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THE ROLE OF HERBAL MEDICINES FOR TREATMENT OF FUNGAL INFECTIONS: A SYSTEMATIC REVIEW

BISAI A², TANDI DY¹, SINGH V¹, KUMAR N², SAHU GK¹ AND SHARMA H^{1*}

1: Rungta Institute of Pharmaceutical Sciences & Research, Kohka, Kurud, Bhilai

2: Rungta Institute of Pharmaceutical Sciences, Kohka, Kurud, Bhilai

*Corresponding Author: Dr. Harish Sharma: E Mail: drharishsharma.817@gmail.com

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ABSTRACT

This study presents the formulation and evaluation of a herbal antifungal cream. 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

1. INTRODUCTION: -

1.1 Fungi: - "Fungi are a kingdom of usually multicellular eukaryotic organism that are heterotrops and have important role in nutrient cycling in an ecosystem". Fungi are a diverse group of eukaryotic organisms

that include microorganism such as yeasts, moulds and mushrooms. They obtain nutrients through absorption, breaking down organic matter in their surroundings. Structurally fungi consist of hyphae, which

form a network called mycelium. They reproduce both sexually and asexually, and their life cycle often involves spore formation. Fungi play crucial ecological roles as decomposers, symbionts and pathogens. Some are used in food production (yeast for baking), while others can cause diseases in plants and animals [1].

1.2 Characteristics of fungi: -

The fungi are eukaryotic, heterogeneous, unicellular to filamentous, spore bearing and chemo-organotropic organism which lack chlorophyll. Some fungi are single celled, while others are multicellular. Fungi cells have a nucleus and organelles, like plant and animal cells. The cell wall of fungi contain chitin, which is hard substance. They do not contain cellulose, which commonly makes up plant cell wall [1, 2].



Figure 1: Fungi

2. TYPES OF FUNGI: -

- Chytridiomycota
- Zygomycota
- Glomeromycota
- Ascomycota

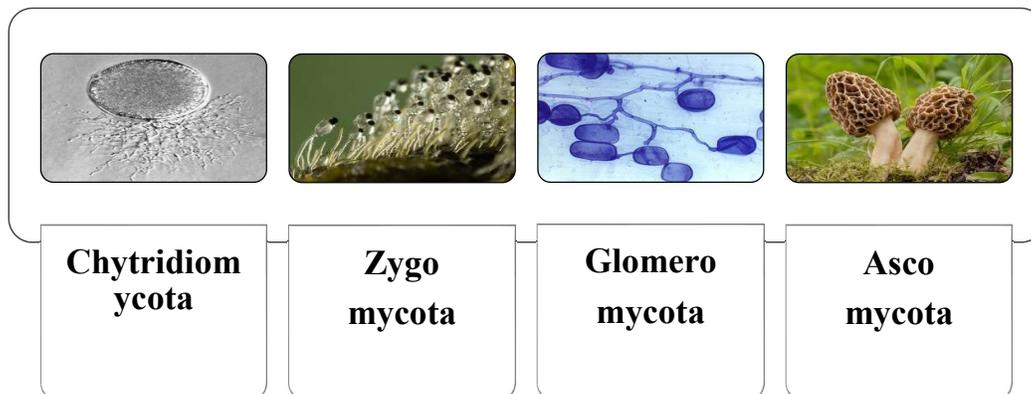


Figure 2: Types of Fungi

2.1 Chytridiomycota: -

Chytridiomycota are usually asexual and produce spores that no around using flagella, small tail like appendages. It can cause fungal infection in frog by burrowing under their skin [3].

2.2 Zygomycota: -

These are mainly terrestrial. They cause problem by growing on human few source. Example: - *Rhizopus stolonifera* a bread mole [4].

2.3 Glomeromycota: - They are found in soil. The fungi obtain sugar from plant and in return, dissolves, minerals in the soil to provide the plant with nutrients. These fungi reproduce asexually [5].

2.4 Ascomycota: -

These are the pathogens of plant and animals, including human in which they are responsible for infection like athletes' foot, ringworm and ergotism, which causes vomiting, convulsions, hallucination and sometime even death [6].

3. FUNGAL INFECTION: -

Fungal infection is an inflammatory condition caused by a fungus. Fungal infection are common through much of natural world. In human, fungal infection occur when an invading fungus takes over an area of the body and is too much for the immune system to handle. Fungi can live in the air, soil, water and plants. There are also some fungi that live in the human body [7-10].

3.1 Types of fungal infection: -

There are several types of fungal infection, including:

- Superficial Mycoses
- Cutaneous Mycoses
- Subcutaneous Mycoses
- Systemic Mycoses

3.1.1 Superficial Mycosis: -

It refers to fungal infections that primarily affect the outer layers of the skin, hair and nails. Unlike deep-seated fungal infections that involves internal organs, superficial mycoses are limited to the surface tissue.

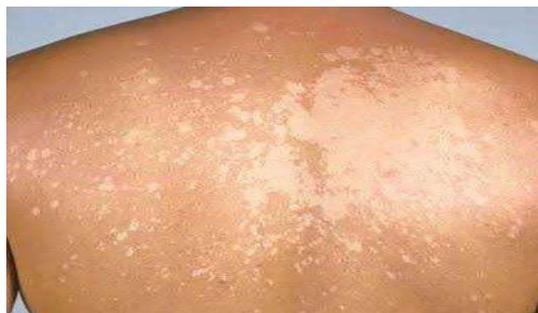


Figure 3: Superficial Mycosis

❖ **Symptom:** -

- Itching
- Redness and inflammation
- Scaling or flaking of the skin
- Circular or irregular rashes

❖ **Causes:** -

- Fungi, especially dermatophytes, candida and Malassezia are the primary causative agents.
- These fungi thrive in warm, moist environments.

❖ **Transmission:** -

- Direct contact with an infected person and animal.
- Indirect transmission through contaminated object like towel, cloths etc.

❖ **Treatment:** -

- Topical antifungals: - Apply creams or powders with antifungal agent.

- Oral medicament

- Shampoos

❖ **Prevention:** -

- Hygiene: keep skin clean and dry.
- Avoid moisture: Choose breathable fabrics, keep skin folds dry.
- No sharing: avoid sharing personal items.
- Regular check-up: Promote treatment and regular check-ups [9-12].

3.1.2 Cutaneous mycoses: -

It is also known as dermatophytosis or ringworm infections, are fungal infections that affect the skin, hair and nails. They are caused by a group of fungi specialized in utilizing keratin, the protein found in skin, hairs and nails.



Figure 4: Cutaneous Mycoses

❖ **Symptoms:** -

- Itching
- Redness
- Scaling
- Cracking
- Blistering

❖ **Treatment:** -

- Topical antifungal: Creams, lotions or powders applied directly to the affected area.

- Oral medication: In severe cases, oral antifungal medication may be prescribed.

❖ **Prevention:** -

- Hygiene maintain
- Regular cleaning
- Avoiding contaminated items [12, 13].

3.1.3 Subcutaneous mycoses: -

These are fungal infections that involve the skin, subcutaneous tissue and occasionally deeper structures. These infections are caused by fungi that typically inhabit soil and plant material.



Figure 5: Subcutaneous Mycoses

❖ Symptoms: -

- Painless nodules or papules at the site of entry.
- Skin discoloration and swelling.

❖ Causes: -

- Fungi that commonly inhabit soil and plant materials.
- Traumatic implantation of fungal elements into the skin through injuries, thorns or splinters.

❖ Treatment: -

- Antifungal medication, such as creams, lotions etc.
- In severe cases, surgical intervention may be required to removed infected tissues.

❖ Prevention: -

- Protective measures: Use gloves and appropriate clothing when handling soil, plants or other materials that may harbor fungi.
- Wound care: promptly clean and treat any wounds or injuries to prevent fungal entry.
- Avoiding contaminated materials [12, 14].

3.1.4 Systemic mycoses: -

There are fungal infections that affect internal organs and tissues.



Figure 6: Systemic Mycoses

❖ Symptoms: -

- Fever: Persistent or recurring fever is a common symptom.
- Weight loss: unexplained weight loss may occur.
- Fatigue: Generalized fatigue and weakness can be present.
- Respiratory issues: Depending on the fungus, respiratory symptoms such as coughing and difficulty breathing may occur.
- Joint pain: Some systemic mycoses may cause joint pain.
- Night sweats: Excessive sweating, particularly during sleep.
- Enlarge lymph node: swollen lymph nodes may be observed.

❖ Treatment: -

- Treatment typically involves antifungal medications and the choice depends on the type of fungus causing the infection.
- It's crucial for individuals with systemic mycoses to be under the care of a health care professional, as these infections can be serious and require close monitoring during treatment.

❖ Prevention: -

- Avoidance: Minimize exposure to environments with high fungal infection.
- Protective gear: Use appropriate protective gear (mask, gloves) when working in environments where exposure is likely.
- Good hygiene: Practice good hygiene to reduce the risk of infection.
- Immunization: In some cases, vaccines may be available for specific fungal infections.
- Environmental control: Limiting exposure to known sources of fungi such as contaminated soil or bird droppings, can help prevent systemic mycoses [12, 13, 15].

3.2 Other skin fungal infection: -

- Ringworm
- Athlete's foot
- Jock itch

3.2.1 Ringworm: -

Ringworm is a common fungal skin infection, that can affect the skin, scalp and nails. It's not caused by a worm but by various types of fungi known as dermatophytes.



Figure 7: Ringworm

❖ **Symptoms:** -

Ringworm often presents as a red, itchy and circular rash on the skin, which may have a raised, scaly border. It can affect different part of body, including the scalp, body, feet and groin.

❖ **Transmission:** -

It is highly contagious and can be spread through direct contact with an infected person, pet or contaminated surface like towels and shower floors.

❖ **Treatment:** -

Antifungal medication such as topical creams or oral antifungal pills are commonly

prescribed to treat ringworm. Over the counter antifungal creams may be effective for mild cases.

❖ **Prevention:** -

- Good hygiene.
- Avoid sharing personal items.
- Keep the skin clean and dry [8, 16].

3.2.2 Athlete's foot: -

Athlete's foot also known as tinea pedis. It is common fungal infection affecting the skin of the feet, particularly between the toes. The fungi grow best in warm, moist placed. They are often found in the summer and in hot, humid climates.



Figure 8: Athlete's foot

❖ **Symptoms:** -

- It's symptoms including burning, itching and stinging sensation.
- The skin may become red, scaly and cracked.
- In severe cases, blisters and ulcers can develop.

❖ **Causes:** -

It is causes by various types of fungi such as Trichophyton or Epidermophyton, that

thrive in worm and moist place like sweat sock and shoes.

❖ **Transmission:** -

The infection is contagious and can be spread through direct contact with infected skin or by touching contaminated surfaces such as shower floor, towels or socks.

❖ **Treatment:** -

Over the counter antifungal cream, spray or powder are often effective for mild cases.

❖ **Prevention:** -

- Good foot hygiene is essential

- Keep feet clean and dry
- Wear breathable shoes and moisture wicking socks
- Avoid walking barefoot in shared or damp environment [8, 17].

3.2.3 Jock itch: -



Figure 9: Jock Itch

Jock itch, also known as tinea cruris. It is a fungal infection that affects the skin in the groin area. It's caused by various fungi, typically those that thrive in warm and moist place. Infection happened most in the summer or warm, wet climate.

❖ Symptoms: -

- Redness: The affected area may appear red and irritated.
- Itching: Persistent itching is common symptom.
- Rash: A raised, red rash with defined edges may develop.
- Flaking or peeling: The skin may flak or peel, especially at the edges of the rash.
- Burning sensation: some individually may experience a burning or discomfort.

❖ Causes: -

- Fungal infection: Usually causes by dermatophytes.
- Warm and moist condition: Fungi thrive in warm, humid environments, making the groin area susceptible.

❖ Treatment: -

- Antifungal creams: Over the counter cream containing ingredient like miconazole are commonly used.
- Keeping the area dry: Good hygiene and ensure the affected area stay dry and can aid recovery.
- Prescription medications: IN severe cases, a health care professional may prescribe stronger antifungal medication.

❖ Prevention: -

- Good hygiene: Regularly clean and dry the groin area, especially after sweating.
- Loos clothing: Ware loos fitting, breathable clothing to minimize moisture.
- Avoid sharing personal items: towels, clothing or other personal items should not be shared to prevent spreading the infection.

- Change wet clothing promptly: if clothing become damp, change into dry clothes as soon as possible [8, 18, 19].

4. HISTORY OF FUNGAL DISEASE: -

The history of fungal disease has evolved over the time. Early development involved seeking causal organism and understanding basic fungal biology during the “Era of discovery” (1894-1919). The “Formative years (1920-1949)” saw the establishment of training programs and studies in common disease. The period from 1950 to 1969, the advent of antifungal and immunosuppressive therapies, was marked by drug discoveries and an increase in severe opportunistic fungal infection. The years of expansion (1970-1979) witnessed the peck of medical mycology with increased services, research and recognition as a specialty. The subsequent “Era of transition (1980-1996)” faced challenges including the rise of opportunistic infections and that fragmentation of the field.

Some key points in the history of fungal disease: -

4.1 Ancient time: -

- Fungal infection, particularly dermatophytes infections like ringworm, were recognized in ancient civilizations.
- The ancient Egyptians documented skin infection and their attempts at treatments.

4.2 Middle ages: -

- The term “ringworm” was coined during the Middle Ages, referring to the characteristic ring like appearance of the infection on the skin.

- Superstition and misconceptions surrounded fungal infections, contributing to various ineffective treatments.

4.3 17th century: -

- Antoni van leeuwenhoek, a Dutch scientist, discovered microscopic fungi using a microscope he designed.
- The understanding of the microbial world, including fungi, started to advance.

4.4 19th century: -

- Louis pasteur’s work laid the foundation for understanding microbial disease, through the focus was primarily on bacteria.
- The link between fungi and disease such as athlete’s foot and ringworm became clearer.

4.5 20th century: -

- Advancements in medical mycology accelerated, and researchers identified various pathogenic fungi.
- Antifungal drugs, like griseofulvin, were introduced for the treatment of fungal infections.

4.6 Late 20th century to present: -

- The emergence of opportunistic fungal infections became a concern, especially among immunocompromised

individuals such as those with HIV/AIDS.

- Antifungal medications, such as fluconazole and voriconazole, were developed to address a broader range of fungal infections.

5. ANTIFUNGAL CREAM: -

“Cream which is used for kill or inhibit the growth of fungi”. Antifungal creams are used to treat fungal infection, which most commonly affect our skin, hair and nails. Antifungal creams are topical medications designed to treat fungal infections of the skin. They typically contain active ingredients that inhibits the growth and spread of fungi [20].

5.1 Need of antifungal cream: -

Antifungal creams are commonly used to treat fungal infection such as ringworm and yeast infection. They help alleviate symptoms like itching, redness and irritation while combating the underlying fungal growth. Antifungal creams play a circular role in treating various fungal infections affecting the skin [20].

5.2 Properties of antifungal cream: -

- Antifungal agents
- Fungistatic or fungicidal
- Broad spectrum or targeted
- Topical application
- Absorption and residue
- Symptom relief
- Compatibility with skin

5.3 Action of antifungal cream: -

Antifungal creams work by inhibiting the growth and spread of fungi, such as yeast or dermatophytes, on the skin. The typically contain antifungal agents like miconazole. These agents interfere with the fungal cell membrane or cell wall, disrupting their structure and function. This help eliminate the fungus causing infections like ringworm or yeast infections.

5.4 Advantages of antifungal cream: -

- Topical application: Antifungal creams are applied directly to the affected area, allowing targeted treatment of the infection without affecting other parts of the body.
- Localized treatment: they are effective for treating superficial fungal infections on the skin, such as jock itch and ringworm.
- Easy to use: antifungal creams are generally easy to apply and integrate into daily hygiene routines.
- Over the counter availability: Many antifungal creams are available without a prescription, providing convenient access for individuals with mild fungal infection.
- Wide range of formulation: Various formulations cater different types of fungal infections, allowing for flexibility in treatment options.
- Combination products: Some antifungal creams may contain additional ingredients, such as anti-inflammatory

agents or moisturizer, enhancing their therapeutic effects [20].

5.5 Disadvantages of antifungal cream: -

- Limited effectiveness for deep infections.

- Inconvenient for certain areas.
- Risk of allergic reactions.
- Incomplete penetration [20].

5.6 Drug used for treatment for fungal disease [8, 21]

Table 1: Drug used for treatment for fungal disease

S. No.	Drug Name	Class	Route of Administration	Dosage form
1.	Amphotericin B	Antibiotic	Orally	Tablets
2.	Nystatin	Antibiotic	Ophthalmic	Eye drops
3.	Fluconazole	Azole	Orally, ophthalmic	Capsule, eye drops
4.	Ketoconazole	Azole	Applied on hair and skin	Cream, lotion, shampoo
5.	Tolnaftate	Topical agent	Applied on skin	Cream, lotion
6.	Butenafine	Topical agent	Applied on skin	Cream
7.	Ciclopirox olamine	Topical agent	Applied on skin.	Cream

6. NEED OF HERBAL: -

Herbal remedies are sought for various reasons, including their potential natural benefits, fewer side effects compared to synthetic drugs and cultural or traditional practices. Many people use herbs for holistic well-being, alternative medicine or to address specific health concerns. Herbal antifungal creams are sought for treating fungal infection using natural ingredients. Herbal antifungal cream potential lower side effects compared to synthetic counterparts [10].

6.1 Advantages of herbal antifungal cream: -

- Herbal antifungal cream is made up of herbal natural ingredients like Neem and Aloe vera,
- Herbal antifungal creams are reduced the side effects.
- It helpful in treating mild skin

- Topically applied to the skin to control and manage fungal infection
- It provides moisture to our skin [22].

7. FUTURE PROSPECTIVE: -

The future prospective for herbal antifungal creams are promising as there is a growing demand for natural and sustainable alternatives in health care. Herbal antifungal creams, derived from plant extracts with inherent antifungal properties, offer a holistic approach to managing fungal infections. The increasing awareness of the side effects associated with synthetic antifungal medications has led to a surge in interest in herbal remedies. Herbal antifungal creams have the advantage of being generally well-tolerated, reducing the risk of adverse reactions. The diverse range of bioactive compounds present in herbs can target various fungal strains effectively. Collaborations between traditional herbal

knowledge and modern pharmaceutical research can lead to the development of innovative formulations.

8. 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.

REFERENCES: -

[1] Arati D. Powar and Dr. Sachin A. Nitave
Polyherbal Antifungal Cream World
Journal Of Pharmaceutical Research

Volume 11, Issue 5, 904-920 Issn 2277-7105.

- [2] Marcin Rozewicz, Marta Wyzinska. The most important fungal diseases of cereals- problems and possible solution. *Agronomy* 2021,11,714. 9 April 2021.
- [3] Jason E. Stajich, Mary L. Berbee. The fungi. *Current Biology* Volume 19 No 18 R840 on 13 January 2018
- [4] Peter C. Lwel, Ishwor Thapa. Review of methods for identification of Zygomycota. *Labmedicine* Vol 42 No. 5 May 2011
- [5] B. F. Rodrigues. Taxonomy of phylum glomeromycotan. *Researchgate*. January 2008, 4:193-216
- [6] Cristian J. Zambrano- Forero, Lina R. Divila-Giraldo. Diversity and distribution of macro fungi (Ascomycota). *Biodiversity data journal* 11: e 104307, 25 Sep. 2023
- [7] G. Kiran Kumar Reddy, Alwar Ramanujam Padmawati. Fungal infections: pathogenesis, anti-fungal and alternate treatment approaches. *Current research in microbial sciences* 3 (2022) 100137
- [8] Aditya K Gupta, Melissa A. Macleod. Fungal skin infection *Pediatrics in review* Vol 38 No 1 27 Feb. 2017.
- [9] Klaus L. Mortensen, David W. Denning. The burden of fungal disease in Denmark. *Mycoses*,2015,58(suppl. S5),15-21. 29 May 2015.

- [10] Ben E. de pauw. What are fungal infection? Mediteranean journal of hematology and infectious diseases, 2011;3; Open journal system. January14,2011.
- [11] Neha Kaushik, George G. A. Pujalte. Superficial Fungal infection. Researchgate
DOI:10.1016/j.pop.2015.08.004 Dec. 2015
- [12] Kusum Kaushik, Shweta Agarwal. Role of herbal antifungal agents for the management of fungal diseases. Asian journal of pharmaceutical and clinical research volume 12, issue7,2019. 28 may 2019.
- [13] Jennifer D. Smith. Cutaneous fungal infection. US Pharma. 2015;40(4):35-39. 16 April 2015.
- [14] Wendemagegn Enbiale, Alemayehu Bekele. Subcutaneous mycoses: endemic but neglected among the neglected topical disease. PLoS Negl Trop Dis 17(9): e0011363 Sep. 27, 2023
- [15] Gonzalo Segrelles-Calvo, Glauber R. de S. Araujo. Systemic mycoses. Future Microbiology. (2020)15(14), 1405-1413. 11 September 2020.
- [16] Wagini N.H., Mahuta A.U. Prevalence of ringworm infection among children in malumfashi community, identification of their etiological agents and the possible herbal therapy. Kasina Journal of Natural and Applied science vol 5 no.2 (issn 2141-0755). 2 September 2016.
- [17] Jayant Sharma, Prashant Upadhyaya. Effect of flat foot on the running ability of an athlete. Indian Journal of Orthopaedics Surgery, 2016;2(1):119-123
- [18] R. Gowri, Tanamani Jenifer. Review on jock itch. Acta scientific clinical reports 3.4(2022): 2125, 4 March 2022.
- [19] Ramdas B. Darade, Krushna K. Zambare. An overview on pharmacotherapy of jock itch. World journal of pharmaceutical research volume 9, issue 1,851-856. 17 Dec.2019.
- [20] Jincy V Varghese, Krishnapriya E, Megha H, Mubashira P M, Rejin Jose, Shana P K. A Review on Formulation Andevaluation of Polyherbal antifungal Cream International Journal of Creative research Thoughts (Ijert) Volume 10, Issue 4 April 2022 | Issn: 2320-2882.
- [21] David H. Van Thiel, Magdalena George. Fungal infection: Their diagnosis and treatment in transplant recipients. International journal of hepatology volume 2012, article id 106923.23 April 2012.
- [22] Kumbhar Abhishek Somanath, Dr. L.D. Hingne, Miss. A.R. Aswar. Prepration and Evaluation of Herbal Anti-Fungal Cream International Journal of Creative Research Thoughts (Ijert) Volume 9, Issue 12 December 2021 | Issn: 2320-2882.