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## **Phytochemical Profiling of Crude Extracts of Leaves of Argemone Mexicana**

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### **ABSTRACT**

Argemone mexicana is also referred to as prickly poppy, is a member of the Papaveraceae family. Argemone mexicana is renowned for having therapeutic properties in the conventional medical system. It has been claimed that it contains antimicrobial, antidiabetic, antioxidant, and hepatoprotective activity. Hence there has been an increase in interest in the research of these qualities over the past few decades. In present study, the extraction was done through maceration method. The phytochemical screening of various crude extracts of leaves of Argemone Mexican are revealed the presence of alkaloids in prominent amounts while anthraquinones, cyanaphoric glycosides, saponins, sterols, tannins, and terpenoids were found to be present in lesser concentrations. The obtained results provide a support for the use of this plant in traditional medicine and suggest its further advance investigation.

**Key words:** Argemone mexicana, Papaveraceae, Crude extracts, Phytochemical screening

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### **Introduction**

Plants play a vital role in the drug industry due to their rich biochemical diversity and the presence of various bioactive compounds. Plants produce a wide range of secondary metabolites, such as alkaloids, terpenoids, flavonoids, and phenolic compounds. Many of these compounds have medicinal properties and can be extracted and used as drugs or as lead compounds for the synthesis of new drugs. Through techniques like high-throughput screening and bioassays, researchers can test plant extracts or isolated compounds to determine their efficacy against specific diseases. This process can lead to the identification of new drugs or the development of improved versions of existing drugs.

Plant-derived drugs often have the advantage of being cost-effective compared to synthetic drugs. Plants can be cultivated or sourced from the wild, making them more accessible and affordable, especially in developing countries. This accessibility is particularly important for essential medicines and treatments that need to be affordable and accessible to wide population.

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### **Material and Methods**

Argemone mexicana belongs to papaveraceae family, popularly known as poppy family which is an ethnopharmacologically significant family of 44 genera and approximately 760 species of flowering plants (Brahmachari and Gorai, 2013). The systematic classification of Argemone mexicana can be given as below (Sharanappa and Vidyasagar, 2014):

**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.

Species: Argemone Mexicana L. – Mexican prickly poppy

The different vernacular names of *Argemone mexicana* are given in the Table 1.1 (Husna and Reddy, 2017):

**Table 1.1: Vernacular names of *Argemone mexicana***

SN	LANGUAGE	VERNACULAR NAMES
1	Hindi	Bharbhand, Biladhutura, Satyanashi
2	Sanskrit	Pitopushpa, Srigalkanta
3	English	Mexican prickly poppy
4	Malayalam	Ponnummattu
5	Telugu	Brahmadandi
6	Tamil	Kurukkum, Kudiyotti
7	Kannada	Datturigidda
8	Marathi	Daruri, Firangidhotra, Kontedhotra
9	Bengali	Barashit-kantal
10	Gujrati	Darudi



**Figure 1.1: *Argemone mexicana***

*Argemone mexicana* is native of tropical America which has distributed in tropical and subtropical regions of the World (Siddiqui, 2002). In India, it grows in the temperate region as a weed in waste lands, cultivating fields and roadsides.

#### ***Plant collection, identification, and authentication***

The bark, stem, flower, leaves and twigs of *Argemone mexicana* plant were collected from Gram Jamli, Tehsil Mhow, District Indore (M.P.). The plant specimen identification, confirmation and approval were done by Dr. S. Ray, Assistant professor of Botany, P.M.B. Gujarati Science College, Indore (M.P.). A specimen of the same was deposited to the herbarium of the college for record purpose.

#### ***Pre-treatment of the plant sample***

The collected plant leaves were washed thoroughly with running tap water to remove any adhering soil particles and dirt. After rinsing with distilled water, the leaves were chopped into small pieces and shade-dried at room temperature for approximately fifteen days. Once dried, the plant material was powdered using a mixer grinder, increasing the surface area for better extraction.

#### ***Extraction Process***

The air-dried and powdered leaf sample was subjected to solvent-solid extraction. The plant sample was soaked in a specific solvent for 7-8 days with occasional shaking. The mixture was then filtered to separate the plant sample residue from the extract. The filtered extract was concentrated and dried using a rotatory vacuum evaporator, resulting in the crude extract.

#### ***Solvent-Solvent Extraction***

The concentrated crude plant extract was further subjected to solvent-solvent extraction. Distilled water was added to the extract, and it was separately extracted with different solvents such as n-hexane, chloroform, ethyl acetate, methanol, and water in succession. Each solvent extraction was performed by shaking the mixture and allowing it to stand for a specific period. The corresponding fractions obtained from each solvent extraction were concentrated on a water bath, weighed, and carefully labeled for further experimentation.

### Phytochemical Screening

Phytochemical screening of the obtained extracts [n-hexane (HE), chloroform (CE), ethyl acetate (EA), methanol (ME), and aqueous (AE)] was conducted using standard methods (Harborne, 1998). Phytochemical screening aims to determine the presence or absence of various phytochemical compounds, such as alkaloids, flavonoids, terpenoids, phenolics, etc., which are known to have potential medicinal properties.

### Results and discussion

The different extracts of leaves of *Argemone mexicana* were subjected to phytochemical screening. Alkaloids were found to be present in significant numbers; while anthraquinones, cynaphoric glycosides, saponins, sterols, tannins, and terpenoids were found to be present in lesser concentrations. Additionally, flavonoids were found in modest quantities. These results are documented in the Table 1.2 given below:

**Table 1.2: Preliminary phytochemical screening of different extracts of leaves of *Argemone mexicana***

Class of phytochemicals	Chemical tests performed	HE	CE	EA	ME	AE
Alkaloids	Dragendorff's test	+	+	+	+++	+
Anthraquinones	Borntrager's test	-	-	-	+	-
Cardiac glycosides	Keller-killiani test	-	-	-	-	-
Cynophoric glycosides	Sodium picrate test	-	-	+	-	-
Flavonoids	Shinoda test	-	+	+	+	+
Saponins	Foam test	-	-	-	+	-
Tannins	Braymer's test	-	-	-	+	-
Terpenoids	Salkowski test	-	-	+	+	-

Note: + means present in higher amounts and – means present in lower amounts

### Conclusion

It is important to note that while *Argemone mexicana* has been traditionally used in folk medicine, scientific research on its efficacy and safety is limited. The plant contains several bioactive compounds, including alkaloids, flavonoids, and saponins, which contribute to its potential medicinal properties. However, it is crucial to consult with healthcare professionals and rely on evidence-based medicine for safe and effective treatments.

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