

PHARMA HERALD BULLETIN

PHARMACY PROFESSIONALS

Black fungus (Mucormycosis)

A handy guide from **COLLEGE OF PHARMACY** on understanding
the Fungal Infection of Human beings.



Fifth Edition 2nd June 2021

Editor-in-Chief

DR. ARVIND GUPTA

Principal

Dr. S. N. Dev College of Pharmacy
Shamli (Uttar Pradesh)



Publishing Partner

Association of Pharmaceutical Teachers of India (U.P.)

&

The Association of Young Pharma Professionals



Pharma Herald Bulletin

Fifth Edition: 2nd June 2021

Editor-in-chief

DR. ARVIND GUPTA

(B.Pharm, M.Pharm, PDCR, M.Sc & Ph.D)

Dr. S. N. Dev College of Pharmacy Shamli (U.P.)

Publishing Partner

1. APTI

Association of Pharmaceutical Teachers of India (U.P.)

Lucknow Uttar Pradesh

Email: upapti@gmail.com

Mobile No: 09198564284

Tel No: 0522-4095748

2. The Association of Young Pharma Professionals

Address:- Noida (U.P.)

Phone No:- +91- 9634308658

Email id:- bhragunandan2112@gmail.com

Website:- <http://www.ayponline.in>

3. Ims.innovesen (The Pharma Research Journal)

Address: office: 842 krishan ganj, Hapur, U.P.

Phone No:- +91- 9917053824

Website:- <https://lms.innovesen.co.in>

All rights reserved. No part of this Bulletin should be reproduced, stored in a retrieval system, without the prior written permission of the Editor – in- Chief and the publisher.

Preface

The aim of this bulletin is to delineate the essential information about Black fungus infection and treatment to remove fungal infection. In the fifth volume of this bulletin, we are aware that India is facing an extraordinary challenge to protect its citizens from the rapidly spreading disease. It is a time of demand to do efforts act against the spread of COVID-19 and fungal infection across India. The technical education community in the country is well-capable of serving the humanity by utilizing the knowledge and resources.

We have a great responsibility of not only making the people aware of precautionary measures but also to provide a solution or helping hand to strengthen the Government and peoples in combating the COVID-19 and fungal infection. In this bulletin we are trying to understand the uses of drugs, minerals, and herbs against diseases and fungal infection.

I hope this manageable Bulletin would serve to provide unique information for prevention, progression and control of fungal infection. My sincere thanks are due to my colleagues for their valuable comments and suggestions.

Dr. A. K. Gupta

Dedicated
to
Human beings

CONTENTS

1. Introduction	1-2
2. Doctors opinion.....	3-7
3. Symptoms.....	8-9
4. Who is vulnerable	10-20
5. Prevention.....	21
6. Diagnosis	22-23
7. Optimal treatment pathways for mucormycosis.....	24
8. Treatment.....	25 - 26
9. Conclusion	27
10. References.	28
11. ICMR guideline for Black fungus.....	
12. Knowledge partner	27

1. Introduction

These days the colours of fungus are making scary headlines, white fungus, black fungus, and yellow fungus are in the news but no one knows who has coloured this fungus. So far, more than 10,000 cases of black fungus have been reported in India.

The fungus affects the eyes, nose, face, lungs, and even brain in some severe cases. As per experts, misuse of steroids and monitoring the side effects of medication can be a reason behind the rise in black fungus cases. The central government has asked all the states to declare black fungus infection as an epidemic. More than 5,400 cases of mucormycosis or black fungus have been registered so far in 18 states.

Mucormycosis (zygomycosis) commonly called black fungus, is a rare but serious fungal infection caused by a kind of fungus called mucormycete. It is a very rare infection. It is caused by exposure to mucor mould which is commonly found in soil, plants, manure, and decaying fruits and vegetables. "It is ubiquitous and found in soil and air and even in the nose and mucus of healthy people," says Dr Nair.

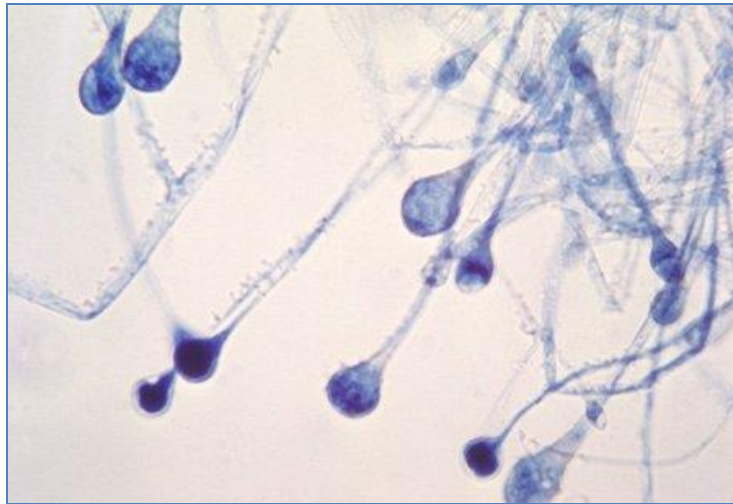


Fig. 1: Picture of sporangia of a *Mucor* spp. fungus; SOURCE: CDC/Dr. Lucille K. Georg

Doctors believe mucormycosis, which has an overall mortality rate of 50%, may be being triggered by the use of steroids, a life-saving treatment for severe and critically ill Covid-19 patients.

Steroids reduce inflammation in the lungs for Covid-19 and appear to help stop some of the damage that can happen when the body's immune system goes into overdrive to fight off coronavirus. But they also reduce immunity and push up blood sugar levels in both diabetics and non-diabetic Covid-19 patients.

It affects the sinuses, the brain and the lungs and can be life-threatening in diabetic or severely immunocompromised individuals, such as cancer patients or people with HIV/AIDS. which is abundant in the environment. It mainly affects people who have health problems or take medicines that lower the body's ability to fight germs and sickness.

2. Doctors opinion

Dr Samir K. Bhargava – ENT Surgeon from Mumbai said, “Unfortunately certain doctors have labelled the colours. To tell you very frankly, the black fungus itself is a misnomer. None of these funguses, none we are tackling, the one we are calling Mucor is black, white, or yellow. Depending upon the medium that it is grown and the time that is seen can have various colours. mucormycosis is called Black fungus for the simple reason that it damages the blood circulation, causes the tissue to become dead and that tissue first becomes white because it does not have a blood supply and then becomes black because it is dead tissue. That is actually a reason why it is a black fungus.”



“White fungus is Candida infection. We see a lot of Candida in the ear, mouth and it is non-invasive, the yellow discolouration can happen in Aspergillum fungus. But none of these is labelled in any microbiology textbook as White, Yellow, or Black. This terminology is given in the Indian subcontinent may create some sensation,” Dr Bhargava further added.

Dr Sureshani Katala, General Practitioner from Mumbai who is also working in various COVID centres said, “The biggest question is that, why are we talking about fungus in terms of colours, I don’t blame the media because what they are publishing is quoted or circulated by some doctors.”



“The media needs to check the authenticity of these doctors. So far expect one case in Uttar Pradesh as claimed by some doctor, no other case of yellow fungus in India. People are paying to cure the fear rather than the symptoms. Doctors should be more responsible while making or leaking such information on public platforms,” said Dr Katala.

Dr Christopher D’Souza, DORL, MS, ENT specialist says, “Most fungi are opportunistic organisms usually growing when there is darkness, dampness, and dying tissue. Most of the fungi are whitish or grey in colour, which can often be mistaken for yellow. The commonest fungus is candida, which is beige in colour. It is called black fungus because it invades and destroys blood vessels in tissues causing them to get necrotic. This causes the tissue to turn black. Because Mucor is a very aggressive fungus it causes rapid death of tissue causing tissues to turn black quickly thus giving it the name of black fungus.”



Dr Varun Dixit, a Plastic and Cosmetic surgeon said, “From what little I know, fungi can be of various types, different colours are just a way to categorize them based on external appearance or under a microscope. Fungal infections can be very deadly and debilitating since they are stubborn organisms. What is most unusual, is that mucormycosis (black fungus) after or during Covid treatment seems to be a phenomenon exclusive to India. There is no consensus or clarity about the exact reason for that to happen.”



Dr Sudhir Parlikar, of Care hospital, Nagpur said, “I think it’s not time to panic over the colours of fungus. Yes, they have different colours and can damage sinuses, our vision and even cause severe brain and fatal systemic infection. It’s time to get an early detection, awareness among the public, maintain available resources, training, fulfil the shortage of life-saving medicines and optimize the use of antibiotics and steroids.”



Dr Geetanjali Shetty, M.D, F.C.P.S, D.D.V Dermatologist said, “When it comes on to clinical findings on the skin, lesions can be nonspecific, but an indurated plaque that is erythematous to purple that rapidly evolves to necrosis is a common finding. There’s no way to avoid breathing in spores. But you can do a few things to lower your chances of mucormycosis. It’s especially important if you have a health condition that raises your risk. Stay away from areas with a lot of dust or soil, like construction or excavation sites. If you have to be in these areas, wear a facemask like an N95. Avoid infected water. This can include floodwater or water-damaged buildings, especially after natural disasters like hurricanes or floods. If you have a weakened immune system, avoid activities that involve dust and soil, like gardening or yard work. If you can’t, protect your skin with shoes, gloves, long pants, and long sleeves. Wash cuts or scrapes with soap and water as soon as you can.”



Dr Rajendra Khatal a Paediatrician said, “Better to address fungal infections by name rather than colour to avoid confusion. It’s better to use the correct name because the colour of the fungus may seem different according to the part of the body in which it is growing. The term ‘black fungus’ came to be associated with cases of mucormycosis because of its culture. The culture comprises white-coloured fungal colonies with black dots. Fungal infections like mucormycosis, candida, and aspergillums are commonly seen in people with weak immunity. Black Fungus cases, White and Yellow fungus infections too were reported from different parts of the country recently, which scientists say are also mucormycosis. Not all people who have contracted coronavirus infection and are on treatment for COVID-19 obtain mucormycosis.”



Dr Suresh Sanghvi, a Plastic surgeon from Pune said, “The fungus itself has no colour, different types of fungus are there, the different colour they create after their reaction with human tissue. Like Mucormycosis is tagged as black fungus, right now the colour of the fungus is really irrelevant, the property is to save people from these deadly fungal infections.”



”

AIIMS Director **Dr Randeep Guleria**, “Don’t know why there are reports on colourful fungus, colour labelling of the fungus was misleading as the colour of fungus could be seen differently if it developed in different areas. Persons with low immunity are infected with Mucormycosis, Candida and Asporogenous infections. These fungi are mainly found in the sinuses, nose, bone around the eyes, and can enter the brain. Occasionally found in lungs (pulmonary Mucormycosis) or in the gastrointestinal tract.”



3. Symptoms

Symptoms and signs first appear usually in the body area infected and may occur as follows:

- Fever,
- Headache,
- Reddish and swollen skin over nose and sinuses,
- Dark scabbing in the nose by eye(s),
- Visual problems,
- Eye(s) swelling,
- Facial pain,
- Coughing sometimes with bloody or dark fluid production,
- Shortness of breath,
- Diffuse abdominal pain,
- Bloody and sometimes dark vomitus,
- Abdominal distension,
- Flank pain,
- An ulcer with a dark center and sharply defined edges, and
- Mental-status changes may occur.
- Warning signs can include toothache, loosening of teeth, blurred or double vision with pain.
- Consequently, serious complications may occur, such as
 - **blindness,**
 - **meningitis,**
 - brain abscesses,
 - **osteomyelitis,**
 - pulmonary hemorrhages,
 - gastrointestinal hemorrhages,
 - cavitory lesions in organs and eventually secondary **bacterial infections, sepsis,** and death.

Note: Preliminary diagnosis is made by patient history, physical exam, and the patient's risk factors for mucormycosis; definitive diagnosis is made by identification of fungi in the patient's tissue.

These include pain and redness around eyes and/or nose, fever, headache, coughing, shortness of breath, bloody vomits, and altered mental status.

Some of the black fungal symptoms are:

- **Sinus and respiratory:** Sinus, oral cavity and nasal involvement with extension to the eye is the commonest type of presentation.
- **Skin Infections:** Due to cut, scratches or burnt skin, there is an exposure of the inner tissue to the black fungus. It may result in symptoms, such as ulcers, redness, swelling, tenderness, blisters, and blackened skin tissue.
- **Brain Infection:** Disseminated black fungus infection in the brain may result in coma or altered mental status.
- **Ocular infection:** Infection of black fungus in the eyes may result in eye pain, redness, swelling, blurred vision, and blindness. In some cases, there is a need to remove the eyes to prevent the progression of infection.
- **Gastrointestinal Infection:** Black fungus infection in the gastrointestinal tract may result in Nausea and vomiting, abdominal pain, and gastrointestinal bleeding.



Figure 2: Cutaneous and rhino-orbito-cerebral mucormycosis

4. Who is vulnerable

Vulnerable groups include people who have health problems or take medicines that lower the body's ability to fight germs and sickness. These include those with diabetes, cancer, or those who have had an organ transplant. "The high levels of sugar, iron and zinc create a favourable condition for the fungus to grow. Unfortunately, even doctors suggest zinc and vitamin supplements without any evidence for their benefits," he said. According to health experts, the commonly used drugs such as steroids and Tocilizumab lower the immunity of patients and use of such drugs without the supervision of a doctor will make the patient vulnerable to Covid-associated mucormycosis (CAM), loosely described as black fungal infection. The steroids would raise the blood sugar level of patients, weaken their immune system and make them vulnerable to fungal attack.

5. Prevention

1. Maintain your surroundings clean and free from dust and dampness.
2. Maintain your oral and nasal hygiene.
3. Try to stay indoors and do regular exercise or workout.
4. Avoid construction areas, fields and grounds. Use masks if you are visiting dusty construction sites.
5. Avoid gardening as soil and plants abound with fungi. Use rubber gloves, masks, and boots, if unavoidable.
6. Wear shoes, long trousers, long-sleeved shirts and gloves while gardening.

6. Diagnosis

There are various methods to diagnose black fungal disease. Some of them are:

- **Clinical diagnosis:** Headache is the most common presenting feature. Tissue necrosis is the evident clinical sign and looking out for eschar (black scab) in the oral or nasal cavity helps in diagnosing the same. Redness and protrusion of the eye with swelling along with the loss of vision, severe facial pain and focal numbness should raise the suspicion of the disease
- **Imaging Techniques:** CT Scan of paranasal sinuses and brain helps in picking up the rhino- orbital disease. CT lungs can help in looking for pulmonary nodule and effusion helps in diagnosing pulmonary disease.
- **Histopathological and microbiological examination:** Identifying the fungus on the microscopic examination of the tissue and looking for uptake of special stains to identify the fungus is the most important step in diagnoses
- **Molecular assays:** Molecular assays, such as restriction fragment length polymorphism analyses (RFLP), conventional polymerase chain reaction (PCR), melt curve analysis of PCR products, and DNA sequencing of defined gene regions, helps in determining the presence of Mucorales (pathogen responsible for black fungus disease). These tests are not commonly carried out as usually microscopic examination suffices.

It depends on the location of the suspected infection. A sample of fluid from your respiratory system may be collected for testing in the lab; otherwise a tissue biopsy or a CT scan of your lungs, sinuses etc may be conducted.

7. Optimal treatment pathways for Mucormycosis:

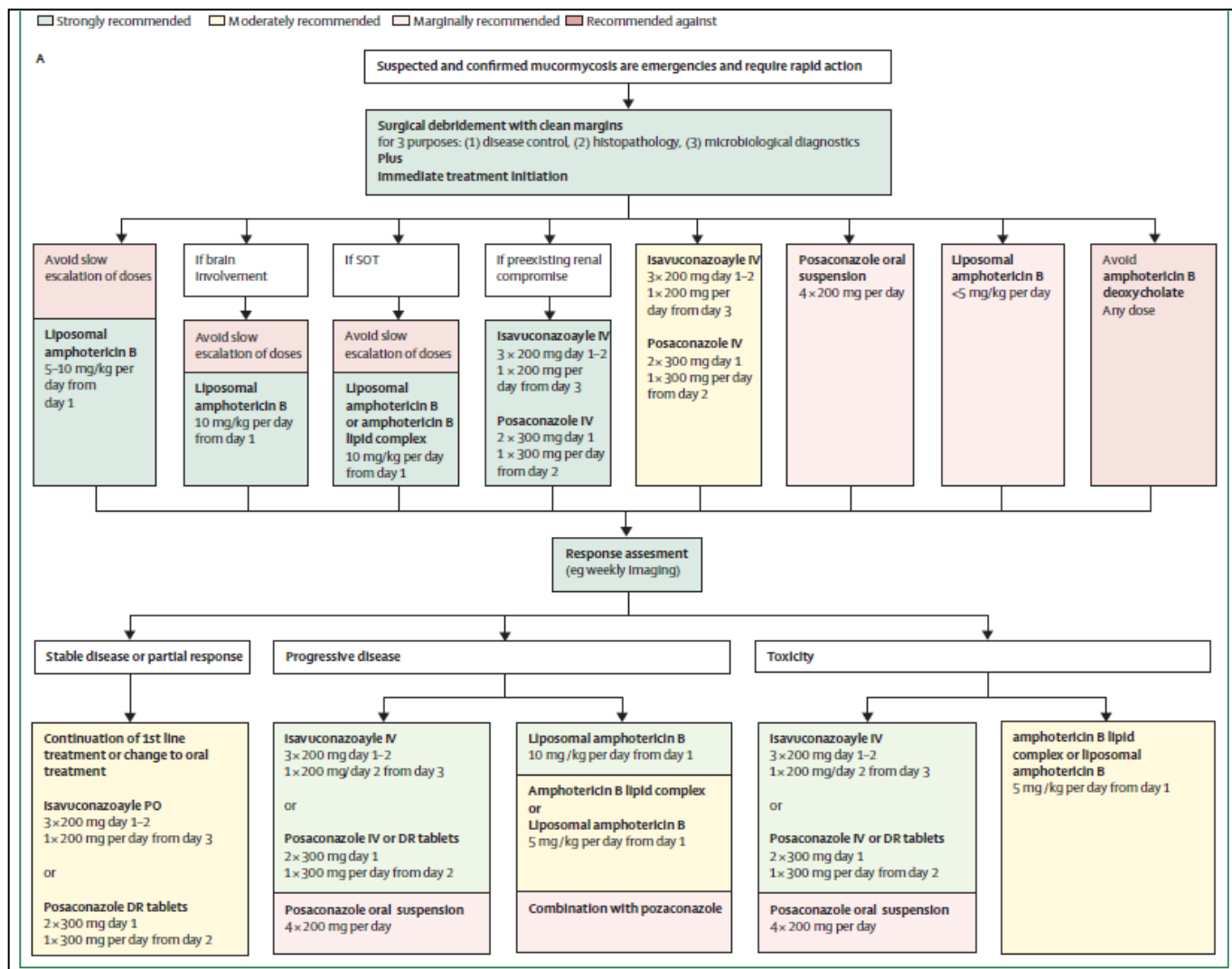


Figure 3: Optimal treatment pathways for mucormycosis in adults

Depending on the geographical location not all recommended treatments may have regulatory approval for use in clinical settings. (A) When all treatment modalities and antifungal drugs are available, (B) when amphotericin B lipid formulations are not available, and (C) when isavuconazole and posaconazole IV and delayed release tablets are not available. IV=intravenous. PO=per os (taken orally). SOT=solid organ transplantation. DR=delayed release.

8. Treatment of Fungal infections:

Mucormycosis needs to be treated with prescription antifungal medicine. In some cases, it can require surgery; it can lead to eventual loss of the upper jaw and sometimes even an eye.

Management of black fungus disease requires a comprehensive approach. It includes managing the underlying predisposing factors, removing the necrotic tissues, initiating antifungal treatment, and adjunctive therapy. Following are the methods to manage black fungus disease:

- **Antifungal medications:** The doctor may prescribe various antifungal medications. Some of them are liposomal amphotericin B, isavuconazole, and posaconazole.
- **Surgical debridement:** Several infection specialists believe that surgical debridement of the infected part is required to save the patient's life. It helps in preventing the progression of the disease. After the successful outcome of treatment, the patient may undergo plastic surgery.

The human body has a series of nonspecific defenses that make up the innate immune system. These defenses are not directed against any one pathogen but instead, provide a guard against all infection. Infectious diseases are caused by viruses, bacteria, fungi, protists, and other pathogens. Pathogens are often spread through coughing, sneezing, and physical contact between people. They can also be spread through contamination of water supply, or through the exchange of body fluids, including sexual intercourse or blood transfusion.

Note: Turpentine oil and liquid paraffin nasal drops are said to be effective in managing myiasis. Maggots are photophobic and they move into darker crevices making their extraction difficult. Turpentine irritates the maggots and forces them to crawl out while liquid paraffin cuts off the oxygen supply and maggots die of suffocation. The other drugs that can be used to treat mucormycosis are Ivermectin and Tiabendazole.

Asphyxiating agents such as mineral oil and chloroform have been found effective in managing the maggots. The treatment of wound myiasis is usually based on the primary cause of ulceration.

8.1 Allopathic Antifungal Medication:

Table 8.1.1 The synthetic drugs available in market for treatment of fungal diseases are:

S. No	Class	Drugs	Uses
1.	Azole antifungals	Clotrimazole, Econazole, Isoconazole, Miconazole, Ketoconazole, Itraconazole	Topical fungal infections, Candidiasis, aspergillus and candida infections, vaginal yeast infections
2.	Echinocandins	Caspofungin, Micafungin	Esophageal Candidiasis, Salvage therapy
4.	Polyenes	Amphotericin B, Nystatin	Systemic mycosis, superficial mycosis
5.	Phenolic cyclohexane	Griseofulvin	Dermatophytic infections
6.	Synthetic pyrimidines	Flucytosine	Cryptococcosis, severe invasive aspergillosis, cryptococcal meningitis treated along with other antifungals
7.	Morpholines	Amorolfine	Topical fungal infections
8.	Pyridines	Buthiobate, Pyrifenox	Dermatophytic infections, Tinea conditions
9.	Phthalimides	Captan	Invasive dermatophytic conditions and candida infections

Table 8.1.2 List of some novel carriers for antifungal plant components and synthetic drugs .

S. No.	Drugs/Plant components	Novel carriers	Indication	Microorganism tested
1.	Essential oil (<i>Bidens tripartite</i>)	Microemulsion gel	Candidiasis	<i>Candida albicans</i>
2.	Curcumin	Phytosome	Onychomycosis	Yeast sp.
3.	Clotrimazole, Econazole nitrate, Fluconazole	Micelles	Superficial fungal infection	<i>Trichophyton</i> sp.
4.	Miconazole	Solid lipid nanoparticles and nanostructured lipid carriers	Candidiasis	<i>Candida albicans</i>
5.	Fluconazole, Ketoconazole, Itraconazole, Voriconazole, Econazole	Microemulsion	<i>Tinea corporis</i> , <i>Tinea circinata</i> , <i>Tinea pedis</i>	<i>Candida albicans</i>
6.	Amphotericin B	Microemulsion	Invasive fungal infection	<i>Trichophyton rubrum</i>
7.	Griseofulvin	Microemulsion gel	Dermatophytosis	<i>Trichophyton</i> sp.
8.	Terbinafine Hcl	Niosomes	Fungal infection	<i>Aspergillus niger</i>
9.	Griseofulvin, Amphotericin B	Transferosomes	Dermatophytosis	<i>Trichophyton rubrum</i>
10.	Clotrimazole, Econazole	Ethosomes	Localized skin fungal infection	<i>Candidasp.</i>

8.2 Ayurvedic Antifungal Medication:**Table 8.2.1 List of plants having antifungal activity against pathogenic fungi.**

S. No.	Botanical name	Family	Parts used	Chemical classes	Microorganism tested
1.	<i>Eugenia uniflora</i>	Myrtaceae	Leaves	Sesquiterpenes, Monoterpene, hydrocarbons	<i>C. albicans</i> , <i>C. dubliniensis</i> , <i>C. glabrata</i> , <i>C. krusei</i>
2.	<i>Psidium guajava</i>	Myrtaceae	Leaves	Methanolic extract	<i>C. albicans</i> , <i>C. dubliniensis</i> , <i>C. glabrata</i> , <i>C. krusei</i>
3.	<i>Curcuma longa</i>	Zingiberaceae	Rhizome	Turmeric oil	<i>C. albicans</i> , <i>C. dubliniensis</i> , <i>C. glabrata</i> , <i>C. krusei</i>
4.	<i>Piptadenia colubrina</i>	Mimosaceae	Stem bark	—	<i>C. albicans</i> , <i>C. dubliniensis</i> , <i>C. glabrata</i>
5.	<i>Schinus terebinthifolius</i>	Anacardiaceae	Stem bark	Extract	<i>C. albicans</i> , <i>C. dubliniensis</i>
6.	<i>Persea americana</i>	Lauraceae	Leaves	Chromene	<i>C. albicans</i> , <i>C. dubliniensis</i> , <i>C. glabrata</i> , <i>C. krusei</i>
7.	<i>Parapiptadenia rigida</i>	Fabaceae	Stem bark	Pyrolidine amide	<i>C. albicans</i>
8.	<i>Ajania fruticulosa</i>	Asteraceae	Fruits	Guaianolides	<i>Candida albicans</i> , <i>C. glabrata</i> , <i>A. fumigates</i>
9.	<i>Alibertia macrophylla</i>	Rubiaceae	Leaves	Extract	<i>Cladosporium sphaerospermum</i> ; <i>C. cladosporioides</i> ; <i>A. niger</i> ; <i>Colletotrichum gloeosporioides</i>
10.	<i>Aniba panurensis</i>	Lauraceae	Whole plant	—	<i>C. albicans</i>
11.	<i>Aquilegia vulgaris</i>	Ranunculaceae	Leaves and stems	Bis (benzyl)	<i>A. niger</i>
12.	<i>Mimosa tenuiflora</i>	Mimosaceae	Stem bark	Sesquiterpene lactone	<i>C. albicans</i> , <i>C. dubliniensis</i> , <i>C. glabrata</i> , <i>C. krusei</i>
13.	<i>P. regnellii</i>	Piperaceae	Leaves	Extract	<i>Trichophyton rubrum</i> , <i>Trichophyton mentagrophytes</i> , <i>Microsporium canis</i>
14.	<i>Rubia tinctorum</i>	Rubiaceae	Root	Triterpene	<i>A. niger</i> , <i>Alternaria alternaria</i> , <i>P. verrucosum</i> , <i>Mucor mucedo</i>
15.	<i>Tithonia diversifolia</i>	Asteraceae	Whole plant	Contained saponins, Polyphenols	<i>Microbotryum violaceum</i> , <i>Chlorella fusca</i>
16.	<i>Vernonanthura tweedieana</i>	Asteraceae	Root	Extracts	<i>T. mentagrophytes</i>
17.	<i>Zingiber officinale</i>	Zingiberaceae	Rhizomes	Steroidal saponin	<i>P. oryzae</i>
18.	<i>Datura metel</i>	Solanaceae	Whole plant	Diterpenoid, Alkaloids	<i>C. albicans</i> , <i>C. tropicalis</i>
19.	<i>Lupinus albus</i>	Leguminosae	Leaf surface	—	<i>T. mentagrophytes</i>
20.	<i>Ecballium elaterium</i>	Cucurbitaceae	Fruit	Extract	<i>Boitylis cinerea</i>
21.	<i>Cassia tora</i>	Leguminosae	Seeds	Anthraquinone	<i>Botrytis cinerea</i> , <i>Erysiphe graminis</i> , <i>Phytophthora infestans</i> , <i>Puccinia recondita</i> , <i>Pyricularia grisea</i>
22.	<i>Chamaecyparis pisifera</i>	Cupressaceae	Leaves and Twigs	Isoflavone	<i>P. oryzae</i>
23.	<i>Prunus yedoensis</i>	Rosaceae	Leaves	Diterpenes	<i>C. herbarum</i>

Table 8.2.2 List of herb and Herbal formulation used all type of Fungal Infection.

S. No.	Formulation	Reference
1.	दद्रु (दाद) रोग— सबसे अच्छी औषधि शीशम का तेल माना जाता है। शीशम की अच्छी, पक्की, पुरानी जड़ को पाताल-यन्त्र में रख कर तेल निकाल ले (इस तेल के लगाने से चार दिन में ही दाद शान्त हो जाता है)	Dhanvantri-chikitsa-visheshank-bhag-1.
2.	क्राइसोफेनिक एसिड (Chrysophanic Acid) वीस ग्रेन (दस रत्ती) को ढाई तोला घी में मिला कर लेप करने से दाद शीघ्र ही मिट जाता है ; किन्तु इससे कभी उस स्थान में जलन होती है और कपड़े में दाग पड़ जाता है।	Dhanvantri-chikitsa-visheshank-bhag-1.
3.	दाद—गंधक, सुहागा, चकवर के बीज, १-१ तो०, कपूर २ तो०, कालीमिर्च, फिटकरी, मैगनेसियम और सैलिसिलिक एसिड प्रत्येक सवा-सवा तोला और सपेद वैस्लीन १० तो०। विधान—सबका वस्त्रपूत चूर्ण बना वैस्लीन में मिला रखें और दद्रु पर दिन में दो बार लगावें। विशेष प्रभाविक योग है।	Dhanvantri-chikitsa-visheshank-bhag-1.
4.	पंचतित्त घृत गुग्गुलु से अनेक रोगियों को लाभ हुआ जिन्हें आधुनिक विज्ञान असाध्य (चिकित्सा द्वारा ठीक नहीं होने वाले) प्रमाणपत्र दे चुका था, ठीक हुये। इन सबका विवरण स्वास्थ्य मंत्रालय को आयुर्वेद की विशेषता बताने के लिये दिया गया। स्वास्थ्य मंत्रालय ने भी इस घृत की उपयोगिता को देखकर केन्द्रीय अंशदायी, चिकित्सा औषधालयों के लिये खरीदना शुरू कर दिया। श्री कृष्णजन्म स्थान पर बने श्री रामनारायण शर्मा आयुर्वेद भवन के संस्थापक पं० रामनारायण शर्मा वैद्य ने भी इसे बहुत उपयोगी और सद्यः लाभप्रद माना है।	Dhanvantri-chikitsa-visheshank-bhag-2.

पंचतित्त घृत

निर्माण—द्रव्य-पंचतित्त (नीम की अन्तर्छाल, गुडूची, वासक, पटोलपत्र, छोटी कंटकारी प्रत्येक २०० ग्राम।

१. गुण—नीम की छाल।

शीतल, त्रिदोषनाशक, कृमि व्रण कुष्ठ स्फोटक, विसर्प और व्रणों में व्यवहृत-होता है बलकारक अर्बुद शोथ में हितकर है।

२. गुडूची—त्रिदोषनाशक कुष्ठ वातरक्त क्रिमि और हृद्रोग, रसायन होने से कामला तथा रक्तविकारनाशक गुणों से उपदंश की द्वितीय अवस्था तथा चर्म के विशेष रोगों में लाभ करता है।

३. वासक—कफ पित्त रक्तविकार कुष्ठ तथा क्षय नाशक है, अनुसन्धान द्वारा यह प्रमाणित हुआ है कि कीटाणुनाशक, विषनाशक छोटे-छोटे जीवों को मार देता है।

४. पटोलपत्र—त्रिदोषनाशक तथा रक्त विकार को दूर करता है शीत और क्षयहर है। मूत्रल विशेष गुण है।

५. कण्टकारी—वातकफनाशक, विवन्धकनाशक दीपन-पाचन पार्श्वशूल हृद्रोगहर, स्वेदल भूत्रल और कफ निस्सारक है।

गुग्गुल १०० ग्राम, घृत ६४० ग्राम, जल १३ लिटर।

सोनापाठा, विडग, देवदारु, गजपीपल, यवक्षार, स्वर्जिका क्षार, शुष्ठी, हरिद्रा, गतपुष्पा, चव्य, कूठ, मालकंगणी, मिर्च, इन्द्रयव, जीरक, चित्रकमूल, कुटकी, भत्लातक शुद्ध, वच, पीपलामूल, मंजीठ, अतीस, त्रिफला (समभाग हरीतकी विभीतक आमलकी) और यवानिका सभी ५-५ ग्राम ।

उपकरण—बड़ी अंगीठी, कपड़ा बड़ा छानने के लिये, कड़ाही, कलछी, हमामदस्ता, कोयला ।

निर्माण विधि—पंचतित्त के सभी काष्ठिक द्रव्यों को हमामदस्ता में कूट लें इन सबको १३ लीटर जल में डालकर अंगीठी गरम पर चढ़ा दें जब ३ लीटर क्वाथ जल रह जाये उसे उतार कर कपड़े से छान लें क्वाथ बनाते समय कलछी से हिलाते रहें । उस क्वाथ में १०० ग्राम, गुग्गुल मिलाकर पुनः अग्नि पर चढ़ायें जब गुग्गुल क्वाथ में घुल जाये तो उसमें ६४० ग्राम शुद्ध गाय का घृत डालकर घृत पाक करें । जब जल घृत में नहीं रहे तो उसे उतार लें घृत को छानकर इमर्तवान में सुरक्षित कर लें ।

मात्रा—५ ग्राम घृत को दूध के साथ प्रातः और रात्रि में दें ।

पथ्य—मूंग, मसूर, चना, घृत, मक्खन, मुनक्का, अनार, करेला, आंवला, खैर, कपूर, चन्दन, शीतवीर्य पदार्थ ।

अपथ्य—उष्ण वीर्य, तमकीन, कटु, अम्ल और विदाही पदार्थ ।

व्यायाम—मैथुन, मद्य, सिरका, दिन में विश्राम ।

गुण—दीपन, पाचन, रक्तशोधक, बलवर्द्धक तथा रक्तोत्पादक, त्वक् रोगों और अन्य वात रोगों में आश्चर्यजनक लाभ करता है । इसके प्रयोग से रोगी पूर्ण रोगमुक्त हो गया ।

5.	<p>गंधक, मिर्च काली, सुहागा, मैन्सिल २-२ तोला और डेला कपूर २॥ तोला, बोरिकएसिड १ तो., सैलिसिलिक ६ माशा सबका बारीक चूर्ण बना २० तोला नारियल के तेल में मिलाकर दिन में एक दो बार लगावें। इसके प्रयोग से दोनों प्रकार की खुजली, दाद, विचर्चिका आदि चर्म रोग जेप नहीं रहते। बहुपरीक्षित योग है।</p>	Dhanvantri-chikitsa-visheshank-bhag-2.
6.	<p>७॥ तोले खूब गरम खोलते पानी में २॥ तोले "वैरियम सलफाईड" मिलाकर खूब मजबूत फार्क लगावें। यह जत्र पानी में मिला जाय तब थोड़ी मात्रा में बाल पर लगाकर ५ मिनट हलके हाथ से मलें। बाल निश्चित ही उड़ जाता है।</p> <p>इसी बनी हुई औषधि में ३ माशे क्राइसोफानिक एसिड मिलाकर दाद में लगावें। यह औषधि रामबाण का कार्य करती है।</p>	Dhanvantri-chikitsa-visheshank-bhag-2.
7.	<p>दादहर तेल—पारद, गन्धक १-१ तोला, नीलाथोथा ६ माशा, तिल तेल आधा पाव प्रथम पारद गन्धक की कज्जली कर नीलाथोथा मिलाकर एक जीव करें, फिर तेल मिलाकर ३-४ प्रहर अच्छी तरह खरल करें, दाद छीव पर लगावें।</p> <p>गुण—दाद, छीव, चम्बल में बहुत उपयोगी है।</p>	Dhanvantri-chikitsa-visheshank-bhag-2.
8.	<p>द्रव्य—पारा ३० ग्राम नीला थोथा ६० ग्राम-क्षपरिया, नौसादर १२० ग्राम, गाय का घी २४० ग्राम लें।</p> <p>विधि—प्रथम पारा गन्धक की कज्जली करें फिर शेष औषधियों को कूट कपड़कनकर कज्जली में मिला घी सहित रखलें।</p> <p>मात्रा—दिन में दो बार दाद को खुजलाकर लेप करें।</p> <p>उपयोग—इस मलहम के प्रयोग से सब प्रकार के दाद अच्छे होते हैं।</p>	Dhanvantri-chikitsa-visheshank-bhag-2.

9.	<p>द्रव्य—अण्डी का तेल १०० ग्राम, देशी मोंम २५ ग्राम, कत्या ५ ग्राम, नैनुवा गन्वक ५ ग्राम, माजूफल ५ ग्राम, मुरदासंग ५ ग्राम, ढाक (पलास) का गोंद ५ ग्राम, खपरिया नोसादर ५ ग्राम, कालीमिचं ५ ग्राम, कच्चा चुहागा ५ ग्राम लें।</p> <p>विधि—प्रथम कड़ाही में तेल छोड़कर गरम कर मोंम छोड़े। फिर शेष औषधि को कूट छानकर मिला दें। बस मलहम तैयार उतार लें।</p> <p>मात्रा—दिन में दो बार दाद खुजला कर लगावें।</p> <p>उपयोग—इस मलहम से कष्ट साव्य दाद नष्ट हो जाता है।</p>	Dhanvantri-chikitsa-visheshank-bhag-2.
10.	<p>रक्त शोधक माजून—नीमजड़ छाल, जंगली अंजीर की जड़ की छाल, साहतरा, चिरायता, धनियां शुष्क, हरड़, बहेड़ा, आमला, कृष्ण हरीतकी सोंफ, चित्रक, गुलाव, सनाय प्रत्येक २ तोला, सबको कूट छानकर त्रिगुण मधु के पाक में मिलाकर माजून तैयार करें।</p> <p>मात्रा—७ माशा, प्रातः सायं।</p> <p>गुण—परम रक्त शोधक है।</p>	Tavak Rog Nidan Chikitsa, Aligarh

Note: All these ayurvedic medicines can be worked on along with allopathic medicine or as an alternative, line of treatment. All these herbal formulations were published in our ayurvedic books after using them many times.

9 Conclusion:

The last 20 years has shown an increase in number of fungal infection. Currently used drugs in treatment of fungal infection are having many side effects, and development of resistance is very common against these drugs. Plants have been considered as traditional source of antifungal medicines for past many years. Plant bioactive with antifungal activity can be considered as an option for development of new and improved alternative formulations in antifungal therapy. Development of improved formulations with plant phyto compounds is the need of the hour for efficient treatment of fungal diseases. Further research on this field can provide us with increased number of options in treatment of fungal diseases that will give the patients with a better quality of life. In the present situation of Covid -19 and fungal infection, natural plant therapy and allopathic medicine with combination may change the situation of infected patient from any type of fungal infection.

10 References:

1. <https://www.bbc.com/news/world-asia-india-57027829>
2. <https://www.medicinenet.com/mucormycosis/article.htm>
3. <https://www.manipalhospitals.com/blog/black-fungus-infection-symptoms-treatment-and-causes/>
4. https://www.icmr.gov.in/pdf/covid/techdoc/Mucormycosis_ADVISORY_FROM_ICMR_In_COVID19_time.pdf
5. <https://www.sciencedirect.com/topics/neuroscience/natamycin>
6. www.google.com/android/devicemanager
7. [https://doi.org/10.1016/S1473-3099\(19\)30312-3](https://doi.org/10.1016/S1473-3099(19)30312-3)
8. dhanvantri-chikitsa-visheshank-bhag-1.
9. dhanvantri-chikitsa-visheshank-bhag-2.
10. dhanvantri-chikitsa-visheshank-bhag-3.
11. Tavak Rog Nidan Chikitsa, Aligarh
12. <https://www.newindianexpress.com/states/kerala/2021/may/25/black-fungus-popping-zinc-tablets-increases-vulnerability-say-doctors-2307119.html>
13. <https://link.springer.com/content/pdf/10.1007/s11046-020-00462-9.pdf>
14. <https://pubmed.ncbi.nlm.nih.gov/7915467/>
15. <https://www.intechopen.com/books/medicinal-plants-use-in-prevention-and-treatment-of-diseases/medicinal-plants-having-antifungal-properties>

11 ICMR guideline for Black fungus:

EVIDENCE BASED ADVISORY IN THE TIME OF COVID-19 (Screening, Diagnosis & Management of Mucormycosis)

Mucormycosis - if uncared for - may turn fatal

Mucormycosis is a fungal infection that mainly affects people who are on medication for other health problems that reduces their ability to fight environmental pathogens.



Sinuses or lungs of such individuals get affected after fungal spores are inhaled from the air.

This can lead to serious disease with warning sign and symptoms as follows:

- Pain and redness around eyes and/or nose
- Fever
- Headache
- Coughing
- Shortness of breath
- Bloody vomits
- Altered mental status



What predisposes

- Uncontrolled diabetes mellitus
- Immunosuppression by steroids
- Prolonged ICU stay
- Co-morbidities - post transplant/malignancy
- Voriconazole therapy

How to prevent

- Use masks if you are visiting dusty construction sites
- Wear shoes, long trousers, long sleeve shirts and gloves while handling soil (gardening), moss or manure
- Maintain personal hygiene including thorough scrub bath

When to Suspect

(In COVID-19 patients, diabetics or Immunosuppressed individuals)

- Sinusitis - nasal blockage or congestion, nasal discharge (blackish/bloody), local pain on the cheek bone
- One sided facial pain, numbness or swelling
- Blackish discoloration over bridge of nose/palate
- Toothache, loosening of teeth, jaw involvement
- Blurred or double vision with pain; fever, skin lesion; thrombosis & necrosis (eschar)
- Chest pain, pleural effusion, haemoptysis, worsening of respiratory symptoms

Dos

- Control hyperglycemia
- Monitor blood glucose level post COVID-19 discharge and also in diabetics
- Use steroid judiciously - correct timing, correct dose and duration
- Use clean, sterile water for humidifiers during oxygen therapy
- Use antibiotics/antifungals judiciously

Don'ts

- Do not miss warning signs and symptoms
- Do not consider all the cases with blocked nose as cases of bacterial sinusitis, particularly in the context of immunosuppression and/or COVID-19 patients on immunomodulators
- Do not hesitate to seek aggressive investigations, as appropriate (KOH staining & microscopy, culture, MALDI-TOF), for detecting fungal etiology
- Do not lose crucial time to initiate treatment for mucormycosis

How to manage

- Control diabetes and diabetic ketoacidosis
- Reduce steroids (if patient is still on) with aim to discontinue rapidly
- Discontinue immunomodulating drugs
- No antifungal prophylaxis needed
- Extensive Surgical Debridement - to remove all necrotic materials
- Medical treatment
 - Install peripherally inserted central catheter (PICC line)
 - Maintain adequate systemic hydration
 - Infuse Normal saline IV before Amphotericin B infusion
 - Antifungal Therapy, for at least 4-6 weeks (see the guidelines below)
- Monitor patients clinically and with radio-imaging for response and to detect disease progression

Team Approach Works Best

- Microbiologist
- Internal Medicine Specialist
- Intensivist
- Neurologist
- ENT Specialist
- Ophthalmologist
- Dentist
- Surgeon (maxillofacial/plastic)
- Biochemist

Detailed management guideline & information available on the following

Global guideline for the diagnosis and management of mucormycosis: an initiative of the European Confederation of Medical Mycology in cooperation with the Mycoses Study Group Education and Research Consortium. *Lancet Infect Dis.* 2019 Dec;19(12):e405-e421. doi: 10.1016/S1473-3099(19)30312-3.

https://www.ijmr.org.in/temp/indian/MedRes1533311_3965147_1100013.pdf



https://www.ijmr.org.in/temp/indian/MedRes1392195_397834_1103013.pdf



Advisory developed by the following experts & National Task Force for COVID-19

- Dr. Anusilive Chaitradasi, Professor & Head, Department of Medical Microbiology, PGIMER, Chandigarh
- Dr. Ash Patel, Infectious Disease Specialist, Ahmedabad
- Dr. Rajeev Soman, Consultant Infectious Disease Physician, Pune
- Dr. Prakash Shastri, Vice Chairman, Critical Care, Sir Ganga Ram Hospital, New Delhi
- Dr. J P Modi, Medical Superintendent, Dr. K. J. Upadhyay, Head, Dept. of Internal Medicine and Multi-disciplinary Clinical Management Group, BJ Medical College & Civil Hospital, Ahmedabad
- Dr. Gitesh Parmar, Dean, Government Dental College & Hospital, Ahmedabad
- Dr. Jasjit Khambolis, Professor, Dept. of Internal Medicine, Smt. NHL Municipal Medical College, Ahmedabad
- Dr. Hemang Parikh, Medical Microbiologist, Smt. NHL Municipal Medical College, Ahmedabad
- Dr. R S Thivadi, Medical Superintendent, Pt. Dindayal Upadhyay Medical College, Rajkot
- Dr. Parul Buch, Professor, Dept. of Pediatrics, Pt. Dindayal Upadhyay Medical College, Rajkot
- Dr. Sapta Malik, Associate Professor, Dept. of ENT, Pt. Dindayal Upadhyay Medical College, Rajkot
- Dr. Deepamala Budhrani, Assistant Professor, Dept. of Internal Medicine, Pt. Dindayal Upadhyay Medical College, Rajkot
- Dr. Sarmita Parde, Head, Epidemiology & Communicable Diseases (ECD), ICMR, New Delhi
- Dr. Agneta Mukherjee, Scientist E, Clinical Trial & Health Systems Research Unit, ECD, ICMR, New Delhi
- Dr. Madhuchandra Das, Scientist D, ECD, ICMR, New Delhi
- Dr. Tanu Anand, Scientist D, Clinical Trial & Health Systems Research Unit, ECD, ICMR, New Delhi
- Dr. Ganjan Kumar, Scientist C, Clinical Trial & Health Systems Research Unit, ECD, ICMR, New Delhi



DEPARTMENT OF HEALTH RESEARCH
MINISTRY OF HEALTH AND FAMILY WELFARE
GOVERNMENT OF INDIA

Knowledge partner

Dr. Ishwar Chandra Giri
(PRESIDENT APTI U.P.)



Dr. Upendra Kumar
Director
OM Group of Colleges, Roorkee (Haridwar)



Dr. Arvind Kumar
Director
S D College of Pharmacy & Voc. St. Muzaffarnagar (U.P.)



Dr. Anuj Mittal
Director
IIMT University Meerut (U. P.)



Dr. Akhil Sharma
Director
RJCP Aligarh (U.P.)

HEAD OFFICE

Pharma Herald Bulletin

**PRS Educational Trust, Corporate Office –
BS – 1202 Galaxy Diamond Plaza, Plot – C1A,
Sector-4, Greater Noida West, Gautam
Buddha Nagar, UP-201308**

<https://phb.innovesen.co.in>

Email: arvindrkgit@gmail.com

Phone No.: +91-9719638415, 8766381032