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Review Article

Formulation And Evaluation of Antifungal Herbal Cream from *Pongamia pinnata* (Karanja)

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ABSTRACT

The concept of 'Herbal medicine' has its origins in ancient societies. In these medicines we use that are plants or its parts to cure disease and improve health and wellbeing. Some herbs have an active ingredient which shows the particular therapeutic value and should be taken with some caution as pharmaceutical medications. In fact, most of the pharmaceutical medicines are based on man-made versions of naturally occurring substances found in nature. Most of the people believe that products which are labelled as "natural" are always safe. This isn't inescapably true. There is no need to do testing of herbal medicines as pharmaceutical medicines have to do. The aim of this research was to formulate herbal cream for nourishing, moisturizing and treating fungal infection. Karanja oil was taken for this preparation of antifungal herbal cream. The stability testing of cream showed that the product found to be stable and there were no evidence of phase separation and no colour variation. The patch test has been done and there are no skin irritation, inflammation and allergic reaction. Hence this herbal cosmetic preparation is safe to use for skin was proved. The main objective of this study to formulate safe and effective cream this does not cause side effect and to study efficacy and safety of prepared antifungal cream.

INTRODUCTION

Pongamia pinnata, commonly known as the karanja tree, is a fast-growing evergreen species native to Asia and Australia, belonging to the pea family, Fabaceae. This tree species exhibits a broad, spreading canopy, reaching heights of up to

40 feet with a 55-foot spread, casting moderate shade. Its pinnately compound leaves, 6-9 inches long, are shiny dark green and briefly deciduous, dropping in early spring only to be rapidly replaced by new growth. The tree's showy, fragrant blossoms, in white, pink, or lavender hues, appear in clusters up to 10 inches long,

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making it an attractive specimen, shade, or windbreak. The seeds, contained in oval, 1-2-inch-long pods, are toxic, but the tree's ornamental value has led to its use as a road tree, despite littering concerns. Overall, *Pongamia pinnata* is a versatile and attractive species with significant ecological and horticultural potential.^[1] *Pongamia*, a versatile and ornamental tree, offers a plethora of benefits for humans, creatures, and the environment. Its fragrant flowers are a rich source of pollen and nectar, which bees convert into dark honey, providing a valuable resource for apiculture and a sustainable livelihood for communities. The leaves of *Pongamia* possess medicinal properties, treating various ailments, including skin diseases, stomach pain, and respiratory illnesses such as bronchitis and whooping cough. Moreover, the seed oil is used as a liniment, while the seed powder is prescribed for fevers. In the realm of livestock, *Pongamia* leaves serve as a nutritious fodder for goats and cattle, and the seed oil yields a pressed cake used as animal feed. Additionally, the tree's oil is utilized as a fertilizer, lamp fuel, and raw material for various industrial applications, including soaps, detergents, varnishes, and paints. Its insect-repelling properties make it an effective natural pest control agent for storage areas and a mosquito repellent.^[2] *Pongamia pinnata* seeds have been found to be a treasure trove of bioactive compounds, boasting an impressive 28-34% oil content rich in polyunsaturated fatty acids. The seeds are particularly notable for their high concentration of phenylated flavonoids and the presence of karanjin, a bioactive molecule with potential therapeutic applications. Further investigation has led to the isolation of six compounds, including two sterols, three sterol derivatives, and one disaccharide, in addition to eight fatty acids (three saturated and five unsaturated). This comprehensive phytochemical profiling of *Pongamia pinnata* seeds highlights their potential as a valuable source of natural products with potential applications in fields such as pharmaceuticals, cosmetics, and functional foods.^[3] Karanja oil, derived from the seeds of the species native to Asia and other regions, has emerged as a promising natural remedy for various

skin and hair conditions. This cold-pressed oil boasts antibacterial, anti-inflammatory, and antifungal properties, making it an effective treatment for inflammatory skin conditions such as psoriasis and eczema. Additionally, Karanja oil has been shown to alleviate irritation and dandruff, promoting a healthy and balanced scalp. Its soothing component also makes it an ideal ingredient in skincare and haircare products, providing a natural and gentle solution for individuals seeking to address skin and hair concerns.^[4]



Fig. No. 1: Seed of *Pongamia pinnata* (L.)

Fungal infection:

Fungal infections, also known as mycoses, are a prevalent skin disease caused by fungi, which are ubiquitous in the environment. These microorganisms thrive in moist areas of the body, such as skin folds, and can lead to skin problems like rashes, bumps, and itching. Common fungal skin infections are caused by *Candida*, *Malassezia furfur*, *Epidermophyton*, *Microsporum*, and *Trichophyton*, which typically inhabit the topmost layer of the epidermis. Obese individuals and those with diabetes are more susceptible to fungal infections due to skin folds and compromised skin integrity. The immune response to fungal infections can manifest as itchy, bumpy rashes, which are not contagious and do not result from touching the infected area. Understanding the causes and risk factors of fungal infections is crucial for effective prevention and treatment of this common skin disease.^[5]



Fig. No.2: Fungal infection

Plant:**Scientific Name:** - *Pongamia pinnata***Synonyms:** -Millettiapinnata (L.) Panigrahi, Cytisuspinnatus L., pongamiaglabra vent**Biological source:** -Karanja oil is extracted from dried seeds of species of *Pongamia pinnata*.**Family:** - Fabaceae.

Chemical constituent: - Seeds contain nearly 28-34% oil with high percentage of polyunsaturated fatty acids. It is rich in phenylated flavonoids. The main active ingredient present in seeds is karanjin. It contains six compounds and eight fatty acids. Oleic acid occurs in highest amount (44.25%), stearic (29.64%), and palmitic (18.58 %) acids were the next in quantity. Hiragonic and octadecatrinoic acids were present in trace amounts (0.88%).

Ingredient Profile:**Table No. 1: Uses of Ingredients** [6,7,8,9]

Sr. no.	Ingredients	Uses
1	Karanja oil	Antifungal agent
2	Petroleum jelly	Soothing agent
3	Hard paraffin	Lubricant
4	Cetyl alcohol	Emollient
5	Glyceryl monostearate	Emulsifier
6	Methyl paraben	Preservative
7	Propyl paraben	Preservative
8	Peppermint water	Fragrance

9	Activated charcoal	Adsorbent
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MATERIALS AND METHODS:**MATERIALS:**

Pongamia pinnata (L.) seeds were procured from local area of kavathemahankal, Sangli, Maharashtra, India and authenticated at P.V.P Mahavidyalaya, Kavathemahankal..



Fig No.3: Karanja Oil

Preparation of extracts:

The dried seed was powdered to appropriate size. 200 g of dried powder of seeds was extracted. 600 ml of petroleum ether was used. Using Soxhlet apparatus extract the dried powder for 7 hours. Then filter the extract in rotary evaporator, it is concentrated until oily extract was produced. Using dry weight of powder, the percent yield of oil was measured.^[7]



Fig.No.6: Extraction of Karanja oil



Formulation Preparation:

1. It is oil in water emulsion. In that 20 and 60% of drugs were formulated.
2. The emulsifier (glycerol monostearate) and other oil soluble components (petroleum jelly, Cetyl alcohol) were dissolved in the oil phase in beaker 1 and heated up to 80° C. ME extract and water-soluble components (Methyl paraban, Propyl paraban) were dissolved in beaker 2 and heated up to 80° C.
3. After heating, the aqueous phase (beaker 1) was added in portions to the oil phase (beaker 2) with constant stirring until cream is formed.
4. Cream was formulated having color i.e., Lemon yellow.
5. Perfume was added when the temperature dropped to 45° C $\pm$ 50° C.

**Fig.No.7: Prepared cream****Evaluation Of Cream:**

A) Physical Properties: The Cream was observed for colour, Odor, appearance and consistency.

Colour: The color of the cream was observed by visual examination i.e., pale yellow color.

Odour: The odour of cream was found to be characteristics.

Appearance: The appearance of cream was examined visually. The cream having a semisolid state.

Consistency: The formulation was examined by rubbing cream on hand manually. The cream having smooth consistency. Cream leaves greasy substances on skin surface after application.

Table No.2: Physical Properties

Sr. No.	Properties	Observation
1.	Colour	Pale yellow
2.	Odour	Characteristic
3.	Appearance	Semi solid
4.	Consistency	Smooth

B) Stability Study:

Stability testing is started as test of drug during drug discovery process. The stability testing of formulation assessed according to ICH guidelines. In this study the formulation is kept in proposed pack or prototype containers if drug in bulk form., in required number at room temperature. It is placed away from the light.

Table No.3: Stability study

Test	After one month
Physical appearance	Semi-solid
Texture	Smooth and creamy
Colour	Pale yellow
Odour	Characteristic
pH value	5.56
Thermal stability	Stable
Degradation of product	No

C) Determination of pH:

In 10ml test tube, 0.5gm of cream was accurately weighed. Add 4.5 ml of water and cream is dispersed in it. At 27° C temperature, the pH of suspension was determined with the help of pH meter.

Table no.4: Ph

Sr. No.	Test	Observation
1.	pH 27° C	5.56

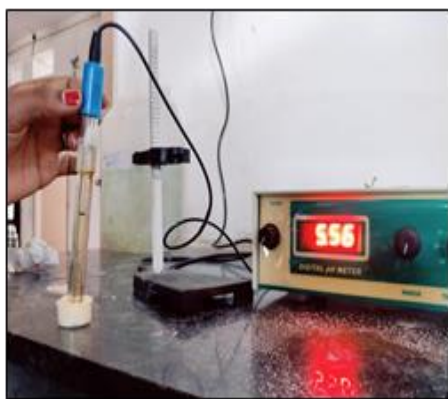


Fig.no.8: Detection of pH

D) Patch Test:

The cream to be tested was taken up to 2gm which is placed on piece of fabric or funnel. Then it is applied on the infected part of the skin. This is tested was applied to area of 1 sq. m of the skin. The area of patch is observed after 24 hrs.

Result of patch test: - No irritation or no any inflammation to the skin.

E) Spreadability Test:

Spreadability is a term expressed to denote the extent of area to which the cream readily spreads on application to the skin. The fixed amount of prepared cream was applied on skin surface, the properties are observed.^[6]

F) Removal of Cream:

The cream was applied on skin and removed the cream by washing with applied part with tap water.

G) Irritancy:

The cream is applied on the skin. Wait for few minutes and effect was studied.

RESULT:

The majority of people in developing countries still depend on herbal medicine to get effective health results. And because of that more research carried out in this field.

1. The stability study of different parameters such as appearance, pH, nature of preparation showed that there was no any difference after one month observation study and the results are given in table no.3
2. The pH of prepared antifungal cream was found to be near about 6 which is suitable for topical application. The results are given in table no.4
3. The prepared antifungal cream shows no any redness, irritation, inflammation, edema during patch test. Thus, it is safe to use on skin.
4. The Spreadability test showed that the cream has good Spreadability.

CONCLUSION:

Now day's researchers focus on therapeutic effect of herbal extract from cosmetic purposes. The uses of cosmetic in personal care have been increased. The bioactive ingredients in cosmetics have biological function of skin and provide nutrition for skin to become healthy. The prepared antifungal cream showed good spreadability, good consistency. There is no evidence of phase separation. Stability parameters such as appearance, nature, pH, color, odour of prepared formulation showed that there was no any variation during observation study.

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