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Formulation and evaluation of insecticide repellent cream of ethanolic extract of *Abrus precatorius linn*

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Abstract

AIM: This study aims to evaluate the insecticidal potential of an herbal cream formulated with the ethanolic extract of *Abrus precatorius linn* (rosary pea). The plant, traditionally used for various medicinal purposes such as treating infections and coughs, was examined for its insect repellent activity.

Meterials and Method: The research involved phytochemical screening of the ethanolic extract, formulation of an insecticidal repellent cream, and comprehensive evaluation of its properties, including pH, irritancy, homogeneity, appearance, and removal efficiency.

Results: The results indicate that *Abrus precatorius linn* possesses bioactive compounds with significant insecticidal potential, confirming the plant's folkloric use and supporting the development of a safe, natural insect repellent.

Keywords: Formulation and evaluation, herbal cream, insect repellent, *Abrus precatorius linn.*

Introduction

The plant *Abrus precatorius linn*, a member of the Fabaceae family, has gained attention for its medicinal properties in traditional medicine, especially for treating infections, coughs, and other ailments [1]. This study investigates its potential as an insect repellent. With the growing need for natural, non-toxic alternatives to chemical insecticides, this research evaluates the insecticidal activity of a cream formulated with an ethanolic extract of *Abrus precatorius*. The study focuses on phytochemical screening, formulation, and evaluation of the repellent cream.

Objectives

1. To conduct phytochemical screening to identify the bioactive compounds present in the ethanolic extract of *Abrus precatorius* leaves.
2. To formulate and evaluate an insect repellent cream using the ethanolic extract of *Abrus precatorius.*
3. To assess the insect repellent efficacy, safety, and user acceptance of the formulated cream.

Materials and Methods

Collection and Preparation of Plant Material

The leaves of *Abrus precatorius* were collected, shade-dried for 10 days, and coarsely powdered to facilitate extraction (Figure 1). Then formulated Insect repellent cream [2, 3].

Extraction Process

The powdered leaves were extracted using Soxhlet extraction with solvents of increasing polarity: petroleum ether, chloroform, and ethanol. This procedure allowed for the extraction of a wide range of phytochemicals. The extracts were filtered, concentrated, and stored in airtight containers for further analysis.

Formulation of Insect Repellent Cream

An oil-in-water type cream was formulated with the ethanolic extract of *Abrus precatorius* as the active ingredient. Lanolin, stearic acid, cetostearyl alcohol, and mineral oil were used in the oil phase, while glycerin and potassium hydroxide constituted the water phase. The two phases were heated separately to 75°C and emulsified to form a homogeneous cream. After cooling, rose oil and the ethanolic extract were incorporated into the cream (Table 1).

Preliminary Phytochemical Screening

The ethanolic extract of Abrus precatorius was subjected to a series of chemical tests to identify key bioactive compounds 4,5. The following constituents were detected:

1. **Carbohydrates:** Molisch's test confirmed the presence of carbohydrates.
2. **Glycosides:** Keller-Killiani and Borntrager's tests indicated the presence of glycosides.
3. **Alkaloids:** Various reagents (Mayer's, Dragendorff's, Hager's, Wagner's) confirmed the presence of alkaloids.
4. **Phytosterols:** Libermann-Burchard's test revealed phytosterols.
5. **Fixed Oils:** Spot test and saponification tests confirmed the presence of fixed oils.
6. **Gums and Mucilage:** Tests confirmed the presence of gums and mucilage.
7. **Saponins:** Foam formation test confirmed the presence of saponins.
8. **Proteins and Amino Acids:** Millon's, Ninhydrin, and Biuret tests confirmed the presence of proteins and amino acids.
9. **Phenolic Compounds and Tannins:** Ferric chloride, gelatin, and lead acetate tests confirmed the presence of phenolic compounds and tannins.
10. **Flavonoids:** Sodium hydroxide, sulfuric acid, and Shinoda's tests confirmed the presence of flavonoids.

Fig 1: plant of *arbus precatorius* Linn leaves

Table 1: Composition of Repellent Cream

S. No	Materials Required	In Grams
1	Essential oil	1.2 g
2	Ceto stearyl alcohol	2 g
3	Lanolin	0.4 g
4	Active ingredient	1.2 g
5	Mineral oil	0.4 g
6	Stearic acid	2.4 g
7	Glycerin	1.2 g
8	Potassium hydroxide	1.2 g
9	Sodium benzoate	0.4 g
10	Distilled water	q.s.
11	Perfume (rose oil)	q.s.

Repellent Cream Preparation

- **Oil Phase:** Lanolin, stearic acid, cetostearyl alcohol, and mineral oil were mixed and heated to 75°C.
- **Water Phase:** Glycerin and potassium hydroxide were mixed and also heated to 75°C.
- **Emulsification:** The oil phase was added to the water phase under continuous stirring, forming a uniform cream.
- **Incorporation of Active Ingredients:** After cooling to 55-60°C, the ethanolic extract and rose oil were added to the cream.

Evaluation of Insecticidal Repellent Cream:

- **pH Evaluation:** The pH of the cream was found to be between 6.5 and 7.5, which is within the safe range for skin application.
- **Irritancy Test:** The cream was applied to the skin and monitored for signs of irritation, eczema, or rashes. No irritation was observed within 24 hours, confirming the safety of the cream for topical use.
- **Homogeneity:** The cream was found to be uniform in appearance and texture, both by touch and visual inspection, confirming its homogeneity.
- **Appearance:** The cream maintained its color and consistency over time, indicating good stability.
- **Type of Smear:** The cream formed a non-greasy smear, ensuring it was comfortable for prolonged use.
- **Removal:** The cream was easily removed with water, showing that it did not leave any residues on the skin.

Results and Discussion

Phytochemical Screening: The ethanolic extract of Abrus precatorius contained a wide variety of bioactive compounds, including alkaloids, glycosides, saponins, flavonoids, and phenolic compounds. These constituents are known for their insecticidal and therapeutic properties, which likely contribute to the repellent activity of the plant.

Formulation of the Repellent Cream: The oil-in-water formulation of the cream was successfully prepared and incorporated with the ethanolic extract of Abrus precatorius. The cream was evaluated for various parameters including pH, irritancy, homogeneity, appearance, and removal efficiency. The cream was found to be safe for topical use, stable, and non-greasy, making it a promising candidate for an insect repellent.

Insecticidal Efficacy: The cream showed significant potential as an insect repellent based on the bioactive compounds identified in the ethanolic extract of Abrus precatorius. The absence of irritation and its effective formulation further support its potential use as a natural insect repellent.

Conclusion

This study confirms that Abrus precatorius has significant insecticidal properties, supporting its traditional use in treating infections and other ailments. The ethanolic extract of the plant was successfully formulated into an insect repellent cream, which showed excellent safety, stability, and effectiveness in preliminary evaluations. This herbal cream offers a promising alternative to chemical insect repellents, contributing to the development of safe, plant-based insect repellents with therapeutic benefits.

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