



A Research On Formulation And Evaluation Of Herbal Antifungal Cream

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ABSTRACT:

A fungal infection of the skin is one of the most common dermatological conditions today. 40 million individuals suffer fungal infections, according to research. Superficial and subcutaneous fungal infections affect the keratinous tissues, mucous membranes, and epidermis. Two of the most prevalent dermatophytic conditions, superficial candidiasis of the mouth, skin, or genital tract and disorders caused by *Malassezia*, include pityriasis versicolor and *Malassezia* folliculitis. When an opportunistic organism infects a susceptible host, it can result in systemic fungal diseases. Either they are native to a certain area, or they may be associated with a more invasive creature. *Aspergillus* species and *Candida albicans* are the most prevalent pathogens; however, other fungi, including *Candida* species that are not *albicans*, are increasingly playing a role in the development of systemic fungal infections. Therapies for fungal infections include flucytosine, azoles, allylamines, echinocandins, and griseofulvin, among other antifungal medications. Particularly about drug resistance, there have been difficulties and barriers to modern treatment. Numerous plant species' phytochemistry has shown that they may be a more effective source of medicine than synthetically made medications. Plant-based natural remedies are still employed as therapeutic agents, particularly to treat helminthic, viral, bacterial, fungal, and protozoal illnesses. This review focuses on using plant components to stop fungal infections brought on by different pathogens. As so, it will prove advantageous for the pharmaceutical industry.

Keywords: Fungal infection, Dermatophyte, Pityriasis versicolor, Pathogens, Endemic, Natural medicine.¹

INTRODUCTION:

Over 1.5 million fatalities globally are attributed to fungal infections, making them one of the worst illnesses. The primary cause of fungal infections is overlooked by society. Over the past 20 years, fungal infections have increased significantly in frequency and are now a leading cause of morbidity and mortality.^{1,2} An alternative term for fungal infections is mycosis. This type of skin disease is brought on by a fungus and a particular kind of microbe. Fungi come in millions of different species. Fungi can inhabit the human body in addition to the air, soil, water, and plants. Skin issues like rashes or bumps may also result from them. Ringworm, jock itch, athletes' foot, and yeast infections are just a few of the various types of fungal infections. *Aspergillus* is one of the dangerous fungi that can cause potentially fatal conditions. Fungal infections can spread from one person to another and be infectious.^{3,4}

FUNGI:

“A kingdom of eukaryotic, often multicellular organisms, fungi are heterotrophs that play a significant part in the ecosystem's nutrient cycle”

Characteristics of fungi:

Multicellular fungi are different from single-celled ones. There are single-celled fungi like yeast. Based on their life cycle stage, certain fungi alternate between multicellular and single-celled yeast forms. The organelles and nucleus of fungal cells are similar to those of plants and animals. The hard substance chitin, which is also found in the exoskeletons of insects and arthropods (such as crustaceans), is a component of fungus cell walls. Plant cell walls lack the cellulose that normally accumulates in them. Multicellular fungi have a lot of branching filaments called hyphae. Hyphae are tubular structures with walls called septa that divide them into compartments that resemble cells. Nuclei and other organelles may travel between the several nuclei that these cells may have. A mycelium is the network of hyphae that makes up a fungus.⁵

FUNGAL INFECTION:

■ Definition:

In the natural world, Fungal infections are prevalent. When an invasive fungus overtakes a part of the body and becomes too much for the immune system to cope with, fungal infections in humans happen. Fungi can live in the air, soil, water, and plants. In medicine, zymosis is the development and spread of an infectious disease, especially one caused by a fungus. For example, Blastomycosis is any of several infections of the skin or mucous membrane caused by *Blastomyces dermatitidis*.⁵

■ Types Of Fungal Infection:

1. Ringworms of the body (*Tinea corporis*)
2. *Tinea pedis*, often known as athlete's foot/Jock itch (*Tinea cruris*)
3. The scalp ringworm, often known as *tinea capitis* *Tinea versicolor*
4. Cutaneous candidiasis

1. Ringworm of the Body (*Tinea corporis*)

A common and very infectious fungal skin illness is ringworm. Instead of a worm, a fungus is to blame. On occasion, it might be discovered on the scalp.

Symptoms:

- A rash that is ring-shaped and has somewhat elevated edges Itching

2. Athletes Foot (*Tinea Pedis*)

This fungus infection affects the region on your foot and between your toes. This illness may extend to the hands, groin, or nails, among other parts of the body.

Symptoms:

- Itching, burning,
- The skin seems flaky, dry, scaly, or red.
- Blisters or cracks in the skin are seen

3. Jock Itch (*Tinea Cruris*):

A fungal skin disease that affects the groin and thighs. The cause of it is a fungus that can infect other people. Men and teenage boys are the ones who exhibit it the most.

Symptoms:

- Itching, red rashes occur in groin area and thighs,
- Scaly, flaky or cracked skin is formed,

- It might affect the abdomen and buttocks.

4. Ringworm of The Scalp (Tinea Capitis)

The epidermis of the scalp and hair shafts are impacted by this fungus infection. It most frequently affects young children.

Symptoms:

- Scaling and itching
- Localized areas of baldness that might be red or scaly.

5. Tinea versicolor

The skin develops tiny, discolored patches as a result of a fungal/yeast infection. In adults, it is most prevalent. The back, chest, and upper arms all have these discolored skin areas. It generally happens in humid or summery areas.

Symptoms:

- Itching
- Flaky or scaly skin

6. Cutaneous candidiasis:

Fungi called candida are the cause of this skin illness. It is found in the body by nature. It happens in places that are warm, humid, and have inadequate ventilation.

Symptoms:

- Itching, burning,
- Skin appears red, scaly, dry or flaky,
- Blisters or cracks in the skin are seen.

Overview of Fungal Skin Infections:

Fungi frequently create their homes in moist areas of the body where skin surfaces converge, such as the vaginal region, under the breasts, and between the toes. Candida and Malassezia furfur are examples of yeasts, whereas Epidermophyton, Microsporum, and Trichophyton are examples of dermatophytes that cause common fungal skin diseases. Many of these fungi only live in the stratum corneum, the outermost layer of the epidermis, and do not penetrate further. Obese people are more prone to these conditions because they have more skinfolds, especially if inflammation and degradation of the skin inside a skinfold occur (intertrigo). Additionally, fungal infections appear to be more common in people with diabetes. Contrary to popular belief, fungal infections in other regions of the body may cause rashes on non-infected areas. For example, a fungal infection on the foot might cause a rash that is unpleasant and rough on the fingers.

The term "dermatophytids," "id responses," or "identification" refers to these eruptions, which are allergic reactions to the fungus. It is not interaction with the polluted area that causes them.⁵



fig. 1- fungal skin infection

Symptoms:

- Skin alterations, such as redness, cracking, or peeling.
- Itching.

Causes of fungal skin infection:

Imbalance of bacteria is due to the following reasons:

- Because antibiotics are used Hormone imbalance
- Poor eating habits ⁵

Diagnosis:

In one of the often affected areas, a doctor may suspect a fungal infection if a patient develops a red, itchy, or scaly rash. To confirm the diagnosis of a fungal skin infection, a small sample of skin is usually sufficient. This sample can be examined under a microscope or placed in a culture medium where the specific fungus can grow and be identified.⁷

Treatment:

- Antifungal drugs
- Measures to prevent moisture
- The most common treatment for fungal infections is antifungal medication, usually topical medication administered directly to the afflicted region. Topical medications might take the form of lotions, gels, creams, solutions, or shampoos. Additionally, antifungal medications can be taken orally.
- In addition to drugs, people may use measures to keep the affected areas dry, such as applying powders or wearing open-toed shoes.
- For some infections, doctors give corticosteroids to relieve inflammation and itching.⁵

Cream:

Definition:

“Cream is a water-based, semisolid pharmaceutical formulation intended for topical application (on the skin). It is an oil preparation (usually lanolin or petrolatum) in water.. “An ointment is preparation for topical use”.⁸

Antifungal cream:-

“Cream which is used for destroying fungi or inhibiting their growth”

Advantages of Cream:

- able to calm inflammation
- Promote skin tone
- Keep wrinkles and acne away
- Increase cell metabolism and blood circulation

- Easily water-washable. Easy to wipe away
- Less greasy compared to ointment
- Easy to spread on the skin's surface (i.e. easy to apply).
- Suitable for sensitive, dry, and fair skin.

Disadvantages of Cream:

- The stability is not as good as ointment
- They are less hygroscopic than other semi-solid preparations, so the risk of contamination is higher than others.
- Less viscous than other semi-solid preparations.⁵

HERBAL ANTIFUNGAL CREAM:

Aim: To formulate and evaluate an antifungal cream from herbal ingredients

Objectives:

1. The objective of this research work was to formulate a cream that does not cause side effects or adverse reactions.
2. To study the efficacy and safety of prepared antifungal cream.

PHYTOCHEMISTRY OF HERBAL DRUG:

Herbal ingredients used:

1. Ginger oil:

Fig. 2- ginger

GINGER**Synonyms :**

Rhizoma zingiberis, Zingibere.

Biological Source :

Ginger consists of the dried rhizomes of the Zingiber officinale Roscoe, belonging to the family Zingiberaceae.

Geographical Source :

It is mainly cultivated in the West Indies, Nigeria, Jamaica, India, Japan, and Africa

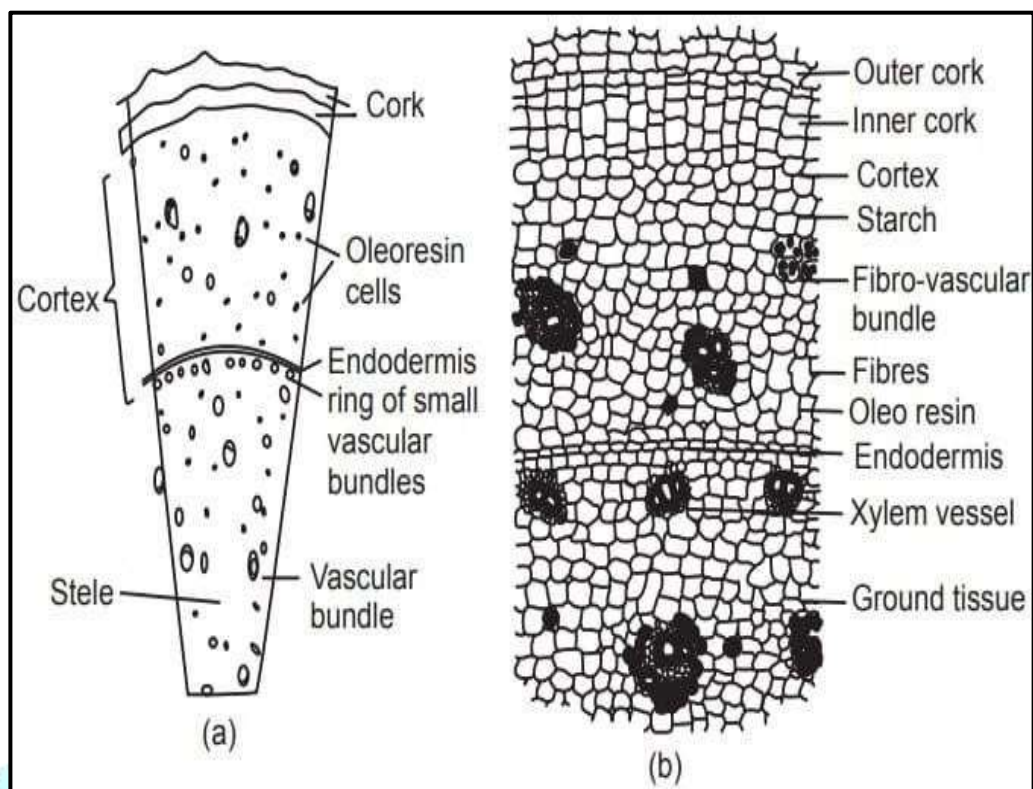
Characteristics:

The Jamaica ginger is found in branches and has a sympodial branching. Its outer surface is buff yellow with longitudinally striated fibers, and it has small circular depressions at the portion of the buds. The fractured surface displays narrow bark, a well-developed endodermis, and a wide stele with scattered small yellowish points of secretion cells and grayish points of fibrovascular bundles. The ginger has a pungent and agreeable taste and an agreeable and aromatic odor..

Fig. 2.1-Zingiber officinale

**Microscopy:**

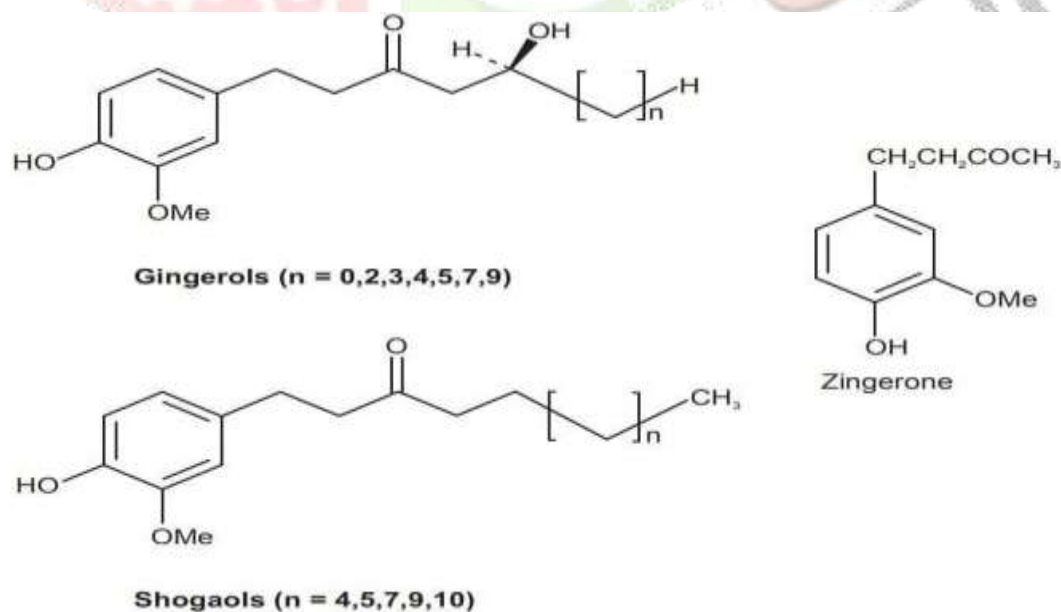
Dark brown and composed of irregular parenchymatous cells, the cork is the outermost layer. Radial rows of colorless, few-layered parenchymatous cells make up the inner cork. Ginger from Jamaica does not include cork. The cortex is made up of spherical, thin-walled parenchyma with plenty of starch granules in the intercellular gaps, and the phellogen is different. Simple, ovate, or sac-shaped starch granules are available. The collateral fibrovascular bundles are also evident, as are several yellowish brown oleoresins. Without starch, the endodermis is unique and is made up of a single layer of suberin-containing, tangentially elongated cells. A ring of thin vascular bundle zones without sclerenchymatous fibers covers the ground tissue, which is located just under the endodermis. The ground tissues are composed of huge parenchymatous cells that are abundant in starch, oleoresin, and fibrovascular bundles. The phloem features well-developed sieve components, whereas the xylem is composed of tubes and tracheids that are either reticular without lignin, annual, or spiral. The fibers are distinct, pitted, and unlined.



1. Schematic diagram (t.s.) and, (b) transverse section of ginger rhizome

Chemical Constituents:

In addition to 1–2% volatile oil and starch, ginger contains 5–8% pungent resinous material. Gingerol's yellowish, oily body, which is odorless, is what gives the drug its pungency, and its volatile oil is what gives it its pleasant scent. α -zetiberol, α -sesquiterpene alcohol, α -bisabolene, α -farnesene, and α -sesquiphellandrene are among the sesquiterpene hydrocarbons that make up volatile oil. Additionally included are less strong ingredients like shogaol and gingerone. Fresh rhizomes do not contain gogaol, which is created when gingerol is dehydrated.



Uses:

Ginger has several uses, including as a carminative, condiment, flavoring ingredient, spasmolytic, antiemetic, and positive inotropic. As an adjuvant to several tonic and stimulant treatments, it is used for asthma, colds, coughs, and unpleasant stomach diseases, as well as for dyspepsia, flatulent colic, and

vomiting spasms. Chewing a slice of ginger helps with hoarseness, voices, and sore throats.⁹

2. Garlic Oil:



fig. 3- garlic

Garlic:

Synonyms:

Allium; Lasan (Hindi).

Biological Source:

The ripe bulb of the Liliaceae family plant, *Allium sativum* Linn, is known as garlic.

Geographical Source:

Garlic grows throughout the United States, southern Europe, and central Asia. In India, it is grown extensively.

Characteristics:

This perennial plant has bulbs that contain several cloves and are encased in a smooth, pink or white membrane.

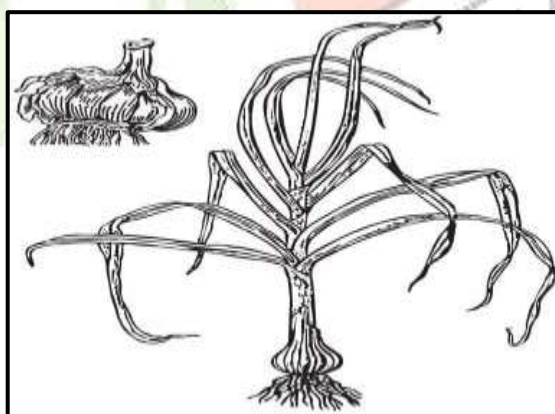


fig. 3.1- allium sativum

Chemical Constituents :

The key ingredient in garlic is allicin, a yellow substance that gives it its smell. Alcohol, ether, and benzene may all be mixed with it, and it breaks down when distilled. Other components of garlic have been discovered as mucilage, albumin, fatty and volatile oils, and alliin. Odorless and crystallized from aqueous acetone, alliin is another active component that is nearly insoluble in ether, benzene, chloroform, and pure alcohol. It is cleaved by the specific enzyme alliinase, which gives it a garlicky smell. The fission products have antibacterial properties similar to those of allicin. Essential oil contains allyl propyl disulphide, diallyl disulphide, and allicin (0.06–0.1%). Garlic is used to extract γ -glutamyl peptides. S-

$$\begin{array}{c} \text{CH}_2 = \text{CH} - \text{CH}_2 - \text{S} - \text{S} - \text{CH}_2 - \text{CH} = \text{CH}_2 \\ \quad \quad \quad \parallel \\ \quad \quad \quad \text{O} \\ \text{Allicin} \end{array} \qquad \begin{array}{c} \text{NH}_2 \\ | \\ \text{CH}_2 = \text{CH} - \text{CH}_2 - \text{S} - \text{CH}_2 - \text{CH} - \text{COOH} \\ \text{Alliin} \end{array}$$
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Aphrodisiac, expectorant, stimulant, and carminative, garlic is used to treat TB, atherosclerosis, and hypertension, as well as respiratory conditions like chronic bronchitis, bronchial asthma, whooping cough, and fevers and coughs. Garlic is used in Germany to prevent vascular abnormalities brought on by aging and as a supplement in the diets of hyperlipidemic patients. Garlic may cause gastrointestinal distress and have an impact on skin and breath odor. Garlic or its constituent parts have antiviral, antifungal, antibacterial, anticancer, and antidiabetic biological action.¹⁰

- It has anti-inflammatory properties.
- Among the most well-known advantages of garlic and ginger is their capacity to reduce inflammation.
- Guard against harm to cells.
- It may benefit cognitive health
- Could lower risk factors for heart disease.
- It may be beneficial for those with diabetes
- Potential anticancer properties
- May promote a healthy immune response

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Excipient Profile:

In this formulation following ingredients are used, and their uses are as follows:

Table no.1: Uses of ingredients

Sr. No	Ingredient	Use
1.	Ginger Oil	Antifungal Agent
2.	Garlic Oil	Antifungal Agent
3.	Petroleum Jelly	Soothing Agent
4.	Hard Paraffin	Lubricant
5.	Cetyl Alcohol	Emollient
6.	Glyceryl Monostearate	Emulsifier
7.	Methyl Paraben	Preservative
8.	Propyl Paraben	Preservative
9.	Peppermint Water	Fragrance
10	Activated Charcoal	Adsorbent

1. Petroleum Jelly:

In this formulation, it is used as a soothing agent.

- A combination of hydrocarbons with a carbon number more than 25 is semisolid.
- It usually has a melting point of 400 to 700 degrees Celsius.
- It can only catch fire when heated to a liquid state.
- When pure, it is transparent, colorless, or light yellow, and has no flavor or smell.
- When exposed to air, it does not oxidize, and chemical reagents do not react with it easily.
- It is soluble in organic solvents but insoluble in water.¹²

2. Hard Paraffin:

- This formulation functions as a lubricant.
- Petroleum is the source of this combination of solid saturated hydrocarbons.
- In physical terms, hard paraffin is a combination of microcrystals that resembles colorless or white wax.
- The melting point of hard paraffin ranges from 470 to 650 degrees Celsius.
- It is used to improve the cream base's rheological properties when solid.⁸

3. Cetyl Alcohol:

In this formulation,

- It is used as an emollient.
- It also goes by the names palmityl alcohol and hexadecan-1-ol.

- It has the formula $\text{CH}_3(\text{CH}_2)_{15}\text{OH}$, making it a fatty alcohol.
- It appears as flakes or a waxy white solid at room temperature.
- Cetyl was initially extracted from whale oil, which is where the name comes from..
- It has a melting point of 49.30°C .¹²

4. **Glyceryl Monostearate:**

In this formulation,

- it is used as an emulsifier.
- $570\text{--}650^\circ\text{C}$ is its melting point.
- In water, it is insoluble. This monoglyceride, sometimes referred to as GMS, is frequently used as an emulsifier in food.
- The substance is a hygroscopic, white, sweet-tasting, odorless powder..
- It is the glycerol ester of stearic acid in chemistry.¹²

5. **Methyl Paraben:**

In this formulation,

It has a preservation function.

- Its chemical formula is $\text{CH}_3(\text{C}_6\text{H}_4(\text{OH})\text{COO})$, making it a preservative.
- P-hydroxybenzoic acid's methyl ester is what it is.⁸

6. **Propyl Paraben:**

It is used in the formulation as a preservative.

- It is a naturally occurring chemical that is an ester of p-hydroxybenzoic acid.
- Although it is synthesized for use in meals, medications, and cosmetics, it is present in a variety of plants and insects.
- It belongs to the parabens class.
- It is commonly present in many water-based cosmetics, including lotions and creams, as a preservative.¹³

7. **Peppermint water:**

In this formulation, it is used as a fragrance.

- The active component of peppermint water is peppermint oil, which is extracted from the peppermint plant's leaves.
- *Mentha piperita* L. is another name for it..
- This herbal remedy has been used for centuries to treat digestive issues like cramping in the stomach, gas, and indigestion.
- It's colorless and transparent.¹⁴

8. **Activated Charcoal:**

It is used as an adsorbent in this formulation.

- It is utilized in creams as an absorbent.
- It has antifungal properties because it successfully rids the body of poisons.
- It helps to develop a beautiful complexion and combat acne by drawing dirt, chemicals, germs, toxins, and other microparticles to the skin's surface.

- Although the body does not metabolize or absorb it, it can be used to cure and sterilize some wounds and deadly bites.¹⁴

❑ EXPERIMENTAL WORK:

• Formulation preparation

Table 2 listed the components used in the formulation. A 20–60% water-in-oil emulsion of the medications was created" In the oil phase (Part A), petroleum jelly, cetyl alcohol, and the emulsifier glycerol monostearate were dissolved and heated to 80° C. Once the extract and water-soluble components (propyl and methyl paraben) were dissolved, Part B was heated to 80° C. Once heated, the aqueous phase was gradually added to the oil phase while being constantly stirred until a cream was formed. The resulting cream had a brilliant pale yellow color. When it cooled to 45°C ± 50°C, perfume was added.¹⁴

Table No. 2 – Composition of Cream

Sr No.	Ingredient	Composition	Composition
		F1	F2
1	Ginger Oil	6 ml	3 ml
2	Garlic Oil	6 ml	3 ml
3	Petroleum Jelly	12.9 gm	12.9 gm
4	Hard Paraffin	6 gm	6 gm
5	Cetyl Alcohol	1.5 gm	1.5 gm
6	Glyceryl Monostearate	1.5 gm	1.5 gm
7	Methyl Paraben	1.2 gm	1.2 gm
8	Propyl Paraben	0.9 gm	0.9 gm
9	Peppermint Water	q.s	q.s
10	Activated Charcoal	0.03 gm	0.03 gm



Fig. .4 –heating of oil and water phase and water phase



fig.5–mixing of oil



Fig. 6 – final formulation

EVALUATION OF CREAM:**1. Physical Properties:**

The cream's color, scent, and appearance were evaluated.

Table No. 3- Physical Properties

Sr. No.	Properties	Observation	
		F1	F2
1	Colour	Pale Yellow	Pale Yellow
2	Odour	Characteristics	Characteristics
3	Appearance	Semi-Solid	Semi-Solid

2. Determination of pH:

The cream weighed precisely $0.5 \pm 0.01\text{g}$ in a 10-ml test tube. The cream was dissolved in 4.5 milliliters of water. The pH of the suspension was determined at 27°C using a pH meter.⁵



fig.7 - ph of f1



fig.8 - ph of f2

Table No. 4 – PH Test

Sr.No	Test	Observation
F1	PH(at $27^\circ\text{C} \pm 2^\circ\text{C}$)	7.15
F2	PH(at $27^\circ\text{C} \pm 2^\circ\text{C}$)	6.55

3. Determination of Viscosity:

Viscosity is the most important consideration while assessing the creams. Viscosity impacts a product's spreadability, pourability, and other properties since it is affected by some factors, such as temperature fluctuations, the quality of the raw material, and production conditions..

Apparatus used- Brookfield viscometer

fig. 9- f1 viscosity



fig.10- f2 viscosity

Procedure:

The operating parameters were determined once spindle No. 64, the suitable spindle for the product in issue, was selected. At a speed of 20 rpm, the viscosity was then measured directly while keeping the torque constant. They discovered the mean. The results are shown in Table No. The viscosities of all formulations were found to be in the centipoises at room temperature. Figure: Brookfield viscometer. The gelling agents in the gelling layer have viscosities ranging from around 1000 to 100,000 cps.¹⁵

Table No. 5 – Viscosity Test

Sr. No.	Viscosity
F1	3960 cps
F2	5423 cps

4. Spreadability:

For semisolids, having good spreadability is a crucial requirement.

“The phrase 'spreadability' refers to how easily a cream spreads across the skin after being applied.”. Additionally, a formulation's spreading value determines its medicinal effectiveness. The formulations' spreadability has been investigated using a specialized instrument. Spreadability is measured in "time in seconds" that two slides take to separate from the formulation when a specific stress is applied between them. Better spreadability results from a shorter time needed to separate the two. A pair of identically sized glass slides was selected. It was necessary to determine the spreadability of the formulation that was applied on one slide. It was placed on top of the formulations, with the other slide five centimeters along the slide. The formulation between the two slides was evenly squeezed using a 10 g weight placed on top of the upper slide to produce a thin layer. After removing the weight, the excess formulation that had adhered to the slides was scraped off. The formulation on one of the slides was corrected. " The second movable slide was placed on top of it, one end of which was attached to a string that could be loaded with a simple pulley and a pan. Following the placement of a 3g weight on the pan, the time it took for the top slide to travel 5.0 cm and separate from the lower slide following the weight's direction was noted. The process listed below was then used to calculate the spreadability.

$$\text{Spreadability} = m \times l / t$$

Where,

m = weight tied to the upper slide (3g)

l = length of glass slide (5cm)

t = time taken in seconds 5

Table No. 6 – Spreadability Test

Formulation	Time(In sec)	Spreadability(g.cm/sec)
F1	1.5	8
F2	1.5	10

5. Patch Test –

Applying one to three grams of the test item to a sensitive skin region, such the skin behind the ears, was done using a funnel or a piece of cloth. One square meter of skin was covered with the cosmetic that was to be examined. Also, control patches were used. The patch location is examined 24 hours later.⁵

Result- Skin irritation or inflammation is absent.

7. Test for microbial growth in formulated creams:

The cream was left out as a control, and the resultant creams were infected using the streak plate technique on the agar medium plates. The plates were incubated for 24 hours at 37 degrees Celsius. The plates were taken out after the incubation period, and the microbial growth was compared to the control.⁵



Fig. 11- antifungal activity of f1



fig. 12- Antifungal activity of f2

7. Stability studies :

Stability testing is done on drug items from the beginning of research until the chemical or commercial product fails. To assess the stability of the drug and formulation, stability studies were carried out per ICH guidelines. Stability testing was done under ICH recommendations. Over a month, the cream was kept in a container at $30 \pm 2^\circ\text{C}$ and $65 \pm 5\%$ relative humidity and at $40 \pm 2^\circ\text{C}$ and $75 \pm 5\%$ relative humidity. After investigation, materials were analyzed for physical properties and viscosity.⁵

Table no.7: Test for Stability

Test	After one month	
	F1	F2
Physical appearance	Semi-Solid	Semi-Solid
Texture	Smooth and Creamy	Smooth and Creamy
Colour	Pale yellow	Pale yellow
Odour	Characteristics	Characteristics
PH Value	7.15	6.55
Thermal Stability	Stable	Stable
Degradation of product	No	No

RESULT AND DISCUSSION

- Since the majority of people in underdeveloped nations still rely on herbal medicine to treat their medical conditions, a lot of research is now being done in this field..
- Following a two-week research period, stability examinations of the formulations' different properties, such as their visual appearance, nature, and pH, revealed no discernible alteration. Currently, a lot of research is being done in this field because the majority of people in underdeveloped nations still rely on herbal medicine to address their health needs.
- Research on spreadability indicates that certain formulations are more spreadable than others. In Table 6, the spreadability findings are gathered.
- In Patch Tests, the cream formulations show no signs of redness, edema, inflammation, or irritation; they are safe for use on the skin.
- To investigate the existence of dangerous bacteria, the cream formulations were cultivated on agar media. (Figure No. 12). After a 24-hour incubation period at 37°C, the antifungal activities were stronger than normal, and no signs of microbial proliferation were seen.



Fig. 13 – Herbal antifungal cream

CONCLUSION

The results of the study show that a herbal antifungal cream formulation dramatically inhibited the development of infection-causing fungus and had an Improved formulations containing plant phyto compounds are desperately needed for the effective treatment of fungal infections. Plants have long been considered a traditional source of antifungal medications; plant bioactive with antifungal activity can be considered as an option for the development of new and improved backup formulations in antifungal therapy. 15 The prevalence of fungal infections has increased over the past 20 years, and the medications now used to treat them have several adverse effects and frequently cause resistance development. The quality of life for people who suffer from fungal infections might be improved by more research in this field, which could provide us with new treatment options. 6. The results described above suggest that F2 is more effective than F1.

REFERENCES

1. Prashanth Kumar V, Chauhan Neelam S et al. Search for antibacterial and antifungal agents from selected Indian medicinal plants. J. Ethnopharmacol 2006; 107: 182–188.
2. Duncan W, Pierre T, Rene JB et al. Antifungal activity of medicinal plant extracts; preliminary screening studies. J. Ethnopharmacol. 2008; 115: 140–146.
3. Norr H, Wagner H. New constituents from *Ocimum sanctum*. Planta Med.1992; 58:574.
4. Udupa SL, Shetty S, Udupa AL, Somayaji SN. Effect of *Ocimum sanctum* Linn. On normal and dexamethasone suppressed wound healing. Indian J. Exp. Biology 2006; 44:49 -54.
5. Arati D. Powar and Dr. Sachin A. Nitave, World Journal Of Pharmaceutical Research, Volume 11, Issue 5, 21 April 2022, page no. 904.
6. T. Meghana and Abbaraju Krishna Sailaja, Pediatrics Case Reports, 1(1) DOI: 10.31579/2835- 2971/004.
7. Parmar P.B; Baria A.H; Faldu S.D; Tank H.M; Design And Evaluation Of Herbal Formulation In Semisolid Dosage Form Journal Of Pharmacy Research, 2009; 1095-1097.
8. Bronaugh R.L and Naibach H.I; “Topical Absorption of Dermatological Product” Mercel Dekk.
9. <https://www.pharmacy180.com/article/ginger-271/>
10. <https://www.pharmacy180.com/article/garlic-256/>
11. <https://www.healthline.com/nutrition/garlic-and-ginger-benefits#The-bottom-line>
12. Note For Guidance On Stability Testing Stability, Stability Testing Of New Drug Substance And Product.
13. Sumathi A; Senthamari R.; A Review on Harbal Medicines and Drug Technology Asia. J. Pharm. Health Science, 2015; 1172-1173.
14. More B.H; Sakharwad S.N; Tembhurne S.V; Sakarkar D.M; Evaluation For Skin Irritacy Testing Of Developed Formulations Containing Tulsi Oil For Its Topical Application, International Journal Of

Toxicology And Pharmacology, 2013; 10-13.

15. Rajashri R. Dhonnar, Mrs. Mona Y. Agarwal, Dr. Yogesh Agarwal. World Journal of Pharmaceutical Research, Volume 12, Issue 10, 794-811.
16. Devi VK, Jain N, Valli KS. Importance of novel drug delivery systems in herbal medicines. Pharmacognosy Rev., 2010 Jan; 4(7): 27-31. Doi: 10.4103/0973-7847.65322. PMID: 22228938; PMCID: PMC3249899.
17. Tayade Jayshri A and A V Patil, October 26-28, 2015, Polyherbal formulation, 3rd International Conference and Exhibition on, Pharmacognosy, Phytochemistry & Natural Products ,Volume 3, Issue 6 ISSN: 2329-6836 NPCR, an open access journal Page 137.
18. Akalonu, E.O., 2005. Superficial Fungal Infections Among Primary School Children in A Rural Community. Faculty Of Paediatrics.
19. Balraj Singh Gill, Richa Mehra, Navgeet, Sanjeev Kumar. Vitex negundo and its medicinal value. Molecular Biology Reports Springer Nature B.V., 2018; 45: 2925–2934.
1. Balowiri, M., Sadiki, M. and Ihsouda, S.K., 2016. Methods for in vitro evaluating antimicrobial activity: A review. Journal of pharmaceutical analysis, 6(2): 71-79.

