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Formulation and Evaluation of Herbal Antifungal Cream

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Abstract: ***Fungal diseases become a major medical problem. Fungal disease is difficult to manage because they tend to be chronic, hard to diagnosis. The fungal infection is a common condition caused by fungi. The herbal antifungal cream was formulated by using various herbs such as neem and aloe vera. Herbal medicine is one of the oldest and most universal system of health care system. The herbal antifungal cream is very helpful and it is fewer side effects. All herbal ingredients are easily available in market. The herbal antifungal cream is used to treat fungal infection which most commonly affect our skin, hair and nails. Herbal antifungal cream are used to treat fungal skin infection such as athletes foot, ringworm and jock itch. This herbal antifungal cream represents a natural and safe to use, and this herbal antifungal cream is beneficial in reduction of fungal infection.***

Keywords: Herbal Antifungal Cream; Fungal Disease; Herbs; Herbal Ingredient; Skin Infection

I. INTRODUCTION

Fungal infections Of skin, such as athletes foot, ringworm and candidiasis are common dermatological conditions that affect millions Of people worldwide. these infections as typically caused by dermatophytes, yeasts, or molds ,and can leads to symptoms such as itching ,redness, and scaling. While conventional anti-fungal treatments, including topical creams, powders, and oral medications ,are widely used ,they Often come with side effects, such as skin irritation or allergic reactions-The increasing resistance Of fungal pathogens to synthetic antifungal drugs poses asingnificant challenges in treatment effectiveness. The response to these concerns, there has been growing interest in alternative treatments using herbal remedies . many plants have demonstrated antifungal, antimicrobial ,and anti inflammatory properties that can help to treat and prevent fungal infections. for centuries, traditional medicine has utilized herbs such as neem (azadirachta indica) ,turmeric (curcuma longa), and garlic (allium sativum) for their healing properties, especially in skin-related disorders. These plant contain bioactive compound like terpenoids, flavonoids, and alkaloids, which exhibit These plant contain bioactive compound like terpenoids, flavonoids, and alkaloids, which exhibit strong antifungal activity and can be effectively inhibit the growth of common skin fungi herbal cream Offer a natural safe, and effective alternative to chemical-based treatments.

II. DISEASE

A. Athlete's Foot Infection

Many people will have athletes foot at some points in their lives. It usually affects the gaps between the toes . athletes foots (tinea pedis) is particularly common between the little

Fig. 1.1

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Toe and the toe next to it. The fungus can cause the skin to redden and crack. The affected areas are flaky and sometimes itchy . this skin can also turn white and thicken , and is then Often slightly swollen .1fthe inflection spreads across the sole of the foot it is refered to as moccasin athaletes foot.
The sole Of the feet, the heels and the edges Of the feet are then dry, scaly, and may be itchy.
Moccasin athletes foot is sometimes mistaken for Other conditions such as eczema. A rare kind
Of athletes foot cause an acute.

Treatments
Herbal ointments have gained popularity in recent years as a natural alternative for treating various skin conditions, including fungal infections. Fungal infections are common in athletes due to factors like excessive sweating, sharing equipment, and close contact in sports. Ointments with antifungal properties, derived from herbal ingredients, can Offer effective treatment with fewer side effects compared to synthetic antifungals.
Below is a comprehensive outline ofthe process for an herbal ointment aimed at treating fungal infections:

B. Ringworm

Ringworm is a fungal infection causing a red or silver ring-like rash on your skin. The rash usually affects your arms and legs, but it can be anywhere on your body, including your scalp. The rash is paler in the middle and has a clear, swollen and scaly outside edge. Over time, the rash spreads outwards and the circle looks as if it's growing.
Sometimes, you may have more than one circular rash.

Fig. 1.2

C. Jock Itch

Jock itch, also known as tinea cruris, is a fungal skin infection that causes an itchy, red, and Often ring-shaped rash in warm, moist areas ofthe body, particularly the groin, inner thighs, and buttocks. It is a common infection, especially among athletes, and is caused by dermatophytes, a type Of fungus that thrives in damp environments.
Key characteristics Of jock itch:
Cause: Fungal infection (dermatophytes).
Location: Groin, inner thighs, buttocks.
Appearance: Red, itchy, scaly rash, Often ring-shaped.
Symptoms: Itching, burning, stinging, sometimes with a musty Odor.
Transmission: Skin-to-skin contact, especially in warm, moist environments.
Medical term: Tinea cruris.
Relationship to Athlete's Foot: Can be spread from the feet to the groin if the individual has athlete's foot.

Fig. 1.3

III. MATERIALS & METHODS

A. Drug Profile

Catheranthous roseus
- Kingdom: Plantae
- Division: Magnoliopsid a
- Class: Magnoliopsida
- Family: Apocynacea
- Species: C.roseus
- Synonyms: Vinca rosea, Madagascar. Plan of Work

l) Collection of herbal ingredients
2) Extraction of herbal ingredients
3) preparation of herbal cream
4) Evaluation (PH determination, patch test, spreadability test, viscosity.)

Neem
- Scientific Name: Azadirachta indica A. Juss.
- Family: Meliaceae (Mahogany family)
- Common Names:
- Neem
- Indian lilac
- Margosa
- Quercetin

Uses
- Medicinal: Neem has been used in traditional medicine for its antibacterial, anti-inflammatory, and antiviral properties.
- Agricultural: Neem is used as a natural pesticide and fertilizer.
- Skincare: Neem is used in skincare products due to its antibacterial and anti-inflammatory properties.

.Aloe Vera

Aloe vera's scientific name is Aloe barbadensis Miller, and it belongs to the following classification:
- Kingdom: Plantae
- Family: Asphodelaceae (previously classified under Liliaceae or Xanthorrhoeaceae)
- Genus: Aloe
- Species: Aloe vera or Aloe barbadensis Miller

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Turmeric

Turmeric is scientifically known as Curcuma longa Linn. It belongs to the following classification:

- Kingdom: Plantae
- Family: Zingiberaceae (Ginger family)
- Genus: Curcuma
- Species: Curcuma longa

Tween-20

The Tween-20 study investigates the properties and applications of a surfactant known as Tween-20, which is commonly used in various industries including pharmaceuticals, food, and cosmetics. Tween-20 is a nonionic surfactant belonging to the Tween series, produced by ethoxylation Of sorbitan monolaurate. Twin-2() exhibits amphiphilic properties, meaning it has both hydrophilic and hydrophobic regions.

Beeswax

Beeswax, a natural substance secreted by honeybees, plays a vital role in the hive's construction and maintenance. It is composed primarily Of esters, fatty acids, and hydrocarbons, making it a complex mixture with various applications. Beeswax has a unique combination Of properties that make it valuable in numerous industries.

Borax

Borax, also known as sodium borate, is a versatile compound with various applications across industries and households. Its chemical formula is Na2B407• Borax is primarily mined from natural deposits in countries like Turkey, the United States, and Chile.

Slica gel

Silica gel is a porous form Of silica dioxide, synthetically manufactured from sodium silicate. It appears as small, translucent beads or granules and is known for its high adsorption capacity.

Bentonite

Bentonite is a versatile clay mineral renowned for its unique properties and wideranging applications across various industries. It is primarily composed Of montmorillonite, a swelling clay mineral, along with Other minerals such as quartz, feldspar, and gypsum.

Methyl paraben

Methyl paraben is a commonly used preservative in cosmetics, pharmaceuticals, and food products due to its ability to inhibit microbial growth and extend product shelf life. Chemically, it belongs to the paraben family, which are esters of parahydroxybenzoic acid.

Rose oil

Rose oil, also known as rose Otto or rose essential oil, is extracted from the petals of various types of roses, primarily Rosa damascena or Rosa centifolia. The extraction process typically involves steam distillation or solvent extraction, yielding a concentrated oil with a strong, floral scent. rose oil is often used in aromatherapy for its calming and mood-enhancing effects

B. Material and method

The dried Neem leaves powder was prepared with the air dried leaves of neem plant.

Material:-l] Neem leaves were randomly collected from local area ofand

Parbhani. The plant leaves were identified. The freshly collected leaves of plant neem . on the date [13-3-2025]

Formulation method of Herbal Antifungal Cream: -

Sr.no	Ingredients	Quantity
01	Catheranthus roseus extraction	20ml
02	Neem extraction	10ml
03	Turmeric extraction	5ml
04	Aloe vera gel extraction	5ml
05	Glycerine	5ml
06	Tween -20	10ml
07	Beeswax	2.5gm
08	Silica gel	0.2gm
09	Bentonite	3gm
10	Methyl parabean	0.1gm
11	Borax	0.1gm
12	Rose oil	9.5ml

Table no 1 :- Ingredients

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C. Extraction process of turmeric

extraction process was modified from the previous study . Ground turmeric (5 g) was extracted with 100 mL Of water, for 2 h at 1000C. the supernatant was filtered through filter paper .

filtered solution

IV. ALOEVERA GEL EXTRACTION

Steps:

I. Choose a mature leaf: Select a thick, mature leaf from the outer section ofthe aloe vera plant. The Older the leaf, the more gel it usually contains.

2.Wash the leaf: Rinse the leaf thoroughly under running water to remove any dirt or debris.

3.Trim the edges: Using a knife, carefully cut Off the serrated edges (spiky sides) Of the leaf.

4.Cut the leaf open: Slice the leaf lengthwise to expose the gel inside.

5.Scoop out the gel: Use a spoon to scrape the clear, slippery gel from inside the leaf. Avoid the yellowish latex layer just beneath the skin, as it can be irritating to the skin and digestive system.

6.Blend (optional): For a smoother consistency, blend the gel for a few seconds.

7.Store: Pour the gel into a Clean, airtight container. It Can be stored in the refrigerator for about 1—2 weeks. Add a few drops of vitamin E or C as a natural preservative to extend shelf life.

Neem decoction (Distilled Azadirachta indica leaves were collected and washed under running tap water and rinsed with distilled water to remove dust and debris. The leaves were crushed In a mortar and pestle to a coarser particle size. The crushed leaves(50gm) added with 40ml ofdistilled water and boiled till the volume reduces to 20 ml. Decoction was passed through muslin cloth and allowed to cool down at room temperature. The prepared decoction was passed through muslin cloth and filtrate used for further research study.

Method Of Extraction (Neem extract)

Mixed with 500 ml Of distilled water

Boiled for 30 min.

Take 50 gm Of dried leaf powder.

Boiled solution ware filtered using filter paper.

Clear aqueous leaf extract was obtained-

Beaker A

Beaker A

Turmeric extract

Take 20 g Of dried turmeric

Mixed with 100 ml Ofdistil water

Boiled min.

Boiled solution were filtered using filter paper

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Beaker B

Clear aqueous turmeric extract was obtained

Beaker B

Method Of preparation
Take two beaker A and B,wash and clean properly
In Beaker A
-Take aloevera gel & boil on water bath
-Add neem extract and turmeric extract with continuous stiring
In Beaker B
-Take glycerine & boil
-Add bees wax & twin 20 with continuous stiring
-Add borax & silica gel with continuous stiring
-Then add methyl paraben
-Mix beaker A & B together with constant mechanical stirring
-Add bentonite with continuous stiring
-Then the formulation cool in room temperature for 5 min
-Then add rose Oil for fragrance

V. EVALUTAION TEST

A. Patch Test

A patch test for a herbal antifungal cream involves applying a small amount Of the product onto a small area of the skin, typically on the forearm or behind the ear. The purpose Of this test is to evaluate the cream's potential for causing irritation or allergic reactions in sensitive individuals. After application, the area is observed for any signs Of redness, swelling, itching, or Other adverse reactions over a period Of 24 to 48 hours. This test helps to assess the cream' s safety profile and determine if it is suitable for use on larger areas Of the skin without causing harm or discomfort

Sr. NO. Properties Observation
l. Colour - Pale yellow
2. Odour- Characteristic
3. Appearance- Semi- solid
4. Texture -Smooth pH determination

The pH Of various semi-solid (cream) formulation were determined by using digital pH meter. Weight 2.5g Of cream and dispersed in 25ml Of distilled water and stored for 2 hours. Then measurement Of pH by using digital pH meter [12].

Spreadability test

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Fig. no1.4 :-Spreadability

The spreadability test for a herbal antifungal cream assesses its ability to evenly distribute and cover a given surface area upon application. This test typically involves placing a fixed quantity Ofthe cream onto a standardized surface, such as glass or a skin mimic substrate, and measuring the diameter Of the spread after a specified time period.

Homogeneity

The homogeneity Of herbal antifungal cream is crucial for consistent effectiveness and application. Manufacturers utilize techniques like blending, emulsification, and particle size reduction to achieve desired consistency

Viscosity

The viscosity Of formulated antifungal creams was measured by Brook field Viscometer using 4 spindle at varying speed and shear rates. This viscosity ensures uniform coverage, facilitating the absorption Of active ingredients into the skin for maximum efficacy against fungal infections

B. PH Determination

The pH ofthe cream was found to be in range Of 5.6 to 6.5 which is good for skin pH. The herbal formulation was shown pH nearer to skin required i.e pH

Fig no.1.5 :-pH

C. Viscosity

Viscosity of formulated cream was determined by brook field viscometer at 21801 mpa using spindle number (needle number).

4. Spreadability Test

The spread ability test showed that the formulated cream has good spreadable property.

s=MxLrr

Where,

S = spreadability (g.cm/s)

M weight applied (in grams)

L = length of the cream spread (in cm)

T Time taken for spreading (in seconds)

M = 200gm

L = 6.8 cm T- 120 sec s = 200x6.8/120 S = 11.33g. cm Is From above calculation the spread ability of antifungal cream is Il .33 gm.cm/s.

5. Microbial test When applied the Cream it inhibit the growth Of fungi

6 . Homogeneity

Cream are uniform distribution on the skin

VI. CONCLUSION

The increasing global awareness Of the environmental impact Of pharmaceuticals and a growing desire for sustainable, natural solutions have propelled herbal remedies into the spotlight. Herbal antifungal creams, harnessing the power Of plant extract, represent a compelling alternative to synthetic medications, offering a balance between efficacy and safety-one of the key strengths lies in the generally well-tolerated nature of herbal formulation, Often associated with synthetic counterparts. Scientific advancements in herbal medicine research further substantiate the efficacy Of specific plant compounds against fungal pathogens. This intersection Of traditional herbal knowledge and modern scientific validation enhances the credibility Of herbal antifungal remedies, paving the way for great integration into mainstream health care practices. The future trajectory Of herbal antifungal creams is marked by sustainability, safety and efficacy making them a compelling choice in the evolving landscape Of antifungal treatments.

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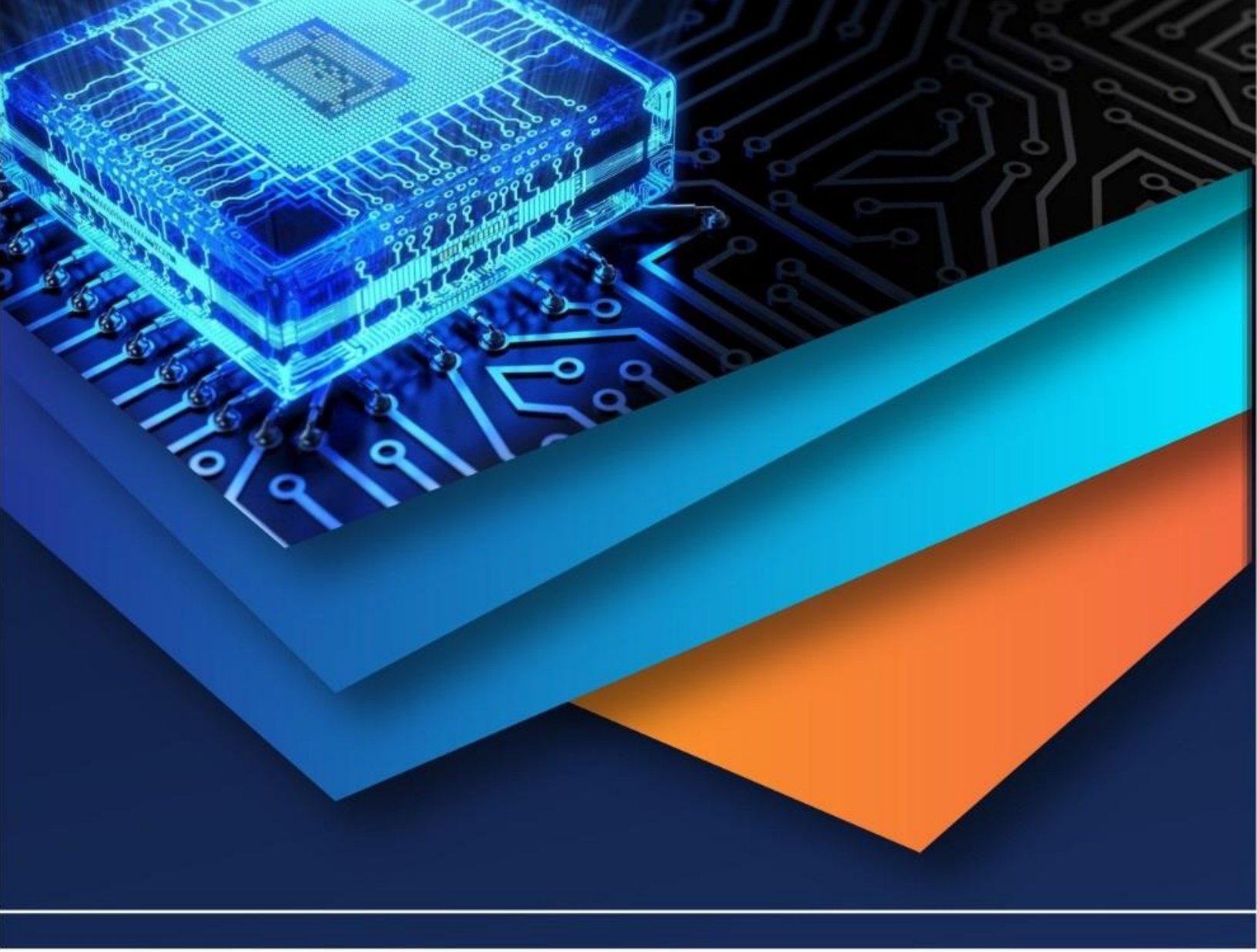

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