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Comparative Study of Marketed Antifungal Creams

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ABSTRACT:

Worldwide, fungal infections are a major problem, especially in areas with warm, humid climates. These infections frequently cause discomfort and a lower quality of life by affecting the skin, nails, and mucous membranes. Because of their minimal systemic effects and localized topical action, antifungal creams are frequently used to treat these infections. Based on a number of physicochemical and biological criteria, this study compares four widely used antifungal creams: Terbinafine, Ketoconazole, Clotrimazole, and Neomycin. Standardized tests were used to evaluate the creams, including dilution and dye tests, pH determination, washability, homogeneity, irritancy, acid value, saponification value, and antifungal effectiveness via zone of inhibition against Candida albicans. The findings showed that all of the creams were of the water-in-oil (W/O) emulsion type, had good physical qualities, and did not cause irritation. Terbinafine, Neomycin, and Clotrimazole were the next most effective antifungal agents, with ketoconazole cream exhibiting the largest zone of inhibition (1.8 cm). Customers and healthcare professionals can choose the best topical antifungal based on scientific assessment rather than just brand reputation with the help of this comparison analysis. The results underline the need for greater research into novel, more potent antifungal drugs while bolstering the continued usage of existing formulations in clinical settings.

Keywords: Antifungal creams, Fungal infections, Ketoconazole, Zone of inhibition, Topical formulation, Comparative analysis, Candida albicans.

INTRODUCTION

Fungi infections are an uncomfortable and annoying disease that affects people all throughout the world. A comparative study looks at aspects including cost-effectiveness, practical efficacy, and convenience of application in order to comprehend the safety and efficacy of antifungal creams. The project aims to provide information to healthcare professionals so they may recommend therapies and assist individuals in selecting the best cream for their specific needs. The purpose of this research is to improve patient treatment and quality of life for individuals suffering from fungal infections.

FUNGI - Living entities that are not considered to be part of either plants or animals are fungi. Our bodies naturally contain many fungi (in the mouth, GI tract, and skin), but they have the potential to overgrow. Skin infections caused by fungi might seem rough, puffy, or red. You might be able to detect a lump under your skin or they may resemble a rash.

Fungal Infections -Fungal infections are diseases caused by fungi, such as mold or yeast. Although fungal infections most commonly occur on the skin or nails, they can also occur in the mouth, throat, lungs, urinary system, and many other parts of the body.

Types of Fungal Infections - Fungal infections can be superficial or mucocutaneous, subcutaneous or deep, and can affect skin, nails, mucous membranes, lungs, brain, or heart, with common types including ringworm and candidiasis.

Symptoms - Itching, discomfort, redness, or a rash, Thick, cracked, or discoloured nails, White spots in the tongue or throat, pain during eating, or a loss of flavour a smooth, under-the-skin bump. Occasionally coughing up blood, Fever, Shortness of Breath, Fatigue (tiredness), joint discomfort, hurts in the muscles, Night sweats, headache, etc.

Causes - Fungal infections, caused by yeast, moulds, and other fungi, can be opportunistic or serious depending on the situation. *Candida albicans*, a naturally living yeast, can cause itching and redness under certain conditions.

Diagnosis and Tests - Medical professionals use the fungus's location to diagnose fungal infections. Skin, blood, sputum, CNS fluid, urine, ocular fluid, and vaginal discharge are some of the ways they may employ. Fungal infections may be treated with oral, intravenous, lotion, mouthwash, eye drops, shampoo, or preventative medications. There may be over-the-counter options for some therapies.

Antifungal Agents - For topical and systemic antifungal therapy, there are now five common groups of antifungal medications, including azoles, polyenes, echinocandins, allylamines, and pyrimidine analogs.

CREAMS - Creams are topical medicines intended to clean, beautify, and enhance appearances, among other cosmetic goals. They are classified as pharmaceutical products and are viscous liquid or semi-solid emulsions that are either water-in-oil or oil-in-water. They are employed to administer drugs locally into the mucous membrane or underlying layer of the skin. Ayurvedic, herbal, or allopathic creams can be divided into o/w and w/o varieties according to their stages.

Types of skin creams – Oil-in-Water (O/W) creams consist of small oil droplets dispersed in a continuous phase, while Water-in-Oil (W/O) creams consist of small water droplet dispersed in a continuous oily phase, with oil being the dispersion medium.

Antifungal creams - Antifungal creams treat skin infections like athlete's foot and ringworm, using active ingredients like clotrimazole, miconazole, or terbinafine.

Name	Information	Mode of action	Administration	Adverse effect
Ketoconazole	A medication called ketoconazole is used to treat and manage fungus infections. It is in the imidazole antifungal class of medications.	Ketoconazole is an antifungal agent that inhibits the cytochrome P450 14αdemethylase enzyme, which is responsible for fungi's biosynthesis of triglycerides and phospholipids, including lanosterol.	Ketoconazole is available in tablet form and as a topical agent in creams, foams, and shampoos. It is also available in mixture products.	These symptoms include tongue discolouration, dry mouth, flatulence, vomiting, nausea, and constipation.
Clotrimazole	Medications like clotrimazole are used to treat and manage fungal infections. Athlete's foot, jock itch, ringworm, pityriasis versicolor, intertrigo, and erythrasma are among the skin illnesses that can be successfully treated with clotrimazole.	Clotrimazole damages the fungal cytoplasmic membrane, inhibiting ergosterol biosynthesis in a concentrationdependent manner. This leads to a dosedependent inhibition of fungal growth, preventing the formation of an intact cell membrane and promoting hormone- like growth	Clotrimazole is available as topical lotions, powders, oral lozenges, and vaginal inserts/ tablets under various trade names approved by the FDA	Itching, nausea, vomiting, anormal liver function tests, rash, hives, blisters, burning, itching, peeling, redness, swelling, pain or skin irritation
Neomycin	Neomycin is a drug used for perioperative prophylaxis as well as treating and managing hepatic coma.	Neomycin disrupts bacterial protein synthesis by binding to the 30s ribosomal subunit, preventing elongation and disrupting translational precision, resulting in bactericidal effects.	Neomycin, despite its various routes of administration, has poor gastrointestinal absorption, making oral administration the preferred method, while topical use is an alternative.	Mouth and rectal irritation, nausea, diarrhoea, clostridium difficile-related colitis, nephrotoxicity, auditory ototoxicity, and vestibular ototoxicity, with serious more severe events.
Terbinafine	Terbinafine is an antifungal medication that works through the	Terbinafine, an allylamine, inhibits fungal membrane production and ergosterol synthesis, leading to fungal cell	Terbinafine, a 250 mg tablet, is prescribed daily for dermatophyte infections, with	Mild and selflimited, including headaches, gastrointestinal symptoms,

	inhibition of squalene epoxidase.	death due to the accumulation of squalene.	treatment duration varying between six weeks for fingernail onychomycosis and up to 12 weeks for toenail onychomycosis and also available in form topical agent in creams.	rash, visual disturbances, dysgeusia, and mild transaminitis.

AIM AND OBJECTIVE –

The Aim of The Current Project Was to Compare Various Marketed Antifungal Creams Via Various Evaluation Parameters.

OBJECTIVES - A comprehensive study comparing various types of marketed antifungal creams through evaluation tests, such as:

1. Physical properties
2. pH of the cream
3. Washability
4. Irritant test
5. Saponification value
6. Acid value
7. Homogeneity
8. Dilution test
9. Dye test
10. Antifungal study.

PLAN OF WORK –

1. Selection of topic.
2. Selection of Antifungal cream
3. Research on drugs.
4. Result.
5. Observation
6. Evaluation test for Antifungal cream
7. Conclusion
8. Reference

MATERIALS REQUIRED:

Sabouraud Dextrose Broth (Sdb), Methanol, 0.5N HCL, 0.5N Alcoholic KOH, Ether, 0.1N NaOH, Scarlet Red Dye.

Fungus Species – Candida Albicans.

The Following Creams are used for evaluation-

1. Ketoconazole cream.
2. Clotrimazole cream.
3. Neomycin cream.
4. Terbinafine cream.

EXPERIMENTAL WORK AND OBSERVATION -

Evaluation Tests of Marketed Antifungal Creams;

1. Ketoconazole cream –

1. Physical Properties –

Sr.No	Parameter	Evaluation
1.	Colour	White
2.	Odour	Characteristic
3.	Texture	Smooth
4.	State	Semi-solid

2. pH of the Cream - The pH of the cream was found to be 6.24, Which is good for skin ph.

Evaluation parameters	Formula	Result
Acid value	5.61n/w	Acid value of Ketoconazole cream is 5.7.
Saponification value	(a-b) x 28.05 / weight (g) of the sample	Saponification value of Ketoconazole cream is 21.03.

Clotrimazole cream –

3. Physical Properties -

Sr. No	Parameter	Evaluation
1.	Colour	White
2.	Odour	Distinct
3.	Texture	Smooth
4.	State	Semi-solid

PH of the Cream - The pH of the cream was found to be 6.45, Which is good for skin ph.

Evaluation parameters	Formula	Result
Acid value	5.61n/w	Acid value of Ketoconazole cream is 5.2
Saponification value	(a-b) x 28.05 / weight (g) of the sample	Saponification value of Ketoconazole cream is 28.05

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Neomycin cream-

1. Physical Properties –

Sr. No	Parameter	Evaluation
1.	Colour	White
2.	Odour	Distinct
3.	Texture	Smooth
4.	State	Semi-solid

2. PH of the Cream - The pH of the cream was found to Be 6.36, which is good for skin ph.

Evaluation parameters	Formula	Result
Acid value	5.61n/w	Acid value of Ketoconazole cream is 5.8
Saponification value	(a-b) x 28.05 / weight (g) of the sample	Saponification value of Ketoconazole cream is 23.8

4. **Terbinafine Cream –**

1. Physical Properties –

Sr. No	Parameter	Evaluation
1.	Colour	White
2.	Odour	Distinct
3.	Texture	Smooth and Soft
4.	State	Semi-solid

2. PH of the Cream -The pH of the cream was found to be 6.07, Which is good for skin ph.

Evaluation parameters	Formula	Result
Acid value	5.61n/w	Acid value of Ketoconazole cream is 5.4
Saponification value	(a-b) x 28.05 / weight (g) of the sample	Saponification value of Ketoconazole cream is 27.24

RESULT:

Evaluation	**Ketoconazole**	**Clotrimazole**	**Neomycin**	**Terbinafine**
1. Physical properties	white	white	white	white
2. pH Test	6.24	6.45	6.36	6.07
3. Washability Test	Good	Good	Good	Good
4. Irritancy Test	Non-Irritating	Non-Irritating	Non-Irritating	Non-Irritating
5. Saponification value	21.03	28.05	23.8	27.24
6. Acid value	5.7	5.2	5.8	5.4
7. Homogeneity	Good	Good	Good	Good
8. Dilution Test	W/O emulsion	W/O emulsion	W/O emulsion	W/O emulsion
9. Dye Test	W/O emulsion	W/O emulsion	W/O emulsion	W/O emulsion
10. Antifungal Activity (Zone Of Inhibition)	1.8cm	1.5cm	1.7cm	1.3cm

CONCLUSION:

The goal of the aforementioned study was to conduct a thorough comparative analysis of popular antifungal creams on the market today. Four creams—Ketoconazole, Clotrimazole, Neomycin, and Terbinafine—were chosen following a poll.

Physical analysis, pH test, washability, irritant test, saponification value, acid value, homogeneity, dilution test, dye test, and antifungal study were among the evaluation procedures that were performed on these creams.

According to the findings of the several tests, all four of the creams were homogeneous, white in color, washable, and free of irritation. All of the creams were verified to be W/O emulsions by the dilution and dye tests. Terbinafine has the most stable pH of 6.5 when compared to the other three formulations, according to the findings of a pH test. On the other hand, ketoconazole and clotrimazole demonstrated good acid and saponification values, respectively. Ultimately, it can be said that all four of the creams met the required standards and are suitable for usage.

REFERENCE:

1. Chauhan, L., & Gupta, S. (2020). Creams: A Review on Classification, Preparation Methods, Evaluation and its Applications. *Journal of Drug Delivery and Therapeutics*, *10*(5-s), 281–289. https://doi.org/10.22270/jddt.v10i5-s.4430.
2. Kruti N Pandya, A. J. S. (2013). Evaluation of safety and in-Vitro Efficacy study of Anti-Fungal Cream. *J. Adv. Pharm. Edu & Res.*, *3*(3), 201–205.
3. Gupta A.k. (2009). Fungal Infection. *A North American Perspective*, *22*(550–9), 1–12.
4. KAB, F., & WALC, W. (2020). DETERMINATION OF ANTIFUNGAL ACTIVITY OF HERBAL OINTMENT PREPARED FROM LEAF EXTRACT OF Cassia fistula ON LABORATORY SPECIMEN OF Candida albicans. *International Journal of Scientific and Research Publications (IJSRP)*, *10*(3), p99100.
5. https://doi.org/10.29322/ijsrp.10.03.2020.p99100.
6. Khatter, N. J., & Khan, M. A. (n.d.). *StatPearls [Internet]. Clotrimazole Continuing Education Activity*.
7. Maxfield, L., Preuss, C. V, & Bermudez, R. (n.d.). *Continuing Education Activity*.
8. Robbins, N., Wright, G. D., & Cowen, L. E. (2016). Antifungal Drugs: The Current Armamentarium and Development of New Agents. *Microbiology Spectrum*, *4*(5). https://doi.org/10.1128/microbiolspec.funk-0002-2016.
9. Sinawe, H., & Casadesus, D. (2023). *StatPearls [Internet]. Ketoconazole Continuing Education Activity*.
10. Veirup, N., & Kyriakopoulos, C. (n.d.). *StatPearls [Internet]. Neomycin Continuing Education Activity.*

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