaves showed significant antimicrobial activity against some bacteria and fungi species, The results of this study suggest that alcoholic extract of Argemone mexicana may serve as an alternative to synthetic antimicrobial which might have significant applications in pharmaceutical or other industries for controlling microorganisms infections. A recent study reported the potentials of the antimicrobial activity of Argemone mexicana leaf extracts against two bacterial strains (Staphyllococcus aureus and Pseudomonas aeroginosa) and against two fungal strains (Candida albicans and Asperigellus flavus).

#### CONCLUSION:

Argemone mexicana is one species of Papaveraceae family, it has antifungal activities against many species of candida . Different concentrations of Argemone mexicana extract (ethanolic) were prepared to measure the antifungal activity against some fungi.

It can used as antifungal agent, The evaluation tests were physical tests including viscosity, pH, Spread ability, homogeneity, colour, odour, and the antifungal assay.

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### Volume 5, Issue 3, June 2025



**REFERENCE**:

[1] Aloyo A. Muinat, Aloyo A. Muinat, N Mbang (2015) Antimicrobial studies of the leaves of argemone Mexicana and its ointment. Pg.no33-40

[2] abdulkarim kaseem yehia Al Zomor (2016) Extraction , formulation and evaluation of Argemone maxicana leaves as a antimicrobial cream and ointment Volume No (5).Pg. no (37-51)

[3] Abdul Wali. Khulaidi Phd Degree, specialist on Flora and vegetation of Yemen As well as vegetation Mapping Using GIS techniques Agricultural Research and extension Authority.

[4] Bhattacharjee I., Chatterjee S.K., Chatterjee S. and Chandra G. (2006) Antibacterial potentiality of argemone Mexicana solvent extracts against some pathogenic bacteria. Memorias do Instituto Oswaldo Cruz, Pg.no (645-648).

[5] Bhardwaj M, Duhan JS, Kumar A, Surekha. (2012) Antimicrobial Potential of Argemone Mexicana : An in vitro study. Asian J Microbiology Biotechnol Environ Sci, Pg .no (353-357).

[6] Ibrahim HA. And Ibrahim H. (2009) Phytochemical screening and toxicity evaluation on the leaves of Argemone Mexicana Linn. (Papaveraceae).

[7] Kasturi, B. and Chitra, M (2014) In vitro studies of antioxidant and anti inflammation activity of Argemone Mexicana L. flower extract. International journal of medicinal chemistry and analysis, P g.no(79-82)

[8] Tripathi KD (2004) Essentials of medical pharmacology. New Delhi: Jaypee brother's medical Publisher (P) Ltd, Pg.no(167).

[9] Abhishek Gosavi (2022) Formulation and evaluation of Herbal antifungal cream by Abhishek Gosavi, Pg .no 1-4





