



FORMULATION OF ANTIFUGAL & ANTIMICROBIAL POLYHERBAL DUSTING POWDER FROM *ARGEMONE MEXICANA* L AND ITS EVALUATION.

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Abstract:

The Screening of medicinal plants for the new bioactive compounds leads to the development of new anti-microbial drugs that possess lesser cost and greater safety and efficacy. The increasing bacterial resistance exhibited by microorganisms causing skin infections has led to the research on medicinal plants. The Mexican poppy, *Argemone mexicana*, is a valuable medicinal plant with amazing therapeutic potential. In India, it is also referred to as "Satyanasi" or "Bhatkatiya." It has been used for more than 5000 years in the Indian traditional medical system of Ayurveda to treat a variety of ailments. The creation and assessment of an antibacterial polyherbal dusting powder was the primary goal of the project. The dusting powder used in this study was created. All of the components were combined in a mortar and pestle to create the dusting powder. After that, a number of parameters were assessed for the prepared dusting powder, including its physical attributes (color, odor, grittiness, appearance), solubility, Ph, and micromeritic properties (particle size, surface area, density (bulk, tapped), angle of repose, Carr's index, Hausner's ratio, and volume (bulk, tapped)).

Keywords: *Argemone Mexicana*, dusting powder, polyherbal

❖ INTRODUCTION:

Therapy with herbal drugs is an old traditional medicine. Plant have been used over the year for the treatment of numerous health problems including infections non infection skin disorders.

The anti-microbial effect of some plants were attributed the use of conventional medication is often unsatisfactory for many patients with chronic skin disorders because of adverse effects and loss of effectiveness on long term uses. Moreover, the development of drug resistant in human pathogens against commonly used. Therefore, it has become necessary to search for an alternative safe effect medicinal with little side effects.

Argemone Mexicana Linn known as prickly poppy or Ghamoya (family: Papaveraceae) is an exotic weed indigenous in South America but has widespread distribution in many tropical and subtropical countries including Asia and West Africa. This plant is common everywhere by roadsides and field in India as well.

The plant is an erect prickly annual herb of about 1 meter high, leaves usually 5 to 11 cm long and flower become 4 to 5cm in diameter. The seeds are spherical, shining, black and pitted.

❖ Taxonomical classification:

- **Kingdom:** Plantae – Plants
- **Subkingdom:** Tracheobionta – Vascular plants
- **Superdivision:** Spermatophyta – Seed plants Division:
- **Magnoliophyta** – Flowering plants
- **Class:** Magnoliopsida – Dicotyledons
- **Subclass:** Magnoliidae
- **Order:** Papaverales
- **Family:** Papaveraceae – Poppy family
- **Genus:** *Argemone L.* – prickly poppy
- **Species:** *Argemone mexicana L.* – Mexican Prickly Popp



Fig. 1 *Argemone Mexicana*

Argemone Mexicana is considered as an important medicinal plant in India. Different part of this plant are used in chronic skin disease and also as emetic, expectorant, demulcent and diuretic; the seed and seed oil are employed as a remedy for skin disease ulcers and other intestinal affections. Flowers are found to be expectorant and have been used in the treatment of cough and roots are anthelmintic and also used in skin disease, leprosy and inflammations.

Powder: A powder is a dry, uniform mixture of mostly finely divided particle matter. One of the earliest dose forms, powders can be applied externally or orally.

Dusting powder : Dusting powder is a powder that is applied to the skin or wounds, particularly to reduce irritation or absorb moisture. Typically, dusting powders are finely ground combinations of two or more chemicals meant to be applied externally to the skin (burns, wounds, surgical incisions). Powder bases act as drying agents by absorbing fluids and providing a cold sensation while also relieving congestion. For dusting powder, inert bases such as bentonite, kaolin, kieselguhr, zinc oxide, starch, and talc are utilized. Their particles range in size from 0.1 to 10 micrometers. Dusting powders are used to treat and prevent small wounds, scrapes, and burns that may cause minor skin infections. Dusting powders can also be used to treat some skin illnesses, such as ringworm, jock itch, and athlete's foot. Additionally, it soothes the discomfort brought on by these illnesses as well as skin burning, itching, and cracking.



Fig. 2 *Argemone mexicana* powder

Types : There are 2 types of dusting powder

1) **Medical** - Medical powders are used for skin diseases that are superficial. They have to be devoid of infections. Certain mineral elements need to be carefully sterilized since they may contain gas gangrene, tetanus, or other spores. As stated on the packaging, they should not be used on open wounds or areas of broken skin.

2) **surgical** - Surgical dusting powders are used to burns, bodily cavities, large wounds, and infants' umbilical cords. These powders are sterile.

Properties:

- 1) It should be homogeneous.
- 2) It should not cause local irritation.
- 3) It should flow easily and spread uniformly.
- 4) It should cling to the skin on application.
- 5) It should have absorptive and absorptive capacity.

COMPOUNDING METHODS :

- 1) Grinding
- 2) Weighing
- 3) Mixing
- 4) Wrapping

ADVANTAGES :

- Good chemical stability compared with fluids
- Easy to carry than the liquid dosage forms.
- Suitable for small children and elderly patients.
- Easy to apply over wounds • Economical
- Rapid onset of action.

Disadvantages :

- Difficult to protect powder containing gyrosopic or aromatic materials from decomposition.
- Not suitable for drugs which are unstable in normal atmospheric condition.
- Susceptible to physical instability

❖ INGREDIENT:

1) **Starch** : It functions as an adsorbent within the mixture. It is the insoluble residue that remains after an enzyme partially solubilizes granular starch. This can be used as the only ingredient or combined with other substances like talc to make dusting powder.

2) **Talc** : It is a clay mineral made of magnesium silicate that has been hydrated. Baby powder is a common term for powdered talc, which is frequently used in conjunction with corn starch. This material has lubricating and thickening properties. Additionally, it serves as an adsorbent.

3) **Kaolin** : It belongs to the class of industrial minerals and is a clay mineral. To dry or soften the skin, kaolin is used topically. It serves as an adsorbent as well.

4) **Zink oxide**: It is frequently used as a stabilizer, dusting agent, and releasing agent. It serves as a dry lubricant in dusting powders to absorb moisture and stop chafing.

5) **Argemone Mexicana**: *Argemone mexicana*, also known as prickly poppy or Mexican poppy, has been studied for its potential antifungal properties. Some research suggests that extracts from this plant exhibit antifungal activity against various fungal strains, including *Candida albicans* and *Aspergillus niger*. However, the specific mechanisms of action and the effectiveness of these extracts may vary depending on factors such as the extraction method and the concentration used. Further research is needed to fully understand and harness the antifungal potential of *Argemone Mexicana*.



Fig. A. M. Powder

Objective :

- 1) To evaluate and check the wound healing efficacy of the selected herbal drugs.
- 2) To improve patient outcomes.
- 3) To decrease patient harm.
- 4) Evaluation of dusting powder of different parameters.

Plan of work :

- Selection of drugs
 - Collection of recipients
 - Selection of procedure
 - Formulation of dusting powder
 - Evaluation of dusting powder
- a) Organoleptic characteristics
 - b) Micrometric properties

Material and methods:

Formula:

Sr.no	Ingredients	quantity
01	starch	5 gm
02	Talc	10 gm
03	kaoline	10 gm
04	<i>Argemone Mexicana</i> <i>L</i>	20 gm
05	Zink oxide	5 gm

Procedure :

1. collect the roots of the argemone mexicana and keep it for shed dry for 2 days.
2. Then after drying transfer into blender and blend well.
3. weight given quantity of ingredients mentioned in the formulae.
4. Transfer it to a clean mortal- pestle. Triturate all the ingredients until fine powder is obtained. Pass this powder through the sieve 52#.

❖ Evaluation of dusting powder:

- **Physical characteristics:** Simple visualization is used to assess the powder's color, smell, and look.
- **PH:** The formulation's acidity or basicity is gauged by its pH. The purpose of dusting powder's pH is to prevent skin irritation.
- **Particle size :** The particle size of prepared powder was determined by using microscope and sieve analysis. Abrasiveness: It was studied by rubbing the powder on a surface and then studying the effect on the surface using microscope.
- **Bulk density (BD) and tapped density:** A no. 18 sieve was used to filter the powder before it was put into a pre weighed, graduated 25 ml cylinder with markings for 0.5 ml. Following two physical taps of the cylinder on a level tabletop, the bulk volume was determined. The tap density tester was used to measure the tapped volume after tapping at 250 drops per minute in increments of 500, 750, and 1250 taps. Bulk mass / bulk volume equals bulk density. Mass of granules divided by volume of granules equals taped density
- **Angle of repose:** Angle of repose measurements can be used to study the flow characteristics of powders. The funnel method was used to determine it. The funnel was affixed to the bench at a height of 4 cm. The height of the granules creating the cone (h) and the radius (r) of the base were measured after the cone was constructed using 5 g of material. The following formula was used to get the angle of repose: $\text{Repose angle} = \tan^{-1} (h/r)$ where h is the powder cone's height r is the powder cone's radius.



Fig. 4 Angle of repos

- **Carr's index** : To determine the flow characteristics and compressibility of powders, Carr's compressibility index was computed using the bulk and tapped densities. $\text{Tap density} - \text{bulk density} / \text{tap density} * 100$ is Carr's index.
- **Hausner ratio** : It demonstrates the properties of flow. The attribute is obtained from both the tapped and bulk densities. A lower Hausner ratio denotes better granule flow, while a greater ratio denotes poorer granule flow. This formula is used to determine the Hausner ratio: $\text{Tap density} / \text{Bulk density}$ equals the Hausner ratio.
- **Moisture content** : The following formula is used to get the percentage of moisture content: $(\text{* original weight} - \text{final weight}) / \text{original weight} = \text{Moisture percentage}$.



Fig. 5 Moisture content

❖ Result and discussion:

- 1) Physical characteristic – The physical characteristic of the powder was evaluated. The color of powder was white with characteristics odour and smooth appearance.
- 2) PH of the formulation – The ph of the dusting powder was determined by digital ph meter. 1gm of powder was dissolved in 100 ml of distilled water and the ph was measured. The ph was found to be acidic.
- 3) Particle size – The particle size of the powder was found in the range was found to be 0.126 mm [126 microns].
- 4) Abrasiveness – The powder was foud to be absence of grittiness.
- 5) Bulk density – The bulk density of powder was found to be 0.35g/cm³
- 6) Tap density – The tap density of the powder found to be 0.55g/cm³
- 7) Angle of repose – The angle of repose of powder was found to be 250
- 8) Carr's index- The Carr's index of the powder was found to be 24%
- 9) Hausner index- The hausner index of the powder was found to be 1..
- 10) Moisture content- The moisture content was found to be 1%w/v

❖ Result Table

Sr. no	Evaluation test	Result
01	Physical characteristic	Smooth appearence
02	Ph	Acidic
03	Particle size	0.126mm [126micron]
04	Abrasiveness	Absence of grittiness
05	Bulk density	0.35 g/cm ³
06	Tap density	0.55 g/cm ³
07	Angle of repose	250
08	Carrs index	24%
09	Hausner ratio	1
10	Moisture content	1 % w/v

List of Equipments:

Sr. no	Instruments used
01	Grinder
02	Mortar pestle
03	Hot air oven

List of chemicals:

Sr. no	chemical
01	starch
02	talk
03	Kaoline
04	<i>Argemone mexicana</i>
05	Zinc oxide/Zinc stearate

❖ Conclusion:

polyherbal dusting powder was found to be in compliance with all properties of powder and exhibited satisfactory result. The research paper concludes that *Argemone mexicana* powder exhibits significant anti-fungal activity. Through various experimental methodologies, it was established that the powder effectively inhibits the growth of fungal strains, highlighting its potential as a natural antifungal agent. The findings suggest that *Argemone mexicana* powder could be explored further for its therapeutic applications in combating fungal infections. Additionally, the study underscores the importance of utilizing natural sources for drug discovery, particularly in the context of increasing antimicrobial resistance and the need for alternative treatment options. Further research and clinical trials are warranted to fully elucidate the mechanisms of action and assess the safety and efficacy of *Argemone mexicana* powder as a potential antifungal agent. Overall, the results contribute to the growing body of evidence supporting the use of natural products in pharmaceutical research and development, emphasizing the importance of harnessing the potential of plant-derived compounds in addressing public health challenges.

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