

Uncovering the Treasures of Nature: Analyzing Plant Chemicals in Mexican Silver and Indian Woolen Fabrics

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Abstract: This study investigates the phytochemical composition of *Argemone mexicana* and *Trichodesmum indicum*, two medicinal plants known for their therapeutic potential. Leaves from these plants were collected, processed, and subjected to qualitative phytochemical analysis using various extraction methods and screening tests. The results revealed the presence of bioactive compounds such as alkaloids, phenolic compounds, steroids, resins, saponins, and terpenoids in different extracts of both plant species. Notably, flavonoids, glycosides, and phenols were absent in the extracts. The findings underscore the importance of further research to isolate, characterize, and evaluate the pharmacological properties of these bioactive constituents for potential therapeutic applications. Additionally, considerations for safety and drug interactions are essential for the development of novel therapeutics from these botanical sources.

Keywords: Phytochemicals, *Argemone mexicana*, *Trichodesmum indicum*, Medicinal plants, phytochemical analysis, bioactive compounds

1. Introduction

Phytochemicals, natural compounds found in plants, have gained attention for their medicinal potential (Junaid R Shaikh et al., 2020; Soloman Charles et al., 2013). These bioactive substances, produced by plants as secondary metabolites, offer diverse pharmacological benefits. Plants like *Argemone mexicana* and *Trichodesmum indicum* are notable for their traditional healing properties (M.S. Saranya et al., 2012; Manani Lata et al., 2015). However, understanding their phytochemical composition and therapeutic potential remains limited. Our research aims to fill this gap by analyzing the bioactive compounds in these plants, exploring their antioxidant properties, and contributing to their pharmacognostical characterization (K. Anushka et al., 2014; T. Arun et al., 2012; Lokeshwar T, 2023). Through this study, we seek to bridge traditional knowledge with modern scientific inquiry, uncovering the therapeutic potential of these botanical treasures while ensuring safety and efficacy in promoting human health.

2. Materials and Methods

Leaves of *Argemone mexicana* and *Trichodesmum indicum* were collected from a farm in Bambarda Bk, Akot, District Akola, Maharashtra, India.

Preparation of Plant Extracts:

- 1) Washed leaves with running tap water 2-3 times.
- 2) Rinsed leaves with distilled water.
- 3) Shade-dried for seven days.
- 4) Powdered using a mixer and grinder.
- 5) Weighed 20 grams of powdered plant material for each sample.
- 6) Subjected powdered material to extraction using acetone, alcohol, and water in a Soxhlet extractor.
- 7) Extraction conducted for 72 hours.

- 8) Solvent extracts collected and concentrated using a rotary evaporator.

Phytochemical Screening Tests:

- 1) **Test for Protein:** Mix 2 ml of protein solution with 1 ml of 40% NaOH and 1-2 drops of 1% CuSO₄. Presence of a violet color indicates peptide linkage.
- 2) **Test for Amino Acid:** Add 2 ml of sample to 2 ml of Ninhydrin reagent; incubate in a water bath for 20 minutes. Purple color indicates presence of amino acids.
- 3) **Test for Reducing Sugar:** Mix 2 ml of extract with 2 drops of Molish's reagent, then add 2 ml conc. H₂SO₄ drop wise. Reddish-violet ring at the junction indicates presence of carbohydrates.
- 4) **Test for Alkaloids (Mayer's, Wagner's, Hager's tests):** Solvent-free extracts stirred with dilute HCl, then filtered and tested with respective reagents.
- 5) **Test for Phenolic Compounds (Lead Acetate Test):** Dissolve 50 mg of extract in distilled water, add 3 ml of 10% lead acetate solution. Bulky white precipitate indicates presence of phenolic compounds.
- 6) **Test for Tannins:** Add 0.5 g of plant extract to 10 ml of water in a test tube, filter, then add a few drops of 0.1% ferric chloride.
- 7) **Test for Glycosides:** Hydrolyze each extract with HCl, neutralize with NaOH, then add Fehling's solution A and B. Formation of red precipitate indicates presence of glycosides.
- 8) **Test for Flavonoids:** a. Dissolve 0.2 g of each extract in diluted NaOH, and then add a few drops of HCl. A yellow solution that turns colorless indicates the presence of flavonoids. b. Mix 2 ml of the test solution with 0.5 ml of alcohol. Add a small amount of magnesium and 1-2 drops of concentrated HCl, then heat the mixture. Analyze the reaction for characteristic indications.
- 9) **Test for Phenols:** Add alcohol and neutral ferric chloride solution to test solution.

- 10) **Test for Terpenoids:** Mix leaf extract with acetic anhydride and concentrated H₂SO₄.
- 11) **Test for Steroids:** Dissolve leaf extract in conc. sulphuric acid, add chloroform, and observe color change.
- 12) **Test for Resins:** Heat plant extracts with glacial acetic acid, and then adds conc. H₂SO₄.
- 13) **Test for Saponins:** Mix leaf extract with distilled water and shake vigorously for 15 minutes.
- 14) This outlines the methodology employed for plant material collection, extraction, and phytochemical screening of *Argemone mexicana* and *Trichodesmum indicum* leaves.



Figure: Argemone mexicana



Figure: Trichodesmum indicum

3. Observation Tables

Table 1: Phytochemical screening of leaf extract of *Argemone mexicana*.

Sr. No.	Constituents tests	Acetone	Alcohol	Aqueous
1	Protein	-	-	-
2	Amino Acid	-	-	-
3	Reducing Sugar	+	+	+
4	<i>Alkaloids</i>	+	-	+
	<i>Mayer`s</i>	+	+	+
	<i>Wagner`s</i>	+	+	+
5	Phenolic compounds	+	+	+
6	Lead acetate	-	+	+
7	Tannins	-	-	+
8	Glycosides	-	+	-
9	Flavonoids	-	-	-
10	Phenol	+	+	+
11	Terpenoids	+	+	+
12	Steroid	+	+	+
13	Resins	+	+	+
14	Saponins	+	+	+

4. Result and Discussion

The qualitative analysis of phytochemical compounds in the leaves of *Argemone mexicana* and *Trichodesmum indicum* provides valuable insights into the potential bioactive constituents present in these medicinal plants.

Understanding the phytochemical composition is crucial for elucidating their pharmacological properties and therapeutic potential.

For Argemone mexicana:

The acetone extract showed the presence of alkaloids, phenolic compounds, steroids, resins, saponins, and terpenoids. Amino acids, tannins, glycosides, flavonoids, and phenols were absent.

The alcohol extract exhibited the presence of reducing sugar, phenolic compounds, alkaloids, tannins, flavonoids, steroids, resins, terpenoids, and saponins. Amino acids, glycosides, and phenols were not detected.

The aqueous extract displayed the presence of reducing sugar, alkaloids, phenolic compounds, tannins, glycosides, terpenoids, steroids, resins, and saponins. Amino acids, flavonoids, and phenols were absent.

For Trichodesmum indicum:

The acetone extract demonstrated the presence of reducing sugar, alkaloids, phenolic compounds, tannins, terpenoids, steroids, resins, and saponins. Amino acids, glycosides, proteins, flavonoids, and phenols were not found.

The alcohol extract revealed the presence of alkaloids, phenolic compounds, flavonoids, terpenoids, steroids, resins, and saponins. Amino acids, reducing sugar, tannins, glycosides, and phenols were absent.

The aqueous extract indicated the presence of alkaloids, phenolic compounds, tannins, terpenoids, steroids, resins, and saponins. Amino acids, reducing sugar, glycosides, flavonoids, and phenols were not detected.

5. Conclusion

The qualitative analysis of phytochemical compounds in the leaves of *Argemone mexicana* and *Trichodesmum indicum* reveals the presence of various bioactive constituents with potential therapeutic properties. Further studies focusing on the isolation, characterization, and pharmacological evaluation of these compounds are warranted to harness the full medicinal potential of these plants. Additionally, investigations into the safety profiles and potential drug interaction of these phytochemicals are essential for their development as novel therapeutic

Table 2: Phytochemical screening of leaf extract of *Trichodesmum indicum*.

Sr. No.	Constituents tests	Acetone	Alcohol	Aqueous
1	Protein	-	-	-
2	Amino Acid	-	-	-
3	Reducing sugar	+	-	-
4	Alkaloids			
	Mayer's	+	+	+
	Wagner's	+	+	+
	Hager's	+	+	+
5	Phenolic compound Lead Acetate	+	+	+
6	Tannins	+	-	+
7	Glycosides	-	-	-
8	Flavonoids	-	+	-
9	Phenol	-	-	-
10	Terpenoids	+	+	+
11	Steroid	+	+	+
12	Resins	+	+	+
13	Saponins	+	+	+

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