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Research Article

Formulation And Evaluation of Anti-Fungal Cream

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ABSTRACT

Fungal disease become a major medical problem . Fungal disease is difficult to manage because they tend to be a chronic, hard to diagnosis.A fungal infection in a common condition caused by fungi.The herbal antifungal cream was formulated by using various herbs such as a nyctanthes arbortrists lin.(NAT).NAT is one of the most beneficial traditional medicine plants, with a variety of application .The herbal cosmetic cream formulation was designed by using extract NAT.Formulated herbal cream also contain high percentage of nyctanthes , it is helpful for treatment of fungal infection .Evaluation test were performed to established the stability of formulated herbal cream pH of herbal cream is 6.00 that is not more acidic and not more basic .The herbal antifungal cream is used to treat fungal skin infection such as athletes foot, ringworm and jock itch.

INTRODUCTION

Herbal medicines are oldest remedies known to mankind. Herbs have been utilized by all societies throughout history. India has one of the oldest, wealthiest, and most diverse cultures living traditionally related to the use of medicinal plants. In the given situation, the demand for herbal products is growing exponentially worldwide, and major pharmaceutical companies are already conducting extensive research on plant materials for their potential medicinal value. Herbal drug innovation is used for converting botanical materials into drugs, where standardization and quality control, with the appropriate integration of advanced scientific procedures and traditional knowledge, are vital. Herbal formulations have reached comprehensive significance as therapeutic agents in diabetes, arthritis, liver diseases, cough and cold, and memory enhancement worldwide. Herbs are traditionally considered beneficial and are increasingly being consumed by individuals without medicine. Conventional medication is increasingly sought after by conventional professionals and herbalists in the treatment of infectious diseases. Household remedies mostly

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consist of common kitchen ingredients and are generally used as over-the-counter drugs. The major drawback of modern medicine is its side effects, which may lead to the prolonged debilitation of patients. Herbal medicine also has its list of side effects like any other manufactured medicine. Hence, it is essential to assess their clinical safety and effectiveness. The role of natural products, herbal medications, and conventional drugs is increasingly recognized in recent years for the prevention and treatment of human ailments. Medicine is a substance that has nutritive, healing, or preventive properties, whereas the term 'herbal' refers to a botanical or plant-based preparation. Consequently, the term 'herbal medicine' is utilized for herbal substances that comprise nutritive, healing, or preventive properties. Herbal medicine is an interdisciplinary department between herbal medicine and Ayurveda as it covers all areas of herbal medicine related to botany, therapeutic plant research, pharmacognosy, phytochemistry, phytotherapy, botanical drugs, Ayurveda, natural chemistry, agricultural science, Unani medication, biotechnology, and natural chemistry. An individual who deals with herbs, particularly medicinal herbs, is known as a cultivator. Herbal publications deal with the use of plants in the treatment of illnesses. Nyctanthes arbortristis is a member of the oleaceae family. It has been used for healing purposes since the oldest times. The plant is known as the “Tree of Sadness” since it completely loses its brightness during the day. The name “Tree of Sadness” comes from the plant’s loss of all its leaves during the day.Parijata is a medicinal plant that has a significant therapeutic predominance in the treatment of a number of diseases, including sciatica, warm infections, chronic fever, hepatoprotective, anti-leishmaniasis, antiviral, antifungal, anti-pyretic, anti-inflammatory, anti-histaminic, antimalarial, anti-bacterial, anti-oxidant, diabetes control, anti-allergic, anti-anxiety, antiaggressive activity, anti-filarial, anti-cancer, anti-trypanosomal potential, anti-tryptaminergic, anti-cholinesterase, anti-parasitic, anti-anemic, CNS depressant, membrane stabilizer, and treatment for piles, gout, and dry cough.

Causes of fungal Infection:

Fungal infection are generally caused due to following reasons

- A weakened immune system,
- Contact with infected individuals or environments,
- A disruption of the body's natural balance,
- Allowing fungi to overgrow.
- Dermatophytes
- Candida

Fig 01: Ringworm

Types of fungal infection :

Superficial fungal infection :

Ex. ringworm, candidiasis

Subcutaneous fungal infection:

Ex. sporotrichosis, chromoblastomycosis, eumycetoma

Deep fungal infection :

Ex. histoplasmosis, blastomycosis, mucormycosis, crptococcosis

Symptoms of fungal infection:

- Itching, soreness, redness or rash in the affected area
- Discolored, thick or cracked nails
- Pain while eating, loss of taste or white patches in mouth or throat
- Cough, sometimes coughing up blood
- Fatigue (tiredness)
- Fever
- Shortness of breath
- Muscle aches
- Joint pain
- Night sweats

Treatment of fungal infection :

To treat a fungal skin infection, you'll need antifungal medications, which can be topical or tablets.

Topical antifungal

Ex.clotrimazole, miconazole, terbinafine.

Antifungal tablet

Ex.griseofulvin, intraconazole, terbinafine.

Prevention of fungal infection

Here are steps you can take to lower your chances of getting a fungal skin infection:

- Dry yourself completely after showering or bathing, especially between your toes and in skin folds where moisture can get trapped.
- Avoid walking barefoot in public places such as locker rooms, showers, and pools where fungus can spread.
- Wear loose-fitting clothing made from cotton or other materials that let your skin breathe.
- Avoid sharing towels, hats, brushes, or combs with others.
- If you often get athlete's foot, switch your shoes every few days to let them dry out completely. Wear sandals or open shoes in hot weather.

Advantages of anti-fungal cream :

- Targeted application
- Minimal systematic effect
- Easy access
- Convenience

Drug Profile:

Nyctanthes Arbortrists:-

Synonym:-

Parijata ,Night Jasmine, Harisingar, sephalika.

Biological source:-

It is obtained from dried leaves of nyctanthes arbortrists belongs to family oleaceae.

Chemical constitutes:

It Contains Nyctanthus, Nyctanthic acid, Palmitate acid, Methyl palmitate, Ascorbic acid, B-sitosterol, Quercetin, Kaempferol.

Geographical source:

India, Pakistan, Europe, Australia, America, Kashmir, Bengal, Africa, Nepal, Asam.

Morphology of Leaves:

1. Color- Greyish-green
2. Odour- odourless
3. Taste- Tasteless

4. Shape- Opposite, Simple, Petiolate

Fig 02: NAT Leaves

Uses:

- The leaves are known for treating fevers, arthritis, cough, and worm infections.
- The flowers are used for gastric compliances, respiratory problems, and are also used medicinally in India, Indonesia, and Malaysia to provoke menstruation.
- The bark is used for eye diseases, ulcers, and bleeding gums.
- The seeds are used as antihelminthics and for hair loss.

METHODOLOGY (MATERIAL & METHODS)

Collection of plant materials:

The bark of plant nyctanthus arbortrists were collected from the local area of Shahapur,Maharashtra, India in month of Jan 2025.The leaves of nyctanthes arbortrists were sun dried and grind in electric mixer.

Preparation of ethanolic extract:

Take 100 gm of powder of nyctanthus arbortrists leaves and add 100ml of ethanol in it reflux 3 hour. Then the extract was filtered and evaporate.

Fig 03: Powder of Leaves

Fig 04: Reflux Condensation

Fig 05: Crude Drug of NAT

Phytochemical Screening:

The above prepared extract powder were subjected to preliminary phytochemical screening test that identify the presence of various components, by using different test and reagents. In that the presence of phytoconstituents such as alkaloids , saponins, flavonoids and tannin shows antifungal activity.

Test for Alkaloids:

1.0ml of plant extract was taken and then add 1.0 ml of saturated solution of picric acid was added.Yellow colour appears.

Fig 06: Test for Alkaloids

Wagner's test:

Take 2ml of extract and add few drops of wagner's reagent, formation of reddish brown precipitate indicate presence of alkaloids.

Fig 6 a: Wagner's test

Dragendroff's test:

Take 2ml of extract and add few drops of dragendroff's reagent, formation of orange brown precipitate indicate presence of alkaloids.

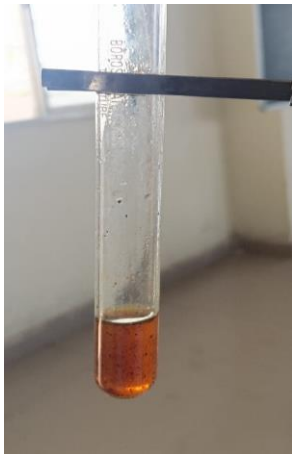

Fig 6 b: Dragendroff's test

Test for Tannins:

About 0.5 g of the extract was boiled in 10 ml of water in a test tube and then filtered. A few drops of 0.1 fecl3 was added.Blue black green.

Fig 07: Test for Tannins

Test for saponins:

0.5g of extract was added in 5ml of distilled water in a test tube. The solution was shaken vigorously.stable persistent froth appears. The frothing was mixed with 3 drops of olive oil and shaken vigorously.Formation of an emulsion.

Fig 08: Test for saponins

Test for cardiac glycoside:

0.5g of extract was diluted to 5 ml in water was added 2 ml of glacial acetic acid containing one drop of feCl3. This was underlaid with 1 ml of conc. Sulphuric acid.

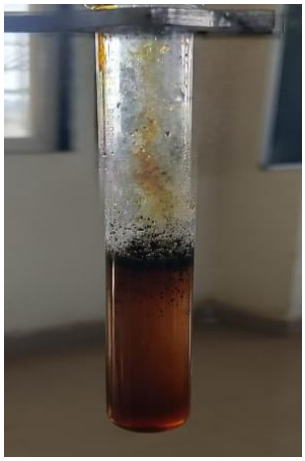

Fig 09: Test for cardiac glycoside

Test for carbohydrates:

Molisch's test:

To 2ml of the extract, add 1 ml of α-napthol solution, add concentrated sulphuric acid through the side of the test tube.reddish violet colour at the junction of the two liquids reveals the presence of carbohydrates

Fig 10 a: Molisch's test

Fehling's test:

To 1 ml of the extract, add equal quantities of Fehling solution A and B, upon heating,Formation of a brick red precipitate indicates the presence of sugars.

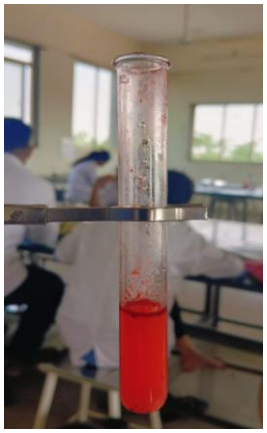

Fig 10 b: Fehling's test

Test for Flavonoids:

5 ml of dil. Ammonia solution were added to a portion of the crude extract followeby addition of conc. H2SO4.Yellow coloration occurs.

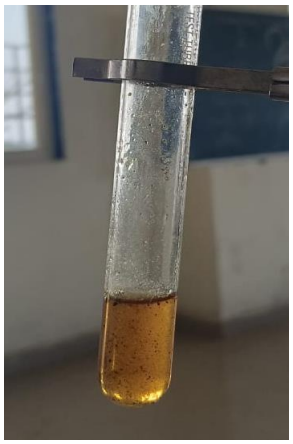

Fig 11.Test for flavonoids

Formulaion table:

The ingredient and its quantity used in formulation are mentioned in **table 1.**

Table 1: Formulation Table

Ingredients	Quantity in ml or gm			
	F1	F2	F3	F4
NAT Extract	0.5	1	1.5	2
Bees Wax	5	5	5	5

Borax	0.02	0.02	0.02	0.02
Liquid Paraffin	7	7	7	7
Methyl Paraben	0.01	0.01	0.01	0.01
Aloevera Gel	1	1	1	1
Rose Oil	3	3	3	3
Distilled Water	5	5	5	5

Chemicals:

Bees wax, Borax, Liquid paraffin, Methyl paraben, Aloevera gel, Rose oil.

Equipments and instrument:

Weighing balance, pH meter, water bath, mechanical stirrer, microscope, thermometer.

Glassware's:

RBF, reflex condensation, meausuring cylinder, petriplate.

Preparation of cream:

In first beaker take 0.02gmof borax dissolved in 5ml water upto 75°C in water bath.(aqueous phase). Then another beaker take 5gm beeswax and 7ml of liquid paraffin heat on water bath upto 70°C obtained molten mass.(oil phase)

- Then mix oil phase in aqueous phase by using mechanical stirrer
- Add methyl paraben and rose oil in beaker and mix well.
- Transfer the preparation into suitable wide container label it properly evaluate and submit.

Fig 12: Formulation Batches

Evaluation Parameter :

Physical Evaluation :

Physical parameter such as colour,odour,and consistency were checked visually physical evaluation of cream formulation reported in **table 4a.**

Measurement of pH:

The pH of cream formulation were determined by using digital pH meter. Take 1gm of cream and dissolved in 10ml distilled water and keep apart for two hours. Then the measurement of pH of formulations was done by dipping the glass electrode completely into the cream system three times and the average values are reported in table 4b.

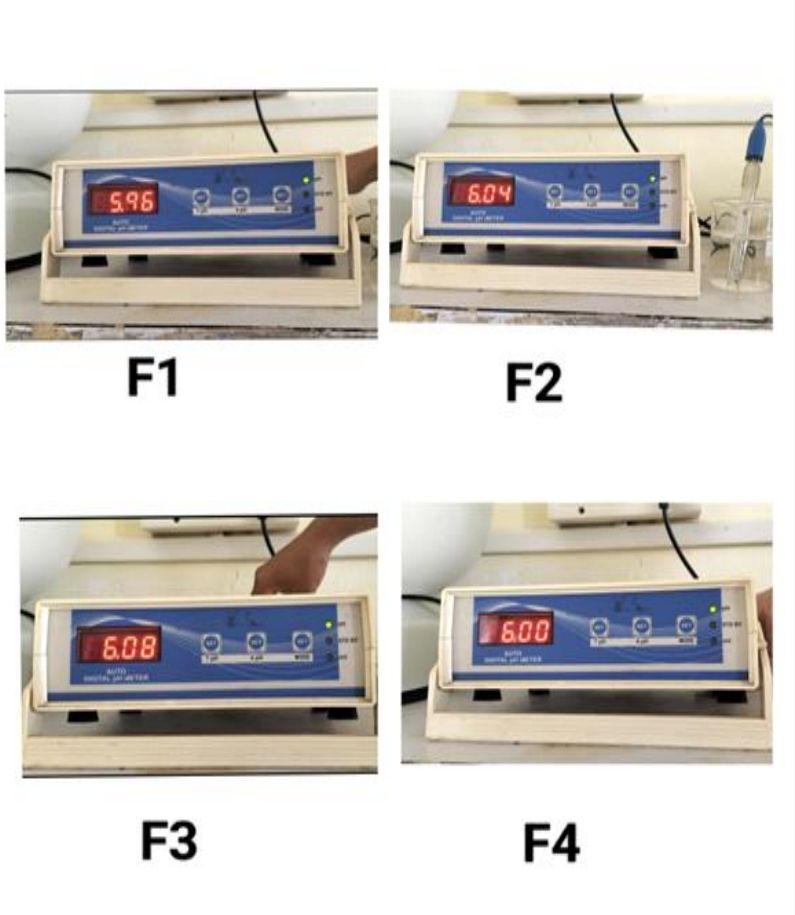

Fig 13: Determination of pH

Spreadability:

Spreadability is expressed in terms of time in seconds determined by glass slide and wooden block apparatus. About 20 gm of weight was added to the pan and the time for upper slide to separate completely from the fixed slide was noted. An excess amount of cream about 2 gm under study was placed on the ground slide. The cream was sandwiched between two slides. One glass slide was fixed on ground and another was provided with the hook. 1 kg weight was placed on the top of slides for 5 minutes in order to form uniform film of cream and to remove air between the slides. Excess of the cream was wiped off from the edges. The top plate was then subjected to pulley with the help of string attached to the hook. The time in seconds required by the top slide to move a distance of 7.5 cm was noted. A shorter or less time interval indicated better spreadability. Spreadability of cream was calculated using the formula.

S= M * L/ T

Where,

S = Spreadability

M = Weight in pan

L = Length covered by glass slide

T = time in sec. taken to separate the slide completely from each other.

Fig 14: Determination Of Spreadability

RESULT AND DISCUSSION:

Phytochemical Screening:

Table 3: Phytochemical Screening

Test	Result
Test for alkaloids: Wagner's test Drangendroff's test	**+ve** **+ve**
Test for tannins	**+ve**
Test for saponin's	**+ve**
Test for cardiac glycosides	**+ve**
Test for carbohydrates Molisch's test Fehling's test	**+ve** **+ve**
Test for flavonoid's	**+ve**

Evaluation Parameter:

Physical Evaluation:

Table 4: Physical evaluation of cream formulation

Formulation	Colour	Odour	Consistency
F1	Light green	Aromatic	Good
F2	Light green	Aromatic	Good
F3	Light green	Aromatic	Good
F4	Light green	Aromatic	Good

2) pH of cream formulation:

Table 4b: pH of cream formulation

Formulation	pH
F1	5.96
F2	6.04
F3	6.08
F4	6.00

3) Spreadability of cream formulation:

Table 4c: Spreadability of cream formulation

Formulation	Spreadability
F1	6.4
F2	6.2
F3	5.9
F4	6.8

Microbial Assay:

- Composition:
- Peptone-1 gm
- Dextrose- 4 gm
- Agar – 2 gm
- Distilled water – 100 ml
- pH – 6.5
- Above composition to prepare culture media make cavity divided 2 part on side.
- Standard solutions (Dermagen) are added into 1st side of cavity of culture media .
- Test solution (cream solution) are add 2nd side of culture media.
- Incubate and observe inhibition of fungi.

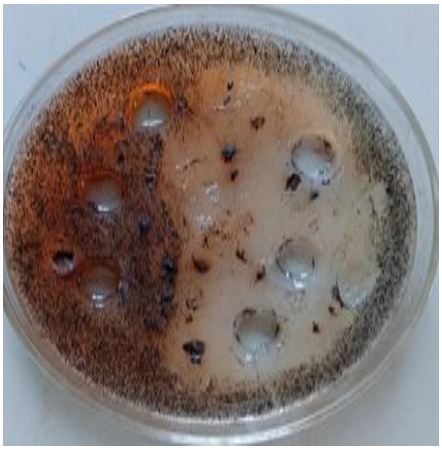

Fig No.13. Microbial Assay

Observation: Observation of zone of inhibition around the cavity measure the diameter of zone of inhibition by antifungal zone reader an in zone of inhibition against lock antifungal and determine the concentration of unknown antifungal sample from gap.

Result : Initial diameter of zone inhibition was 0.9 cm and final result after 48 hr was 1.9 cm which will increase 1 cm so zone of inhibition was 1cm.

Optimization of batches

Table 5: Optimization Of Final Batch

Parameters	Optimization batch(final)
colour	Light green
odour	Aromatic
consistency	Good
pH	6.8
spreadability	6.5

RESULT AND DISCUSSION

The spreadability assessment for a herbal antifungal cream evaluates its capacity to uniformly distribute and cover a specified surface area upon application. This evaluation generally entails applying a predetermined amount of the cream onto a standardized surface, such as glass or a skin-like substrate, and measuring the diameter of the spread after a designated time interval. Various factors, including viscosity, texture, and formulation ingredients, affect the cream's spreadability. A cream that exhibits good spreadability guarantees even coverage, facilitates easy application, and improves efficacy. This assessment aids in refining formulation parameters to attain the desired spreading characteristics, thereby enhancing the consumer experience and therapeutic results.

Result: Microbial Test. For this evaluation, prepare culture media using nutrient agar. Nutrient agar media was utilized to study microbial growth. In this process, nutrient agar was incubated for 24 hours, after which microbial growth was monitored. Subsequently, the cream was applied to the surface area of the petri dish, and observations were made.

Table 6: Optimization Of Batches

Formulation	Colour	Odour	Consistency	pH	Spreadability
F1	Light green	Aromatic	Good	5.96	6.4
F2	Light green	Aromatic	Good	6.04	6.2
F3	Light green	Aromatic	Good	6.08	5.9
F4	Light green	Aromatic	Good	6.00	6.8

CONCLUSION:

As we all known that nowdays the herbal medicine demand increases day by day because they show less side effects than synthetic ones. The data presented in this study,it is demonstrated that that the develop herbal cream formulation F4 possess effective, therapeutically beneficial and suitable vehicle for drug delivery in low cost. Based on the phytochemical screening of nyctanthus arbortritis extract, the presence of phytoconstituents such as saponins and tannins show good antifungal activity which inhibit the growth of fungi. All the evaluation parameter give satisfactory results and hence it is make the formulation are to treat fungal infection.

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