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Antifungal Dusting Powder

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ABSTRACT

Fungal is one of the most common healthcare-associated infection. It is related with the skin criasis. It is also called mycosis.

Various antifungal medication are available in the market with claims a reliable therapy on fungal infection.

In the review we studied a different type of fungal infection depending upon the skin site and their symptoms. Also, we studied the various antifungal drug, there Mechanism of action and we make a market survey of few antifungal medication which are available in the in the form of dusting Powder.

KEYWORDS - Dusting powder, effectiveness of powder, Applications.

INTRODUCTION

Antifungal Dusting Powder is an antifungal medicine. It is used to treat skin infections caused by fungi. It works by killing and stopping the growth of fungi, thereby clearing the infection and relieving the symptoms. There are two types of antifungals: local and systemic. Local antifungals are usually administered topically or vaginally

A fungal infection, also called mycosis, is a skin disease caused by a fungus. There are millions of species of fungi. They live in the dirt, on plants, on household surfaces, and on your skin. Sometimes, they can lead to skin problems like rashes or bumps

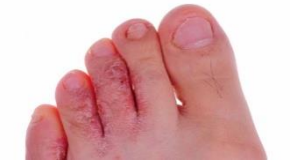
There are various types of fungal infections but commonly caused infections are ringworm and yeast infection

1. RINGWORM–

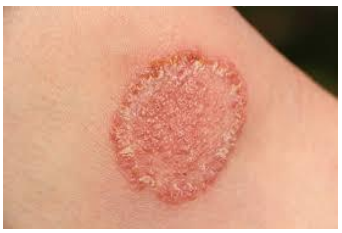
Ringworm is a common infection of the skin and nails that is caused by fungus. The infection is called “ringworm” because it can cause an itchy, red, circular rash. Ringworm is also called “tinea” or “dermatophytosis.” The different types of ringworm are usually named for the location of the infection on the body.

Such as-

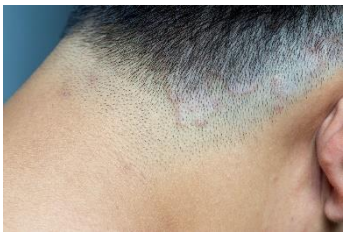
a) Tinea pedis-which is also called as ‘athlete foot’ this infection commonly affect teen and male adults



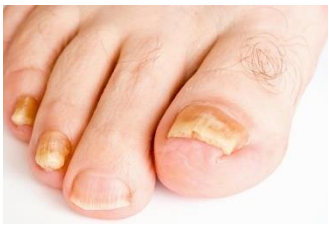
b) Tinea curis-which is also called as ‘jock itch’ many times this infection may be hard to cure



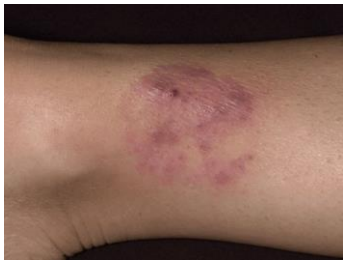
c) Tinea capitis- this type of tinea is called as scalp ringworm which is usually cure by ketocanzole drug



d) Tinea unguium- this type of infection is cause is nails finger as well as toes

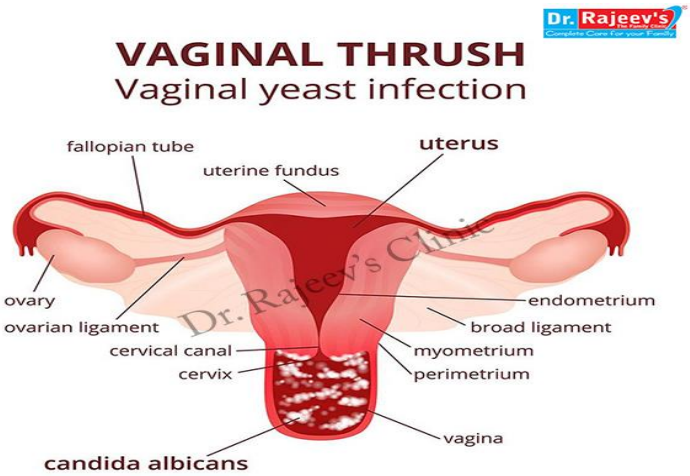


e) Tinea corporis- this tinea cause anywhere on body so it is called as body ringworm and is causes large number of people



2. YEAST INFECTION-

A yeast infection is a fungal infection that causes irritation, discharge and intense itchiness of the vagina and the vulva — the tissues at the vaginal opening. Also called vaginal candidiasis, vaginal yeast infection affects up to 3 out of 4 women at some point in their lifetimes



LOTRIMAZOLE

Medical uses

It is commonly available without a prescription in various dosage forms, such as a topical cream, ointment, or vaginal suppository. It is also available as an oral troche or throat lozenge as a prescription only. Topically, clotrimazole is used for vulvovaginal candidiasis (yeast infection) or yeast infections of the skin. For vulvovaginal candidiasis, clotrimazole tablets and creams are inserted into the vagina. Topical clotrimazole is usually not effective in

treatment of fungal infections of the scalp or nails. When using over-the-counter drug clotrimazole products, use should be discontinued if condition does not improve after treatment for 2 weeks for jock itch or after 4 weeks for athlete's foot or ringworm.[4]
Clotrimazole is usually used five times daily for 14 days for oral thrush, twice daily for 2 to 8 weeks for skin infections, and once daily for 3 or 7 days for vaginal infections. Clotrimazole may be compounded with a glucocorticoid, such as betamethasone, in a topical cream for the treatment of tinea corporis (ringworm), tinea cruris (jock itch) and tinea pedis (athlete's foot). Although FDA approved, clotrimazole–betamethasone combination cream is not the preferred treatment for dermatophyte infections due to increased side effects from the topical glucocorticoid. Although temporary relief and partial suppression of symptoms may be observed with the combination therapy, glucocorticoids can elicit an immunosuppressive response and rebound effect that results in more severe infection typically requiring systemic antifungal agents to treat the disease. Combination creams are best avoided in order to improve treatment outcome, reduce the possibility of skin atrophy associated with prolonged topical glucocorticoid use, and to limit the cost of treatment. It can be effective in treating chronic paronychia. The preferred treatment of tinea infections is therefore with clotrimazole monotherapy. Topical and oral clotrimazole can be used in both adults and children.Additionally, clotrimazole may be used to treat the sickling of cells (related to sickle cell anemia).It can be taken by mouth as a lozenge or troche or applied as a topical cream to the skin or in the vagina.

SIDE EFFECTS-

Side effects of the oral formulation include itching, nausea, and vomiting. Less than 10% of patients using the oral formulation may have abnormal liver function tests. Side effects include rash, hives, blisters, burning, itching, peeling, redness, swelling, pain or other signs of skin irritation.[1] For this reason, liver function tests should be monitored periodically when taking the oral clotrimazole (troche). When used to treat vulvovaginal candidiasis (yeast infection), less than 10% of patients have vulvar or vaginal burning sensation. Less than 1% of patients have the following side effects: burning or itching of penis of sexual partner; polyuria; vulvar itching, soreness, edema, or discharge

INTERACTIONS -

There are no known significant drug interactions with topical clotrimazole. However, with oral (troche) clotrimazole, there are multiple interactions as the medication is a CYP450 enzyme inhibitor, primarily CYP3A4. Thus, any medication that is metabolized by the CYP3A4 enzyme will potentially have elevated levels when oral clotrimazole is used. The prescribing physician should be aware of any medication the patient is taking prior to starting oral clotrimazole. Certain medications should not be taken with oral clotrimazole.[12]

Pharmacology-

Pharmacodynamics -

Clotrimazole is an imidazole derivative which works by inhibiting the growth of individual Candida or fungal cells by altering the permeability of the fungal cell wall.[9] It binds to phospholipids in the cell membrane and inhibits the biosynthesis of ergosterol and other sterols required for cell membrane production.[9][12] Clotrimazole may slow fungal growth or result in fungal cell death.[1]

SALES VOLUME-

Clotrimazole is available as a *generic medication.[1]* and in 2016 Canesten brand Clotrimazole was one of the biggest-selling branded *over-the-counter* medications sold in Great Britain, with sales of £39.2 million.

PRODUCTS AVAILABLE IN MARKET-

CLOTRIMAZOLE DUSTING POWDER

Brand name	Percentage of ingredients	MRP	Company name	Indications
Candid	1% w/w	Rs.130	Glenmark	-Dust in a thin layer. -Do not rub or pat.
Clocip	1% w/w	Rs. 93	Cipla	-Dust in a thin layer. -Do not rub or pat.
Abzorb	1% w/w	Rs.116.44	Ranbaxy ltd.	-Dust in a thin layer. -Do not rub or pat.
Zocon	1% w/w	Rs.90	FDC ltd.	-Dust in a thin layer. -Do not rub or pat.
canesten	1% w/w	Rs.128	Bayer	-Dust in a thin layer. -Do not rub or pat.

FLUCONAZOLE

MEDICINAL USES-

Fluconazole is a first-generation triazole antifungal medication. It differs from earlier azole antifungals (such as ketoconazole) in that its structure contains a triazole ring instead of an imidazole ring. While the imidazole antifungals are mainly used topically, fluconazole and certain other triazole antifungals are preferred when systemic treatment is required because of their improved safety and predictable absorption when administered orally. The treatment of non-systemic Candida infections of the vagina ("yeast infections"),throat, and mouth.Certain systemic Candida infections in people with healthy immune systems, including infections of the bloodstream, kidney, or joints. Other antifungals are usually preferred when the infection is in the heart or central nervous system, and for the treatment of active infections in people with weak immune systems.The prevention of Candida infections in people with weak immune systems, such as those neutropenic due to cancer chemotherapy, those with advanced HIV infections, transplant patients, and premature infants.As a second-line agent for the treatment of cryptococcal meningoencephalitis, a fungal infection of the central nervous system.

RESISTANCE-

Fungal resistance to drugs in the azole class tends to occur gradually over the course of prolonged drug therapy, resulting in clinical failure in immunocompromised patients (e.g., patients with advanced HIV receiving treatment for thrush or esophageal Candida infection). Resistance occurs by way of mutations in the ERG11 gene, which codes for 14α-demethylase. These mutations prevent the azole drug from binding, while still allowing binding of the enzyme's natural substrate, lanosterol. Development of resistance to one azole in this way will confer resistance to all drugs in the class. Another resistance mechanism employed by both C. albicans and C. glabrata is increasing the rate of efflux of the azole drug from the cell, by both ATP-binding cassette and major facilitator superfamily transporters. Other gene mutations are also known to contribute to development of resistance C. glabrata develops resistance by up regulating CDR genes, and resistance in C. krusei is mediated by reduced sensitivity of the target enzyme to inhibition by the agent.

CONTRAINDICATIONS-

Fluconazole is contraindicated in patients who:

- Drink *alcohol*
- have known hypersensitivity to other azole medicines such as *ketoconazole*;
- are taking *terfenadine*, if 400 mg per day multidose of fluconazole is administered;
- concomitant administration of fluconazole and *quinidine*, especially when fluconazole is administered in high dosages

SIDE EFFECTS -

Adverse drug reactions associated with fluconazole therapy include

- Common (≥1% of patients): rash, headache, dizziness, nausea, vomiting, abdominal pain, diarrhea, and/or elevated liver enzymes
- Infrequent (0.1–1% of patients): *anorexia*, fatigue, constipation
- Rare (<0.1% of patients): oliguria, hypokalaemia, paraesthesia, seizures, alopecia, Stevens–Johnson syndrome, thrombocytopenia, other blood dyscrasias, serious hepatotoxicity including liver failure, anaphylactic/anaphylactoid reactions

If taken during pregnancy it may result in harm. These cases of harm, however, were only in women who took large doses for most of the first trimester. Fluconazole is secreted in human milk at concentrations similar to plasma. Therefore, the use of fluconazole in lactating mothers is not recommended.

History

Fluconazole was patented by *Pfizer* in 1981 in the United Kingdom and came into commercial use in 1988. Patent expirations occurred in 2004 and 2005.

PRODUCTS AVAILABLE IN MARKET-

FLUCONAZOLE DUSTING POWDER

Brand name	Percentage of ingredients	MRP	Company name	Indications
Flucos	0.5% w/w	Rs.140	Oaknet healthcare pvt ltd.	-Dust in a thin layer. -Do not rub or pat.
Zocon	0.5% w/w	Rs. 83	Cipla	-Dust in a thin layer. -Do not rub or pat.

Ikon	0.5% w/w	Rs.120	Inex medicaments pvt ltd.	-Dust in a thin layer. -Do not rub or pat.
Efcin	0.5% w/w	Rs.108	Catholicon pharmaceuticals pvt ltd.	-Dust in a thin layer. -Do not rub or pat.
Funlilax	0.5% w/w	Rs.105	Cosmederma remedies	-Dust in a thin layer. -Do not rub or pat.

KETOCANAZOLE

MEDICAL USES-

Topical antifungal

Topically administered ketoconazole is usually prescribed for fungal infections of the skin and mucous membranes, such as athlete's foot, ringworm, candidiasis (yeast infection or thrush), jock itch, and tinea versicolor.Topical ketoconazole is also used as a treatment for dandruff (seborrheic dermatitis of the scalp) and for seborrheic dermatitis on other areas of the body, perhaps acting in these conditions by suppressing levels of the fungus Malassezia furfur on the skin.

Systemic antifungal

Ketoconazole has activity against many kinds of fungi that may cause human disease, such as *Candida*, *Histoplasma*, *Coccidioides*, and *Blastomyces* (although it is not active against *Aspergillus*), *chromomycosis* and *paracoccidioidomycosis*. Ketoconazole is used orally in dosages of 200 to 400 mg per day in the treatment of superficial and deep fungal infections.

Off-label uses

Hair loss

Ketoconazole shampoo in conjunction with an oral 5α-reductase inhibitor such as finasteride or dutasteride has been used off label to treat androgenic alopecia. It was speculated that antifungal properties of ketoconazole reduce scalp microflora and consequently may reduce follicular inflammation that contributes to alopecia.[23] Limited clinical studies suggest ketoconazole shampoo used either alone[24][25] or in combination with other treatments[26] may be useful in reducing hair loss in some cases.

CONTRAINDICATIONS-

Oral ketoconazole has various contraindications, such as concomitant use with certain other drugs due to known drug interactions.[33] Other contraindications of oral ketoconazole include liver disease, adrenal insufficiency, and known hypersensitivity to oral ketoconazole.

SIDE EFFECTS-

Gastrointestinal

Vomiting, diarrhea, nausea, constipation, abdominal pain, upper abdominal pain, dry mouth

Endocrine

The drug may cause adrenal insufficiency so the level of the adrenocortical hormones should be monitored while taking it.

Hypersensitivity

Anaphylaxis after the first dose may occur. Other cases of hypersensitivity include urticaria.

Topical formulation

The topical formulations have not been associated with liver damage, adrenal problems, or drug interactions.

OVERDOSE

In the event of an overdose of oral ketoconazole, treatment should be supportive and based on symptoms.[33] Activated charcoal may be administered within the first hour following overdose of oral ketoconazole

INTERACTIONS

The concomitant use of the following medications is contraindicated with ketoconazole tablets:

- methadone, disopyramide, dronedarone
- irinotecan, lurasidone, colchicine

And is not recommended:

- carbamazepine, phenytoin
- gastric acid suppressants

PRODUCTS AVAILABLE IN MARKET

KETOCANAZOLE DUSTING POWDER

Brand name	Percentage of ingredients	MRP	Company name	Indications
Keto	2% w/w	Rs.99	Med Manor pvt ltd.	-Dust in a thin layer. -Do not rub or pat.
Ketinax	2% w/w	Rs. 159	Brostin Seizz Biocare	-Dust in a thin layer. -Do not rub or pat.
Phytoral	2% w/w	Rs.185	Micro Labs ltd.	-Dust in a thin layer. -Do not rub or pat.
Ketmith	2% w/w	Rs.150	Rezicure pharmaceuticals	-Dust in a thin layer. -Do not rub or pat.
Kz	2% w/w	Rs.185	Hedge & Hedge Pharmaceuticals	-Dust in a thin layer. -Do not rub or pat.

TERBINAFINE

MEDICAL USES

Terbinafine is mainly effective on fungi of the group Onygenales and some yeasts in the genus Candida (e.g. Candida glabrata)
As a cream or powder, it is used topically for superficial skin infections such as jock itch (tinea cruris), athlete's foot (tinea pedis), and other types of ringworm (tinea corporis).[10]
Tablets by mouth are often prescribed for the treatment of onychomycosis, a fungal nail infection, typically by a dermatophyte or Candida species. Fungal nail infections are located deep under the nail in the cuticle to which topically applied treatments are unable to penetrate in sufficient amounts. The tablets may, rarely, cause hepatotoxicity, so patients are warned of this and may be monitored with liver function tests. Alternatives to oral administration have been studied.
Terbinafine may induce or exacerbate subacute cutaneous lupus erythematosus. Persons with lupus erythematosus should first discuss possible risks with their doctor before initiation of therapy

SIDE EFFECTS

- Gastrointestinal problems: Diarrhea, constipation, nausea, fullness, abdominal pain, indigestion, dyspepsia, gastritis, cholestasis, flatulence, altered stool colour, abdominal muscular pain
- Central nervous system or neurological problems: Headaches, dizziness, vertigo, light-headedness, decreased concentration levels, paraesthesia (pins and needles)
- Hepatic problems: Raised liver enzyme levels, liver inflammation (hepatitis), liver damage, liver failure

- Immune system problems: Decreased white blood cell counts including pancytopenia, leukopenia, lymphopenia, thrombocytopenia, agranulocytosis, and neutropenia, autoimmune reactions such as lupus erythematosus. Psychological problems: Depression, anxiety, insomnia, increased or unusual dream activity, malaise
- Sensory problems: Complete loss of taste (ageusia), decreased taste (hypogeusia) and distorted taste (dysgeusia), often involving a metallic taste sensation and dry mouth, visual disturbances including blurred vision, green vision and double vision. In extremely rare cases, the loss or impairment of taste is permanent [15]
- Skin problems: Rashes, hives (urticaria), skin irritation, itching, jaundice, Stevens–Johnson syndrome
- Other side effects: Fatigue, increased heart rate (tachycardia), hair loss (alopecia), decreased red blood cell count (anemia), muscle pain (myalgia), joint pain (arthralgia)

PHARMACOLOGY

Like other allylamines, terbinafine inhibits ergosterol synthesis by inhibiting squalene epoxidase, an enzyme that catalyzes the conversion of squalene to lanosterol. In fungi, lanosterol is then converted to ergosterol; in humans, lanosterol becomes cholesterol. However, as fungi and animals diverged around 1.1 billion years ago - there is enough difference in this enzyme that terbinafine preferentially binds fungal squalene epoxidase, making it selective for inhibiting ergosterol production in fungi without significantly affecting cholesterol production in mammals. This is thought to fatally disrupt the fungal cell membrane.Terbinafine is highly lipophilic and tends to accumulate in hair, skin, nails, and

BRAND NAMES

Terbinafine is sold in India as Terboderm by Omega Pharma and Tyza (Abbott Healthcare)
It is also available as a generic medication in the United States, the United Kingdom, Belgium, Switzerland, Brazil, Mexico and Canada
Other names include Terbinaforce (Mankind Pharma) and Tafine (Deurali Janta Pharmaceuticals Pvt Ltd.) Turbo (Apex Pharmaceuticals Pvt Ltd) in Nepal.
The topical form is sold as Lamisil AT in the United States.

HISTORY

Terbinafine first became available in Europe in 1991 and in the United States in 1996. The U.S. Food and Drug Administration has approved the first generic versions of prescription Lamisil (terbinafine hydrochloride) tablets. The remaining patent or exclusivity for Lamisil expired on June 30, 2007.
On September 28, 2007, the FDA stated that terbinafine is a new treatment approved for use by children age four and up. The antifungal granules can be sprinkled on a child's food to treat ringworm of the scalp, tinea capitis.
In the United States the price in 1999 was $547 for a 12-week course; this fell to $10 by 2015, after the patent had expired.

PRODUCTS AVAILABLE IN MARKET

TERBINAFINE DUSTING POWDER

Brand name	Percentage of ingredients	MRP	Company name	Indications
Tyza	1% w/w	Rs.180	Abbott	-Dust in a thin layer. -Do not rub or pat.
Dava India	1% w/w	Rs. 40	Dava india generic pharmacy	-Dust in a thin layer. -Do not rub or pat.
Terbinaforce	1% w/w	Rs.99	Mankind pharma	-Dust in a thin layer. -Do not rub or pat.
Sebifin	1% w/w	Rs.110	Sun Pharmaceuticals ltd.	-Dust in a thin layer. -Do not rub or pat.

MICONAZOLE

MEDICAL USES

Miconazole is an antifungal medication used to treat ring worm, pityriasis versicolor, and yeast infections of the skin or vagina. It is used for ring worm of the body, groin (jock itch), and feet (athlete's foot). It is applied to the skin or vagina as a cream or ointment.

Common side effects include itchiness or irritation of the area in which it was applied. Use in pregnancy is believed to be safe for the baby. Miconazole is in the imidazole family of medications. It works by decreasing the ability of fungi to make ergosterol, an important part of their cell membrane.
Miconazole was patented in 1968 and approved for medical use in 1971.
Miconazole is mainly used externally for the treatment of ringworm including jock itch and athlete's foot. Internal application is used for oral or vaginal thrush (yeast infection). This oral gel may also be used for the lip disorder angular cheilitis and other associated systems.
In the UK, miconazole may be used to treat neonatal oral thrush, while the alternative nystatin is only licensed for patients over the age of one month, but drug interactions are possible.

SIDE EFFECTS

Miconazole is generally well tolerated. The oral gel can cause dry mouth, nausea and an unpleasant taste in about 1–10% of people. Anaphylactic reactions are rare. The drug prolongs the QT interval.

INTERACTIONS

The substance is partly absorbed in the intestinal tract when used orally, as with the oral gel, and possibly when used vaginally. This can lead to increased concentrations of drugs that are metabolized by the liver enzymes CYP3A4 and CYP2C9, because miconazole inhibits these enzymes. Such interactions occur for example with anticoagulants of the warfarin type, phenytoin, some newer atypical antipsychotics, ciclosporin, and most statins used to treat hypercholesterolemia
These interactions are not relevant for miconazole that is applied to the skin.

CONTRAINDICATIONS

Miconazole is contraindicated for people who use certain drugs that are metabolized by CYP3A4, for the reasons mentioned above:

- drugs that also prolong the QT interval because of potential problems with the heart rhythm
- ergot alkaloids
- statins
- triazolam and oral midazolam
- sulfonamides with a potential to cause hypoglycaemia (low blood sugar)

PHARMACOLOGY

Mechanism of action

Miconazole inhibits the fungal enzyme 14α-sterol demethylase, resulting in a reduced production of ergosterol. In addition to its antifungal actions, miconazole, similarly to ketoconazole, is known to act as an antagonist of the glucocorticoid receptor.

Pharmacokinetics

After application to the skin, miconazole can be measured in the skin for up to four days, but less than 1% is absorbed into the bloodstream. When applied to the oral mucosa (and possibly also for vaginal use), it is significantly absorbed. In the bloodstream, 88.2% are bound to plasma proteins and 10.6% to blood cells. The substance is partly metabolized via the liver enzyme CYP3A4 and mainly eliminated via the faeces.

OTHER USES

Miconazole is also used in Ektachrome film developing in the final rinse of the Kodak E-6 process and similar Fuji CR-56 process, replacing formaldehyde. Fuji Hunt also includes miconazole as a final rinse additive in their formulation of the C-41RA rapid access color negative developing process.

PRODUCTS AVAILABLE IN MARKET

MICONAZOLE DUSTING POWDER

Brand name	Percentage of ingredients	MRP	Company name	Indications
Losweat	Miconazole 2% w/w Chlorohexidine 0.5% w/w	Rs.150	Stedam Pharmaceuticlas pvt ltd.	1. -Dust in a thin layer. 2. -Do not rub or pat.
Zeasorb AF	2% w/w	Rs. 85	GSK Pharmaceuticlas ltd.	3. -Dust in a thin layer. 4. -Do not rub or pat.
Relmyco	2% w/w	Rs.90	Reliance Formulation pvt ltd.	5. -Dust in a thin layer. 6. -Do not rub or pat.
Nswet	Miconazole 2% w/w Chlorohexidine 0.5%w/w Allantoin 0.5%w/w	Rs.150	Nemus Pharmaceutical pvt ltd	7. -Dust in a thin layer. 8. -Do not rub or pat.
D Swet Powder	Miconazole 2% w/w Chlorohexidine 0.5%w/w Allantoin 0.5%w/w	Rs.89	Notus Pharmaceutical pvt ltd.	9. -Dust in a thin layer. 10. -Do not rub or pat.

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