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Formulation And Evaluation of Herbal Antifungal Spray

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ABSTRACT

It has been discovered that human fungal infections have increased recently. The type of fungal species also significantly expanded along with its growth rate. To treat these fungal diseases in a straightforward way, an efficient formulation is required. My research project's primary goal was to create a topical antifungal spray formulation. Create a topical antifungal spray formulation. In the treatment of fungal infections, the creation and development of tropical antifungal formulations has shown excellent outcomes. In addition to their exceptional benefits, these topical medication delivery formulations offer additional advantages over traditional dose forms. Both natural and synthetic components are included in this spray mixture, including Neem (Azadirachta indica) ,Turmeric (curcuma longa), Lemongrass oil, Peppermint Oil, Ethyl Alcohol, Glycerol. components with antibacterial and antifungal qualities. In vitro diffusion tests were used to formulate and assess the topical antifungal spray. For the purpose of assessing their safety, the ingredients in this formulation are microbiologic.

KEYWORDS: Antifungal spray, studied Topical Herbal Antifungal Spray, Neem, Turmeric ,Lemongrass Oil ,Peppermint oil, etc.

INTRODUCTION

The most prevalent and bothersome illness in people is fungal infection. Dermatologists and skin therapists employ the many antifungal medicines that are available on the market in different forms, such as creams, lotions, ointments, topical antifungal powders, etc. Natural components like Neem, Turmeric , Lemongrass Oil, Peppermint Oil. has antifungal properties and are effectively used in topical preparation and can further be used in the treatment of various fungal infections. This preparation has both antifungal and antibacterial properties. It is applied topically using mechanical spray on various fungal infections.

There are numerous varieties of fungal infections, some of which are epidermal tissue invasions. Multiple

fungal species are responsible for this invasion of skin tissues. Both superficial and deeper skin tissue infections are caused by them. These infections can also occur in the bloodstream and are referred to as systemic illness or septicemia. The human body's immune system is directly infected by pathogenic fungus. Curing these skin diseases is often aided by topical antifungal therapy. This involves improving therapeutic efficacy, decreasing potential side effects, increasing patient compliance, and targeting infections, among many other things. Many kinds of chemicals are utilized to treat these fungal infections of the skin. All of these antifungal substances are now marketed in a range of traditional medication forms, including lotions, creams, oils, gels, sprays, and more.

The most popular treatment options for fungal infections are topical and systemic antifungal and antibacterial medications. Oral antifungal medications are also utilized therapeutically, however patient compliance is low due to their numerous adverse effects..

Fig 1 – Fungal Infection

PLANT PROFILE: - 1. Neem -

Figure – Neem

Scientific Name: Azadirachta indica

Common Names: Neem, Nimba, Indian lilac, Miracle tree

Biological Source: It Consists Of Leaves and Other Aerial Parts Of Azadirachta indica

Family : Meliaceae

Uses- Anti-inflammatory**,** Hypoglycemic**,** Antigastric ulcer**,** Antifungal**,** Antibacterial

2- Turmeric

Figure No – 3 Turmeric

Scientific Name: Curcuma Longa

Common Names: Haldi

Biological Source: Turmeric is the dried rhizome of Curcuma L Curcuma Longa Linn.

Family : Zingiberaceae

Uses : Antifungal, Antioxident, Anti – Inflammatory, Anti- Bacterial., Anti – Diabetic

3. Lemon Grass Oil

Part used: Stalk, leaves, roots etc.

Scientific name and family: Cymbopogon flexuosus with poaceae.

Uses: Cymbopogon flexuous activities such as anti- amoebic, antibacterial, antidiarrheal, antifilarial, antifungal and antiinflammatory properties. Cymbopogon citratus essential oil is used in aromatherapy. Lemongrass is antifungal and antibacterial in nature owing to citral, an organic compound that is found in its leaf, stalk and roots.

MATERIALS AND METHODS

Neem leaves Extraction:

1. Preparation of Plant Material: Dry and cut plant material into small pieces or powder to increase surface area.

2. Weight and Transfer Place the measured amount of plant material into a clean, dry container.

3. Add Solvent Add an appropriate volume of solvent to completely submerge the plant material. Common ratios: 1:4 to 1:10 (plant:solvent).

4. Soaking Period : Allow the mixture to stand for 2 to 7 days, depending on the material and solvent used. Stir occasionally to improve extraction.

5. Filtration : After maceration, filter the mixture through a cloth or filter paper to separate the extract from the plant residue.

Curcumin Rhizomes Extraction:

Soxhlet Extraction Process

1. Preparation of Rhizomes: Dry the turmeric rhizomes thoroughly to remove excess moisture.
2. Selection of Solvent: Choose a suitable solvent based on the desired extraction efficiency and curcumin yield.
3. Soxhlet Extraction: Place the dried rhizomes in the Soxhlet apparatus and add the selected solvent. Heat the solvent to create a continuous extraction cycle.
4. Extraction Time: The extraction time can vary depending on the solvent, temperature, and desired yield.
5. Filtration: Filter the extract using filter paper or cheesecloth to remove any impurities.

Phytochemical Test Neem Extract

1. **Alkaloid Test:**
Add Few drops of Dragandorff reagent to 1 ml of Neem Extract Mix well Formation of Precipitate Alkaloids is present

2. **Flavonoids Test**:
1 ml Extract Add Few drop of ammonium hydroxide add few drop of hydrochloric acid Yellow or orange Precipitate Flavonoid is present

3. **Saponin Test :**

1 ml Extract add 4 ml D.W shake vigorously Formation of Froth Confirmed Saponin is Present

4. **Tannin Test :** Ferric Chloride Test
1 ml extract Add Few dropes of 1%Ferric Chloride Green or Blue Black colour Tannin is present.

5. **Terpenoids test :**
2 ml of Extract add Few drop of Sulfuric acid Reddish brown colour presence of Terpenoids.

Phytochemical Test of Curcumin Extract

1. **Alkaloid Test:**
Add Few drops of Dragandorff reagent to 1 ml of Neem Extract Mix well Brown colour Alkaloids is present

2. **Flavonoids Test**:
1 ml Extract Add Few drop of 10% NaoH Yellow or orange Precipitate Flavonoid is present

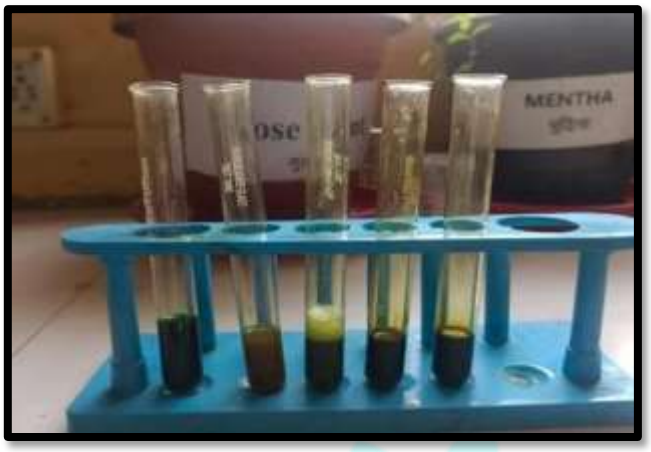
3. **Tannin Test :** Ferric Chloride Test1 ml extract dd Few dropes of 1%Ferric Chloride Green or Blue Black colour Tannin is present.

4. **Saponin Test :**

2 ml of Extract in test tube ana add 5 ml of distilled water add shake vigorously

Formation of Froth Confirmed Saponin is Present

5. **Glycoside test :** Ferric Chloride Test
1 ml extract Add Sodium Nitropruside Add NaoH Red colour Glycoside is Present.



Phytochemical test- Neem Extract

Method of Preparation of Antifungal Spray –

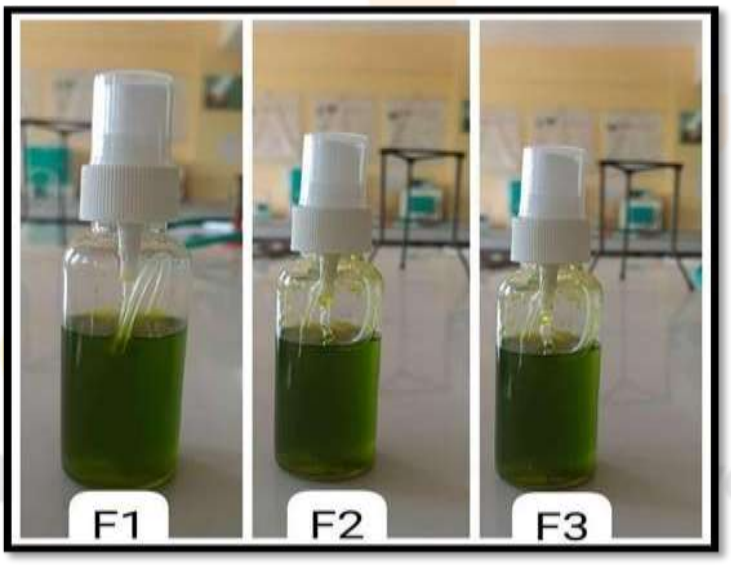
To get antifungal spray ready, With a magnetic stirrer, lemon grass oil dissolves in propylene glycol.Using a magnetic stirrer and ethyl alcohol, curcumin was dissolved. The lemon grass oil solution is gradually supplemented with neem and curcumin solution.A magnetic stirrer is used to agitate the mixture for five minutes. After two minutes of stirring the mixture with ethyl alcohol, a few drops of peppermint oil are added.The ready-made mixture is put into the appropriate container.

Formulation of herbal antifungal spray

Formulation Ingredients Table

Table.1: Spray formulation

INGREDIENTS	F1	F2	F3
Neem Extract	2 ml	2.5 ml	3 ml
Turmeric Extract	1 ml	1.5 ml	2 ml
Lemon grass oil	1 ml	1.5 ml	2 ml
Glycerol	5 ml	5 ml	5 ml
Propylene glycol	4 ml	5 ml	6 ml
Peppermint oil	0.5 ml	0.5 ml	0.5 ml
Ethyl alcohol	15.5ml	12 ml	8.5 ml
Rose Water	1 ml	2 ml	3 ml
Total	30 ml	30 ml	30 ml



Evaluation Parameter-

1. pH Test:

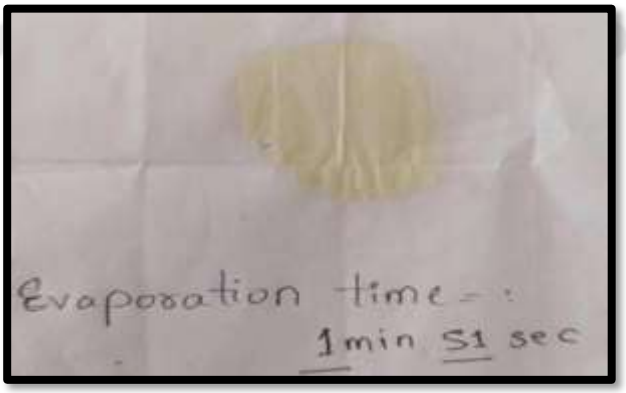
The pH of the optimized spray solution was determined using the digital pH meter. The pH of the improved formulation was calculated after the pH meter was calibrated using phosphate buffer with varying pH values (4.0, 7.0, and 9.0). The spray solution's pH was ascertained. After measuring each formulation three times, the mean values were determined.

2. Viscosity:

Digital Viscometer are used for measure viscosity of Fluid

3. Evaporation Time:

After spraying the formulation onto white paper, the evaporation time—the amount of time needed for the spray film to dry—was calculated and found to be between one and a half minutes for each formulation.



4. Stickiness of Spray

No stickiness found in formulated spray which mentioned.

5. Spray angle:

Spray angle(ø)= $\tan^{-1}$ (h/r)

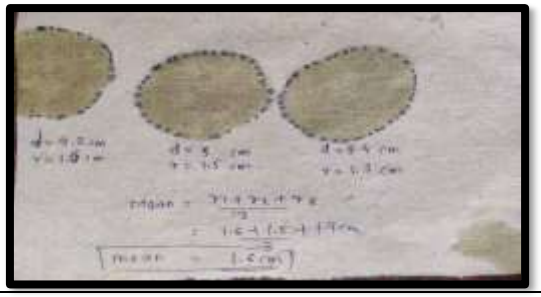
Where, h is the distance of paper from the nozzle &r is the average radius of the circle. Therefore spray angle was found to be 80^0

6. Leak test:

Effectiveness of pump seal of a spray and its ability to store the contents of the products. Hence there is no leakage in container.

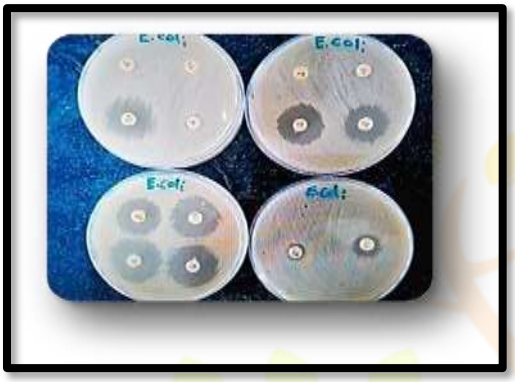
7. Spray pattern:

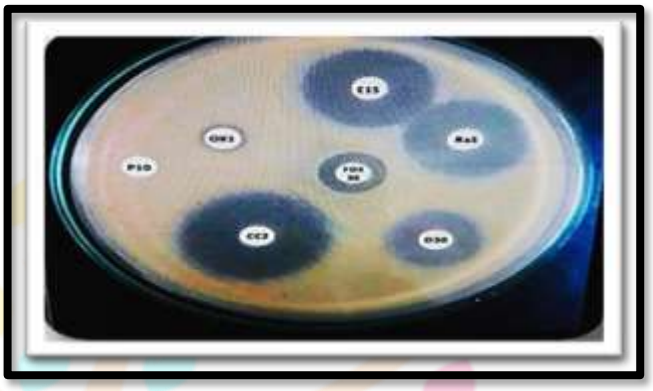
By applying the spray to a piece of paper, the spray pattern was evaluated. After actuation, a uniform and spherical spot is produced by an excellent spray pattern.As a result, 1.6 cm was the spray pattern.



ANTIMICROBIAL TEST :

- In this investigation, the agar well diffusion method is helpful. This uses Mueller-Hinton agar that is poured in 125–150 mm and 4 mm deep.
- The pH ranged from 7.3 to 7.5, and an aseptic approach was employed for this purpose. After immersing the sterile swab in the broth culture of a certain organism, the excess fluid was extracted by spinning the swab.
- By streaking the plate in a single direction while rotating it at 90%, uniform growth is achieved. These plates are left to dry after approximately five minutes of waiting.
- These plates were all incubated at 37°C (98.6°F) for the entire night. The inhibitory zones and the common antifungal substances were contrasted.





Result and Discussion-

Sr.No	Parameter	Result		
		F1	F2	F3
1.	pH	5.6	5.8	6.0
2.	Viscosity	1.26	1.30	1.36
3.	Drying time	2.5 min	2 min	1.5 min
4.	Stickiness of spray	No Stickiness	No Stickiness	No Stickiness
5.	Spray Angle	76.5^0	78.5^0	80^0
6.	Average weight of dose	46.5	46.2	45.8
7.	Leak test	No Leakage	No Leakage	No Leakage
8.	Spray Patterns	1.6 cm	1.6 cm	1.6 cm
9.	Antifungal teat	36	37	45

CONCLUSION

The components in this formulation were proven to be effective against fungal infections, according to all formulation trials. This multi-ingredient topical antifungal and antibacterial spray was effectively created as a spray solution that can be used to other participants in subsequent studies. The current research project is promising and offers a fresh approach to the transdermal antifungal treatment, according to the numerous investigations and findings.

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