

“Review On Ayurvedic Remedies For Fungal Infection”

Jadhav S.S*, Naikwade N.S, Hake R.B, Gavade R.S, Pawar J.J, Shingade H.A

Appasaheb Birnale College of Pharmacy, Sangli.

ABSTRACT:

In underdeveloped countries, microorganisms are frequently a cause of prevailing diseases, presenting a serious public health problem in a significant segment of the population as revealed by either private or officially granted health care systems. With the rise in-at risk patients, the number of invasive fungal infection has dramatically increased in both developed and developing countries. An antifungal drug is a medication used to cure fungal infections such as candidiasis (thrush), athlete's foot, ringworm, serious systemic infections such as cryptococcal meningitis, and others. Such drugs are usually advised by a medicinal practitioner or purchased over-the-counter. But use of this types of drugs used in large way makes the unusable due to resistance to antibiotics and with the toxicity during prolonged treatment. There are large number drawback in synthetic drugs so people move towards herbal drugs which is safer. The presented review summarizes the information about introduction, treatment, herb and medicine for fungal infection and concerning the new profile of antifungal drugs obtaining from medicinal plants.

Key-words: Fungi, Ayurveda, herb, Infection etc.

INTRODUCTION:

Most of the time, the human species together live with peaceful environment in coexistence with the microorganisms that surround them and if, when the defense system was damaged or the concentration of pathogens reach an enormous high density, an infection may emerge. Most infections pass by unrecognized but sometimes the infecting agents do elicit a response of the body, which leads to clinically manifest signs and symptoms, a condition referred as communicable disease. Bacteria , viruses, parasites, fungi, prions, worms, helminthes have all been incriminated in infectious disease, of which those caused by common viruses are the most frequent. As strategies to regulate bacterial infections in patients improved, fungi became the more hazardous pathogens.(1)

In underdeveloped countries, microorganisms are frequently a cause of prevailing diseases, presenting a serious public health problem in a significant segment of the population as revealed by either private or officially granted health care systems. The high cost of industrialized medicines, economic crisis, inefficient public access to pharmaceutical and medical care. There is currently an increase in the numbers of immune compromised individuals due to advances in medical technology and a pandepidemic of HIV infection.(2) With the rise in-at risk patients, the number of invasive fungal infection has dramatically

increased in both developed and developing countries. An antifungal drug is a medication used to cure fungal infections such as candidiasis (thrush), athlete's foot, ringworm, serious systemic infections such as cryptococcal meningitis, and others. Such drugs are usually advised by a medicinal practitioner or purchased over-the-counter. But use of this types of drugs used in large way makes the unusable due to resistance to antibiotics and with the toxicity during prolonged treatment. There are large number drawback in synthetic drugs so people move towards herbal drugs which is safer. Yeasts of the particular genus candida (mainly *C. Albicans*) and of the species *Cryptococcus neoformans* and are the fungal agents most frequently involved in the etiology of infectious processes in subjects affected by AIDS.

Many studies investigating the antifungal susceptibility of clinical strains of candida species have been performed with a variety of results and these studies point to the emergence of new resistant strains.(3) Disseminated cryptococcosis, on the other hand, affect a more limited percentage of patients (6-8%) yet is still a serious life-threatening condition. In the present criteria, an emergence of multiple drug resistance in human pathogenic fungi and the few number of antifungal classes available stimulated research directed towards the discovery of novel antifungal agents from various sources, such as medicinal herbs. There is a very little information available on the activity of medicinal plants.(2)

Common pathogenic fungi include *Cryptococcus neoformans*, *Blastomyces*, *Candida*, *Coccidioides*, *Aspergillus*, *Cryptococcus gattii* and *Histoplasma*. They may affect various parts of the body such as ears, eyes, vagina, gastrointestinal tract, mouth, skin, throat, toenails, fingernails and lungs.(4)

PATHOPHYSIOLOGY OF FUNGAL INFECTION:

Only a few of the fungi infectious for humans are sufficiently virulent to infect a healthy host. Most are relatively harmless unless they encounter an immunocompromised patient, in whom a weakened defence system permits them to invade the body. Under normal circumstances, the intact epithelial surfaces of the gastrointestinal tract will inhibit invasion by micro-organisms and the mucociliary barrier of the respiratory tract protects the aspiration of fungal cells and spores.while.in contrast. Dead or damaged tissue may turn into a breeding ground for infection. For these reason invasive fungal infections have to be ranked amongst the typically opportunistic infections.(1)

Why fungi did evolve to become such formidable enemies of seriously ill patients?

First of all, it is clear that fungi, in spite of their potential to make bread rise, to provide us with beer and wine, and to give taste to cheese and other food,primary belong to the end of biological life they are active in disposing decaying organic material,including human corpses,which will eventually be dissolved by fungi, the big cleansing machines of the world.Signals of decay appear to trigger fungal growth and,once activated,the fungus will not stop expanding just because medical interventions aim to postpone a physiological death. On the country,modern treatment modalities may even facilitate the growth of fungi

through negative interference with the remaining components of the immune system. Let's have closer look at these peculiar infective agents, called fungi or mycoses.(1)

AYURVEDIC VIEW OF FUNGAL INFECTION:

Ayurveda doesn't treat fungal infections as a separate segment of diseases but has included them along with other conditions of each system. e.g., fungal skin infections are involved in kushtha roga (skin diseases). As per Ayurveda, consumption of incoherent food combinations, newly harvested foods and high calories meals are some of the factors that cause vitiation of all tri-doshas and lead to skin diseases. Various disorders of skin are listed under this category and classified into 18 types of categories. These 18 types of skin disease are further sub classified as maha kushtha (major skin ailments) and kshudra kushtha (minor skin ailments) which are given below:

Kshudrakushta

- ✓ Ekakushta
- ✓ Kitibha
- ✓ Charmakyam
- ✓ Dadru mandala
- ✓ Vipadika
- ✓ Vicharchika
- ✓ Shataru
- ✓ Sphota
- ✓ Pama
- ✓ Charmadala
- ✓ alasaka

Mahakushtha

- ✓ Mandala kushta
- ✓ Kakanakushta
- ✓ Kapalakushta
- ✓ Pundareekakushta
- ✓ Sidhmakushta
- ✓ Rushyajihwakushta
- ✓ Udumbarakushta

Some of the common fungal diseases of the skin include- Dadru (ringworm) and Alaska (athlete's foot).(5,6)

Dadru is classified as mahakushta by Acharya Sushutra and kshudra kushtha by Acharya Charka. It is a situation which is caused by vitiation of all tri-doshas with predominant vitiation of kapha and pitta.(7,4) As per modern perspective disease, dadru comes under "superficial fungal infection of skin" the most common dermatological manifestation affecting up to 15% of world's population in all age group.(8)

Alasaka is classified as kshudra kushtha by Acharya Charaka and is a fungal infection of the skin caused by predominate vitiation of vata and kaphadoshas. Athlete's foot (tinea pedis) is a skin infection caused by a type of fungus called a dermatophyte. Athlete's foot is the most common dermatophyte infection seen and can affect anyone. People with compromised immune system are especially vulnerable to infections caused by these organisms.(9,4)

AYURVEDIC TREATMENT FOR FUNGAL INFECTIONS:

Therapies such as vamana (medical emesis) and lepa (coating the affected body part with medications) are also effective in the management of fungal infections.

❖ Vamana:

Vamana is a panchakarma (five therapies) procedure, in which, various herbs are administered orally to induce vomiting which runs for a fixed duration and then stopped. Teatyoes of herbs are used to induce vomiting in vamana therapy. It involves the vamaka herbs and vamanopaga herbs.

- ✓ Vamaka herbs- it helps to induce vomiting. E.g. vacha (calamus) and yashtimadhu
- ✓ Vamanopaga herbs- it enhance the effects of vamaka herbs. e.g., neem and amalaki (Indian gooseberry).

Vamana karma cleanse the stomach and eliminate toxins and mucus from the circulatory channels and chest too. It is effective in cure of diseases such as pulmonary tuberculosis of lungs, viral infections, fungal infections, filariasis and tumour.(10,4)

❖ Lepa:

Lepas are topical preparations made from individual herbal or polyherbal formulations. Herbs for lepa are selected according to individual condition and prepared in a semi-solid formulation in the form of paste with ingredients such as ghee (clarified butter) .Some of the lepas for the treatment of ringworm are prepared from:

- ✓ Bark of Shigru (drumstick) prepared in reddish juice.

- ✓ **Manjishtha** (Indian madder), lac, haridra, gandhak (sulfur), triphala (a combination of amalaki {emblicmyrobalan}, vibhitaki {bellericmyrobalan}, haritaki {chebulicmyrobalan}) prepared in mustard oil.
- ✓ **Chakramarda** (foetid cassia) was prepared in radish juice.
- ✓ **Vidanga** (false black pepper) seeds, mustard, chakramarda, Kushtha root (costus) and rock salt in sour curd.
- ✓ **Durva** (Doob grass herb), Haritaki fruit peels, Chakramarda seeds, Tulsi leaves and rock salt prepared in buttermilk.

Some of the Ayurvedic herbs and medicines used to treat fungal infections are Adraka (Ginger), Yashtimadhu (Mulethi), Rasonam (Garlic), beal, Ashwagandha (Indian Ginseng), Neem, Haridra (Turmeric), Vasa (Malabar Nut), Hinguliya Manikyarasa, Tulsi (Holy Basil), Dadrugni Dad, Chandraprabha Dad, Arogyavardhini Dad, KaishoraGuggulu and Gandhak Rasayana.(4)

AYURVEDIC HERBS FOR FUNGAL INFECTIONS:

❖ RASONAM:

Rasonam acts on the circulatory, digestive, nervous, reproductive and respiratory systems and has anthelmintic, anti-parasitic, expectorant (expels mucus or phlegm), carminative or digestive (relieves flatulence), disinfectant, rejuvenating and stimulating properties. Garlic bulbs contain pectin, garlic, essential oils, volatile oils, allin and alstatins I and II as chemical components. It has a detoxifying effect and cleanses ama (toxins) from blood and lymph. The antiseptic nature of this herb is useful in treating lung and skin infections, it is also an important effect in the treatment of Vata fever.

Garlic extracts showed a broad spectrum fungicidal effect against a wide range of fungi including candida, torulopsis, trichophyton, Cryptococcus, aspergillus, trichosopron and rhodotoula species. Recently, garlic extract was found to inhibit the Meyerozymaguilliermondii and Rhodotorulamucilaginoso germination and growth.

Soaking your feet in garlic infused water can help to cure fungal infections of the feet such as athlete's foot. Garlic steeped in olive oil can be applied directly to the infected area to suppress the growth of fungi. (11,12,4)

According garlic (Lashina) possesses five tests, sweet, sour, pungent, bitter and astringent (pancharasa). It doesn't possess the salty test. It is heavy (guru), unctuous (snigdha), a hot potency (ushnavirya) and has strong (tikshna) induces mobility (sara). It has a post-digestive effect which is (Vipaka) is pungent (Katu).

It is nourishing (balya), ignites fire (deepana), improves eye vision (Chakushya) acts as a aphrodisiac (vrashya), heart tonic (medhya), rejuvenator (rasayana) and antimicrobial (jantughna). It purifies the blood (raktadoshhar), aids in healing of fractures (bhagnasandhankar), improves complexion (varnva), balances vata and kapha dosha but increases pitta dosha.(13,4) Based on its function, garlic is also known as mahoushadha. It means that, it treats disorders due to vata imbalance. It is able to have positive impact on many diseases.

The ancient Indian ayurvedic physician kashyapa told that garlic is born from nectar. It means that, it has a rejuvenating (rasayana) property. This herb clears the channels (srotas), produces spermatic fluid (shukra) and sperm along with ovarian hormones (shonita) and ovum. It also nourishes the breasts.(14)It acts as a rejuvenator to remedy all types of obstructions (avarana) expect those caused by pitta dosha and blood tissue (rakta).(15)

❖ ADRAKA:

Adraka acts on digestive and respiratory systems and has pain-relieving, aromatic, carminative, expectorant and nervine (relieves stress) properties. It is considered as a universal medicines as it can treat disorders of all three doshas. It can be used in combination with various herbs, depending upon disease condition. Adraka increases digestive fire,thereby promoting digestion. It balances vitiated vata and lowers aggravated kapha. It contains several constituents which have antibacterial and antifungal effects. Thegingerol and shagelol are identified as more active agents. Caprylicacid,which is one of the constituents of ginger,is a potent antifungal agent.Ginger can be used in the treatments of fungal infections by boiling it in water and washing the affected areas with this water.(16,4)

❖ YASHTIMADHU:

Yashtimadhu acts on the digestive,nervous,reproductive, respiratory and excretory systems and relieves inflammation and irritation.It has rejuvenating,expectorant, sedative and tonic properties. It cleanses kapha from lungs and stomach and heals ulcers and inflammation. Mulethi purifies blood and clears ama from the body. It is also useful in treating fatigue and abdominal pain. It works on all three dosha, it pacify vata and dosha pitta. It helps bring out aggravated kapha dosha in body and it is very good remedy for asthma,cough and inflammation of throat and lungs.

It has numerous antifungal phytoconstituents, which make it effective in the treatment of fungal infections. Yashtimadhu can be used in combination with ginger or can be boiled separately in water.It can be used in the form of a decoction,milk decoction, powder or ghee.(17,4)

❖ HARIDRA:

Haridra acts on the circulatory, digestive, urinary and respiratory systems and has antibacterial, anthelmintic, carminative, stimulant, and wound healing properties. It improves blood circulation and blood tissue formation and acts as a natural antibiotics for the intestinal flora. It can treat psoriasis, acne and inflammation and is also helpful in the management of fungal infections. Haridra can be used in the form of infusion, milk decoction, decoction and lepa.(4)

❖ NEEM:

Neem acts on the circulatory, digestive, respiratory and urinary systems and has soothing anthelmintic, antiseptic, antiviral, disinfectant, insecticidal and stomachic properties. Neem is also termed as “Divine tree”, “nature’s drug store”, “free tree of India”, “village dispensary”, “heal all” and “Panacea of all diseases. It cleans the blood and expels toxins from the body, thereby reducing fungal growth. It is helpful in the treatment of ulcers, eczema and numerous other skin diseases. It can be used in the form of decoction, infusion or medicated ghee or oil. Quercetin, beta isosterol and polyphenolic flavonoids, were purified from neem fresh leaves and were known to have antifungal and antibacterial properties.(18,4)

❖ BAEL:

The scientific name of bael is *aegle marmelos* belongs to the rutaceae family. The bael fruit has anthelmintic and antifungal properties. Anthelmintic activity is an activity by which parasites in the body can be expelled from the body. Bael leaves have nutritional and medicinal properties. It has antidiabetic, antimicrobial, antifungal, antibacterial and hepatoprotective properties also. Bael fruit and leaf are being used in ayurveda since archaic periods. Almost every part of the bael tree has medicinal effects that are used to overcome many of the common diseases and serious illness too. Bael leaf has antifungal and antiviral properties. Due to presence of these properties, one can use the juice of bael leaves in wounds and other injuries. It can help to prevent the spread of infection in wounds. Studies were shown that bael leaf extract has potential to preventing and destroying the growth of infectious bacteria.(19)

❖ ASHWAGANDHA:

Ashwagandha is an important herb in the Ayurvedic and indigenous medicine system for over 3000 years. *Withania somnifera* (L.) Duns, commonly known as Ashwagandha or Indian ginseng or winter cherry, is a renowned medical plant in ayurvedic medicine. The principal active ingredients include several withanolide-type compounds. Ashwagandha acts on the nervous, reproductive, and respiratory system and has rejuvenating, anti-inflammatory, sedative, aphrodisiac, tonic and astringent properties. It is one of the main immune-boosting herbs that are used in the management of candidiasis. One of the most common fungal infections affecting individuals with weak immunity. It relieves pain and fatigue, promotes tissue healing, and is effective in the management of arthritic swellings and inflammations. It can be taken in the form of a ghee, decoction, powder or herbal wine.(20,4)

❖ TULSI:

Tulsi acts on the nervous, digestive and respiratory systems and has antispasmodic, antiseptic, antibacterial and pain-relieving properties. It improves oxygenation in the body and has a cleansing effect on the circulatory and nervous system, which makes it as effective therapy for fungal infections. Tulsi also improves digestion and destroys ama. It can be used in the form of a juice, infusion, ghee or powder.(21,4)

❖ VASA:

Vasa acts on the respiratory, circulatory, nervous and excretory systems and excretory system and has antispasmodic and expectorant properties. This herb mainly acts on the respiratory system and is useful in the treatment and cure of conditions like cough, asthma, tuberculosis and bronchitis. It is highly effective in treating fungal infections and can be used as a repellent for mosquitoes, fleas and other insects. Vasa is also used for the management of influenza and kapha disorders. It can be used in the form of an extract, decoction, infusion, poultice or powder.(4)

AYURVEDIC MEDICINES FOR FUNGAL INFECTIONS:**❖ HINGULIYA MANIKYARASA:**

Hinguliya manikyarasa is prepared from various ingredients including purified hingula (cinnabar), gandhak, haritala (yellow orpiment) and juice of palash (flame of the forest) flowers. The herb haritala in this medicine has antifungal and antimicrobial properties against species such as *Candida albicans* and *Staphylococcus aureus*. Consequently, this medicine is useful in the treatment and cure of vaginal yeast infections like candidiasis.

❖ DADRU GHNIVATI:

It is a tablet-like formulation with chakramarda as its main constituent. It is one of the best antifungal Ayurvedic medicines and is useful in the management of all types of skin infectious ringworm, and white spots.

❖ CHANDRA PRABHAVATI:

This medicine has 42 ingredients, which include shatavari (hundred roots), rock salt, trikatu (a combination of three acids-pippali {long pepper}, sunthi {dried ginger} and maricha {black pepper}), triphala, bhringraj (bhanga) and guggulu (Indian bdellium tree). It is helpful to prevent and reduce post-surgical complications in individuals with urogenital diseases. This medicine treats fungal infections of the urinary system and other urogenital problems including urinary incontinence, dysuria and haematuria (blood in the urine). You can take chandraprabhavati with honey, milk or as per your doctor's direction.

❖ AROGYA VARDHINIVATI:

Arogyavardhinivati is a well-known and extensively used Ayurvedic medicine indicated in the treatment and management of skin diseases. It consists of several ingredients including neem, trivrit (Indian jalap), abhrakabhasma (calcined preparation of mica), triphala, and tamrabhasma (calcined preparation of copper). These ingredients of arogyavardhinivati have pitta virechana (elimination of pitta through faeces), vataanulomana (pacification and regulation of vata) and kapha shaman (pacification of kapha) properties. It also has medohara, pachana (digestive), deepana (hunger-increasing) and tridoshashamaka (tridosha-pacifying) effects on the body. Arogyavardhinivati helps in the remove of aggravated doshas and aids in various purification procedures.

❖ KAISHORA GUGGULU:

Guggulu (Indian bdellium-tree), triphala and guduchi (heart-leaved moonseed) are the primary constituents of kaishoraguggulu. This medicine removes the increased pitta and purifies blood. It treats all types of skin diseases including fungal infections and also enhances the lustre of skin.

❖ GANDHAK RASAYANA:

Gandhak rasayana is a polyherbal formulation prepared from purified gandhak, cow's milk, and a decoction of twak (cinnamon), ela (cardamom). Nagakesara (Indian rose chestnut), triphala, sunthi, juice of guduchi, bhringraj (bhanga), adraka and various other ingredients. This medicine is commonly used in the treatment of fungal infections caused by candida albicans. As treatments vary based on numerous factors and an individual's prakriti (constitution), consult a qualified Ayurvedic doctor for the appropriate medications and treatments for your specific complaints.(4)

REFERENCES:

1. de Pauw BE. What are fungal infections?. Mediterranean journal of hematology and infectious diseases. 2011;3(1).
2. Meena AK, Kaur R, Singh B, Yadav AK, Singh U, Sachan A, Pal B, Rao MM. Review on antifungal activities of Ayurvedic medicinal plants. Drug Invent Today. 2010 Feb 1;2(2):146-8.
3. De Resende JC, De Resende MA. In vitro antifungal susceptibility of clinical isolates of Candida spp. from hospitalized patients. Mycoses. 1999 Dec;42(11-12):641-4.
4. www.myupchar.com
5. Shastri ambikadutta, susruta samhita, chaukhambha Sanskrit sansthan Varanasi, fourth edition 1976, nidana sthana 5/5:247
6. Charaka Samhita Kushta Chikithsa 7th Chapter.(thevaidyar.com)

7. Chaudhari VM, Kokate KK. Management of Dadru Kushtha with Ayurveda Intervention-A Case Study. *Journal of Ayurveda and Integrated Medical Sciences*. 2020 Jun 30;5(03):164-71.
8. Hemlata Dixit, Anita Sharma , Vandana Chandel , Sharad. M. Porte. Ayurvedic Methods of Diagnosis and Management of Dadru Kushta W.S.R. to Fungal Infection *International Journal of Health Sciences and Research* Vol.10, March 2020
9. Best Practice Guideline: 1 Athlete's foot 2012, 11-28 JJustad, MD, DDP A
10. www.aashaayurveda.com
11. El-Saber Batiha G, Magdy Beshbishy A, G Wasef L, Elewa YH, A Al-Sagan A, El-Hack A, Mohamed E, Taha AE, M Abd-Elhakim Y, Prasad Devkota H. Chemical constituents and pharmacological activities of garlic (*Allium sativum* L.): A review. *Nutrients*. 2020 Mar;12(3):872.
12. www.webmd.com
13. Ayurvedic pharmacopeia of india part 1 VOL 3
14. Prof P.V.Tewari, Kashyapa samhita (2002), kalpasthana chapter-2:327
15. Prof. K.R.Srikanth Murthy Astanaga hridaya, Chikista sthana chapter 22 verse 70 krishnadas academy.
16. Atai Z, Atapour M, Mohseni M. Inhibitory effect of Ginger Extract on *Candida Albicans*. *Am J Applied Sci* 2009; 6: 1067-1069.
17. www.planetayurveda.com
18. Sharma V. A review on medicinal properties of neem (*Azadirachta indica*).
19. Poonkothai M, Saravanan M. Antibacterial activity of *Aegle marmelos* against leaf, bark and fruit extracts. *Ancient science of life*. 2008 Jan;27(3):.
20. Khanchandani N, Shah P, Kalwani T, Ardeshta A, Dharajiya D. Antibacterial and Antifungal Activity of *Ashwagandha* (*Withania somnifera* L.): A review. *Journal of Drug Delivery and Therapeutics*. 2019 Oct 15;9(5-s):154-61.
21. Anand N. Antifungal, Contraceptive, Anti-Cancer, Mosquito Repellent Properties of *Azadirachta Indica*: A review.