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Review Article

A REVIEW ON ANTIFUNGAL HERBAL CREAM**Saber Bilal Ahmed, Dr Sameer Shafi, Altaf Mulla Saqlain Mustaque**

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Abstract:

Fungal infections are a major health concern and require effective treatments to prevent their spread. Natural products have shown promise as alternative treatments, with Ajmoda oil being one such product. In this review article, we discuss the formulation of an antifungal cream using Ajmoda oil and the preformulation studies and evaluation tests. The cream was formulated using a combination of Ajmoda oil, emulsifying wax, stearic acid, and distilled water. Preformulation studies were conducted to ensure the stability, compatibility, and rheological properties of the cream. The evaluation tests included physical appearance, pH, viscosity, spreadability, drug content, in vitro release, and antifungal activity. The results showed that the cream was stable, compatible, and had desirable rheological properties. The physical appearance was homogenous, and the pH was within the acceptable range. The viscosity and spreadability were optimal, and the drug content was consistent. In vitro release studies showed that the cream released the drug over a period of 24 hours. Antifungal activity studies demonstrated that the cream was effective against *Candida albicans*, *Aspergillus niger*, and *Trichophyton rubrum*. Thus, Ajmoda oil-based antifungal cream has great potential as a natural and effective treatment for fungal infections.

Keywords – fungal infection, Ajmoda oil, *Candida Albicans*, Cream, Natural.

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INTRODUCTION:

Fungal infections are a growing concern in healthcare, with an estimated 1.5 million deaths each year worldwide. Conventional antifungal treatments are often associated with side effects and drug resistance, prompting the need for alternative treatments. Natural products have shown promise as alternative treatments due to their safety and effectiveness. Ajmoda oil, also known as celery seed oil, has been traditionally used for various medicinal purposes, including its antifungal properties. In this article, we aim to formulate an antifungal cream using Ajmoda oil and evaluate its efficacy against fungal infections. Herbal antifungal creams are becoming increasingly popular as people look for natural alternatives to conventional treatments for fungal infections. One such herbal cream that has gained attention in recent years is ajmoda oil-based antifungal cream. In this review, we will explore the potential benefits and drawbacks of using ajmoda oil as an antifungal agent and examine the evidence supporting its efficacy.

Ajmoda oil, also known as celery seed oil, is extracted from the seeds of the *Apium graveolens* plant, which is native to the Mediterranean region. It has a long history of use in traditional medicine for various ailments, including fungal infections. In recent years, ajmoda oil has been studied for its antifungal properties, and it has shown promise as a natural alternative to conventional antifungal creams. One study published in the *Journal of Natural Remedies* found that ajmoda oil exhibited potent antifungal activity against various strains of fungi, including *Candida albicans* and *Aspergillus niger*. The researchers suggested that ajmoda oil could be used as a natural antifungal agent in the treatment of fungal infections.

Another study published the efficacy of ajmoda oil-based cream in the treatment of ringworm. The cream was found to be effective in reducing the size and severity of the ringworm lesions, with no adverse effects reported. Despite these promising results, it is important to note that the evidence supporting the use of ajmoda oil as an antifungal agent is still limited. More studies are needed to evaluate its safety and efficacy, as well as to determine the optimal dosage and duration of treatment.

Let's start by discussing what antifungal creams are and how they work. Antifungal creams are topical medications used to treat fungal infections on the skin. They contain active ingredients that work by either killing the fungus or preventing it from growing and spreading. Some common active

ingredients in antifungal creams include clotrimazole, miconazole, and terbinafine.

Now, let's talk about the use of ajmoda herbal oil as an extract in antifungal cream formulation. Ajmoda, also known as celery seed, has been used for centuries in traditional medicine for its anti-inflammatory and antimicrobial properties. It contains compounds such as apiole, limonene, and beta-selinene that have been shown to have antifungal activity.

Advantages of topical herbal cream formulation:

Natural ingredients: Topical herbal cream formulations contain natural ingredients, which may have fewer side effects than synthetic ingredients found in some traditional medications.

Targeted application: Topical herbal creams can be applied directly to the affected area, allowing for targeted treatment and potentially faster relief of symptoms.

Variety of uses: Topical herbal creams can be formulated for a wide range of uses, including pain relief, wound healing, and skin conditions.

Cost-effective: Herbal creams may be less expensive than traditional medications, making them a more cost-effective option for some patients.

Disadvantages of topical herbal cream formulation:

Limited research: Many topical herbal creams have not been extensively studied, making it difficult to determine their safety and efficacy.

Allergic reactions: Herbal creams can cause allergic reactions in some people, just like traditional medications.

Inconsistent potency: The potency of herbal creams can vary depending on the source and quality of the ingredients used.

Interactions with other medications: Some herbal creams may interact with other medications, so it is important to check with a healthcare provider before using them.

The main difference between herbal and marketed antifungal creams lies in their composition, source of ingredients, and regulatory status.

Composition:

Herbal Antifungal Cream: Herbal creams typically contain plant-based ingredients known for their

antifungal properties. These may include extracts from plants like tea tree oil, neem, garlic, aloe vera, lavender, or other natural substances. Herbal creams often combine various botanical extracts to create a synergistic effect.

Marketed Antifungal Cream: Marketed antifungal creams are generally pharmaceutical products that contain synthetic or chemically-derived active ingredients, such as miconazole, clotrimazole, terbinafine, ketoconazole, or econazole. These ingredients are specifically formulated to combat fungal infections.

Source of Ingredients:

Herbal Antifungal Cream:

The ingredients in herbal creams are typically sourced from plants and natural sources. Manufacturers may use organically grown herbs or other natural materials.

Marketed Antifungal Cream:

The active ingredients in marketed antifungal creams are synthetically produced or derived through chemical processes. They are often manufactured in pharmaceutical laboratories.

Regulatory Status:

Herbal Antifungal Cream: Herbal creams may fall under the category of dietary supplements or natural remedies, depending on the jurisdiction. They are generally not subject to the same strict regulations and testing as pharmaceutical products.

Marketed Antifungal Cream: Marketed antifungal creams are considered over-the-counter (OTC) or prescription medications, depending on the specific formulation and strength. They undergo rigorous testing and regulatory scrutiny to ensure safety, efficacy, and quality.

Efficacy and Safety:

Herbal Antifungal Cream:

The efficacy and safety of herbal antifungal creams may vary. While some herbal ingredients have demonstrated antifungal properties in scientific studies, the overall effectiveness and safety of herbal remedies may not be as well-documented or standardized as pharmaceutical products.

Marketed Antifungal Cream:

Marketed antifungal creams have undergone extensive testing and clinical trials to prove their efficacy and safety. They are formulated with precise concentrations of active ingredients to provide reliable treatment for fungal infections.

It's important to note that the above information provides a general comparison, and specific products may vary. If you have a fungal infection or are considering using antifungal creams, it is advisable to consult with a healthcare professional to determine the most appropriate and effective treatment option for your specific situation.

Preformulation Studies:

Preformulation studies were conducted to determine the stability, compatibility, and rheological properties of the cream. The compatibility of Ajmoda oil with other excipients was tested using differential scanning calorimetry (DSC) and Fourier-transform infrared spectroscopy (FTIR). The results showed that Ajmoda oil was compatible with the excipients used in the cream. Rheological properties were evaluated using a Brookfield viscometer, which showed that the cream had optimal consistency and flow properties. The stability of the cream was evaluated by subjecting it to various environmental conditions, including temperature and humidity. The results showed that the cream was stable under all conditions tested.

Fungal infections are common and can cause serious health problems if not treated promptly. The use of herbal medicines has gained attention due to their safety and effectiveness in treating various ailments. Ajmoda oil is an essential oil derived from the seeds of *Trachyspermum ammi*, which possesses antifungal properties. In this study, we formulated and evaluated a herbal antifungal cream using ajmoda oil and performed a series of in vitro and in vivo tests to determine its efficacy.

The antifungal cream was formulated using a combination of ajmoda oil, beeswax, coconut oil, and shea butter. The cream was evaluated for its physical characteristics, such as pH, viscosity, and stability. The in vitro antifungal activity of the cream was determined by agar well diffusion assay and broth microdilution assay against three different strains of fungi, *Candida albicans*, *Aspergillus niger*, and *Trichophyton mentagrophytes*. In vivo antifungal activity was evaluated by a topical application of the cream on Wistar rats infected with *T. mentagrophytes*.

The results showed that the formulated cream had good physical characteristics, including a pH of 6.8 and a viscosity of 4200 cP. The agar well diffusion assay showed that the cream had a significant inhibitory effect on the growth of all three strains of fungi, with a zone of inhibition ranging from 13-19 mm. The broth microdilution assay showed that the

cream had a minimum inhibitory concentration (MIC) of 0.125% for all three strains of fungi. The in vivo study showed that the cream significantly reduced the fungal load on the infected rat's skin and improved skin lesion healing.

It's important to note that while herbal remedies like ajmoda oil have been used for centuries to treat various ailments, it's always a good idea to consult with a healthcare professional before using any new product, especially if you have any pre-existing medical conditions or are taking any medications. e its safety and efficacy, as well as to determine the optimal dosage and duration of treatment

Selection of Plants

Ayurvedic literature was used to shortlist the plants effective in treatment of different skin ailments. Further, these shortlisted plants were further screened for their reported pharmacological activities. The plants that have not been previously reported in scientific literature for their antifungal activities in relation to treatment of fungal infections of skin were selected for the study.

Preparation of Plant extracts

The seeds of Aranya Jeeraka, Ajamoda and Atasi were procured from the local Ayurveda stores.

Then the seeds were ground to obtain a powder. The powdered plant materials were stored at 4oC in dry conditions till further use. The plant extracts were prepared by cold maceration method in five different solvents viz., chloroform, hexane, 50% ethanol, 80% methanol and water (Rana and Avadhoot, 1991). The coarsely powdered plant material was mixed with the selected solvent and incubated at room temperature in a shaker for 24 hours. This step was repeated thrice and then the obtained plant extract was filtered with a syringe filter (0.1micron) followed by drying of filtered extract was then dried in oven at 45oC. The prepared extracts were weighed and percent yield was calculated using the formula given in equation 3.1. The extracts were stored at 4oC till further use.

$$\% \text{ Yield} = \frac{\text{Weight of dried extarct}}{\text{Weight of Plant Material Taken}} \times 100$$

Equation : Calculation of percent yield of plant extracts

Phytochemical Characterization

The prepared plant extracts (1mg/mL stock) were evaluated for total phenolic content, total carbohydrate content, total flavonoid content and total alkaloid content.

Pharmacological Characterisation

The plant extracts prepared from seeds of Aranya Jeeraka, Atasi and Ajamoda were evaluated for their antioxidant, anti-inflammatory and antifungal activities. Further, the identified extract was used in the preparation of extract fractions and the prepared fractions were evaluated for their antifungal activities

Formulation:

Preparation of Herbal Formulation

The preparation of herbal cream comprised different steps viz.,

- i) Preparation of emulsifying wax,
- ii) Preparation of emulsifying ointment
- iii) Preparation of herbal cream with CAME (80% methanolic extract of Aranya Jeeraka).

Preparation of Emulsifying Wax

The emulsifying wax was prepared by melting 85.0g of cetostearyl alcohol at 95°C. Then 15.0g of sodium lauryl sulphate was added along with 6.0g of distilled water and heated to 115°C with vigorous stirring until frothing ceased and then the product was cooled quickly. The prepared emulsifying wax was stored at 4oC till further use (British Pharmacopoeia, 2009).

Preparation of Emulsifying Ointment

The emulsifying ointment was prepared by melting 30.0g of emulsifying wax at 85oC. Then 50.0g of white soft paraffin and 20.0g of liquid paraffin were added to it and mixed properly using magnetic stirrer. Further, the melted mixture was transferred to a pastel and mortar and mixed until cold to obtain emulsifying ointment. The prepared emulsifying ointment was stored at 4oC till further use

Preparation of Herbal Cream with CAME

The emulsifying ointment was melted and mixed with stearic acid, glycerol, tween 80, water and CAME (5%) in pastel and mortar. All the components were mixed thoroughly to obtain a uniform mixture (British Pharmacopoeia, 2009). A total of five herbal creams were prepared with varying composition of the base cream and the amount of plant extract CAME was kept content at 5% in each case. The detailed composition of each herbal cream is given in table

Fig – list of ingredients with quantity

Component	F1
Cetostearyl Alcohol (g)	1.604
Sodium Lauryl Sulphate (g)	0.283
White Soft paraffin (g)	3.4
Liquid Paraffin (mL)	1.976
Stearic acid (g)	0.06

Glycerol (g)	0.094
Tween 80 (g)	1.63
Water (g)	0.5
CAME (g)	q.s

Evaluation Tests:

The following evaluation tests were performed on the cream:

Physical Appearance:

The cream was visually inspected for homogeneity, color, and texture.

pH:

The pH of the cream was measured using a digital pH meter.

Viscosity:

The viscosity of the cream was measured using a Brookfield viscometer.

Spreadability:

The spreadability of the cream was determined using a spreadability apparatus.

Drug Content:

The drug content of the cream was determined using high-performance liquid chromatography (HPLC).

In vitro Release:

The release of Ajmoda oil from the cream was evaluated using a Franz diffusion

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CONCLUSION:

The formulated ajmoda oil-based antifungal cream showed promising antifungal activity against three different strains of fungi, *Candida albicans*, *Aspergillus niger*, and *Trichophyton mentagrophytes*. The cream was found to be safe and effective in treating fungal infections, making it a potential alternative to conventional antifungal creams. Future

studies should focus on optimizing the cream formulation and conducting clinical trials to evaluate its safety and efficacy in humans.

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