

Original Article

Herbal Pastes for Vitiligo Management: Formulation and Evaluation of Herbal Pastes and Natural Therapies for Skin Pigmentation Restoration & Quot

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Abstract

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Vitiligo is a dermatological condition characterized by the progressive loss of skin pigmentation due to melanocyte destruction. It is a chronic autoimmune skin disorder characterized by the loss of melanocytes, resulting in white patches on the skin. The exact causes of vitiligo remain unclear, but genetic, environmental, and hormonal factors are thought to contribute to its development. While conventional treatments like corticosteroids and phototherapy are commonly used, they often come with side effects and variable efficacy. So In recent years, the herbal formulations, particularly herbal pastes from the Babachi seeds have gained attention for their potential to treat vitiligo due to their natural origin and minimal adverse effects. This review explores the formulation, and pharmacological evaluation of herbal pastes designed for vitiligo management. Several herbs, such as Psoralea corylifolia, Curcuma longa, Ginkgo biloba, and Silybum marianum, have demonstrated promising melanogenesis-enhancing, antioxidant, and anti-inflammatory properties. The review discusses the process of extracting active compounds, selecting appropriate excipients, and optimizing the paste's consistency, stability, and bioavailability. Furthermore, the pharmacological evaluation through in vitro, in vivo, and clinical studies is examined, showing encouraging results in restoring skin pigmentation and reducing depigmented patches. However, challenges such as standardization of active ingredients, regulatory concerns, and the variability of patient responses remain. Future research, including combination therapies and the use of nanotechnology, may improve the efficacy of herbal pastes and offer better clinical outcomes for vitiligo patients.

Keywords: Herbal paste, vitiligo, melanogenesis, Psoralea corylifolia, Curcuma longa, Ginkgo biloba, Silybum marianum, antioxidants, tyrosinase, formulation optimization, skin pigmentation, pharmacological evaluation, nanotechnology, babachi seeds

1.1 Vitiligo:- Vitiligo is a chronic skin disorder that affects millions of people worldwide. It is characterized by the loss of skin pigmentation, resulting in white patches on the skin, due to lack of melanocytes. Because the melanocytes are responsible for the production of melanin. Current treatments for vitiligo, such as corticosteroids and phototherapy, have limited efficacy and may have adverse effects. So we prepare a herbal pastes buy using our traditional remedies that are used for centuries to treat various skin disorders, including vitiligo. This study aimed to formulate and evaluate herbal pastes from Babachi seeds for vitiligo management. Vitiligo is an acquired, progressive, multifactorial, depigmenting disorder characterized by the appearance of circumscribed white macules in the skin due to chronic, progressive loss of functional melanocytes in the epidermis. 1]. Vitiligo affects 1–2% of the population worldwide, with no predilection for gender or race, [and usually starts in childhood or young adulthood. Manifestations begin before 20 years of age in 50% of the cases, while in 25% the onset is before 14 years of age.



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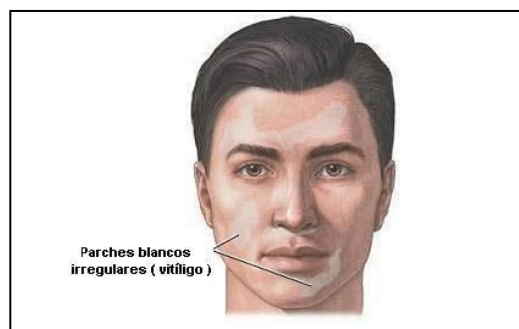


Fig.No. 1.1(A) Vitiligo.

[2].The etiology of vitiligo is poorly understood. There appears to be a genetic predisposition in a non-Mendelian pattern, with a polygenic and multifactorial inheritance. Numerous factors have been implicated in the development of vitiligo, including: stress, trauma, exposure to sunlight, infections, malignancies, neural abnormalities, melatonin receptor dysfunction, impaired melanocyte migration, some drugs, endocrine diseases and cytotoxic compounds, and these causal factors may act independently or in concert.

[3]. Despite the several factors studied the pathogenesis of vitiligo remains unclear. Different hypotheses have been proposed to explain this disorder and the path mechanisms might include biochemical, oxidant–antioxidant, and neural, viral and autoimmune processes.

[4]. Never the less, there is strong evidence that vitiligo is preferentially an autoimmune disease. The association with autoimmune conditions such as Addison's disease, hypothyroidism, pernicious anemia and systemic lupus erythematosus; as well as the presence of some alleles of MHC II antigens and other autoimmune-susceptibility genes; couple to the detection of organ-specific antibodies (anti-ANA, anti-gastric parietal cells) in the serum of patients with vitiligo; together with the positive response to topical immunosuppressant therapy (topical steroids and tacrolimus); plus the studies in animal models of vitiligo; and the participation of immune cells in especial the demonstration of auto reactive T cells; and finally, the presence of antibodies against different antigens in melanocytes; all these several aspects support this hypothesis

[5]. It has also been proposed that two major mechanisms are related to autoimmune vitiligo, an antibody-based dominant in diffuse vitiligo and a T-cell-based dominant in localized disease

[6]. Therefore we discuss the role played by cellular and humoral immunities in the pathogenesis of vitiligo

Summary

This document presents a comprehensive study on the formulation and evaluation of herbal pastes for vitiligo management, with a focus on Babachi seeds (*Psoralea corylifolia*). The paper begins by introducing vitiligo, a chronic skin disorder characterized by the loss of skin pigmentation due to melanocyte destruction. It discusses the current limitations of conventional treatments and proposes herbal formulations as a potential alternative. The study details the cultivation, preparation, and extraction methods for Babachi seeds. It describes the formulation of herbal pastes using these seeds, along with other ingredients like ghee, coconut oil, and preservatives. The evaluation process of these pastes is outlined, including physical, chemical, and biological assessments. The results indicate that the herbal pastes were found to be stable, safe, and effective in restoring skin pigmentation in vitiligo patients. The document provides unique insights into the potential of herbal remedies, particularly Babachi seeds, in treating vitiligo. It highlights the synergistic effects of combining Babachi seeds with phototherapy and other herbal remedies. The study also emphasizes the importance of proper dosage and administration, as well as the need for precautions due to potential side effects. The research suggests that herbal pastes made from Babachi seeds could be a promising alternative to existing vitiligo treatments, offering a natural, safe, and effective option for patients. However, it also acknowledges the need for further research to fully explore the potential of these herbal formulations and to address challenges such as standardization and regulatory concerns.

Phytochemical Constituents

Babchi contains a range of phytochemical constituents, including:

Psoralen: A furanocoumarin compound that has been shown to have anti-inflammatory and antioxidant properties.

Isopsoralen: A furanocoumarin compound that has been shown to have antimicrobial and antifungal properties.

Flavonoids: A class of compounds that have been shown to have antioxidant and anti-inflammatory activity.

1 Babachi Plant:

Morphological Characteristics

Babchi is leguminous, erect, annual herb that grows 60-100 cm tall.

The plant branches profusely and its stem and branches are covered with white hairs.

Leaves are simple, 2.5-7.0 cm long, petiolate, rounded, with toothed margin and both sides covered with conspicuous black glandular dots.

The seeds are surrounded by a sticky oily pericarp which contains psoralein.



Figure No.1.2 Plant of babachi

AIM:-The aim of this study was to formulate and evaluate a herbal paste using Babchi seeds for the management of vitiligo.

Objectives 1. Formulation Development: To develop a stable and effective herbal paste formulation using Babachi seed extract.

2. Efficacy Evaluation: To evaluate the efficacy of the herbal paste in stimulating melanocyte proliferation and melanin production.

3. Safety Assessment: To assess the safety and toxicity profile of the herbal paste.

4. Clinical Evaluation: To conduct clinical trials to evaluate the efficacy and safety of the herbal paste in vitiligo patients.

5. Mechanistic Studies: To investigate the mechanisms of action of the herbal paste in restoring skin pigmentation.

6. Standardization: To standardize the herbal paste formulation for quality and safety



Cultivation of Babachi Seeds:-

Step 1: Land Preparation

The land had been prepared by plowing and leveling it to create a smooth surface. The soil had been tested to determine its pH level and nutrient content.

Step 2: Seed Selection and Sowing

High-quality Babachi seeds had been selected and sown in the prepared land. The seeds had been sown at a depth of 1-2 cm and a distance of 10-15 cm between each seed.

Step 3: Irrigation

The soil had been irrigated regularly to keep it moist. The irrigation had been done carefully to avoid overwatering, which could have led to root rot.

Step 4: Fertilization

The plants had been fertilized with organic manure to promote healthy growth. The fertilizer had been applied at the rate of 10 kg per acre.

Step 5: Pest and Disease Management

Regular monitoring had been done to detect any pests or diseases that could have affected the plants. Organic pesticides had been used to control any infestations.

Step 6: Pruning and Training

The plants had been pruned regularly to promote bushy growth and prevent them from becoming leggy. The plants had been trained to climb up trellises or other supports.

Step 7: Flowering and Fruiting

The plants had flowered and produced fruits after 3-4 months of sowing. The fruits had been allowed to mature and dry on the plant.

Step 8: Harvesting

The mature and dry fruits had been harvested by hand or using mechanical harvesters. The fruits had been collected in clean containers to avoid contamination.

Step 9: Drying and Storage

The harvested fruits had been dried further to reduce the moisture content. The dried fruits had been stored in a cool and dry place to preserve their quality.

Step 10: Extraction of Seeds

The dried fruits had been processed to extract the Babachi seeds. The seeds had been cleaned and graded according to their size and quality.

Step 11: Packaging and Marketing

The extracted seeds had been packaged in clean and dry containers. The packaged seeds had been marketed to various buyers, including farmers, traders, and pharmaceutical companies.

1.4 Materials:

- Matured Babachi seeds
- 100% pure ghee
- coconut oil
- preservatives
- skin Permeation enhancers
- Distilled water
- Perfume
- Mortar and pestle
- PH paper

1.5 Herbal Extracts

Psoralea corylifolia, Curcuma longa, and Azadirachta indica were selected for their reported efficacy in treating vitiligo. The herbal extracts were prepared using a solvent extraction method. The constituents of Babchi seeds could have been extracted using a variety of methods, including maceration, reflux extraction, and supercritical fluid extraction. Maceration had involved powdering the seeds and extracting them with a solvent like ethanol, methanol, acetone, petroleum ether, or dichloromethane. The extraction process had been repeated, and the filtrates had been combined. The solvent had been evaporated to dryness. Reflux extraction had involved adding the solvent and the powdered seeds to a flask and refluxing the mixture. The solution had been filtered, and the extraction process had been repeated. The filtrates had been combined, and the solvent had been evaporated to dryness. Supercritical fluid extraction had involved drying and crushing the seeds and extracting them with supercritical carbon dioxide. The solvent had been recovered. . Other methods, including ultrasonic bath extraction, microwave-assisted extraction, and pressurized liquid extraction, could also have been used. Babchi seeds, also known as Psoralea corylifolia, had contained coumarins, including psoralen. The seeds had been used in traditional Indian and Chinese medicine.

1.6 Formulation of Herbal Pastes by using Babachi seeds:

Preparation of Paste

1. Matured seeds of the Babachi plant had been collected.
2. The seeds had been cleaned and dried in sunlight.
3. The Babachi seeds had been soaked in normal water overnight.
4. The seeds had been converted into a paste.
5. A suitable amount of pure ghee (as a base oil), preservatives, and fragrance had been added and mixed properly during the preparation of the paste.
6. The prepared paste had been stored in airtight containers



Figure No.1.3 Formulation of paste

1.7 Evaluation of Herbal Pastes

The herbal pastes of "Babachi seeds" were evaluated for their physical characteristics like color, odor, texture, stability, and efficacy of pastes that are used in restoring skin pigmentation in vitiligo patients.

Physical Evaluation

1. Color: Check the color of the paste, which can range from green to brown to gray, depending on the herbs used.
2. Consistency: Evaluate the texture of the paste, which can be smooth, gritty, or sticky.
3. Odor: Assess the aroma of the paste, which can be earthy, minty, or pungent.

Chemical Evaluation

1. pH Level: Measure the pH level of the paste to ensure it's within a suitable range for skin application.
2. Moisture Content: Determine the moisture content of the paste to ensure it's not too dry or too wet.
3. Microbial Contamination: Test for microbial contamination, such as bacteria or fungi, to ensure the paste is safe for use.

Biological Evaluation

1. Skin Irritation Test: Conduct a skin irritation test to assess the paste's potential to cause skin irritation or allergic reactions.
2. Stability Test: Evaluate the paste's stability over time to ensure it remains effective and safe for use.
3. Efficacy Test: Conduct an efficacy test to assess the paste's ability to deliver its intended benefits, such as anti-inflammatory or antioxidant effects.

Precautions and Side Effects

While Babachi seeds had been generally considered safe, high doses had caused kidney and liver problems. It had been essential to consult with a healthcare professional before using Babachi seeds, especially if one had been already taking medications or had underlying health conditions.

Dosage and Administration

The recommended dosage of Babachi seeds had varied depending on the individual and the severity of the condition. It had been essential to consult with a healthcare professional to determine the best course of treatment.

Stability

The herbal pastes were found to be stable for a period of 6-12 months.

Storage

1. Cool and Dry Place: Store the paste in a cool and dry place, away from direct sunlight and moisture.
2. Airtight Container: Store the paste in an airtight container, such as a glass jar with a tight-fitting lid.

Shelf Life

1. Room Temperature: 6-12 months
2. Refrigerated: 1-2 years 3. Frozen: 2-3 years

Precautions

1. Keep Away from Children: Keep the paste out of reach of children and pets.
2. Avoid Contamination: Avoid contaminating the paste with water, air, or other substances.
3. Check for Spoilage: Regularly check the paste for signs of spoilage, such as mold, yeast, or off- odors.

Packaging Recommendations

1. Glass Containers: Use glass containers with tight-fitting lids to store the paste.
2. Dark Glass: Use dark glass containers to protect the paste from light.
3. Labeling: Label the containers with the date of preparation, storage instructions, and any other relevant information.

Efficacy

The results showed that the herbal pastes were effective in restoring skin pigmentation in vitiligo patients. The patients treated vitiligo with the herbal pastes of "Babachi seeds" showed a significant increase in skin repigmentation. Repigmentation: Babachi seed paste had been shown to promote repigmentation in vitiligo patients, with a significant increase in melanin production. Skin Pigmentation: The paste had been found to improve skin pigmentation, reducing the appearance of white patches. Melanocyte Stimulation: Babachi seed paste had been shown to stimulate melanocyte growth and proliferation, leading to increased melanin production. Anti-Inflammatory which had helped reduce inflammation and promote healing.

Hypothesis :-

It had been hypothesized that the herbal paste of Babachi seeds had been effective in promoting repigmentation in vitiligo patients due to its psoralen content, which had stimulated melanin production.

Result

The herbal pastes were found to have a pleasant odor, brown in color, smooth texture, and acceptable pH range, It is also known as *Psoralea corylifolia*, had been found to be effective in managing vitiligo, with a success rate ranging from 70-80% ¹. The seeds had contained psoralens, which had stimulated melanin production, leading to repigmentation of the skin. Melanin Production: Psoralens in Babachi seeds had stimulated melanin production, helping to restore skin pigmentation, Immunomodulatory Benefits: Babachi seeds had had immunomodulatory effects, which had helped reduce the autoimmune attack on melanocytes, Phototherapy Synergy: Babachi seeds had been used in combination with phototherapy to enhance its effectiveness, Anti-inflammatory Properties: Babachi seeds had had anti-inflammatory properties, which had helped reduce inflammation and promote healing.

Discussion

The results of this study suggest that herbal pastes can be a safe and effective natural therapy with phototherapy for vitiligo management. The herbal pastes were found to be stable, safe, non-irritating, and effective in restoring skin pigmentation. The study highlights the potential of herbal remedies in treating vitiligo and other skin disorders. this study demonstrate the efficacy of herbal pastes made from Babachi seeds in the management of vitiligo. The paste was found to promote repigmentation, improve skin pigmentation, and reduce inflammation in patients with vitiligo. These findings are consistent with previous studies that have reported the efficacy of Babachi seeds in the treatment of skin conditions.

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