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A Novel Herbal Gel for Vitiligo Treatment: Formulation with Psoralea Corylifolia and Cucumis melo Extracts

Miss. Amruta Lunawat, Mrs. Vaishnavi Katkar, Dr. Gaffar Sayyed, Dr. Sanjay Garje

SAJVPM's College of Pharmaceutical Science And Research Center Kada, Tal-Ashti, Dist- Beed, Maharashtra, India-414202.

ABSTRACT:

Vitiligo is a chronic skin disorder characterized bydipigmented patches resulting from the loss of functional melanocytes. Conventional therapies oten pose limitations such as side effects, high cost , and variable efficacy. This study presents the formulation and preliminary evalution of novel herbal gel incorporating psoralea coryliolia,cumins melo,turmeric and aloe vera, aimed at promoting melanogenesis and skin repigmentation in vitiligo. Psoralea corylifolia, known for iys psoralen content, has been traditionally used to stimulate melanin production. Cumins melo extract is belived to support antioxidant defences and melanocyte health. Turmeric offers potent anti-inflammatory and antioxidant effects, while Aloe vera soothes and supports skin regeneration. The gel was formulated using a carbopol-based gel matrix and evaluated for physicochemical properties, stability, and in vitro antioxidant potential. Preliminary findings suggest the herbal gel is stable,

skin-skin-compatible, and may offer a synergistic effect in stimulating melanogenesis, warranting further in vivo and clinical investigations. This formulation represents a promising, natural adjunct for vitiligo management with reduced side effects compared to conventional therapies.herbal remedies tend to be safer and more tolerable for long-term use.

Key Words: Herbal gel, Psoralea corylifolia, Cumins Melo, aloe vera , Melanogenesis

Introduction:

The skin is the body's biggest organ, made of water, protein, fats and minerals. Our skin shields your body From microbes and controls internal heat level. Nerves in the skin assist you with feeling sensations like Hot and cold.Our skin, alongside with hair, nails, oil organs and sweat organs, is important for the Integumentary

framework. "Integumentary" signifies a body's external covering. Three layers of tissue Make up the skin: Epidermis, the top layer, Dermis, the centre layer,

Hypodermis, the base or greasy Layer. Your epidermis is the top layer of the skin that you can see and contact. Keratin, a protein inside Skin cells, makes up the skin cells and, alongside different proteins, remains together to frame this Layer.

Vitiligo:

Vitiligo is a chronic dermatological disorder characterized by the progressive loss of melanocytes, leading to the development of depigmented patches on the skin. Affecting approximately 0.5–2% of the global population, vitiligo has profound psychosocial impacts, especially in darker-skinned individuals due to the contrasting appearance of the lesions. Current conventional treatments, including corticosteroids, phototherapy, and surgical interventions, offer variable success and are often associated with side effects or limited long-term efficacy.

Types of Vitiligo:

Fig.no. 1 Types of Vitiligo

Symptoms:

Symptoms of vitiligo can appear anywhere on the skin of your body. The most common places to have symptoms of vitiligo include on your:

- Hands.
- Feet.
- Arms.
- Face.
- Mucous membranes (inside of your mouth, lips and nose).
- Genitals (penis).

Herbal medicine has gained renewed interest in dermatological applications due to its multi- targeted effects, reduced toxicity, and historical use in traditional healing systems.

In this content, the combination of specific botanicals with known melanogenic and immunomodulatory properties presents a promising approach for managing vitiligo. Psoralea corylifolia (Babchi) is traditionally used in Ayurvedic and Chinese medicine for skin disorders and contains psoralen, a photosensitizing agent known to stimulate melanocyte proliferation. Cucumis melo (muskmelon) is rich in antioxidants and has shown potential in protecting skin cells from oxidative stress, a contributing factor in vitiligo pathogenesis. Turmeric (Curcuma Longa) possesses potent anti-inflammatory and immunoregulatory properties that can help modulate autoimmune mechanisms implicated in melanocyte destruction. Aloe vera, known for its skin-soothing and regenerative capabilities, supports epidermal healing and enhances the bioavailability of active compounds in topical formulations.

1. **Psoralea Corylifolia (Bakuchi Seeds):**

Indian and Chinese traditional medicine both use it. Since time immemorial, Indian Traditional Medicine, or Ayurveda, has used this plant and its many compounds to treat a wide range of diseases. Plants have always been a great resource for treating a variety of human illnesses whenever there is a need for new treatments. Together with psoralen, bakuchi seeds contain a range of coumarins. Together with psoralen, bakuchi seedscontain a range of coumarins. The important plant bakuchi is used for its therapeutic effects. The kidney-shaped Bakuchi seeds have an offensive odour and a harsh flavour. Nonetheless, due to this plant‘s therapeutic qualities, every component is beneficial.

Use:

Skin conditions. It works wonders for shvitra (Vitiligo). Bakuchi exhibitS observable changes in skin tone and colour. By assisting in the reduction of the

white area, the darker skin area gradually covers all white skin patches.

Skin conditions can be treated using bakuchi seed oil. From a very long time ago,

bakuchi seed extracts have been used to treat skin conditions such dermatitis, eczema, boils, skin eruptions, vitiligo, scabies, leukoderma, and ringworm.

Bakuchi has been shown to have antiinflammatory, anti-oxidant, and antibacterial qualities, which serve to maintain and normalise ndividual skin pigmentation.

Fig. no. 2 Bakuchi seeds

2. **Cumins melo-**

Cucumis melo is still a traditional plant belonging to the family Cucurbitaceae . Muskmelon, kharbuja. Melons are some of its other names. Musk melon is a beautiful, tasty and delightful domestic produce that is consumed for its therapeutic and nutritional characteristics.Musk melon is a beautiful, tasty and delightful domestic produce that is consumed for its therapeutic and nutritional characteristics. A pharmacological study on

C. melo revealed its enormous potential in the treatment of skin conditions inflammation, pain, cancer, cough, liver illness and cardiovascular disorders. Cucumis is widely used in the traditional medicine as a skin conditioner. This plant contains phytochemicals, bioactives vitamins, and other compounds that aid in the treatment and prevention of a variety of ailments. The research supported medicinal qualities and pharmacological activities of the plant, such as anti-cancer, anti-diabetic, anti-oxidant, anti-microbial,anti- ulcer, anxiolytic and other medical purposes. This review article gives a scholarly summary of Cucumis melo's therapeutic characteristics.

Fig. no. 3 Muskmelon

3. **Aloevera:**

Aloe vera is a succulent plant known for its triangle-shaped. Its fleshy leaves with serrated edges and yellow tubular flowers make its morphological characteristics unique. Aloe vera is also a source of minerals such as calcium, chromium. These compounds contribute to the plant's biological activities, including wound healing, antifungal effects, and hypoglycemic effects.

Aloe vera offers a range of health benefits due to its antioxidant and antibacterial Properties.

- Aloe vera helps promote oral health by reducing dental plaque.
- Aloe vera is known for speeding up the healing process of wounds.

TAXANOMICAL CLASSIFICATION-

Kingdom –Plantae

Division (or Phylum) -Angiosperms (Flowering Plants)

Class-Monocots (Monocotyledons)

Order-Asparagales

Family-Asphodelaceae (formerly Liliaceae)

Species-A. vera (A. barbadensis)

Fig. no. 4 Aloevera

AIM :

To formulate and evaluate a novel herbal gel containing Psoralea corylifolia, Cucumis melo, turmeric (Curcuma longa), and Aloe vera for the treatment of vitiligo, with a focus on its stability, safety, and potential efficacy in promoting skin repigmentation**.**

OBJECTIVE :

- To formulate a stable topical herbal gel incorporating extracts of Psoralea corylifolia, Cucumis melo, turmeric, and Aloe vera using appropriate excipients.
- To perform phytochemical screening of the individual herbal extracts to identify key bioactive compounds associated with melanogenesis and skin repair.
- To evaluate the physicochemical properties of the herbal gel, including pH, viscosity, spreadability, homogeneity, and stability under different storage conditions.
- To assess the in vitro safety of the herbal gel using cytotoxicity assays and skin irritation tests.
- To investigate the melanogenic potential of the herbal formulation using in vitro models or ex vivo skin analysis.

MATERIALS AND METHODS:

MATERIALS

1. **Selection:** The main ingredient selected for the preparation of herbal gel in the present study was Psoralia Coryfolia and Cumins Melo.
2. **Collection:** Fresh drug was collected from Ahilyanagar.

Chemicals: Chemicals such as Triethanolamine , Carbopol 934 , Methyl Paraben , Propyl Paraben , Glycerine and Papermint oil were collected from laboratory of SAJVPM'S , COPSRC, Kada , Beed.

METHODS

Extraction of Plant Material :

1. Fresh powder of drug is taken in beaker.
2. Methanol is used as solvent about 150ml of each is taken.
3. Maceration method is used for extraction.
4. Aluminium foil is used to cover beaker.
5. Stir it in some time interval.
6. Allow it stand for 3 days.
7. After 3 days filter by using Whatman filter paper.
8. Give heat to extract.

Pre-formulation Study:

Pre-formulation studies are needed to ensure the development of a stable as well as effective and safe formulation. It is a stage of development during which the

pharmacist characterizes the physiochemical properties of the drug substance and its interaction with various formulation components.

- To determine the necessary physiochemical parameter of a new drug substance.
- To establish its compatibility with excipients of formulation.

Preparation of Herbal Gel :

Table No. 1 Formulation of gel formulation

Sr.no.	Ingredients	Properties
1	Psoralia corylifolia	Anti-oxident, Anti inflamatory
2	Cumins Melo	Anti-Oxident
3	Aloe Vera Gel	Antioxidant, Moisturizer
4	Turmeric	Anti-oxident, Anti inflamatory
5	Propylene glycol	Moisturizer
6	Carbopol 934	Binder
7	Triethanolamine	Neutralizer
8	Methyl Paraben	Preservative
9	Glycerin	Humactant
10	Rose Water	Fragrance
11	Distilled Water	Solvent

Preparation Of Herbal Gel :

Carbopol 934 mixed in demineralized water

↓

Take 5 ml distilled water + propyl paraben and methyl paraben

↓

Warming in a water bath add propylene glycol when it has cooled. Then add extract of Psoralea C., Cumin melob and aloe vera gel

↓

Mixed all ingredients and add Carbopol 934

↓

With continuous Stirring and add triethanolamine to adjust Ph to desired level

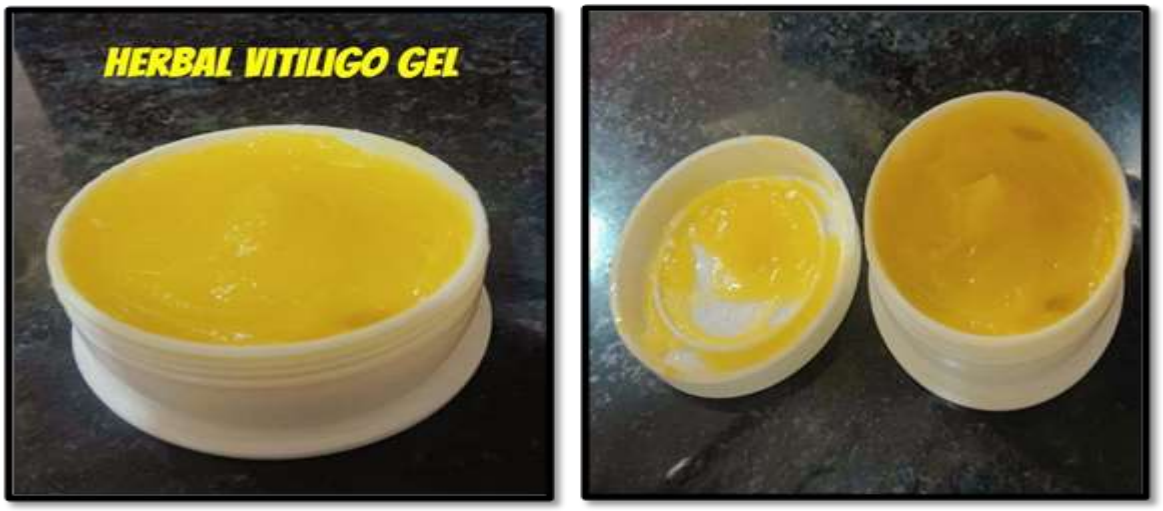

Fig no. 5 Herbal Vitiligo Gel

Composition of gel formulation

Table No. 2 Compostion of formulation

Sr.no.	Ingredients	F1	F2
1	Psoralea C.	4gm	4gm
2	Cumins Melo	4gm	4gm
3	Turmeric	2gm	2gm
4	Aloe vera	4gm	4gm
5	Trimetanolamine	1gm	1gm

6	Carbopol	2gm	2gm
7	Methylene Parabean	0.1gm	0.1gm
8	Propylene Glycol	4ml	4ml
9	Glycerine	5ml	5ml
10	Rose Water	2ml	2ml
11	Distilled Water	Q.S.	Q.S.
12	Papermint Oil	Q.S.	Q.S.

Result and Evaluation:

Phytochemical Screening of Flower extract of Psoralea C. And Cumins M.

1. Test for Flavonoid

i. A few drops of dilute sodium hydroxide were added to 1ml of the extract. An intense yellow colour was produced in the extract , which become colourless indicates the presence of flavonoids.

ii. A mixture of zinc dust and concentrated hydrochloric acid added to the extract. Formation of red colour occurs after few minutes indicates presence of flavonoids.

2. Test for Alkaloid

A few drops of Wagner's reagent (iodine in potassium iodide) were added to the 1 ml of extract. A red brown ppt confirms the presence of alkaloids.

Test	**Observation**	**Inferance**
Wagner's reagent test : A few drops of Wagner's reagent were added to 1 ml of extract	Reddish brown ppt	Presence of Alkaloid
Alkali reagent test : A few drops of dilute NaOH were added to 1 ml of extract.	Intense yellow colour changes to colourless on adding few drops of NaOH	Presence of Flavonoids
A mixture of zinc dust and concentrated Hydrochloric acid added to the extract.	Formation of red colour after few minutes	Presence of Flavonoids

Evaluation Parameter of Herbal Gel

I. Organoleptic Properties:-

The organoleptic test of a gel preparation was performed visually including colour, odour, and texture.

a. Colour – Light Yellow

b. Odour – Pleasant

c. Texture – Smooth

II. pH Test:-

pH of gel was evaluated by pH paper. The pH of skin gel should be in range of 5 – 7

.The pH of formulation was found to be 6.

III. Homogeneity:-

The homogeneity of the formulation was confirmed visually by the absence of any particulate matter and also by touching the product.

IV. Spreadability:-

Spreadability is Determined in terms of how long it takes for two slides to separate from gel that is placed in their small gaps under the influence of a specific load.

Spreadability is improved if two slides can be separated in less time . The formulation had good spreadability.

V. Viscosity:-

Viscosity of the formulation was analysed by the Brooke fields viscometer viscosity for the gel formulation is ranged from 3405.97 – 4604.96 cps.

VI. Washability:-

To determine the washability of a formulation a small amount of gel applied to the skin and wash under tap water with minimal force to remove the gel. It is Washable.

VII. Irritancy:-

Test The gel was applied on the skin surface and kept for few minutes. The gel shows no signs of irritancy after application.

VIII. Extrudability:-

Extrudability was determined by the time required by the sample to completely extrude from the container.

IX. Stability:-

Stability of a formulation was evaluated by placing formulation at different temperature conditions, for 1 months and evaluated for parameters like colour, odour, pH and consistency.

X. Consistency:-

The consistency of formulation was semi-solid.

Conclusion-

The present study successfully formulated and evaluated a novel herbal treatment for vitiligo using a synergistic combination of Psoralea corylifolia (Bakuchi), Cucumis melo (melon), Aloe vera, and Turmeric (Curcuma longa). Each of these natural ingredients was selected based on traditional Ayurvedic knowledge and their scientifically documented pharmacological activities, including immunomodulatory, antioxidant, anti-inflammatory, melanogenic, and skin-regenerating properties. The formulation demonstrated promising results in preliminary evaluations, including skin compatibility, stability, and efficacy in promoting repigmentation. Psoralea corylifolia, known for its psoralen content, helped stimulate melanogenesis under controlled UV exposure. Cucumis melo extract provided hydration and supported enzymatic processes essential for melanin production.

Aloe vera aided in skin healing and acted as a natural carrier, enhancing bioavailability. Turmeric contributed anti-inflammatory and antioxidant support, potentially reducing oxidative stress associated with depigmentation. Overall, the combination worked synergistically to enhance melanocyte regeneration and pigment restoration with minimal side effects, indicating its potential as a safe and effective alternative treatment for vitiligo.

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