

EXTRACTION, FORMULATION AND EVALUATION OF ARGEMONE MEXICANA 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.

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

1. Introduction:

Plants have been used in medicines since time immemorial. India has a rich heritage of using medicinal plants in traditional medicines, as in the Ayurveda, siddha and Unani systems besides folklore practices. The plant kingdom is a virtual goldmine of biologically active compounds, and it is estimated that only 10-15% of existing species of higher plants have been surveyed. Many plants have been successfully used in the treatment of various diseases. The ancient record is evidencing their use by Indian, Chinese, Egyptian, Greek, Roman, and Syrian dates back to about 5000 years.

1.1 History of Argemone Mexicana plant and its Availability

Meaning of the name Argemone -argots means white spot, eye cataract, which the plant was believed to cure; mexicana -from Mexico. A. Mexicana has been introduced accidentally (seed Contaminant), as an ornamental or for its cultivation mainly for ethnobotanical purposes. Little is known about the history of its introduction and spread around the world. By 1814 it was the commonest weed of St Helena and was first recorded on Ascension in 1828. In New Zealand, it was accidentally introduced with imported wheat in the 1890s.

The plant was introduced to Hawaii as an ornamental and was first recorded in 1934. Type reported that the plant was still relatively uncommon and suspected that it may become problematic in the future. In the Czech Republic, it was first reported occurring in the wild in 1965,

1.2 Different Names of *Argemone Mexicana*:

Table 1: Different Nomenclature of *Argemone Mexicana*

Languages	Names
Bengali	Siyal-Kanta
Hindi	Satyanashi, Bharband
Kannada	Datturigidda
Konkani	Phirangidhuro
Malayalam	Ponnummattu
Malayalam	Khomthongpee
Marathi	Firangidhotra

Table 2: Scientific Classification:

Kingdom	Plantae
Division	Magnoliophyta
Class	MagnoliopsidaDicotyledons
Subclass	Magnoliidae
Order	Papaverales
Family	Papavaraceae
Species	<i>Argemone mexicana</i>

1.3 Botanical Description:

Argemone mexicana is an erect annual herb, rising up to 1m height with a somewhat branched tap root. Its stem is extremely prickly and generally branched, half-fastening the stem conspicuously sinuate-lobed and sharp [5].

When it is cut, it gives out a yellow juice. It bears bright yellow flowers. Its leaves are alternate and thistle-like, toothed (serrate), without petioles and spiny margins. The leaves also contain grey-white veins protruding against the bluish-green upper leaf surface area. The cross-sectional view of the stem is oblong.

Flowers are terminal, solitary and scentless of yellow colour and 2.5-5 cm diameter. Fruit is characterized as prickly with oblong or ovoid capsule. There are numerous seeds, sparkling, dark, circular, covered in a fine network of veins, with brownish black in colour with the size of about 1 mm diameter [6]

1.4 Global description:

Argemone Mexicana is an erect spiny annual or biennial herb, up to 1 m tall, with a slightly branched taproot. Its stem is branched and very prickly; it exudes a yellow juice when cut. The leaves are thistle-like and alternate, without leaf stalks, toothed and with spiny margins. The grey-white veins stand out against the bluish-green upper leaf surface. Showy solitary flowers of 2.5-5 cm diameter appear at the tips of the branches; their six rounded petals are bright yellow. The fruit is a prickly oblong or egg-shaped capsule that releases numerous small black seeds. *A. mexicana* forma *leiocarpa* is a form found in West Africa which has few or no prickles on the stem, leaves and capsule.

1.5 Habitat:

Argemone Mexicana tends to grow along roadsides, in fallow and cultivated lands, riverbanks, disturbed areas, and on floodplains. It competes with and replaces native species in some cases and is also a significant crop weed.

Plant Part Used

Whole plant, Seeds, Seed oil, Flowers, Latex, Roots, Leaves.

Morphology:



Fig No. 1 *Argemone Mexicana*

The plant is an erect prickly annual herb of about 1 m high; leaves are usually 5 to 11 cm long, and more or less blotched with green and white, glaucous broad at the base, half-clasping the stem prominently sinuate-lobed and spiny. The flowers of this plant having a 2-3 foliaceous bracts. Sepals of this 8-12 mm long and 5-7 mm broadband acute in shapes, prickly outside. Petals are 4-6 obviolate in shapes and 2.5-3.5 cm long and (1.5-)2-2.5 cm in broad and bright yellow colour. Stamens are indefinite, 8-12 mm long curved after flowering. Ovary ovate is 8-10 mm long and 3-5 mm broad covered with long soft spines. Fruits are capsules, prickly and oblong ovoid.

1.6 Morphological Characteristics:

Similar_species

Argemone mexicana differs from *A. ochroleuca* in that it has bright yellow flowers as opposed to cream or pale-yellow flowers, and globular flower buds as opposed to the egg-shaped buds of *Argemone ochroleuca*. The leaves of *A. mexicana* are green as opposed to bluish glaucous for *A. ochroleuca*.

Cotyledons

Cotyledons are linear and pale green, fleshy to acute apex, 6 cm long.

First Leaves

First leaves are simple, alternate, arranged in a rosette, green ribbed white, sessile. The blade is spatulate, attenuate at base, 6 to 8 cm long and 1 cm wide with 4 strong teeth, terminating in a short spine.



Fig No. 2 first leaves

Stem: Stem is cylindrical to oblong, smooth and pale greenish. The entire stem is covered with very short hairs and few long yellowish spines.



Fig no.3 Stem

Leaves: Leaves are simple, alternate, sessile, blue-green, thick and leathery. Blade is lobed, pinnate shape obviate, base slightly clasping, 6 to 20 cm long and 3 to 8 cm wide. Lobes oblong, convoluted, teeth ending in spines. Pinnate veins, whitish spines on smaller and less frequent, especially on the underside. Both leaf surfaces are hairless.



Fig No. 4 Leaves

Inflorescence

Inflorescence is solitary sessile, in terminal or axillary, bright yellow.

Flowers

The flowers are large, 4 to 7 cm in diameter. There are 6 round petals, bright yellow.



Fig No.5 Flower

Fruits:

Fruits are ovoid capsules, 5cm long and 2cm in diameter. It is covered by stout, yellowish spines. When ripe it opens from the apex. It is divided into five chambers, contain numerousseed.



Fig No. 6 Fruit

Seeds: Seeds are produced in large quantity, small and black, 1.7-2 mm x 1.6 mm



Fig No. 7 Seeds

1.7 Traditional uses:

A. Mexicana is extensively used in traditional system of medicine in the treatment of numerous diseases. Various parts of the plant were extensively using in Ayurveda, Siddha, Unani and Homeopathic medicines.

In Ayurveda:

The whole plant of *A. mexicana* is effective in guinea-worm infestations, purgative and diuretic. Seeds of the plant are used as an antidote in snake poisoning and also acts as an emetic, expectorant, demulcent and laxative. The protein-dissolving substances containing seed extract is used to cure warts, cold sores, cutaneous infections, itches, jaundice and dropsy¹⁷. Seeds are effective against skin infection, sores, dropsy and jaundice¹⁸. Juice of the plant cures ophthalmic and opacity of cornea. Oil of the seed is used to treat skin diseases. Roots are antihelminthic and also used in, skin diseases, leprosy and inflammations¹⁹.

In siddha medicine:

This plant is widely used to cure venereal sores, photophobia, scorpion bite, leucorrhoea. Leaves along with black pepper are used to cure diabetes. The latex of *A. mexicana* used to treat boils by topical application on the site of boils. Whole plant is used to treat dental disorders. Leaf decoction is used in the treatment of malarial fever and ulcers. Juice of the plant is applied on scorpion sting. Seeds are effective against leprosy, jaundice and dropsy.

In Unani medicine:

A. mexicana helps in the enrichment of blood which acts as an expectorant and aphrodisiac. It is also used in treating skin diseases and leucoderma²¹

In Homeopathic medicine:

The drug prepared from this plant is very effective in treating the problem caused by tape worm. The whole plant is reported to be used for the treatment of whooping cough and bronchitis.

Folkloric Uses:

- For women during parturition pains, an infusion of roots is given. It is also given for a variety of chronic skin diseases.
- In French Guinea, decoction prepared from roots or stems are given for vesicular calculus. Decoctions are also employed as an eye-wash, as a mouthwash for tooth-aches and a lotion that can be used for inflammatory conditions. It is also taken internally for gleet and the stem part is used as diuretic. Seeds are used as an emetic and cathartic agents and flowers as narcotic.
- Powdered root is used against tapeworm infection.
- In Gambia, the people use the infusion of leaves for the treatment of coughs. They are also used as narcotic and sedative drugs.
- Latex from the plant has a little corrosive property and is applied to warts, chancres, etc. and also used for eczema.
- Yellow juice of the plant is used in the treatment of jaundice, cutaneous affections and dropsy.
- It is used as a diuretic, heals excoriations, relieves blisters, and indolent ulcers and as an external application for conjunctivitis.
- In Konkani, juice is given along with milk for the treatment of leprosy.
- In Jodhpur, the obtained yellow juice from the plant is used for eye diseases and rubbed on the body to reduce rheumatic pain.
- In the West Indies, it is used as a substitute for ipecacuanha.
- Seeds are used for catarrhal infections of the throat, pertussis, cough and asthma.
- In Mexico, the plant is used as an antidote to snake venom.
- In Delhi, smoke from burning seeds is used to reduce toothaches and also, for avoiding dental caries.
- Oil of seeds is purgative, aperients and used for herpetic lesions and other skin diseases. It is also used in Delhi and Sindh on indolent ulcers and eruptions and as an external application for headaches.

1.8 Cream Formulation:

Creams are the topical preparations which can be applied on the skin. Creams are defined as “viscous liquid or semi-solid emulsions of either the oil-in-water or water-in-oil type” dosage forms which consistency varies by oil and water. Creams are used for cosmetic purposes such as cleansing, beautifying, improving appearances, protective or for therapeutic function. These topical formulations are used for the localized effect for the delivery of the drug into the underlying layer of the skin or the mucous membrane. These products are designed to be used topically for the better site specific delivery of the drug into the skin for skin disorders. Creams are considered as a pharmaceutical product as they are prepared based on techniques developed in the pharmaceutical industry; unmediated and medicated creams are highly used for the treatment of various skin conditions or dermatomes. Creams can be ayurvedic, herbal or allopathic which are used by people according to their needs for their skin conditions. They contain one or more drug substances dissolved or dispersed in a suitable base. Creams may be classified as o/w or w/o type of emulsion on the basis of phases. The term ‘cream’ has been traditionally applied to semisolid formulated as either water-in-oil (cold cream) or oil-in-water (Vanishing cream).

Anatomy of Skin The skin is the largest organ of the body, accounting for regarding 15% of the overall weight. It performs several very important functions, together with protection against external physical, chemical, and biological assailants, similarly as prevention of excess water loss from the body and a role in thermoregulation. The skin is continuous, with the mucous membranes lining the body's surface.^[8] The system is made by the skin and its by-product structures. The skin composed of three layers: the epidermis, the dermis, and

subcutaneous tissue. The outermost level, the epidermis, consists of a selected constellation of cells called keratinocytes that perform to synthesize albuminoidal, along, threadlike super molecule with a protecting role. The middle layer, the dermis, is fundamentally made up of the febrile structural protein known as collagen. The dermis lies on the connective tissue tissue, orpanicles, that contains tiny lobes of fat cells called lymphocytes. The thickness of those layers varies significantly, betting on the geographic location on the anatomy of the body. The eyelid, for instance, has the thinnest layer of the epidermis, measure but 0.1 mm, whereas the thickest stratum layer, measure approximately 1.5mm. The dermis is thickest on overlying epidermis, wherever it's 30–40 times as thick because the suprajacent epidermis

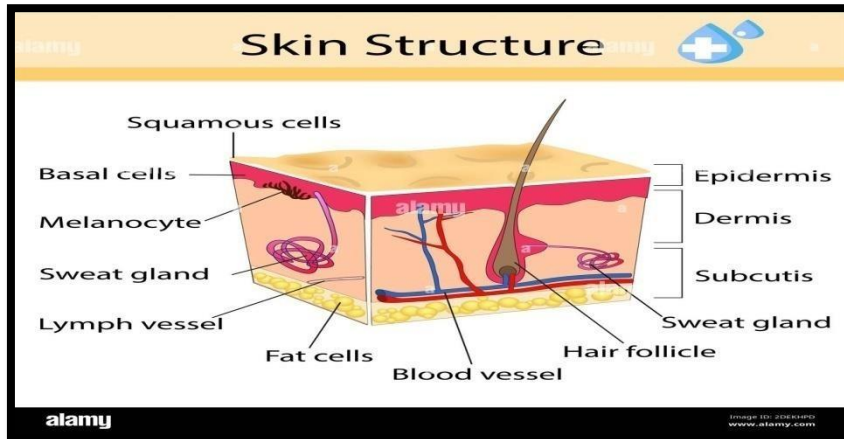


Fig No : 8 Structure of skin

Types of skin

1. Epidermis
2. Dermis
3. Subcutaneous

Table No: 5.1

Languages	Names
Bengali	Siyal-Kanjta
Hindi	Satyanashi, Bharband
Kannada	Datturigidda
Konkani	Phirangidhutro
Malayalam	Ponnummattu
Malayalam	Khomthongpee
Marathi	Firangidhotra

Traditional uses:

A. Mexicana is extensively used in traditional system of medicine in the treatment of numerous diseases. Various parts of the plant were extensively using in Ayurveda, Siddha, Unani and Homeopathic medicines.

5.2. White Soft Paraffin

Petroleum jelly, petrolatum, white petrolatum, soft paraffin, or multi-hydrocarbon, CAS number 8009-03-8, is a semi-solid mixture of hydrocarbons (with carbon numbers mainly higher than 25), originally promoted as a topical ointment for its healing properties. Vaseline has been an American brand of petroleum jelly since 1870.

After petroleum jelly became a medicine-chest staple, consumers began to use it for cosmetic purposes and for many ailments including toenail fungus, genital rashes (non-STI), nosebleeds, diaper rash, and common colds. Its folkloric medicinal value as a "cure-all" has since been limited by a better scientific understanding of appropriate and inappropriate uses. It is recognized by the U.S. Food and Drug Administration (FDA) as an approved over-the-counter (OTC) skin protectant and remains widely used in cosmetic skin care, where it is often loosely referred to as mineral oil.

Physical Properties:

Petroleum jelly is a mixture of hydrocarbons, with a melting point that depends on the exact proportions. The melting point is typically between 40 and 70 °C (105 and 160 °F). It is flammable only when heated to liquid; then the fumes will light, not the liquid itself, so a wick material is needed to ignite petroleum jelly. It is colourless (or of a pale yellow color when not highly distilled), translucent, and devoid of taste and smell when pure. It does not oxidize on exposure to the air and is not readily acted on by chemical reagents. It is insoluble in water.

It is soluble in dichloromethane, chloroform, benzene, diethyl ether, carbon disulfide and turpentine. Petroleum jelly is slightly soluble in alcohol. It acts as a plasticizer on polypropylene (PP) but is compatible with most other plastic. It is a semi-solid, in that it holds its shape indefinitely like a solid, but it can be forced to take the shape of its container without breaking apart, like a liquid, though it does not flow on its own. At room temperature, it has 20.9% solid fat content. Its partially crystalline stacks of lamellar sheets, which immobilize the liquid portion, make up its microstructure. In general, only 7–13% of it is made up of high molecular weight paraffins, 30–45% of smaller paraffins, and 48–60% of small paraffins.

Depending on the specific application of petroleum jelly, it may be USP, B.P., or Ph. Eur. grade. This pertains to the processing and handling of the petroleum jelly so it is suitable for medicinal and personal-care applications.

Uses: Petroleum jelly has lubricating and coating properties, including use on dry lips and dry skin. Below are some examples of the uses of petroleum jelly.



Fig No.5.7: White soft Paraffin

5.3 Bees Wax:

Beeswax (also known as **cero alba**) is a natural wax produced by honey bees of the genus *Apis*. The wax is formed into scales by eight wax-producing glands in the abdominal segments of worker bees, which discard it in or at the hive.

Physical Characteristics:

Beeswax is a fragrant solid at room temperature. The colors are light yellow, medium yellow, or dark brown and white. Beeswax is a tough wax formed from a mixture of several chemical compounds.

Beeswax has a relatively low melting point range of 62 to 64 °C (144 to 147 °F). If beeswax is heated above 85 °C (185 °F) discoloration occurs.

The flash point of beeswax is 204.4 °C (400 °F).

When natural beeswax is cold, it is brittle, and its fracture is dry and granular. At room temperature (conventionally taken as about 20 °C (68 °F)), it is tenacious and it softens further at human body temperature (37 °C (99 °F)).

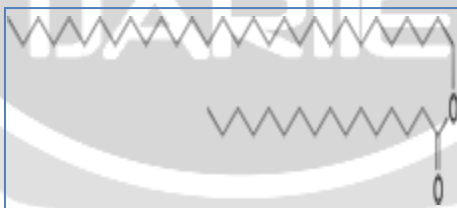


Fig No 5.8: Structure of Triacontanyl

Chemical Composition:

An approximate chemical formula for beeswax is $C_{15}H_{31}COOC_{30}H_{61}$. Its main constituents palmitate, palmitoleate are, and oleate esters of long-chain (30–32 carbons) aliphatic alcohols, with the ratio of triacontanyl palmitate $CH_3(CH_2)_{29}O-CO-(CH_2)_{14}CH_3$ to cerotic acid $CH_3(CH_2)_{24}COOH$, the two principal constituents, being 6:1.

Beeswax can be classified generally into European and Oriental types. The saponification value is lower (3–5) for European beeswax, and higher (8–9) for Oriental types. The analytical characterization can be done by high-temperature gas chromatography.



Fig No 5.9: Bees Wax

Uses:

- As candles - the oldest intact beeswax candles north of the Alps were found in the Alamannic graveyard of Oberflacht, Germany, dating to 6th/7th century AD
- In the manufacture of cosmetics
- As a modelling material in the lost-wax casting process, or *core perdue*
- For wax tablets used for a variety of writing purposes
- In encaustic paintings such as the Fayum mummy portraits
- In bow making
- To strengthen and preserve sewing thread, cordage, shoe laces, etc.
- As a component of sealing wax
- To strengthen and to forestall splitting and cracking of wind instrument reeds
- To form the mouthpieces of a didgeridoo, and the frets on the Philippine *kutiyapi* – atype of boat lute
- As a sealant or lubricant for bullets in cap and ball firearms
- To stabilize the military explosive Torpex – before being replaced by a petroleum-based product
- In producing Javanese *batik*
- As an ancient form of dental tooth filling
- As the joint filler in the slate bed of pool and billiard tables.

5.4 Borax:

Borax (also referred to as sodium borate, tinsel (/ˈtɪŋkəl/) and tincar (/ˈtɪŋkər/)) is a salt (ionic compound), a hydrated or anhydrous borate of sodium, with the chemical formula $\text{Na}_2\text{H}_2\text{O}_4\text{B}_4\text{O}_{17}$ (also written

as $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$ ^{[1][a]}).

It is a colourless crystalline solid that dissolves in water to make a basic solution.

It is commonly available in powder or granular form and has many industrial and household uses, including as a pesticide, as a metal soldering flux, as a component of glass, enamel, and pottery glazes, for tanning of skins and hides, for artificial aging of wood, as a preservative against wood fungus, and as a pharmaceuticals alkalinizer. In chemical laboratories, it is used as a buffering agent.^{[1][8]}

The terms tincal and tincar refer to native borax, historically mined from dry lake beds in various parts of Asia.

Physical Characteristics:

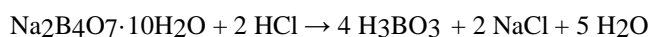
Properties	
Chemical formula	$\text{Na}_2\text{B}_4\text{O}_5(\text{OH})_4 \cdot 8\text{H}_2\text{O}$
Molar mass	$381.36 \text{ g} \cdot \text{mol}^{-1}$
Appearance	White or colorless crystalline solid
Density	1.73 g/cm^3 (decahydrate, solid) ^[2]
Melting point	$743 \text{ }^\circ\text{C}$ ($1,369 \text{ }^\circ\text{F}$; $1,016 \text{ K}$) (anhydrous) ^[2] $75 \text{ }^\circ\text{C}$ (decahydrate, decomposes) ^[2]
Boiling point	$1,575 \text{ }^\circ\text{C}$ ($2,867 \text{ }^\circ\text{F}$; $1,848 \text{ K}$) (anhydrous) ^[2]
Solubility in water	31.7 g/L ^[2]
Magnetic susceptibility (χ)	$-85.0 \cdot 10^{-6} \text{ cm}^3/\text{mol}$ (anhydrous) ^{[2]:p.4.135}
Refractive index (n_D)	$n_1=1.447$, $n_2=1.469$, $n_3=1.472$ (decahydrate) ^{[2]:p.4.13}

Chemistry:

From the chemical perspective, borax contains the $[\text{B}_4\text{O}_5(\text{OH})_4]^{2-}$ ion. In this structure, there are two four-coordinate boron centers and two three-coordinate boron centers.

It is a proton conductor at temperatures above $21 \text{ }^\circ\text{C}$. Conductivity is maximum along the *b*-axis.^[14]

Borax is also easily converted to boric acid and other borates, which have many applications. Its reaction with hydrochloric acid to form boric acid is:





Borax is sufficiently stable to find use as a primary standard for acid-base titrimetry.^{[15]:p.316}

Molten borax dissolves many metal oxides to form glasses. This property is important for its uses in metallurgy and for the borax bead test of qualitative chemical analysis.

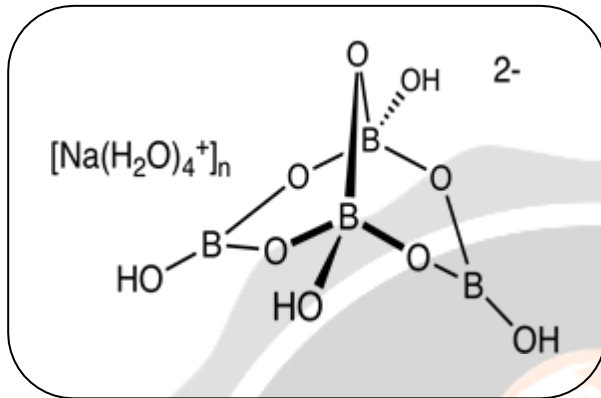


Fig No 5.10: Structure of Borax



Fig No 5.11: Image of Borax

Uses:

- Borax is used in pest control solutions.
- Borax is used in various household laundry and cleaning products
- Borate ions (commonly supplied as boric acid) are used in biochemical and chemical laboratories to make buffers, e.g. for polyacrylamide gel.
- Ingredient in enamel glazes
- Component of glass, pottery, and ceramics
- Used as an additive in ceramic slips and glazes to improve fit on wet, greenware, and bisque
- Fire retardant
- Anti-fungal compound for cellulose insulation
- Mothproofing 10% solution for wool

- Pulverized for the prevention of stubborn pests (e.g. German cockroaches) in closets, pipe and cable inlets, wall panelling gaps, and inaccessible locations where ordinary pesticides are undesirable
- Precursor for sodium perborate monohydrate that is used in detergents, as well as for boric acid and other borates
- Tackifier ingredient in casein, starch and dextrin-based adhesives

5.5 Liquid Paraffin:

Liquid paraffin, also known as paraffinum liquidum, paraffin oil, liquid paraffin oil or Russian mineral oil, is a very highly refined mineral oil used in cosmetics and medicine. Cosmetic or medicinal liquid paraffin should not be confused with the paraffin (i.e. kerosene) used as a fuel. The generic sense of paraffin meaning alkane led to regional differences for the meanings of both paraffin and paraffin oil.

History:

Petroleum is said to have been used as a medicine since 400 BC, and has been mentioned in the texts of classical writers Herodotus, Plutarch, Dioscorides, Pliny, and others. It was used extensively by early Arabians and was important in early Indian medicine. Its first use internally is attributed to Robert A. Chesebrough, who patented it in 1872 for the manufacture of a "new and useful product from petroleum".

5. Methodology:

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 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 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

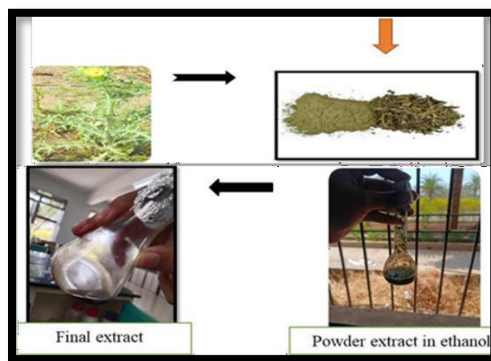


Fig No 6.1. Powder Extract in Ethanol

6.1. The quantity ingredients is shown below:

Ingredient	Formulation 1	Formulation 2	Formulation 3
White soft paraffin	10 gm	10 gm	10 gm
Hard paraffin	7 gm	7 gm	7 gm
Bees wax	4.5 gm	4.5 gm	4.5 gm
Liquid paraffin	45 gm	45 gm	45 gm
Borax	0.2 gm	0.2 gm	0.2 gm
Argemone Mecicana leaves extract	0.3 gm	0.5 gm	0.3 gm
Perfume	qs	qs	q.s.
Water	Up to 100 gm	Up to 100 gm	Up to 100 gm

7. Experimental Work:

Leaves of Argemone Mexicana are collected from plant of Argemone Mexicana and dried in shade for 15 days and powdered in the mixer. The maceration method is used for extraction when compound to be extracted has limited solubility in chosen solvent and the impurities are insoluble. Hence, is used for extraction of drug extract of Argemone Mexicana from dried leaves powder. Ethanol is used as a solvent for extraction process. Experiment of maceration Extraction method is conducted for 7 days under continuous observation of extraction process are done. Ethanol is evaporated by using water bath heating and herbal extract of Argemone Mexicana is collected. 30 gm. dried powder of Argemone Mexicana used for maceration and after this process 3 gm. of extract is given out



Fig No.7.1 Preparation of Maceration



Fig No.7.2 Extract

8. Finding Observations:

1. Physical Evaluation:

Cream was observed for colour, texture, odour, etc.

2. Irritancy :

Cream is applied to that area and note that time. After interval up to 24 hours it is checked for Irritancy, Erythema and Edema if any reported .

3. Wash Ability :

Apply a small amount of cream on the hand and wash with tap water.

4. Phase Separation:

Cream is kept in close container away from light at 25-100oC for one month and observed for phase separation

.5.Spreadability:

Spreadability is carries out for all formulations. The less time taken for separation of both slides better the spreadability.

6. Greasiness:

The cream is applied in the form of smear on the surface of skin and observed if smear is oily or greas like.

7. pH Determination :

0.5g cream was taken and dispersed in 50 ml distilled water and pH was measured by digital pH meter

8. Thermal Behaviour :

The cream is placed at -10o C for 24 hours and placed in room temperature 25oC for 24 hours for thermal stability behaviour evaluation

1. Physical Evaluation

Sr. No.	Parameter	Observation
1	colour	Green
2	odour	Pleasant
3	Texture	Smooth
4	Test	Semi solid

2. Irritancy

Mark the area (1cm²) on the left-hand dorsal surface. After that, the cream was administered there, and the duration was recorded. Then it is checked for irritancy, erythema, and edema if any for an interval up to 24 h and reported. According to the results, the formulation is showing no sign of irritancy, erythema, and edema.

3. Washability

Applying a small quantity of cream to the hand and then washing it with tap water served as the washability test.



4. Phase Separation

The prepared cream was kept in a closed container at a temperature of 25-100 °C away from light. The phase separation was then monitored for 24 hours for 30 days. Any change in the phase separation was observed/checked. According to the results, no phase separation was observed in the formulation.

5. Spreadability

The spreadability of the formulation was carried out and the time taken by the 2 slides to separate is less so as said in the description of the evaluation test. Lesser the time taken for separation of the two slides, the better the spreadability, so according to this state, better spreadability.



6. Greasiness:

Here the cream was applied on the skin surface in the form of a smear and checked if the smear was oily or greasy-like. According to the results, we can say that all three formulations were non-greasy.

7. pH:

According to the results, the pH formulation was found to be 6.71 so it can be safely used on the skin

Fig: 8.1pH Meter

8 Antifungal activity:



- Take a slice of bhakri. Sprinkle some water on both sides of bhakri slice.
- Place a bhakri slice in a container closed it and wait for 3 to 5 days.
- After 5 days we can observe cluster of tiny plants on bhakri slice, mould (Aspergillums) is a type of the fungi that grow on bhakri.
- After growing the fungus on bread add extract on the bhakri.
- After adding our extract of Argemone mexicana wait for a 2 days



Formulation of mould



Cream apply on bhakari



Fig No.6.2 Antifungal Activity on Bhakari



8. Conclusion:

Argemone Mexicana is one species of papaveraceae family, it has antifungal activities against many species of candida . Different concentrations of Argemone Mexicana extract were prepared to measure the antifungal activity against some fungi. It can used as antifungal agent, The evaluation tests were physical tests including pH, Spread ability, homogeneity, colour, odour, and the antifungal activity.

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