Formulation and Evaluation of Anti-fungal Soap

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Abstract
Azadirachta indica (Neem soap is a specialized cleansing product designed to prevent and treat fungal infections on the skin. These soaps contain active ingredients with anti-fungal properties, such as clotrimazole, miconazole, tea tree oil, or undecylenic acid, which inhibit fungal growth and reduce the risk of infections like athlete's foot, ringworm, and yeast infections .Fungal skin infections are most common among people, requiring significant attention for treatment and also to maintain good and healthy skin. Some herbal plants have anti-fungal activity. The aim and objective of the present study is to formulate anti-fungal herbal bath soap using different herbal plants. The anti-fungal activity of the prepared formulation was tested using agar diffusion method against the organism Candida albicans. The prepared herbal soaps formulations exhibited a good anti-fungal effect.

Keywords: Introduction, fungal infection, plant and active ingredient

INTRODUCTION

Anti fungal soap is a particular kind of soap that is used to treat various fungal infections. these infections may be treated with allopathic medications or with conventional herbal remedies like plant extracts or herbal oils. anti-fungal soap contains fungus-fighting ingredients like fluconazole and ketoconazole, but many use natural ingredients like neem leaves ,turmeric and lemon . they can help with a variety of fungal infections, including ringworm, jock itch, and athlete's foot. anti-fungal are medicines that kill or stop the growth of fungi (the plural of fungus) that cause infections. they are also called antimycotic agents. fungal infections can affect the circulatory system.anti-fungal soap, containing ingredients that combat fungal infections, can be a valuable tool for preventing and treating conditions like athlete's foot, jock itch, and ringworm, often incorporating natural or medicated formulations .anti-fungal soap is a type of soap specifically designed to prevent and treat fungal infection on the skin these soaps contain ingredients with anti-fungal properties which help to reduce the growth of fungi and prevent infections . anti-fungal agents are medications used to treat infections caused by fungi. these infections can range from superficial, like athlete's foot, to systemic and potentially life-threatening conditions such as cryptococcal meningitis. anti-fungal agents are classified

into several categories based on their chemical structure and mechanism of action.an anti-fungal agent is a drug that selectively eliminates fungal pathogens from a host with minimal toxicity to the host.the anti-fungal agents are fungi-static in nature and are used to prevent and treat fungal infections such as candidiasis, ringworm, etc. anti-fungal is basically the drugs which help in detecting and eliminating fungal pathogens from the foreign body with less toxic side effects to the body. the skin or cutaneous membrane covers the external surface of the body. it is the largest organ of the body in surface area and weight. the function of the skin is body temperature regulation, a reservoir for blood, protection from the external environment, cutaneous sensations, excretion and absorption, and vitamin d synthesis. the external defence system prevents microbial microorganisms to enter the body. skin is biggest external defence system. skin covers the outside of the body but has other functions beside the defence mechanism. it serves as a mechanical barrier between the inner part of the body and the external world. temperature of skin varies in a range of 30 to 40°c degree depending on the environmental conditions. skin is one of the most readily accessible organs on human body for topical administration and is main route of topical drug delivery system. this research is concern with all detail information regarding rational approach to topical formulation, aim of topical permeation and basic components of topical drug delivery systems. absorption of ointment through the skin depends on a number of factors, the important of which are concentration, time of contact, solubility of drug, and physical condition of skin layer and part of the body exposed.[1,2,3]

Advantages of anti-fungal soap for skin

1)kills and prevents the growth of fungus.

2)This relieves the symptoms caused by the infection.

3) It may be used to treat infections such as ringworm, athlete's foot, fungal nappy rash, and fungal sweat rash. You should keep using it for as long as it is prescribed even if your symptoms have gone.

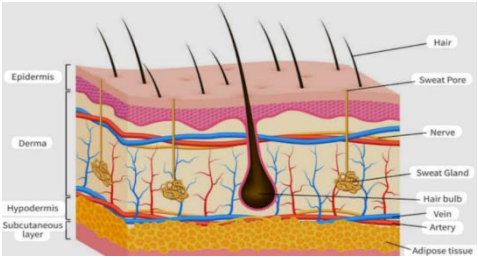

Fig no 1. Skin Anatomy

Layers of Skin:

1. Epidermis: It is the top most layer of skin that can we see and feel it touch it. In this layer new skin cells development occurs and it also contains the keratinocytes stem cells. There are 5 types of epidermis. i) Stratum Basale. ii) Stratum Spinosum.iii) Stratum Granulosum. iv) Stratum lucidum. v) Stratum Corncum.
2. Dermis: It is connective tissue layer sandwiched between the epidermis and subcutaneous tissue. The role of dermis is to supply and protect the skin and deeper layer assist in thermorcgulation and aid in sensation.
3. Hypo-dermis: It is known as subcutaneous tissue which is innermost tissue. The hypo-dermis protect your skeletal system, organ, muscle and tissue from harm.

2 FUNGAL INFECTION:

A fungal infection, also called mycosis, is a skin diseases caused by a fungus. There are million species of fungi. They live in dirt, on plants, on household surfaces, and on your skin. Sometimes, they can lead to skin problems like rashes or bumps. Different types of fungi can cause fungal infections. In some cases, fungi that aren't typically found on or inside your body can multiply out of control and causes an infection. Fungal infections can be contagious. They can spread from one person to another. Currently, fungal skin infection is one most serious dermatological concerns in the world. It has been found that in developing and underdeveloped countries, about 40 million people have suffered from fungal infections.[9,10,11]The key difference between bacterial and fungal infections is how doctors treat them. You'll take an anti-fungal medicine for a fungal infection, which could take a while to treat. Doctors prescribe antibiotics to treat bacterial infections, and these medicines work more quickly[4,5,6]

Fig no 2. Fungal Infection

Most Common Skin Disease :

1) Eczema
2) Acne
3) Rashes
4) Psoriasis
5) Allergies
6) Ringworm etc

Fungal Infection can affect the:

1)Circulatory System
2) Respiratory System
3) Skin and Nails

3 LIST OF CHEMICALS

List of chemicals used in soap base, neem, tulsi,lemon ,turmeric ,SLS, Steric acid ,Fluconazole ,Lavender oil.

4. PLANT AND ACTIVE MATERIAL:

1.NEEM:

Neem exhibits significant anti-fungal activity, primarily due to the presence of compounds like terpenoids, alkaloids, and glycosides. Extracts from neem leaves and seed oil can inhibit the growth of various fungal pathogens, including dermatophytes and plant pathogens, demonstrating its potential as a natural anti-fungal agent

.**Fig No 3 : Neem**

- SYNONYMS:- Nimba, Vemb, Kadulimbha
- FAMILY :- MELIACEAE
- BIOLOGICAL SOURCE- Azadirachta Indica
- CHEMICAL CONSTITUENTS:- Azadirachta, Nim-bin, Nimbidin
- PATS USE:- Leaves, Seed, Flower, Bark
- PROPERTIES :- Antibacterial. Anti-Septic
- OTHER USES :- Insecticide, Antifeedant Anti-fungal

Applications:

1)Neem extracts and oil can be used as natural fungicides for plant disease control, particularly against rust and powdery mildew.

2)Neem leaf extracts have shown promise in managing skin fungal infections like tinea capitis.

3)The anti-fungal properties of neem can also be utilized to increase the shelf life of plant tubers after harvest. [7;8,9,10]

2) TULSI

Tulsi (Ocimum sanctum), commonly known as Holy Basil, exhibits anti-fungal activity and has been used traditionally for treating fungal infections. Studies have demonstrated that various extracts and essential oils derived from Tulsi inhibit the growth of several fungal pathogens. The plant's anti-fungal properties are attributed to its active compounds, including essential oils, terpenoids, and flavonoid. Ocimum sanctum leaves possessed anti-fungal activity against clinically isolated dermatophytes at the concentration of 200 µg/mL. MIC and MFC were high with water fraction (200 µg/mL) against dermatophytes fungi used

Antifungal Properties:

Tulsi is recognized for its antimicrobial properties, including anti-fungal activity. It has been used traditionally to treat fungal infections in both humans and plants

Fig No :5 Tulsi

- SYNONYMS:-Gauri ,bahu Manjari ,pavani
- FAMILY :- Lamiaceae (Labiatae
- BOTANICAL NAME :- Ocimum sanctum
- COMMON NAME :- Holy Basil.
- CHEMICAL CONSTITUENTS :- Eugenol Germacrceterpen
- PART TYPICALLY USED:- Leaves
- COLOUR :- Green
- PROPERTIES:- Antifungal, Antibacterial, Antiseptic[11,12]

3) TURMERIC

pound cur-cumin. Turmeric essential oil and cur-cumin have shown effectiveness against various fungal species, including those causing skin diseases and those thatcontaminate food.

Fig No 6 - Turmeric

- SYNONYM ;- Curcumae Longae Rhizoma

- FAMILY :- Zingiberacea
- BIOLOGICAL SOURCE:- Curcuma Longa
- COMMON NAME:- Haldi
- PART TYPICALLY USED:- Root
- EFFECT:-Dark Spot, Natural Glow, Diminish Scars
- PROPERTIES:- Antibacterial, Anti-aging, Antioxidant[13,14]

4)LEMON

Lemon juice does exhibit anti-fungal activity, primarily due to its acidity, which can inhibit fungal growth, according to CARE Hospitals. However, it's not a guaranteed cure and can cause skin irritation, especially on broken or sensitive skin. Lemon can be helpful in addressing fungal infections due to its anti-fungal properties. The acidity in lemon juice can inhibit the growth of certain fungi, like Candida albicans. However, it's important to note that lemon is not a guaranteed cure and may cause skin irritation if applied directly, especially on broken or sensitive skin.

Antifungal properties:

Lemon's acidity can disrupt the cell walls of some fungi, hindering their growth.

Fig No 7 - Lemon

- SYNONYMS:- Bomb
- BIOLOGICAL SOURCE :- Citrus Lemon
- FAMILY :- Rutaceae
- PROPERTIES:- Lemon juice is a good source of Vitamin C, known for boosting the immune system, and also contains antioxidants and other beneficial compounds[15]

Lavender Oil

Lavender oil is a versatile essential oil extracted from the flower spikes of lavender plants through steam distillation Lavender oil is said to have many medicinal properties, including antibacterial, anti-fungal, and anti-inflammatory effects.

Fig no 8 Lavander oil

- SYNONYMS : Lavandula officinalis Chai x, // Lavandula fragrances Jord.
- FAMILY : Lamiaceae family
- BIOLOGICAL SOURCE : primarily the flowering tops of the Lavandula angustifolia plant, also known as true lavender
- USES Effective antiseptic, antibacterial, and anti-inflammatory agent.[16,17]

5. EXPERIMENTAL WORK

MATERIAL AND METHOD:

1. Neem

Selection of plant :

In the present study, I have selected the plant .Azadirachta indica (Neem)

A. Collection of Drug Sample

The Neem leaves were collected from Saikrupa Institute Of Pharmacy Campus Situated in Village Of Ghargaon A.nagar .

Preparation of powder

The Leaves were Dried Under Shade For About 2 weeks and then made into powdered from using motar and pestle then sieved

2.TULSI

Selection of plant :

In the present study, I have selected the plant Ocimum tenuiflorum (Tulsi).

Collection of plant :

The Ocimum tenuiflorum (Tulsi) leaves from Saikrupa Institute Of Pharmacy Campus situated in village of Ghargaon, Ahmednagar.

Preparation of powder

The leaves were dried under shade for about 2 weeks and then made into powdered from using moter and pestle then sieved.

EXTRACTION OF NEEM AND TULSI

By cold maceration method :

Then Azadirachta indica (Neem) Ocimum-tenuiflorum (Tulsi) was extracted with Chloroform And Distilled Water by Using maceration process With Continuous stirring for 3-4 days

Fig no 9. Extract neem

Fig No 10. Extract Tulsi

B. Method

ANTIFUNGAL SOAP FORMULATION PROCEDURE

1. Place the necessary amount of soap base in a 500 ml beaker
2. Heat it on a water bath without stirring while maintaining the desired temperature
3. The soap foundation will next be transformed intoliquid form
4. To get the right combination without stirring, bring the ingredients to a boil over a water bath
5. Then the mixture was poured into the soap mould, which were then frozen for two to three hours

A. Formula

Sr. No	Name of ingredients	Quantity taken (50gm)
1	Neem	2ml
2	Tulsi	2 ml
3	Turmeric	1 gm
4	Lemon juice	1 gm
5	Lavender oil	0.5 gm
6	Steric Acid	5 gm
7	SLS(Sodium Lauryl sulphate)	2 gm
8	Fluconazole	1 gm
9	Vitamin E	0.5 gm
10	Soap Base	35 gm

6. EVALUTION PARAMETER OF ANTIFUNGAL SOAP

1. Physical Parameter

Colour - Brownish Colour

Order - Orange

Shape - Rectangle

2 pH: The pH was determined by using pH meter the pH was found to be

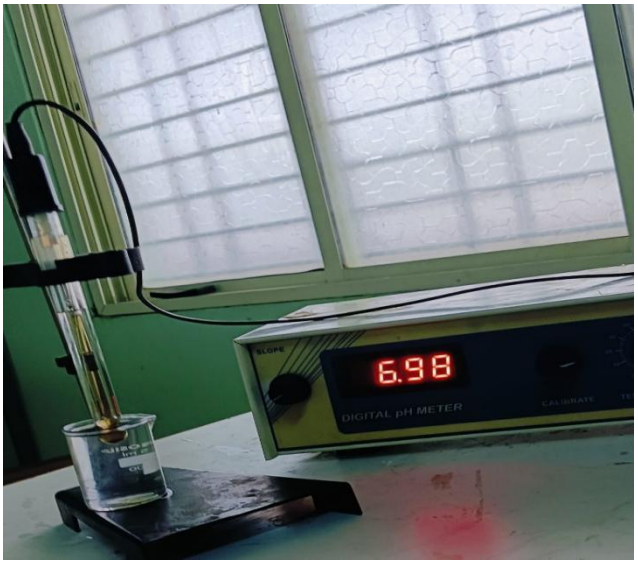

Fig no 11 pH Meter Test

Parameter	Fig no 11	Standard value
pH	7	6 -7

3 Foam ability:-

50 ml of distilled water was taken and 2 gm of soap sample was dissolved completely by stirring. It was then transferred into a 250 ml measuring cylinder along with washings. The volume was made up to 200 ml by adding distilled water. 25 uniform strokes were given to the mixture and kept stand still for some time until the water volume comes to 200 ml. The foam height was measured from above the water volume.

Fig no 12 Foam ability Test

Parameters	Fig no 12
Foam ability	5 cm

4 Foam stability:

Same quantity of soap sample and quantity of distilled water along with process was carried out as that of foam ability and the mixture was kept stand still for 30 min. After 30 min measurement of foam height was done from above the water volume.

Parameters	Fig no 12
Foam stability	3 min

5 Wash Ability

We tested how easy to wash off soap from our hands using tap water . soap were easy to wash off

Fig no 13. wash ability

8. RESULT AND DISCUSSION

1 Physical Parameters

Properties	Characters
Colour	Brownish Colour
Order	Orange
Shape	Rectangle

2 pH

Parameter	Fig no 11	Standard value

pH	**7**	**6 -7**

3 Foam Ability

Parameter	**Fig no 12**
Foam ability	**5 cm**

4 Foam stability

Parameters	**Fig no 12**
Foam stability	3 min

DISCUSSION

order to verify the efficacy and quality of the final formulations ,the following physicochemical characteristics were tested such as colour, aroma, pH, clarity, dirt dispersion, foam height, foam retention, skin irritation, and saponification value, etc. The soap formulation was tested using the standard approaches.

1. Colour:- When visualizing the herbal soap , a white background was used so that the colour could be determined and so that the clarity of formulations .

2. Odour / Aroma:- An evaluation of the odour of formulations we used two different methods. The first method included heating the sample on a hot plate. The second method involves inhaling a direct sample by five to six different people, including both males and females.

3. Shape:- Evaluation of organoleptic properties , such as shape and clarity , was carried out by sensory and visual examination.

4. pH:- In to determine the pH or hydrogen ion concentration , we must prepare of the sample . We used a pH 4 and pH 7 buffer solution to calibrate the pH matter . Take pH readings at room temperature , just as the reference solution. Record and note the pH level of the solution that was used to calibrate the matter and the electrode.

5. Foam forming ability:- The Cylinder Shake Method was utilised to determine Foaming ability. First, in a 100 ml measuring cylinder, we put 50 ml of a 1 % sample solution and shaken vigorously 10 times. After shaking for 1 minute, we measured the height of the foam that had formed and recorded the total volume of foam.

6. Foam stability:- The Cylinder Shake Method was utilised to determine the Foaming ability. First , in a 100 ml measuring cylinder, we put 50 ml of a 1 % sample solution. The cylindrical container was covered up with the use of the hand and shaken vigorously 10 time. The volume -of the foam after ten minutes was calculated.

CONCLUSION

The formulated anti-fungal soap containing Neem, Tulsi, Turmeric, and Lemon exhibited potent anti-fungal activity, making it an effective solution for treating fungal infections. The combination of these natural ingredients provides a holistic approach to skin health, leveraging their individual anti-fungal, antibacterial, and anti-inflammatory properties. The soap's physicochemical properties, such as pH, foam ability, and stability, were satisfactory, indicating its potential for commercial development. This herbal soap formulation offers a natural alternative to synthetic anti-fungal products, promoting skin hygiene and potentially preventing infections.

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