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''FORMULATION, EVALUATION AND PHARMACOLOGICAL PROPERTIES OF SHIAL KATA.''

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ABSTRACT

Argemone mexicana is an indigenous herb commonly known as Prickly poppy. It belongs to the family Papaveraceae. Papaveraceae family is known to have CNS depressant activity, so A. mexicana was evaluated for CNS activities. It grows as weed in almost all part of India. It's potential as a medicinal plant has been practiced traditionally and been prescribed as medicines by Ayurvedic, Unani, Siddha and Homeopathic practices since several years. It is a well-known weed in the agricultural and waste lands. Argemone mexicana is the source of a diverse kind of chemical constituents, alkaloids being most abundant. The plant consists of alkaloids, flavonoids, terpenoids, long-chain aliphatic alcohol, amino acids, carboxylic acid. It is reported to have antimicrobial Activity, wound healing property, larvicidal and, allelopathic potential, anti-malarial, antibacterial and antifungal, anti-cancer, anti-HIV and neuro-pharmacological activity. Analgesic and anti inflammatory studies of the ethanol extract of the roots of A. mexicana were studied in mice and rats respectively. Beyond pharmaceutical efficacies, certain plant parts also show toxic effects as well. Argemone Mexicana oil adulteration poses a serious threat to human health and should be checked by appropriate regulatory measures. Chemical investigations of this plant have revealed the presence of alkaloids, amino acids, phenolics and fatty acids. A. mexicana has shown promise as an effective bio-control agent. In light of these medicinal properties, this plant can be represented as a valuable source of medicinal

compound. Argemone mexicana is a plant with evidence of traditional use for skin ailments including infection, psoriasis and cancer.

KEYWORDS: Shial Kata, Protein, Non-Edible oil, Argemone Seed, Argemone Mexicana and Pale yellow.

INTRODUCTION

Argemone name was taken from the Greek word ‘argena’, sense ‘cataract of the eye. Fruit is a capsule, prickly, 2.5-4.5 cm long and 2 cm broad, amid 4-6 valves with aperture at the tip to release abundant brownish-black, nearly spherical seeds having the diameter of about 1 mm, a fine network of veins present, oily in nature (Lucas, 1962). This weed has been cultivated for its seed oil, which is specifically used at industrial scale for soap manufacture and also for fuel production (Hanelt and IPK, 2016).[1] Argemone mexicana L. (Papaveraceae) is an annual herb, grows up to 150cm in height. The stem is erect, branched, usually prickly and pale bluish-green in color. This plant is used as a medicinal plant in several countries, and for this purpose the whole plant, seeds, seed oil, flowers, latex, roots and leaves are the organs that are used in the traditional system of medicine. Edible vegetable oil either accidentally contaminated with A. mexicana or intentionally adulterated by unscrupulous traders has resulted in epidemic dropsy.[2] This plant is almost everywhere by roadsides and fields in India. It is an annual herb, with a height of about 1 m; leaves are about 5 to 11cm high, erect and spiny. The seeds are spherical and black. The flowers diameter is 4 to 5 cm, are yellow in colour and unsmelling. The capsule is spiny and 3cm length. The yellow juice has long been used astraditional medicine, for jaundice, scabies, dropsy and cutaneous afflictions in India.[3] The seeds are used as demulcent, emetic, expectorant, and laxative and also used as an antidote in snake poisoning.[4] Argemone mexicana belongs to family of Papaveraceae is commonly known as Mexican poppy or Prickly poppy. In India it is known as “Satyanasi or Bhatkatiya”.[5] The whole plant is analgesic, antispasmodic, possibly hallucinogenic and sedative (Emboden, 1979; Chevallier, 1996). It contains alkaloids similar to those in the opium poppy (Papaver somniferum) and so can be used as a mild pain-killer (Chevallier, 1996).[16] It has bright yellow latex. It is a poisonous to grazing animals, and it is rarely eaten, but it has been used medicinally by many peoples, including those in its native area as well as the indigenous people of the western United States parts of Maxico and many parts of India. In India, during the colorful festival “Holi ka Dahan”, adults and children worship by offering flowers, and third species is in its maximum flowering phase during march when the Holi

festival is celebrated. It is also reffered to as “kateli ka phool” in India. Argemone mexicana is used by traditional healers in Mali to treat malaria (Willcox ML et al., 2007), externally in the treatment of cataracts and internally in the treatment of dropsy and jaundice. The root is used for the treatment of chronic skin diseases and alterative (Chevallier A., 1996, Chopra. R. N. et al. 1986). Stem is cylindrical to rectangular, swish and pale chromatic. The complete stem is roofed with terribly short hairs and few long yellow spines.[19] Leaves and seeds are also reported to find application in maintaining normal blood circulation and cholesterol level in human body.[21] The dried leaf of this plant was used in the treatment of jaundice.[22] The plant is diuretic, purgative and destroys worms and it is also effective in wound healing (Patil etal., 2001). Ayurvedic formulations are usually prepared from root, stem, leaf, flower and fruits of medicinal plants. Various infections caused by bacteria, fungi, virus, parasite as well non-infectious metabolic disorders are effectively treated with herbal/Ayurvedic formulations.[24]

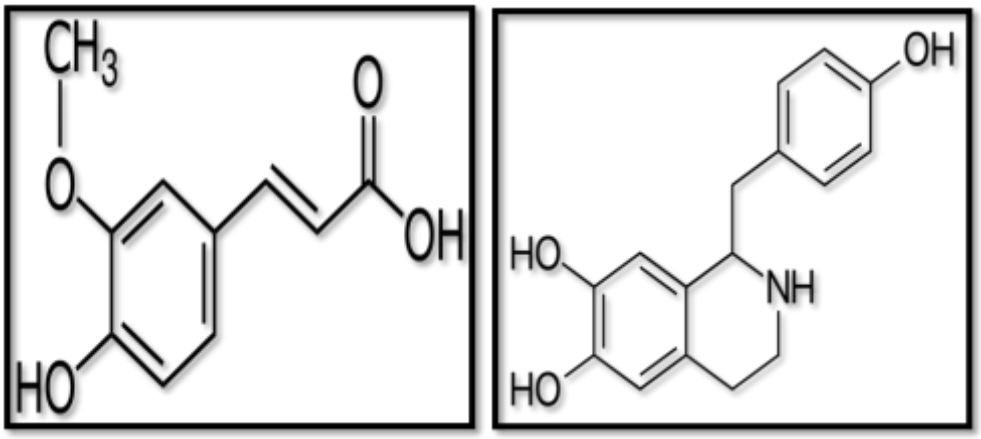
Figure No. 1: Argemone Mexicana plant.

Chemical Constituents: Seed oil otherwise called as Argemone oil reported to contain sanguinarine and dihydrosanguinarine. It also contains palmitic, myristic, oleic and linoleic acids.[6] The yellow juice containing small quantities of berberine, potassium nitrate was identified among the salts naturally existing in the plant. Two aliphatic compounds; mexicanol and mexicanic acid have been isolated from leaves. Three isoquinoline alkaloids have been isolated as dihydropalmitine hydroxide; berberine and protopine from the seeds. Oil contain up to 40% free glycerides of fatty acids. Four quaternary isoquinoline alkaloids,

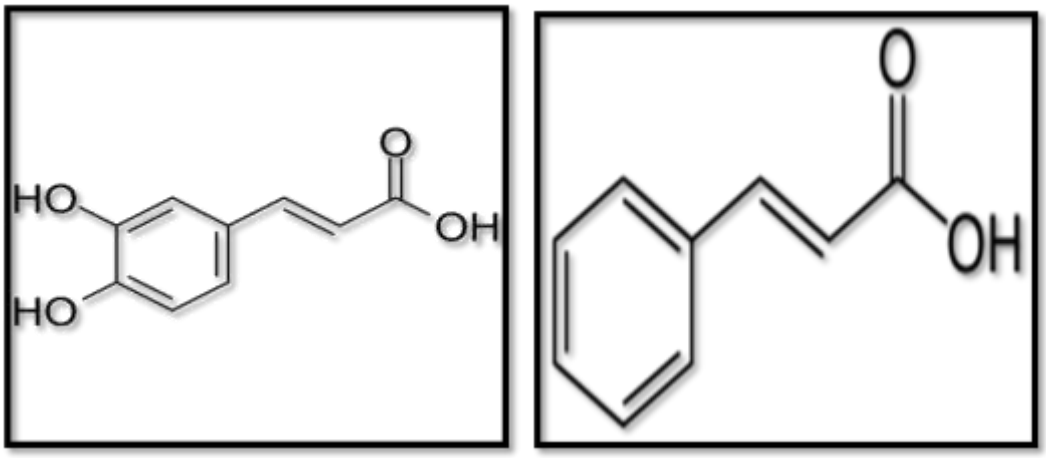
dehydrocorydalmine, jatrorrhizine, columbamine, and oxyberberine, have been isolated from the whole plant of Argemone Mexicana.[7]

Table 1: Chemical constituents of Argemone Mexicana L.

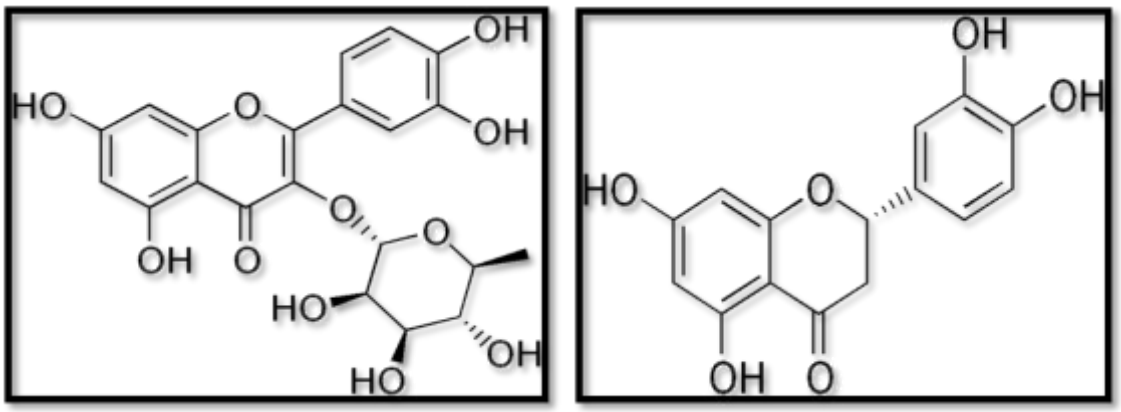
Sr. No.	Plant parts	Compund
1.	Apigeal part	Isocrydine, berberine, (+)reticuline, protopine All ocryptopines (-)cheilanthifoline and (-) Scoulerine
2.	Arial parts	-(+) reticuline, protomexicine, 13-oxoprotopine, (+) argenaxine, (+) higenamine, N-demethyloxysanguinarine and pancorine
3.	Seeds	Berberine, porotopine, sanguinarinedihydrochelerythine
4.	Whole plants	Dehydeocheilanthifoline, dehydrocorydalmine, Jatrorrhizine, Columbamine, Coptisine, Captopine Muxamine, argemexicaine, Aargemexicaine B, (+)chalanthifoline (-)stylopine, nor-chelerythrine, oxyhydrastinine, thalifoline, argemexmine, dihydrocoptisine, o-methylzanthoxyline, nor-chelerythrine, ornottianamide, angoline



Higenamine Ferulic acid



Caffeic acid Cinnamic acid



Quercitrin Eriodictyol

Fomualtion of Argemone Maxicana Cream (Shial Kata)

Figure No. 2: ***Fomualtion of Argemone Maxicana Cream.***

Medicinal Uses of Argemone Mexicana

A. Argemone Mexicana Leaves

Figure No. 3: Leaves of Argemon Mexicana.

1. Leaves along with black pepper are used to cure diabetes. Leaf decoction is used in the treatment of malarial fever and ulcers.
2. Leaves and seeds are also reported to find application in maintaining normal blood circulation and cholesterol level in human body.
3. The leaves are useful in cough, wounds, ulcer, warts, cold sores, cutaneous affections, skin diseases, itches etc.[9]
4. The leaves and stems of A. mexicana are employed to treat malaria and dropsy. They possess anti-analgesic, antispasmodic, antiparasitic, and narcotic properties with antifungal, hepatoprotective, larvicidal, and chemosterilant activities.[11]

B. Argemon Mexicana Flowers

Figure No.4: Flowers of Argemon Mexicana.

1. It is used as an infusion to relieve post-natal kidney pain.
2. It is used to trouble sleeping (insomnia) aches, nervous agitation, bed, wetting in children and diseases of the bladder and liver.
3. The flowers of A. Mexicana were tested for anticancer activity against the human hepatoma cell line.
4. The flowers are expectorant and have been used in the treatment of coughs and other chest complaints.

C. Argemone Mexicana Seeds

Figure No. 5: Seeds of Argemon Mexicana.

1. The seed oil is purgative and used in the treatment of skin problems.
2. The smoke of the seeds is use to relieve toothache.
3. The fresh yellow, milky seed extract contain protein dissolving substances effective in the treatment of diuretic, anti-inflammatory, malarial fever, leprosy, scorpion sting, and warts. Cold sores, skin disease itches jaundice and antidote to various poisons.[13]
4. The seeds have been used as an antidote to snake poisoning.[24]

D. Argemone Mexicana Roots

Figure No. 6: Roots of Argemon Mexicana.

1. The root is used for the treatment of chronic skin disease and alternative.
2. Roots are anthelmintic and also used in skin diseases, leprosy and inflammations.
3. It is used as antibacterial, cytoxicity; Wound healing, antioxidant and antifungal agent.
4. A maceration of the root is used to treat vaginal discharge and hepato-bilary problems.[9]

E. Argemone Mexicana Stem

Figure No. 7: Stem of Argemon Mexicana.

1. The stem extract of A. mexicana contained only terpenoids, flavonoids, quinines and small amounts of steroids.
2. Carbohydrates, cardiac glycosides, flavonoids, phenols, quinones, steroids, and terpenoids were detected in the ethyl acetate extract made at a low temperature.
3. The methanolic extract produced at room temperature contained high amounts of alkaloids, carbohydrates, flavonoids, phenols, quinones, saponins, steroids and terpenoids.
4. The aqueous extract prepared under this condition contained only carbohydrates, phenols, and quinines.[23]

F. Argemone Mexicana Juice/Latex

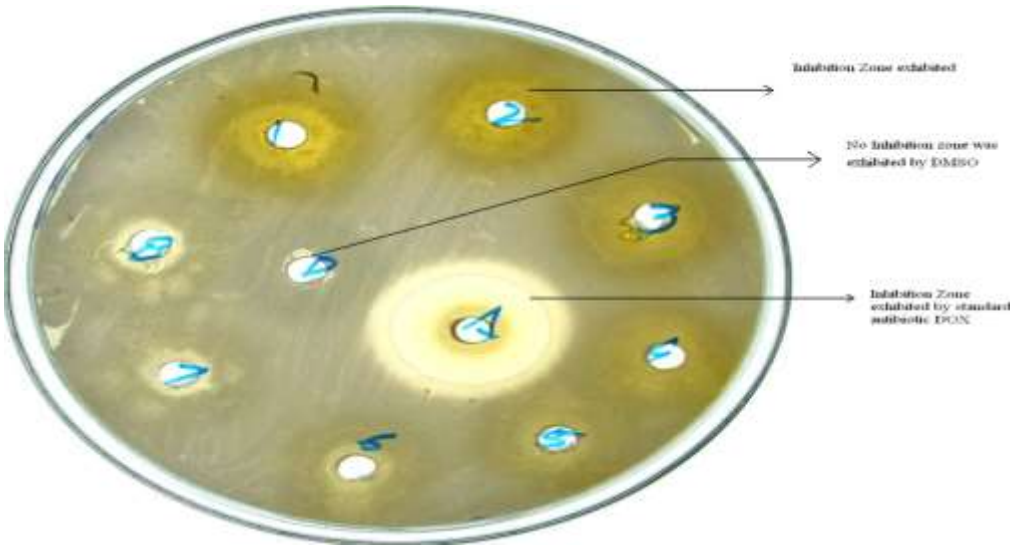


Figure No. 8: Latex/ Juice of Argemon Mexicana.

1. The latex of Argemone Mexicana used to treat boils by topical application on the site of boils.
2. Juice of plant is applied in scorpion sting.
3. The latex is considered a good woumd dressing and is also used against dermatitis.[9]
4. Latex is massaged on body to get relieve of rheumatic pain, thin liquid is applied on eye for eye infection.[15]

Useful Parts: Leaves, Seeds, Roots, Flowers, Stems and Yellow juice/Latex.

Taxonomical Classification

Sr. No.	Classification	Scientific name and Common name
1.	Kingdom	Plantae
2.	Division	Angiosperm
3.	Sub division	Eudicots
4.	Order	Ranunculales
5.	Family	Papaveraceae
6.	Genus	Argemone
7.	Species	A.mexicana

METHOD OF PREPARATION

Preparation of Argemone Maxicana leaves extract in cream formula

1. 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.

2. Preparation of aqueous phase

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

3. 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 gets cold.[26]

The Quantity Ingredients is shown below

Sr. No.	Ingredients	Formulation
1.	White soft paraffin	10 gm
2.	Hard paraffin	7 gm
3.	Bees wax	4.5 gm

4.	Liquid paraffin	4.5 gm
5.	Borax	0.2 gm
6.	Argemone Mexicana leaves Extract	1 ml
7.	Water	Up to 100gm

MATERIAL AND METHOD

Plant material and extraction

Fresh leaves were collected from young matured trees and authenticated by the taxonomists of the Botanical Survey of India, Shibpur, and Howrah. After authentication, the plant material were collected in bulk, washed under running tap water to remove adhering dirt followed by rinsing with distilled water. The plant material was then shade dried and pulverized in a mechanical grinder followed by sieving to obtain coarse powder. The powdered leaves (500 g) was successively extracted with petroleum ether (40-60^0 C), chloroform, methanol and water for 48 h in a soxhlet extractor. Following extraction, the liquid extract were concentrated under vaccum to yield dry extracts. Standard methods were used for preliminary phytochemical screening of the different extracts to know the nature of phytoconstituents present within them.[10]

PHARMACOLOGICAL PROPERTIES

Figure No. 9: Pharmacological Properties of Argemone Mexicana.

1. Antimicrobial activity

Argemone Mexicana has been a plant that has been in used since years even by the tribal for its established use an anti-microbial agent.[18] The crude methanol and aqueous extracts (hot and cold) of leaves and seeds of A. mexicana is reported to possess antimicrobial activity against multi drug resistant pathogenic bacteria (Staphylococcus aureus, Bacillus subtilis, Eschericia coli and Pseudomonas aeruginosa). Antimicrobial activity was carried out by agar well diffusion method. Methanol extract showed highest zone of inhibition for the tested organisms fallowed by hot and cold aqueous extracts.[8]

2. Antipyretic Activity

Leaves of Argemone mexicana L. (Papaveraceae) are used in the folk medicine of Burkina Faso (West Africa) to treat a variety of illness. The aqueous decoction is indicated in the treatment of malaria fever, abdominal pains, and jaundice.[7] The antipyretic potential showed by the two doses of drug extract might be attributed to the phytochemical constituents such as alkaloids, glycosides, flavonoids, phenolic compounds as tannins, saponins found in the water aqueous extract of Argemone mexicana leaves.[6]

3. Antimalerial Activity

A decoction of A. mexicana is used in many countries of the world as a traditional medicine against malaria, and even if it cannot eliminate the Plasmodium falciparum parasite, treatment with this agent is relatively successful in uncomplicated forms of the disease. Malaria is one of the major public health problems in many countries; the use of an inexpensive decoction of A. mexicana in developing countries such as Mali represents an important therapeutic tool in the fight against this disease.[12]

4. AntibacterialActivity

Crude plant extracts of A. mexicana L. as well as some of its chemical constituents were found to exhibit antimicrobial potential (Saranya et al., 2012). Rahman and his group (2009) studied in vitro antibacterial activity of the crude stems extracts (n-hexane, chloroform, ethyl acetate and ethanol) of the plant against a number of food-borne gram positive and gram negative bacteria such as Bacillus subtilis, Staphylococcus aureus, Listeria monocytogenes, Clostridium botulinum, Clostridium perfringens, Escherichia coli, Pseudomonas aeruginosa and Salmonella typhimurium.[17] Many reports have been carried out to investigate the antibacterial deyermines of Argemone Mexicana axtracts.[15]

5. Wound Healing Property

Extraction of A. mexicana shows significant result with established drug nitrofurazone.[19] Wound healing activity of different extracts of A. mexicana leaves investigated using excision, incision and dead space wound models in Wistar albino rats. Methanol extract of A. Mexicana leaves shows better and faster result in wound healing respect of petroleum ether, chloroform, and aqueous extracts of the leaves.[20] The petroleum ether, chloroform, methanol and aqueous extracts of the leaves of Argemone mexicana Linn. (Family: Papaveraceae) were evaluated for their wound healing activity in ratsusing excision (normal and infected), incision and dead space wound models respectively. The results of the study revealed that the animals treated with methanol and aqueous extracts of A. mexicana showed faster rate of wound healing compared to other extracts under study. The chloroform extract of the selected plants also produced promising results but the effects are seen to be of lesser extent than the corresponding methanol and aqueous extracts. The petroleum ether extract did not produce significant results. The wound healing effects of the chloroform, methanol and aqueous extracts may be attributed to the presence of phytoconstituents like alkaloids, triterpenoids, tannins and flavonoids in the extracts which are known to promote the wound healing process mainly due to their astringent, antioxidant and antimicrobial properties. The present work justifies the use of the leaves of A. mexicana for wound healing activity as claimed in the folklore literature.[18]

6. LarvicidalProperty

A. mexicana extract in petroleum ether at higher concentrations, after acetone fraction showed larvicidal properties and also growth restraining action in opposition to the subsequent (second) instar larvae of Aedes aegypti (Sangameswaranet al., 2004).[1]

7. Anti-HIV-1RT Activity

The anti-HIV-1RT activity of different plant extracts was determined by employing RT colorimetric assay kits (Roche, NY, USA), in accordance with the manufacturer's instruction.[11] Methanolic extracts isolated from air dried plant of argemone Mexicana was found to show anti-HIV activity against H9 Lymphocytes (Leyva-Peralta et al., 2015).[17]

8. Antifeedant Activity

It is reported that petroleum ether and aqueous leaf extracts of A. Mexicana were found to exhibit significant antifeedant activity against second stage larvae of Henosephilachna vigintiocto puncata Fabricius (Rao et al., 1990).[16]

9. Anti-Inflammatory Activity

Ethanolic extract of leaves showed significant antiinflammatory and analgesic activity at a dose of 200 mg/kg in mice. Anti-inflammatory activity may be because of isorhamnetin-3-O-β-D-glucopyanoside, β-amyrin, cysteine and phenylalanine.[3] The ethanolic extract of leaves of A. mexicana is reported to have significant anti-inflammatory and analgesic activity at a dose of 200 mg/kg in mice (Sharma et al., 2010). It is also reported that leaf extract of A. mexicana is able to show significant anti-inflammatory activity in rats; the investigators (Sukumar et al., 1984) are in opinion that the chemical constituents of the leaf extract such as isorhamnetin-3-O-β-D-glucopyanoside (70), β-amyrin (47), cysteine (66) and phenylalanine (67) might be responsible for such activity.[16]

10. Antifungal Activity

Argemone mexicana plant was dried and its powder was extracted in methanol. Antifungal activity was carried out using fungi like A. niger, Mucu species, and A. fumigates at concentrations 25, 50, 100 mg/mL. The zone of inhibition in mm is compared with a standard drug ketoconazole and it showed promising activity. A. mexicana flowers, berries and seeds was extracted in ethanol, methanol and chloroform. Antifungal activity of extracts was performed using A. niger and A. fumigates. In bioassay, highest antifungal activitywas found for ethanolic crude plant extract followed by the methanol and chloroform.[25]

Evaluation of Argemone Mexicana

1. Physical Observation

Sr. No.	Parameters	Observation
1.	Colour	White
2.	Odour	Pleasant
3.	State	Semi-solid

2. Washability Test

Sr. No.	Formulation	Washability
1.	Cream of Argemone Mexicana	Difficult to wash

3. Sensitivity Test

Sr. No.	Formulation	Sensitivity to Edema/Irritation.
1.	Cream of Argemone Mexicana	No

4. Acute oral toxicity studies

Acute oral toxicity studies of the extracts were carried out as per the OECD guidelines, draft guidelines 423.[37] Different groups of animals each containing three female rats (180–210 g)

Received A. mexicana methanol extract suspended in water separately at doses of 300, 600 and 2000 mg/kg orally by gavage. Animals were observed individually after dosing once during the First 30 minutes, periodically during the first 24 hours, with special attention given during the First 4 hours and daily thereafter, for a total of 14 days. Observations included changes in skin and fur, eyes and mucous membranes, respiratory and behaviour pattern. A special attention was directed to observations of tremors, convulsions, salivation, diarrhea, lethargy, sleep and coma.

5. Histological studies

For histological studies, pieces of granulation tissues from dead space wound model were fixed in 10% neutral formalin solution for 24 h and dehydrated with a sequence of ethanol-xylene series of solutions. The materials were filtered and embedded with paraffin (40-60 °C). Microtome sections were taken at 10 µ thickness.

CONCLUSION

Argemon mexicana it could be used as antifungal agent, the evaluation test of physical tests included physical observations, washebility, oral toxicity studied, Histological studied and sensitivity test. Argemon mexicana has been identified as important medicinal plant. Belonging to the Papavercaea family or the poppy family, it was commonly known as Mexican poppy. Argemone maxicana with wide spectrum use and most important used as an indigenous medicine. Being a wild plant it was easily procurable and available in abundance in the season. Argemone maxicana was an important source of various types of compounds with diverse chemical structures as well as many pharmacological activities. The plant was rich in alkaloids and also contains many kinds of phenols, flavanoids, carboxylic acid, amino acid, etc. All are distributed over the, plant parts but some have exclusive existence amongst the parts of the plant. Apart from the uses A. mexicana has also been identified as a toxic plant, its safety evaluation was also a point to be considered.

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