JCRT.ORG

ISSN: 2320-2882



INTERNATIONAL JOURNAL OF CREATIVE **RESEARCH THOUGHTS (IJCRT)**

An International Open Access, Peer-reviewed, Refereed Journal

Systemic overview of Ayurvedic and Allopathic of **Mucormycosis**

¹Bamb Y, ²Bamb P, ³Sirvi I

123 Third year student B- pharmacy

1,2,3 Department of Pharmaceutical sciences, Shri Jain Vidya Prasarak Mandal Rasiklal M. Dhariwal Institute of Pharmaceutical Education and Research; Chinchwad, Pune-411019, Maharashtra- India.

ABSTRACT: Mucormycosis upshout from a variation of black fungi that may be typically harmless environment fungi and in essence affect immune compromised patients. Infection spot by five types and caused by group of moulds as mucormycetes. Because of the increased prevalence of diabetes mellitus, cancer, leads blindness, death and organ transplantation the more number of patients at risk for this viral infection is increasing. Regardless of forceful treatment, which incorporates distorting careful debridement and habitually adjunctive harmful antifungal treatment, the general death rate is high. Since patients with raised serum levels of accessible iron are exceptionally vulnerable to mucormycosis and these diseases are profoundly angioinvasive, accentuation is set on the capacity of the life form to secure iron from the host and on its collaborations with endothelial cells lining veins. A few promising remedial techniques in preclinical stages are recognized. The pathogenesis of mucormycosis and the host response to invading hyphae ultimately will provide targest for novel mechanism. Comparisons of Ayurvedic and allopathic mechanism of action strategies were carried out in the present time. Depending upon the patients condition and symptoms. Ayurveda is the treatment long lasting. Allopathic treatments inhibit viral infection and quick relief. Researchers & scientists may face a challange of a drugs that cure a mucormycosis in emergency condition without any side effects. Research significant behind the review is to study the various treatments on mucormycosis and its mechanism of action.

Index Terms: Mucormycosis, Allopathic, Ayurvedic, Natural remedies, prognosis,

INTRODUCTION: Mucormycosis is an infectious disease mainly affect to immunocompromised and diabetes mellitus patients [1][2]. It is also known as black fungus or zygomycosis, belonging to the family ofmucorales have ubiquitous in nature[2]. After covid-19 it can be caused due to reduction of immune function & glucocorticoid therapy and affecting at any age of people including premature infants. Mucormycetes spores mainly found in soil, decomposing organic matterand enters through inhalation, injuries, contaminated food, etc. in human body[1][3]. Symptom may include headache, loss of smell, fever, runny nose & area of infection appear as black color due to tissue death. When infection occurs in face & lungs may have a high risk of blurred vision and blood in cough, difficulty in breathing, respectively. Missing of jaw, difficulty in chewing, swallowing problems can be face after surgery of mucormycosis The infection seenin 5 types such as rhino cerebellar, pulmonary, disseminated, cutaneous and gastrointestinal [4].

HISTORY: Mucormycosis firstly identify in lab with the help of a tissue sample like phlegm or nasal discharge. In 1855 First time observed the symptoms of mucormycosis coined by Friedrich kuchenmeister[5]. In 1876 Furbringer first time detected disease in lungus[6]. In 1884 lichtheim finding out newer stage of disease in rabbits and describing two species like mucourcorymbifera and mucourrhizopadiforms. Scientists said that it's a group member of fungii that causes mucormycosis also known as fungal disease. mucormycosis directly connected with environment like air, soil, decaying organic matter such leaves, animal, dung etc[7].

PATHOPHYSIOLOGY: Mucormycosis is caused by a group of molds called as mucormycetes, in which mucorales are the ubiquitous fungi present in the soil and decaying matter. Mucormycosis mainly affect that people who have less immunity to fight against germs, viruses, etc. The main route of infection has through inhalation & other by injuries, ingestions, traumatic inoculations, in which spores can enter in blood vessels [8]. This spore can rapidly grow in blood vessels and decreases the blood volume. Due to less supply of blood in tissues, they can't work properly hence, nutrition & oxygen supply also decreases & forms a ischemic condition. Due to ischemic condition, tissue necrosis occurs & area of death tissue will be seen as black color[9].

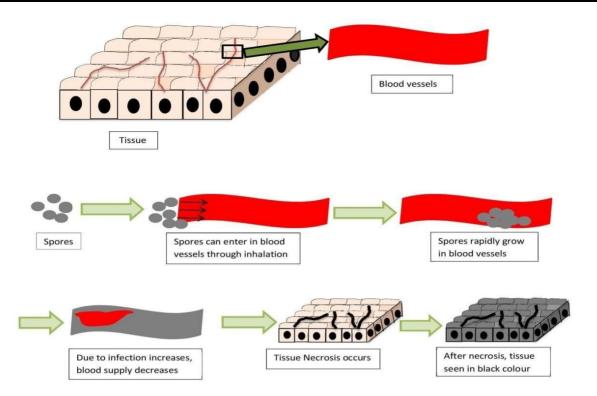


Figure 1. Pathophysiology[8]

AYURVEDIC MEDICINE MECHANISM:

(A) Sanjivanivati: It's also known as SanjeevaniGutika[10].

Category: Antipyretic and diaphoretic Ayurvedic medicine[11].

Ingredients:-1) Vaividang (False black paper)- Embeliaribes 2) Sonth(Ginger Rhizome) - Zingiberofficinate 3) Pippali(Long Pepper) -Piper longum4) Harad(ChebulicMyriam) -Terminalia chebula5) Bibhitaki(Bahera)Terminalia bellirica6) Amla(India Gooseberry) -Phyllanthus emblica7) Vacation (Sweet Flag) - Scotia Calamus (Guduchi) - Tinospora cordifolia (Shuddha Vatsanabha - Aconitum ferox 10 Cow's Urine [11] [12].

How to react: -In these ayurvedic(anti-toxic) medicine orally passed through the our body then attack to the our upper side respiratory tract and fight the viral infection and also bacterial infection and reduce the symptoms of viral infected body[13].

Dose formation:-Children: - 2mg (Per kg body weight)

Adults: - 125 to 375 mg (1 to 3 tablet per day)

Geriatric dosage :- 125 mg (1 tab)

Maximum possible dose :- 750 me per day

Uses:-It is used for removal of viral infection of our upper side respiratory tract (primary symptoms)[14].

(B) Mahasudarshanghanvati: -It's a antiviral ayurvedic formulation and booster immunity herbal tablet [15]. Category :- Antiviral[15][16].

Ingredients: -Pohkar (Inularacemosa) Mulethi (Glycyrrhizaglabra) Kuda (Holarrhenaantidysenterica) Ajwain(Trachyspermumammi)[17]

Indrajav (Holarrhenaantidysenterica) Bharangi (Clerodendrumserratum) Sahajan (Moringapterygosperma)

ShudhaPhitakari (Alum(Pure) Vach (Acoruscalamus) Dalchini (Cinnamomumzeylanicum) Padamkhar (Prunuspuddum) Khas (Vetiveriazizanioides) Chandanshwet (Santalum album) Atis (Aconitum heterophyllum) Khareti (Sidacordifolia) Shalparni Prishinparni (Urariapicta) (Desmodiumgangeticum) Viavidang (Embeliaribes) Tagar (Valerianawallichii) Chitrak (Plumbagozeylanica) Devdaru (Cedrusdeodara) Chava (Piper chaba) Patolpatra (Trichosanthesdioica) Baheda (Terminaliabelerica) Amla (Emblicaofficinalis) Haldi(Curcuma longa) Daruhaldi (Berberisaristata)[18].

How to react: Take a mahasudarshiphanyatiayurvedic medicine per prescribe physian, It orally pass through the body then attack to the viral symptoms like that swinflu, fever cough etc and cures a viral infection and releives cough and cold

Dose formulation:-4 tablet per day after meal[18].

Uses:-1) It use to be cures to viral symptoms of our body 2) It is a powerful medicine for viral infection purpose[19].

(c) DivyaKayakalpvati: DivyaKayakalpvati is an Ayurvedic medicine in which kaya means body and kalpa means transformation [21]. It is used in the treatment of yeast infections,

ringworms,eczema,psoriasis,wrinkles pimples, dark circles,skin infection,etc. It can give a natural glow to the affected part of the body.DivyaKayakalpvati can detoxified the blood [22].

Category:-Antiacne, Antipyretic, Anti-inflammatory, Antiviral, Antifungal, Anriaging[21][23].

Ingredients:-panvad Beej, turmeric, Darhaldi, Kadira or catechu, karanja, Neem, Amla, Manjistha, Giloy, chirayata, kutki, Dronapushpi, satyanashi, katha, Rasmanikya[20][23]

How to react:

- •How causes a skin infection:-The toxins such as bacteria, fungi can affect the skin and makes an impure blood with immune inflammatory reaction and cause a skin infection[23]. Due to blood impurities skin turn to dark and glow less and producing acne, rashes, and pimples [23].
- •After take a dose of DivyaKayakalpvati:- It can betaken by oral route. Due to antifungal property of a kayakalpvatiit can fight with fungus and kill the fungi and controlled the infection and helps to cure the skin infection, remove black marks and burning sensation.

Dose formation: For adult:- 2 tablets with warm water, before meal[24]. For geriatric:-2tablets with lukewarm water, after meal.

Precautions to be taken before and after take a dose:- 1) Avoid rubbing the skin[21].

- 2) Avoid milk before 1hr and after 1 hrwhen take a dose.
- Avoid spicy and fried food.
- (D) GandhakDruti: 'Druti' is derived from plant of the root "GandhakDruti means that Drutatva [liquefaction]. It is necessary process of Rasashastra in which metal or minerals are converted into properly stable liquefaction state [25]. Druti where the sulfar is converted into stable liquid state with the help of different herb, mineral and heat. It is indicated for various ailment such as kasa ,pandu , kshudra and also to enhance health[25][26].

Category: Antiviral and all skin infection types.

Ingredient:

Drug of quantity:- Shuddhagandhaka- 1 part, Shunthi- 1/16 part, Pippali-1/16 part, Maricha- 1/16 part, Tila Taila- Quantity

Drug material: - Impure Gandhaka, Cow milk, Earthen vessel, Sarava, Cotton cloth, Multanimitti for sundhibandhana, Uplas.

How to react:-

- External: It is medicinal oil which is an application in each and every skin ailment. In these antiviral and a skin infection medicine externally apply the disease part of a skin and after some time symptoms have of diseases reduced.
- Internal: It can be given in the dose of 1-2 drops to 5-7 the ml or as per the disease of the treatment and a condition. Antiviral medicine has orally passed through our body then attack the infected part of or an organ and an internal skin and fight the infected part. Slowly - slowly fight and reduce the symptoms[26].

Dosage from :- 1) For Adults :- 1-3 grams in divided doses per day.

- 2) For child up to 5 years :- 250 mg per day
- 3) For children of 5-12 years of age: 250 mg -1 gram per day in equal doses[25][26].

Uses:-1. It is useful of all types of skin disease like that eczema, lichenusplanus, lichen simplex, worm infection[26].

- 2.In external can be used to dress the open cuts, burned skin etc.
- 3. Prevents recurrence.
- 4. Alleviates severe itching attack immediately with massage.

(E) SiddhamrutKadha: Its is improve the immune system internally and protect the body from infected of part. its is present powder from . 10 -15 medicine plant of part are made siddhamutkadha. This kadha boost immunity to fight against fungi, bacteria, virus[27].

Category: - Antioxidant, Antiviral, Antifungal

Ingredient :- GlycorthizaGlabra, Desmodiumgangeticum, Acacia catechu, Tinosporacordifclia, embicaofficinalis, stercospermumsuaveoiens , Azadirachtaindica, Andrographispenincutata , carumcarvi Syzigiumaromaticum, Tulsi, Kalimrchi, Saunthi, Dalchini and pincon of turmeric[27].

Process of drug taken: 1) This packet is 3 days' quantity for one person only. Divide the powder into three parallel parts.

- 2) Boil one part powder in a glass of water in a steel vessel on medium heat till it becomes half a glass and then filter it.
- 3) In the filtered decoction, mix one teaspoon ginger juice, one teaspoon lemon juice and one teaspoon honey (sugar) in place of patient honey, take half teaspoon turmeric) and mix it well in the morning on an empty stomach (within 30 minutes after making the decoction).), after that do not eat or drink anything for 1 hour[27]. 4) Similarly, the decoction has to be consumed for 3 days.
- 5) After this, after 3 days in the morning on an empty stomach, after roasting 4 garlic cloves well on the pan (without oil), chew and eat and drink 1 glass of lukewarm water.
- 6) After this, do not eat or drink anything for 1 hour. Children of 5 years have to eat 2 cloves of garlic.

How to react :- Siddhamrutkadha is fall of antioxidant and vitamins that are very essential to enhance your immune system and symptoms of bodypart. This kadha helps to reduce internal infection and external infection by destroying free radicles. It is directly spreed in blood so that blood purification with reduce the symptoms of infected part like that fungi. Some of the best siddhamrutkadha to boost the immunity are elderberry, enhinacea and ginger[27].

Dose formation: it is generally advised to consume 30 to 60 ml of the kadha after meals two or three a day. It is best to consume it with one glass of walter.

For Child: - 10 -15 ml in day 3 times.

Uses:-1) Reduce fever

- 2) stimulates digestion
- 3) Increase immunity 4) reduce infected part 5) Detoxifies body.

ALLOPATHIC MEDICINE MECHANISM:

1.POSACONAZOLE:-Posaconazole is an antifungal drug that is used to treat of micromyosisdiseases[29]. The brand names of noxafil and posanol. It was approved for medical use in the united states in September 2006. It kills and stop the growth of the fungi and destroying its cell membrane[29].

Mechanisms of action: 1. In the cell membrane is a lipid bilayer with protein, calcium, K+ embedded in it. Its differs by presence of furan ring and substitution of chlorine with fluorine. In side chain of posaconazole and traconazole add with the azole target CYP51. Furgus trawl is the major sterile synthesized by 14 alpha demethylase enzyme that provide stability to the membrane[31].

- 2. Glucans synthase complex located in the cell membrane is responsible for synthesis of beta 1-3 glucan chains. Elongation and cross—linking of the glue can change with chitin imparts toughness to the cell wall.
- 3. The easels have broad spectrum antifungal activity they impair our gastral synthesis by inhibiting the fungal cytochrome p450 medicated enzyme 14 alpha demethylase inhibiting demethylation of one ester all and accumulation of methyl sterols lack of ergosterol leads to disruption of fungal cell membrane. The many multiple hydrophobic result from and the interaction of the extended side chain within a channel of CYP51 . protein and small molecules pass in extracellular membrane so that fungal cell membrane destroying and new cell from[31].

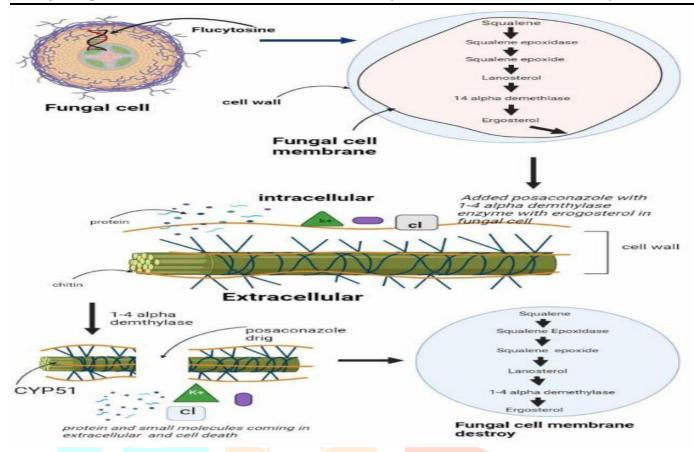


Fig no: - 2. mechanism action of Posaconazole[31]

2. Amphotericin B:- Amphotericin B is an macrocyclic polyene compound antibiotic with 7 conjugated double bonds. It is derived from Streptomyces nodosus & effective in first line therapy or as treatment for invasive fungal infection. It is an fungicidal and has a stimulatory effects which can attacks on phagocytic cell and stops to grow fungal infection 32. Amphotericin B administered by intravenously and metabolized in kidney and 40% excrete out by urine [32][33].

Mechanism of action: - Amphotericin B acts by two different ways:-

- 1.By inducing oxidative damage: Amphotericin B causing an oxidative stress inside the fungal cell and remains unclear when extent of oxidative damage and contribute with drug effectiveness. When addition of free radicals antioxidants or scavengers, it can increase membrane permeability. Amphoteric in B can resist to species like scedosporium prolificans without affecting the cell wall[33].
- 2.By binding with ergosterol at cell membrane and induce pore formation and ergosterol sequestration: Amphotericin B has a higher affinity towards ergosterol and forms bimolecular complex which can nurture the pores and stabilized by Vanderwaal interactions. Formation of pores in cell membrane which leads to inhibit the fungal glycolysis and quick release of potassium, magnesium & small molecules present inside the fungal cell & results the death of fungal cell[32].

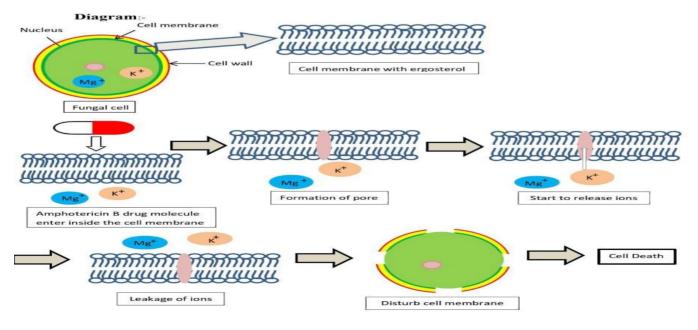


Figure 3. Mechanism action of Amphoterecin[32][33]

3.isavuconazole:- is also known as creseba. The drug FDA department approved in march 2015 for the treatment of mucourmycosis. Isavuconazonium sulphate is a prodrug an also active agent 34. Is a sulphate fastly metabolized by serum but ylcholine sterse to the active form isvuconazole (ISZ). As a important fungal infection isavuconazole is second generation triazole(tri+zole) with again brod spectrum. The drug availble in market is IV, Intranchangeble ,and oral form approved by USA and EU for the treatment of mucourmycosis and its a water soluble prodrug[34][35].

Mechanism of action:-1. Isavuconazole family of drug specifically targets the fungal cell membrane[35].

- 2. The cell membrane of fungi is similar to that of other eukaryotic cell and is composed of a lipid bilayer with protein embedded within it a major component of the fungal cell membrane is the present of sterols which are virtually absent from all prokaryotes including bacteria[36].
- 3. One of the essential sterols in the fungal cell membrane is orga sterile in most fungi it replaces the cholesterol component found in higher eukaryotic cell membrances[35][36].
- 4. Ergo sterile provides stability and flexibility to the fungal cell membrane lanosterol serves as the precessor for the formation of ergo sterile although many enzymes are involved in the formation of ergosterol the 14 alpha demethylase enzyme is responsible for the C14 alpha methylation of lannister all it is essential enzyme that serves as target for asel antifungal agent [36][37].
- 5. Although some a souls have an immediate effect of damaging the fungal cell membrane directly.
- 6. The major mechanism of action is by binding the cytochrome p450 mediated 14 alpha demethylase are enzyme thus inhibition the diminution of lanister all and blocking the syntesis of ergosterol in turn this result in an accumulation of 14 alpha methyl sterile and a depletion of argost all in the cell membrane.
- 7. The lack of ergosterol in the fungal cell membrane makes it very unstable eventually cell membrane begins to break down and the fungal organism dies[37].

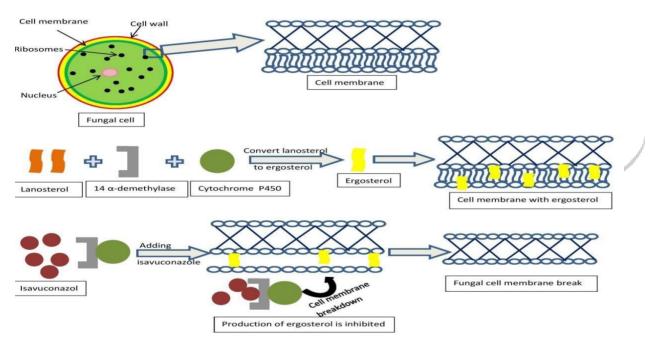


Figure 4. Isavuconazole mechanism of action[34][36][37]

COMPARISON OF ALLOPATHIC DRUG AND AYURVEDIC DRUG[38][39][40][41]

POINTS	AYURVEDA	ALLOPATHY
Origin	The naturally available plants and	The chemical and synthetic things
	herbs.	alone.
Approach	Holistic	Non – holistic
Healing Time	Natural but take more time.	Quick process with spontaneous relief.
Side effect	Ordinary natural.	This is concomitant no side effects.
Testing	It is tested on animals. The process	It is not tested on animal for its
	may lead to in efficiency and	effect and action. It is not bring
	irreversible side effects both on the	more amounts of harm to the human
	humans and animals.	body.
Diagnosis	Done by use of five sense or guns.	Done by laboratory equipments and investigations.
Therapeutic level	This considers cure of a disease as	Science seen to be confused for
	the only way to go for the	most of time. These talk about the
	treatments. there cannot be down	treatments and managements.
	than the a medical science.	
Aim	The wellness is a complete	Believe to changes of the organ.
	packaging not a scattered tissue.	
Efficiency	Not developed enough for quick healing.	Surgical treatments are more advanced.
Evidence	The nature it directly means that it is	The system of medicine but not that
	following some natural wisdom and	true the physicians launches and
	a universal truth, which need not to	withdraws medicines it never seems
	be launch and withdraw.	to be evidence based system of
		medicine.
Wholesomeness	The wellness is a complete package	Believe to change of the organs.
	not a scattered issue.	
Natural	To follows the nature is the only	They believe in chemical and
	way to achieve the complete	synthetic things alone.
7	wellness.	N. II. I. I
Root cause	The important role the root cause	Medical science understands this
	first and then applies the same understanding to root out the	things and they keep on suppressing the sign and symptoms alone not
	diseases form the body.	concerned with the root cause of a
		disease.
Diet	Brings permanent cure for the	Brings spontaneous relief.
	suffering by penetrating deep into	
	the cells.	

CONCLUSION:- The outbreak of the fungus can affects the public & medical financial infrastructure.

Allopathic treatments can take short time with severe side effects but ayurvedic treatments take long time to recover. Due to emergency conditions, peoples & doctors can go towards allopathic treatments for rapid action but they can face various side effects. Mucoral spores requires less immunity of human to attack & people have a high risk of blindeness or death. To avoid blindness, death we can build a strong immune system by eating healthy foods. The potential advantages of intercessions that would supplement existing treatments would be significant for patients with mucorrmycosis.

REFERENCES:-

- 1. Fungal diseases, Centers for Diseases Control & Prevention, 09 August 2021.
- 2. Kontoyiannis DP, Mucormycosis. National Organization for Rare Disorders: 2018.
- 3. Mucormycosis, 16 September 2021.
- 4. Coronavirus Diseases(COVID-19)/Mucormycosis, world health organization, 2021.
- 5. Mucormycosis historical perspective,29 july 2021.
- 6. S Bell et al. crit care Nurse, Mucormycosis: a case study, The ohio state university medical center, coloumbus, USA, Feb
- 7. Fungal disease, Mucormycosis, centers for diseases control and prevention, 14 january 2021.
- 8. AvnishSandhu, What is the pathophysiology of mucormycosis (zygomycosis)?, infectious diseases,06 july 2021.
- 9. Michael Gibson, Syed Hassan, Abbas Kazmi, Mucormycosis pathophysiology, 29 july 2021.
- 10. DIVYA SANJEEVANI VATI, ayurvedic-medicine.
- 11. Gairolas*, Gupta V, Bansalp, PHARMACOLOGICAL ACTIVITES OF POLYHERBAL FORMULATION SANJIVANI VATI, International journal of Ayurvedic Medicine, 2010.
- 12. PatanjalidivyasanjvaniCari -80, PRAKRATEE Goodness of Ayurved, unani, organic and herbal treasure.
- 13. Sanjivanivati Baidyanath, Ayurcentral.
- 14. Baidyanathsanjivanibati, eAYuR.com, Ayurvedic, 2021.
- 15. BaidvanathMahasudarshanGhanBati, myupchar, 2021.
- 16. Dr. Jagdey Singh, Mahasudarshan Ghan Vati, Ayur times live Healthier, Happier and longer life, 04 Oct 2017.
- 17. PatanjaliDivyaMahasudarshanGhanVati- Combat Viruses Naturally, Distacort, 06 Augest 2020.
- 18. patanjali-mahasudarshan-ghan-vati-tablet, Ayurveda medicine, 12 Dec 2020.
- 19. Guapha Ayurveda MahasudarshanGhanVati, Gupta Ayurvedic Pharmacy Pvt Ltd, new delhi, 2021.
- 20. PatanjaliDivyaKayakalpVati: Uses, Ingredients, Dose, Side effects. AYURMEDINFO.
- 21. Dr. Anusaini, DivyaKayakalpVati, ayurvedic-proprietary-medicine, 09 Dec 2016.
- 22. DIVYA KAYAKALP VATI EXTRA POWER 20 GM, Ayurvedic-medicine, patanjali.
- 23. Aunpama, DivyaKayakalpVati For Skin Diseases Facts, Ayurveda, Bimbima, 12 oct 2012.
- 24. Ojha BB, PatanjaliDivyaKayakalpVati, myupchar, 2021.
- 25. Dr. HemantAdhikari, Gandhakdruti is our own proprietary product. The classical gandhak, General practice (Ayurveda), roundglass, 2021.
- 26. Gauray, GandhakDruti, SCRIBD, 21 feb 2010.
- 27. Benefits of Immunity Booster Kadha or Herbal Tea, Health Today. Home remedies, pharm easy, 2020.
- 28. Posaconazole, drugbank, 2021.
- 29. H Hof. Mycoses, A new, broad-spectrum azole antifungal: posaconazole--mechanisms of action and resistance, spectrum of activity, National Library of medicine, pubmed, 2006.
- 30. vijayalakshminagappn, Stan Deresinski, Posaconazole: A Broad-Spectrum Triazole Antifungal Agent, Clinical Infectious Diseases, Volume 45, Issue 12, Pages 1610–1617, Clinical infectioius Diseases, OXFORD ACADEMIC, 15 dec 2007.
- 31. FedjaFarowski et al. Future Microbio, Posaconazole: a next-generation triazole antifungal, National Library of medicine, Pubmed, jan 2007.
- 32. Amphoterecin B, DRUGBANK Online, 28 September 2021.
- 33. Amphoterecin B, 12 oct 2021.
- 34. Misti Ellsworth and Luis Ostrosky-Zeichner, Isavuconazole: Mechanism of Action, Clinical Efficacy, and Resistance, Journal of fungi (Multidisciplinary Digital publishing institute - MDPI), 29 oct 2021.
- 35. isavuconazonium sulfate (Rx), antifungals-systemic, medscape, 2021.
- 36. Marisa H. Miceli1, Carol A .kauffman2, Isavuconazole: A New Broad-Spectrum Triazole Antifungal Agent, Clinical Infectious Diseases, Volume 61, Issue 10, Pages 1558-1565, OXFORD ACADEMIC, 15 September 2021.
- 37. Lefteris Floros1, Daniel Kuessner2, Cost-effectiveness analysis of isavuconazole versus voriconazole for the treatment of patients with possible invasive aspergillosis in Sweden, BMC Infection diseases 19, 11feb 2019.
- 38. sahiba. Sharma, How is the study of Ayurveda different from Allopathy, careers360, 13 march 2021.
- 39. Abhyuday Joshi, How is the study of Ayurveda different from Allopathy?, shiksha, 22 May 2020.
- 40. Top 10 Ayurvedic Alternatives to Allopathic Medicines, keralaayurveda, 22 july 2020.
- 41. The complementarity of Ayurveda and allopathic medicine, EVENTS, NEW EARTH Ayurveda health center, 06 March 2017.