



Reckoning the Ayurvedic way forward for Post covid fungal infections: a review

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Abstract : Increase in severe fungal infections happened after 1950s with the use of broad-spectrum antibiotics, cytotoxic drugs, corticosteroids, indwelling catheters & implants and with emergence of AIDS. These medicines and conditions generally lead to collapse of host defense mechanism, which eases the invasion of saprophytic fungi into living tissues. Post second wave of Covid 19 infection, because of usage of antiviral, antibiotics, and steroids at a mass level, there was a sudden surge in severe cases of fungal infection. The treatment in modern science has a lot of side effects, it is very costly and sometimes not sufficient and may require resection of the infected parts, which may also not help, and the patient mostly succumbs to death.

Therefore, there is a need to find alternatives which are effective and safe at the same time. In Ayurveda fungus can be considered as a *Krimi* and therefore the formulations mentioned in *Krimiroga* should apply to the fungal infections as well. Taking this thought, the article is an attempt to understand the use and effectiveness of Ayurvedic treatment in such conditions, through review of various scientific research done till date on antimicrobial action of Herbo-mineral drugs and formulations. Outcome of the study suggest effectiveness of the formulations mentioned in *Krimirogadhikara*, however there if a need to do further in-vitro and in-vivo studies for confirmatory results.

IndexTerms - Fungal infection, Antifungal ayurvedic treatment, Antifungal treatment, Krumi, Krimi, Post Covid complications

I. INTRODUCTION

Fungal infections are very common and occur as primary infections or secondary to some treatment and sometimes secondary to specific disease conditions. There are two types of Fungi – Budding form (Yeast like) and Hyphae (Moulds). Based on pathogenesis, they can be broadly categorized into:

- i. Fungal species which are responsible for local infections
 - Surface fungal infections such as tinea versicolor or pityriasis versicolor caused by *Malassezia furfur*
 - Cutaneous fungal infections such as dermatophytosis or ring worm infections caused by Dermatophyte species
- ii. The species which are responsible for systemic infections such as Yeast, Mucor, Rhizopus, Aspergillus etc. [1]

After the emergence of fungal infections post 1950, modern science has developed many antifungal medicines around 1960 and thereafter. They can be broadly categorized as systemic and topical. Systemic antifungals include – Amphotericin B, Ketoconazole, Fluconazole and Itraconazole, whereas there are some topical ones namely – Clotrimazole, Miconazole, Econazole and Terbinafine.

These antifungal drugs act by having fungicidal or fungistatic effect mostly by interfering with the cell membrane structure, by hindrance in the activities of ergosterol or squalene. The choice of drug in present fungal infection crisis is the quickest acting and wide spectrum antifungal – Amphotericin B. However, the downside is its high toxicity and cost. The Cholesterol present in host cell membrane closely resembles ergosterol and therefore polyenes (the group to which Amphotericin belongs to) binds to it as well. Thus, the low selectivity of action of the drug makes it toxic to the host as well. [2]

1. Ayurvedic Concept

In Ayurveda, the drugs and medicines have holistic action and are advised based on Dosha (body humors) and disease. Disease is broadly categorized in Ayurveda as *Nija Vyadhi* and *Agantuja Vyadhi*. [3] *Nija Vyadhi* are the diseases caused because of endogenous causes, which is imbalance of internal doshas of the body, and occur because of the faulty dietary and behavioral habits. On the other hand, *Agantuja Vyadhi* are the diseases caused by some external factors – like accidents or infections. However, it is said that even in *Agantuja Vyadhi* eventually the external factors will lead to vitiation of internal Dosha balance. Therefore, the treatment in both the cases is according to the *Dosha Dushya Sammurchhana* (combination of the vitiated Dosha and the effected tissues leading to a specific presentation in the body).

Krimi is one such entity in Ayurveda under which all kinds of microbes, parasites and helminthic infections can be taken. *Krimi* is broadly categorized as *Bahya* (external) and *Abhyantara* (internal). *Abhyantara Krimi* is again divided into *Kaphaja*, *Raktaja* and *Purishaja*. [4] The symptoms told to be associated with presence of *Krimi* in the body are – Fever, discoloration, pain, disorders of

the heart, giddiness, aversion to food and diarrhoea.[5] While *Kaphaja* and *Purishaja Krimi* have all the specifications, in terms of symptoms and resemblance both, of helminthic infections, *Raktaja Krimi* can be considered as the microbial infections. *Raktaja Krimi* are told to be *Anva* (minute) and *Adarshanam* (invisible). They are told to be found in all the organs of *Raktavaha Strotasa* (liver, spleen, arteries, veins, and blood itself). [6]

1.1 Treatment in Ayurveda

There are three basic steps of treatment of *Krimi* viz. [7]

- Apakarshana i.e. removal or extraction – this can be achieved by Panchakarma procedures such as Vamana (inducing vomiting in a methodical way), Virechana (inducing purgation), Vasti (giving medicines via rectal route), Raktamokshana (bloodletting) and Shirovirechana (medicines through nasal route). Depending on the part of the body affected, any of these measures can be adopted to pull out the *Krimi* or infection out of the body
- Prakritivighata i.e. destroying the conducive environment to the infectious worms or microbes. This will include the medicinal treatment along with the dietary and behavioural measures. These measures will destroy the remains of the infection or the worms inside the body after the purification process explained in point above.
- Nidana Parivarjanam i.e. to eliminate the causative factor of the worms or the infection. This will break the chain and will prevent recurrence of the disease.

1.2 Some Formulations given in Ayurvedic texts

In Ayurvedic classical texts there are some formulations, which contain *Vidanga* (a potent anti-helminthic drug) and are specifically for intestinal worms. Where as there are other set of formulations which are mentioned as *Sarvakrimi hara* (which works against all kinds of *Krimi*). Some of these formulations are given below:

- Krimikuthar Rasa [8]– Shunthi, Saindhava Lavana, Chitraka, Maricha, Amalaki, Vacha, Sh. Guggulu, Bola, Haridra, Viavidanga, Kushtha, Lashuna, Sh. Gandhaka, Karanja beeja, Arjuna phala, Palash beeja, Khadira sara, Jeera, Pippali, Ajmoda, Sauvachala Lavana
- Krimimudgar Rasa [9]– Kajjali, Ajamoda, Vidanga, Sh. Kuchala, Palash beeja churna
- Vidangadi churna[10] - Vidanga, Saidhava, Yavakshara, Kampillaka, Hareetaki with Takra
- Haridra khanda/ Paribhadravalehya[11]- Paribhadra swarasa-1 Prasta, Sita- ½ Prasta, Ghrita-1 Kudava, Haridra churna-1/2 Prasta
Prakshepaka- Chitraka, Ajamoda, Triphala, Musta, Jeeraka, Saidhav lavana, Nirgundi, Patha, Vidanga, Sariva dwaya, Vasa, Palasha, Shunthi, Maricha, Pippali, Trivrit, Danti moola, Harenuka, Nimba twak, Bakuchi
- Vidanga lauha [12]- Kajjali, Maricha, Jatiphala, Lavanaga, Shunthi, Sh. Harataala, Pippali, Vanga bhasma- equal parts, Loha bhasma-8 parts, Vidanga-18 parts
- Khadiradi kwatha [13]- Khadira twak, Kutaja twak, Nimba twak, Vacha, Trikatu, Triphala and Trivrit

There is a need to study the effect of these formulations in fungal diseases.

II. MATERIAL AND METHOD

The Pharmacology books and Ayurvedic classical texts such as KD Tripathi, Satoskar, Yogaratnakara, Madhava Nidana, Bhaisajya ratnavali, were referred for an in-depth knowledge and correlation between Fungus & *Krimi* and an exhaustive online search was done to know the antifungal action of herbal drugs, mineral drugs and formulations given in Ayurvedic texts.

Review of research work on antifungal properties of the herbs, mineral and Herbo mineral formulations:

Table 1: Research work on single herbs

S. No.	Dravya (Herbal Drug)	Scientific name	Part used	Active principle	Fungal Strains it Inhibits
1	<i>Shunthi</i> [14]	Zingiber officinalis	Rhizomes	Caprylic acid	<i>P. oryzae</i>
2	<i>Yashti</i> [15]	Glycyrrhiza Glabra	Root	Glabridine	<i>Candida albicans</i> , <i>Arthrimum sacchari</i> and <i>Chaetonmium funicola</i> . Active against both yeast and filamentous fungi. Glabridin was found to be most potent against amphotericin B resistant <i>C. albicans</i> .
3	<i>Haridra</i> [14]	Curcuma longa	Rhizome	Turmeric oil and curcumin	<i>C. albicans</i> , <i>C. dubliniensis</i> , <i>C. glabrata</i> , <i>C. krusei</i>
4	<i>Nimba</i> [16]	Azadirachta Indica	Leaves	methanol and ethanolic extract of Azadirachta Indica	<i>Aspergillus flavus</i> , <i>Alternaria solani</i> and <i>Cladosporium</i>
5	<i>Ahwagandha</i> [17]	Withania somnifera	Leaves and Roots	Withania somnifera glycoprotein (WSG)	<i>Aspergillus flavus</i> , <i>Fusarium oxysporum</i> , <i>F. verticilloides</i> ; WSG exerts a fungistatic

					effect by inhibiting spore germination and hyphal growth in the tested fungi; WSG is an acidic, non-toxic (trypsin-chymotrypsin) protease inhibitor
6	<i>Vacha</i> [18]	<i>Acorus calamus</i>	Rhizome	Ethyl acetate and ethanol extract; From the phytochemical analysis flavonoid, glycoside, saponin, resin and steroid were found in the rhizome extract	<i>Aspergillus niger</i>
7	<i>Nagavalli</i> [19]	<i>Piper betel</i>	Leaves	Ethyl acetate extract; Hydroxychavicol a major phenolic component, isolated from the aqueous extract of <i>P. betel</i> L.	Fungicidal effects against <i>Candida</i> spp., <i>Aspergillus</i> spp. and dermatophytes
8	<i>Vaasa</i> [20]	<i>Adhatoda vasica</i>	Flowers, Leaves	Ethyl acetate fraction	<i>C. lunata</i> and <i>C. albicans</i> , <i>Alternaria</i> sp., <i>Aspergillus parasi</i> , <i>Aspergillus nidulans</i> , <i>Trichoderma harzianum</i> and <i>Aspergillus flavus</i>
9	<i>Kantakari</i> [21]	<i>Solanum xanthocarpum</i>	Leaves	Hexanic extract	<i>C. albicans</i>
10	<i>Kumari</i> [22]	<i>Aloe barbadensis miller</i>	Leaves	Ethanol extract	<i>C. albicans</i>
11	<i>Tulasi</i> [23]	<i>Ocimum sanctum</i>	Leaves	Four forms i.e., crude (10%), powdered (10%), boiled (10%) and ethanol (1%) extract	Inhibited the following test species: <i>Rhizoctonia solani</i> , <i>R. bataticola</i> , <i>Phoma sorghina</i> , <i>Colletotrichum gloeosporioides</i> , <i>Fusarium pallidorosem</i> , <i>F. oxysporum</i> (<i>ciceri</i>), <i>Sclerotium rolfsii</i> , <i>Sclerotinia sclerotiorum</i> , <i>Alternaria solani</i> and <i>A. alternate</i>
12	<i>Dhatura</i> [14]	<i>Datura metel</i>	Whole plant	Diterpenoid, Alkaloids	<i>C. albicans</i> , <i>C. tropicalis</i>
13	<i>Chakramarda</i> [14]	<i>Cassia tora</i>	Seeds	Anthraquinone	<i>Botrytis cinerea</i> , <i>Erysiphe graminis</i> , <i>Phytophthora infestans</i> , <i>Puccinia recondita</i> , <i>Pyricularia grisea</i>
14	<i>Amalaki</i> [24]	<i>E. officinalis</i>	Fruits	Aqueous extract	<i>Mucor</i> sp, <i>A. Niger</i> and curious and bacterial species. <i>A. flavus</i> , <i>A. fumigatus</i> , <i>A. terreus</i> , <i>A. versicolor</i> and <i>A. parasiticus</i> , <i>Penicillium</i> , <i>Alternaria</i> , <i>Curvularia</i> , <i>Syncephalastrum</i> and <i>Rhizopus</i> . Not found effective against <i>A. Niger</i>
15	<i>Dugdika</i> [25]	<i>Euphorbia hirta</i>	Leaves	Methanolic extract	<i>Colletotrichum capsici</i> , <i>Fusarium pallidoroseum</i> , <i>Botryodiplodia theobromae</i> , <i>Phomopsis caricae-papayae</i> , and <i>Aspergillus niger</i>
16	<i>Madyantika</i> [25]	<i>Lawsonia inermis</i>	Leaves	Methanolic extract	Oral infection by <i>Candida albicans</i> , effective at MIC 5

					mg/ml without any toxic effects.
17	<i>Chiraita</i> [25]	<i>Swertia chirata</i>	Leaves	Methanolic extract	Oral infection by <i>Candida albicans</i> , effective at MIC 5 mg/ml without any toxic effects.
18	<i>Chitraka</i> [26]	<i>Plumbago zeylanica</i>	Root	Ethanollic extract	<i>C. albicans</i>
19	<i>Bibhitaki</i> [27]	<i>Terminalia bellirica</i>	Fruits	Ethanollic extract	<i>Aspergillus</i> sp., <i>Fusarium</i> sp. and <i>Alternaria alternata</i>
20	<i>Palash</i> [28]	<i>Butea monosperma</i>	Seeds & Flowers	Medicarp	<i>C. Cladosporioide</i>
21	<i>Bakuchi</i> [29]	<i>Psoralea corylifolia</i> L	Seeds	Bakuchiol	<i>Microsporum gypseum</i> , <i>Epidermophyton floccosum</i> , <i>Trichophyton rubrum</i> , and <i>Trichophyton mentagrophytes</i>
22	<i>Arka</i> [30]	<i>Calotropis gigantea</i>	Root bark/ Latex	Ethanollic extract	<i>Aspergillus niger</i> and <i>Trichoderma harzianum</i> / <i>Candida Albicans</i> , <i>Saccharomyces cerevisiae</i> ,
23	<i>Musta</i> [31]	<i>Cyperus scariosus</i>	Rhizomes	Ethanollic extract	<i>Aspergillus niger</i>
24	<i>Amaltas</i> [32]	<i>Casia fistula</i>	Leaves	Hydroalcoholic aextract	<i>Aspergillus niger</i> , <i>Aspergillus clavatus</i> , <i>Candida albicans</i> , and some bacterial sp. - <i>Staphylococcus aureus</i> , <i>Streptococcus pyogenes</i> , <i>Escherichia coli</i> , <i>Pseudomonas aeruginosa</i>
25	<i>Shleshmantaka</i> [33]	<i>Cordia dichotoma</i>	Bark	methanol and butanol extracts of the bark	<i>Aspergillus niger</i> , <i>A. clavatus</i> , and <i>Candida albicans</i>
26	<i>Ajmoda</i> [34]	<i>Apium graveolens</i>	Seeds	Thymol	<i>Candida albicans</i>
27	<i>Vatsanabha</i> [35]	<i>Aconitum heterophyllum</i>	Root	Methanolic extract	<i>Aspergillus niger</i> and <i>Alternaria solani</i>
28	<i>Sarshapa</i> [36]	<i>Brassica campestris</i>	Seeds	Allyl-isothiocyanate in essential oil	Antimicrobial and antifungal- <i>A. ochraceus</i> , <i>P. citrinum</i> , <i>A. niger</i>
30	<i>Devadaru</i> [37]	<i>Cedrus deodera</i>	Wood	<i>Cedrus deodara</i> Essential oil	<i>Aspergillus fumigatus</i> (no activity against <i>C. albicans</i> . Also anti-insecticide and anti-inflammatory, immunomodulatory)
31	<i>Brahmi</i> [38]	<i>Bacopa monnieri</i> (L.).	Whole plant	Ethanollic extract of <i>Bacopa monnieri</i> has marked activity. Diethyl ether extract and Ethyl acetate extract has slight antifungal activity. Aqueous extract of the different concentration showed no inhibitory effects on the tested microorganisms	<i>Staphylococcus aureus</i> , <i>Proteus vulgaris</i> , <i>Candida albicans</i> and <i>Aspergillus niger</i>
32	<i>Manjishtha</i> [39]	<i>Rubia cordifolia</i>	Root	Menthol extract	<i>C. albican</i> , Gram positive and gram negative
33	<i>Bhallataka</i> [40]	<i>Semecarpus anacardium</i>	Nut oil	Methanol extract	<i>Rhizoctonia solanii</i> , <i>Sclerotium rolfsii</i> , <i>Alternaria</i> spp., <i>Fusarium oxysporum</i>

34	<i>Guggulu</i> [41]	Commiphora wightii,	Root, Shoot Seed	Alcoholic extract	Aspergillus niger, Aspergillus flavus, Candida albicans and Microsporum fulvum.
35	<i>Agaru</i> [42]	Aquilaria Agallocha	Root	Ethanollic extract	Antifungal, antibacterial effect - E. faecium, L. monocytogenes, B. subtilis, C. albicans, S. epidermidis and S. aureus.
36	<i>Indravaruni</i> [43]	Citrullus colocynthis	Fruit	Ethanollic extract	Candida albicans, Candida dubliniensis, Candida tropicalis, Candida parapsilosis, Candida krusei, Candida glabrata, Candida guilliermondii, Aspergillus fumigatus, Aspergillus flavus, Aspergillus niger
37	<i>Khadira</i> [44]	Acacia Catechu	Bark	Methanollic extract	Antifungal and antibacterial (Bacillus subtilis, Staphylococcus aureus, Salmonella typhi, Escherichia coli, Pseudomonas aeruginosa and Candida albicans.)

To summaries the table above, some important herbal drugs, which showed significant activity against Fungus includes: *Palash*, *Chitrak*, *Nimba*, *Yashti*, *Vacha*, *Haridra*, *Guggulu*, *Tirphala*, *Shleshmantaka*.

Table 2: *Rasa Dravyas* (Minerals and Metals) which showed antifungal action.

1	<i>Hartala Bhasma</i> [45]	Significant activity on Gram positive bacteria (S. aureus), less significant on C. Albicans and no activity on gram negative. Another article reported activity against Streptococcus pneumoniae, Klebsiella pneumoniae, Pseudomonas aeruginosa
2	<i>Sasyaka</i> [46]	<i>Sasyaka Bhasma</i> with 10%, 20% and 100% solution have shown significant zone of inhibition against bacteria and fungi than the standard drug. <i>Tuttha Bhasma</i> (<i>Sasyaka</i>) is having better antifungal properties than anti-bacterial properties.
3	<i>Sphatika</i> [47]	Alum has antimicrobial activity against the C. albicans and N. gonorrhoeae however, the inhibition response to N. gonorrhoeae has an ability that is almost to the strong category when compared with antifungal against C. albicans. Alum has the potential to be one of the medicine compositions for Vaginal discharge.
4	<i>Tankana</i> [48]	Effective against bacterial strains E. coli, P. aeruginosa, S. aureus, S. pyogenes and fungal strains C. albicans, A. niger and A. clavatus.

Tamra bhasma has strong antibacterial activity however no antifungal action noticed during a research study. [45]

Table 3: Formulations which showed antifungal action.

1	<i>Gandhaka Rasayana</i> [49]	<i>Gandhaka Rasayana</i> has demonstrated both antibacterial and antifungal activity, but antibacterial activity was significant than antifungal activity. <i>Gandhaka Rasayana</i> solution in higher concentration showed similar antifungal activity compared to Fluconazole against Candida albicans and Cryptococcus neoformans, but it was more significant against Trycophytum rubrum and Aspergillus Niger than Fluconazole.
2	<i>Gandhaka Druti</i> [50]	C. albicans depicted susceptibility towards <i>Gandhak Druti</i> with a zone of inhibition measuring 18 mm.
3	<i>Rasakarpoora</i> [51]	<i>Rasakarpoora</i> has much better antifungal activity on C. albicans and A flavus, than the proven drug Fluconazole.
6	<i>Talishadi Churna</i> [52]	A potential antifungal agent on human oral pathogenic microorganisms

7	<i>Chandramshu rasa</i> [53]	Through Antifungal study its observed that classical dosage of <i>Chandramshu rasa</i> possess antifungal action against <i>Candida albicans</i> than other doses but less compared to the standard drug. It might be because of improper dilution of <i>Chandramshu rasa</i> in the liquid media where as standard drug was completely dissolved in media
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Formulations such as *Agnitundi vati*[54], *Aarogyavardhini vati*[55] and *Manikya rasa*[55] which have *krimighna* (antimicrobial) action, were found to have significant antibacterial activity however showed no antifungal action.

Table 4: *Dhoopa Kalpanas* (fumigation) which were found to have antifungal action.

S.no	Yoga/ Formulation	Strains against which activity is seen
1	<i>Maheshwar Dhoopa</i> [56]	Inhibitory effect on <i>Mucor</i> and <i>Rhizopus</i> species, <i>Psuedomonas</i> species, <i>Escherichia coli</i> , <i>Kleibsella</i> species, <i>Staphylococcus aureus</i>

Maheshwar Dhoopa was found to show Antibacterial, Antiviral effect with significant outcome ($p < 0.0001$) with one-week residual effect when compared with Basiloid to fumigate minor operation theatre and procedure rooms.[57]

III. DISCUSSION

As per the online search results of different research papers on antifungal properties of herbal drugs, it appears that most of the herbs possess antimicrobial properties. Some commonly used herbs which are found to have significant antifungal activity includes: *Palash*, *Chitraka*, *Shleshmantaka*, *Vacha*, *Guggulu*, *Nimba*, *Yashti*, *Amalaki*, *Ashwagandha*, *Vaasa* and *Bhibhitaki*, *Shunthi*, *Yashtimadhu*, *Haridra*, *Kantakari*, *Tulasi*, *Aamalaki*. It's good to note that many of these are being widely used during the Covid crisis and research works prove their preventive role pertaining to fungal infections.

Many Rasasharstra minerals are found to show antifungal properties, and these include – *Hartala*, *Kasisa*, *Sasyaka*, *Tankan*, *Sphatika*, *Gandhaka*. Out of these *Tankana* and *Sasyaka* comes as vital drugs in present scenario of SARS CoV 2 infection owing to their following properties. *Tankana* being antitussive and indicated in cough and other respiratory conditions can help in treating the disease and at the same time will prevent any fungal infection during the course. Similarly, *Sasyaka* indications are *Prameha* (Diabetes), *Netra roga* (Eye disorders) to name a few. Therefore, in the present scenario when the fungal infection post covid are mostly affecting the diabetic patients and there are numerous cases of steroid induced raised blood sugar, it will play a significant role in curing both the problems at the same time. In addition to this, the post covid fungal infections are mostly affecting paranasal sinus and orbital region and *Sasyaka* is beneficial for all diseases relating to eyes. Hence it has multi-fold benefits and can be utilized as an antifungal agent. Also, *Hartala* based formulations have wide application in respiratory disorders, therefore this drug is also quite useful in present scenario.

Speaking about the formulations, there are two, which are specifically indicated in respiratory diseases: *Talishadi Churna* & *Rasakarpura* and research has found both to be acting against fungal infections as well. One more formulation called, *Gandhaka rasayana* was found to have significant antifungal effect and can be used for post covid fungal infection, after analyzing signs and symptoms of individual patients.

Dhoopa preparations in Ayurveda mostly contains drugs like *Guggulu*, *Vacha*, *Haridra*, *Nimba*, *Sarshapa*, which are all anti-fungal agents. A research work done on Maheshwara dhoopa also establishes this fact and therefore it can be used for the fumigation in the rooms of patients effected with SARS CoV 2 infection, to avoid any fungal opportunistic infection later.

Fungal and other microbial infections can be correlated to *Raktaja Krimi* in Ayurveda, which has similar signs and symptoms such as – Fever, discoloration of the skin, pain etc. There are many formulations given in Ayurvedic classics out of which some act mainly on Intestinal worms and contains *Vidanga* (which is a potent anti-helminthic) as main herbal drug, whereas there are others which are *Sarva Krimihara* (acts against all kinds of worms and microbes). If we analyze the *Sarva Krimighna* formulations, the common contents include- *Nimba*, *Kuchala*, *Palash beeja*, *Vacha*, *Triphala*, *Trikatu*, *Trivrita*, *Chitraka*, *Ajmoda*, *Vaasa*, *Musta*, *Khadira*, *Hartala*, *Gandhaka*. All of which have antifungal properties, indicating the role of these formulations against fungal infections. Therefore, there is a strong need to get further invitro research works, in order to prove the antifungal effect for the above-mentioned formulation.

IV. CONCLUSION

Many research works are done on antifungal activity of the herbal drugs, minerals and formulations and a significant number of these works have given positive results. Based on these research works there are some drugs and formulations which are antifungal and can be useful in the treatment of covid related disease manifestations. Important herbal drugs include: *Vacha*, *Triphala*, *Guggulu*, *Haridra*, *Nimba*, *Ashwagandha*, *Yashti*, *Vasa*, *Tulasi*, *Kantakari* etc. In minerals *Sasyaka*, *Tankana* and *Hartala* seems to be quite promising owing to their role on respiratory system diseases (*Tankana* & *Haratala*) and anti-diabetic action (*Sasyaka*). The formulation which can be of importance are *Talisadi churna*, *Rasakarpura* and *Gnadhaka Rasayana* because of their role in respiratory and infectious diseases. *Maheshwar Dhoopa* as found to have significant effect against fungal strains can be used to fumigate the rooms of Covid patients to avoid further complications. Even the *Sarva Krimihara* formulation in Ayurvedic texts, have many ingredients which are found to be antifungal. Therefore, there is a need of further research work to study and establish the effect of *Sarva Krimihara* formulations against fungal strains.

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