ScienSage

Journal of Advanced Scientific Research

Available online through https://sciensage.info

ISSN
0976-9595
Research Article

A STUDY TO ANALYSE THE ANTIMICROBIAL ACTIVITY OF *KUSHTA AMRUTHASANGADI AVACHURNANA* AND ITS MODIFIED *MALAHARA* FORM

Saimeera P.*[1], Chithra G. Nair[2]

[1]*Research scholar, Department of Rasasastra and bhaishajya Kalpana, MVR Ayurveda medical college, Parassinikkadavu, Kannur*

[2]*Dept of Rasashastra and Bhaishajya Kalpana, Faculty of Indian Medical System, SGT University*

**Corresponding author: sairammeera8@gmail.com*

Received: 12-11-2023; Accepted: 08-12-2023; Published: 31-12-2023

 https://doi.org/10.55218/JASR.2023141106

ABSTRACT

Ayurveda categorizes various skin diseases under "*kushta*", with treatments described in ancient texts like the *Charaka samhitha*. Among these treatments, *kushtaamruthasangadi avachurnana* (dusting powder) is recommended for skin conditions like *dadru* (tinea), *kitibha* (psoriasis), *pama* (scabies), and *vicharchika* (eczema), which exhibit itching, oozing, and discolouration. *Avachurnana* involves dusting fine powdered herbs over skin lesions. The *avachurnana* (dusting powder) formulation is having *kushta* (Saussurialappa) and *amruthasanga* (blue vitriol) as the first two ingredients; hence it is named as *kushta amruthasangadi avachurnana*. To enhance its effectiveness, this study explores transforming *avachurnana* (dusting powder) into a *Malahara* (oinment) to increase its contact duration on the skin. The research focuses on the antimicrobial properties of *kushtaamruthasangadi avachurnana* (dusting powder) and its *Malahara* (oinment) form by using agar well diffusion method against the strains *streptococcus pyogens, staphylococcus aureus, aspergillus niger* and *candida albicans*. In testing, *avachurnana* exhibited limited antimicrobial activity, with no impact on *staphylococcus aureus* and *streptococcus pyogenes* but showing inhibition of *candida albicans*. The Malahara form, tested 80% hexane, showed no impact on *aspergillus niger* and *candida albicans* but displayed some inhibition of *staphylococcus aureus* and *streptococcus pyogens*. The results suggest varying antimicrobial effectiveness against different microorganisms. *Avachurnana* is more potent against fungi like *candida albicans* and *aspergillus niger*, while the Malahara form shows some activity against specific bacteria. This difference could be due to the presence of *sarshapataila* in the Malahara, known for its antibacterial properties. In summary, this research investigates Ayurvedic treatments for skin diseases, shedding light on their antimicrobial effects and potential applications.

Keywords: Antimicrobial activity, *Kushta amruthasangadi avachurnana*, Malahara, skin disease.

1. INTRODUCTION

The term *kushta* encapsulates a range of skin diseases, often causing significant mental and physical distress among patients. These infections can progress swiftly, presenting both primary and secondary manifestations. Primary skin infections exhibit distinct morphologies and courses, often initiated by single organism such as *staphylococcus aureus, streptococcus pyogens*, and corniform bacteria. In contrast secondary infections manifest as superimposed conditions on already afflicted skin. As the prevalence of skin diseases continues to rise, the necessity for advanced treatment modalities becomes ever more apparent.

The current study is strategically planned to address *kushta* management using ayurvedic preparations outlined in *Charaka Samhitha* [1]. Among fifteen types of external applications for skin diseases mentioned, the *avachurnana* (medicated dusting powder) preparation commencing with *kushtaamruthasanga* (saussurealappa and blue vitriol) has been selected due to its significance. This study endeavours to craft a *Malahara* (oinment) using the same formulation.

The role of *oil massage* in *avachurnana (dusting powder)* underscores the contribution of *mustard oil* to the therapeutic efficacy of its practice. Consequently, the ingredients of *avachurnana* (medicated dusting powder) are blended with mustard oil to formulate the *Malahara (oinment)* [2]. Interestingly, these same formulations finds

reference in the classical texts like *Ashtanga Hridaya* and *Ashtanga Sangraha*, albeit with slight variations in ingredient preparations within commentaries. However, the indications and mode of administration remain consistent across these references.

In this comprehensive study, traditional *Ayurved*ic wisdom converges with contemporary insights, resulting in effective strategies to address *kushta (skin diseases)*. The amalgamation of diverse sources and interpretations enriches our understanding of this therapeutic approach, contributing holistically to the management of skin disease.

2. MATERIAL AND METHODS

Fine powders of the herbals drugs such as *Kushta (Saussurialappa), Daruharidra (berberis aristate), Kampillaka (mallotusphilippensis), Musta (Cyperus rotundus), Lodra (symplocusracemos), Sarjarasa (shorea robusta), Vidanga (embeliaribes), Karaviratwak (nerium indicum),* and the purified minerals such as *Tuttha* (blue vitriol) [3], Kasisa (green vitriol) [4], *Gandhaka* (sulphur) [5], *Manashila* (realgar) [6], *Haratala* (orpiment) [7], are the ingredients of both *avachurnana* (medicated duting powder) and the Malahara (oinment).

Table 1: Ingredients for preparing medicated dusting powder and ointment

Sl no	Ingredients	Latin name/chemical name	English name [8]
1	*Kushta*	*Saussurialappa* Asteraceae	Costus
2	*Daru haridra*	*Berberis aristata* Berberidaceae	Indian barberry
3	*Kampillaka*	*Mallotusphilippensis* Euphorbiaceae	Kamala tree
4	*Musta*	*Cyperus rotundus Linn.* Cyperaceae	Nut grass
5	*Lodra*	*Symplocosrecemosa Roxb.* Symplocaceae	Symplocos bark
6	*Sarjarasa*	*Shorea robusta Geartn.* Dipterocarpaceae	Resin of White damar , or Indian opal tree
7	*Vidanga*	*Embeliaribes Burm.f.* Myrsinaceae.	False black pepper
8	*Karaviratwak*	*Nerium indicum* Apocyanaceae	Bark of Indian oleander
9	*Tuttha*	Copper sulphate	Blue vitriol
10	*Kasisa*	Hydrous ferrous sulphate	Green vitriol
11	*Gandhaka*	Sulphur	Sulphur
12	*Manashila*	Arsenic disulphide	realgar
13	*Haratala*	Arsenic trisulphide	orpiment
14	*siktha*	Bee wax	Bee wax
15	*Sarshapataila*	Oil of *Brassica juncea*	Mustard oil

Fig. 1: Showing the ingredients

2.1. Preparation of *Kushta amruthasangadi avahurnana* (dusting powder) [9]

Twenty four (24)g each of all the ingredients except bee wax and mustard oil were taken together and sieved through 120 mesh so that a homogenous mixture is prepared and stored in an airtight glass container. 311g of fine powder having brown colour with lusture was obtained.

Fig. 2: Showing *kushta amruthasangadi avachurnana*

2.2. Preparation of *kushta amruthasangadi malahara* (oinment) [10]

Since the preparation was done in summer season, for preparing bee wax oil, the ratio taken was 1:5 [10]. A part of bee wax (91g for this study) was melted in 5 parts of mustard oil (455g for the study) on medium flame. All the powdered ingredients were taken in a mortar and pestle. After complete melting of bee wax in mustard oil, it was poured above the powdered drugs in mortar and pestle followed by trituration for a specific duration till they were mixed uniformly. After getting cooled, the *Malahara* (oinment) was weighed and stored in an airtight glass bottle.

Fig. 3: Showing *kushta amruthasangadi Malahara*

2.3. Antimicrobial study

To detect the antimicrobial action of given sample antimicrobial study was performed using agar well diffusion method. Microbes used were *streptococcus pyogens* (MTCC 442), *staphylococcus aureus* (NCIM 2127), *pseudomonas aeruginosa* (NCIM 2200), *aspergillus niger* (NCIM 1004), and *candida albicans* (NCIM 3102).

Inoculum separation

A loopful of bacteria culture was transferred from working stock slants to 5 ml of MHB/YEPD/PDB and incubated 37°C/25°C till getting a visible turbidity equivalent to 0.5 MacFarland unit. MHA/MGYPA plates were prepared in sterile petri dishes and allowed to solidify. A sterile swab was dipped into the broth culture and the swab was gently squeezeed against the inner wall of the tube in order to remove excess fluid in the swab. a lawn of growth of the test organism was made by swabbing on the plate. The plates were allowed to dry for 5 minutes. PAD plates were prepared by pouring 25ml media inoculated with 0.1ml culture in to sterile petriplate. The wells were prepared on the swabbed agar plates using sterile cork borer of 8 mm diameter. 100µl of sample concentrations were added to the well using micropipette.

The plates were kept in the biosafety cabinet till complete diffusion of sample occured and after that the MHA plates were incubated at 37°C for 48 hours, MGYPA plates were incubated at 25°C for 48 hours and PDA plates were incubated at 25°C for 5 days. The plates were observed for zone of inhibition and the results were recorded.

3. RESULTS

The most challenging aspect of this study was undoubtedly the antimicrobial study. This difficult primarily arose from the unavailability of certain strains that had been initially chosen for the study. Notably, critical strains like *Trichophyton Rubrum* and *Corneyform* Bacteria were unfortunately not accessible during the research period. The collection of these strains posed a considerable challenge due to their lack of availability at the time. Consequently, a decision was made to substitute with *Candida Albicans* and *Aspergillus Niger*. This adjustment in the research plan was necessitated by the practical constraints of strain availability. The chosen method for the study was the agar well-diffusion method, mainly because, as per the microbiologist's suggestion, Malahara (oinment) encountered difficulties in dilution. Consequently, hexane was selected as the solvent.

The results of antimicrobial study of *kushta amruthasangadi avachurnana* (dusting powder) indicated that it did not exhibit a zone of inhibition against *Staphylococcus aureus* and *Streptococcus pyogenes* when compared to the standard drug, streptomycin. However, the dusting powder did demonstrate a zone of inhibition in the case of *Candida albicans*. Specifically, at 150000ppm, no inhibition was observed. When the concentration increased to 300000ppm and 600000ppm, the drug exhibited zones of inhibition measuring 14mm, 13mm and 19mm,20mm respectively. Turning into its impact on *aspergillus niger*, the standard drug displayed inhibition zones of 30mm each. In contrast, the test drug, dusting powder, showed inhibition zones of 17mm at 150000ppm, 20mm at 300000ppm and 21mm at 600000ppm.

Upon analysing the antimicrobial activity of *Kushtaamruthasangadi Malahara* (oinment), conducted in 80% hexane, no zones of inhibition were found for *Aspergillus Niger* and *Candida albicans*. However a 11mm inhibition zone was observed for *staphylococcus aureus* and 21mm inhibition zone was noted for *Streptococcus pyogens*, whereas the standard drug, streptomycin, produced 23mm inhibition zones in both cases.

The results highlight varying levels of antimicrobial activity of *kushta amruthasangadi avachurnana* (dusting powder) and *Kushta amruthasangadi Malahara* (oinment) against different microorganisms, wtith *avachurnana* (dusting powder) being more effective against *Candida albicans* and *aspergillus niger* (fungi), and *Kushta amruthasangadi malahara* (oinment) showing some activity against certain bacteria not fungi. The potential reason for *Kushta amruthasangadi malahara* (oinment) antimicrobial effects could be attributed to its content of mustard oil. Mustard oil contains isothiocyanate, a compound known for its potent antifungal properties.

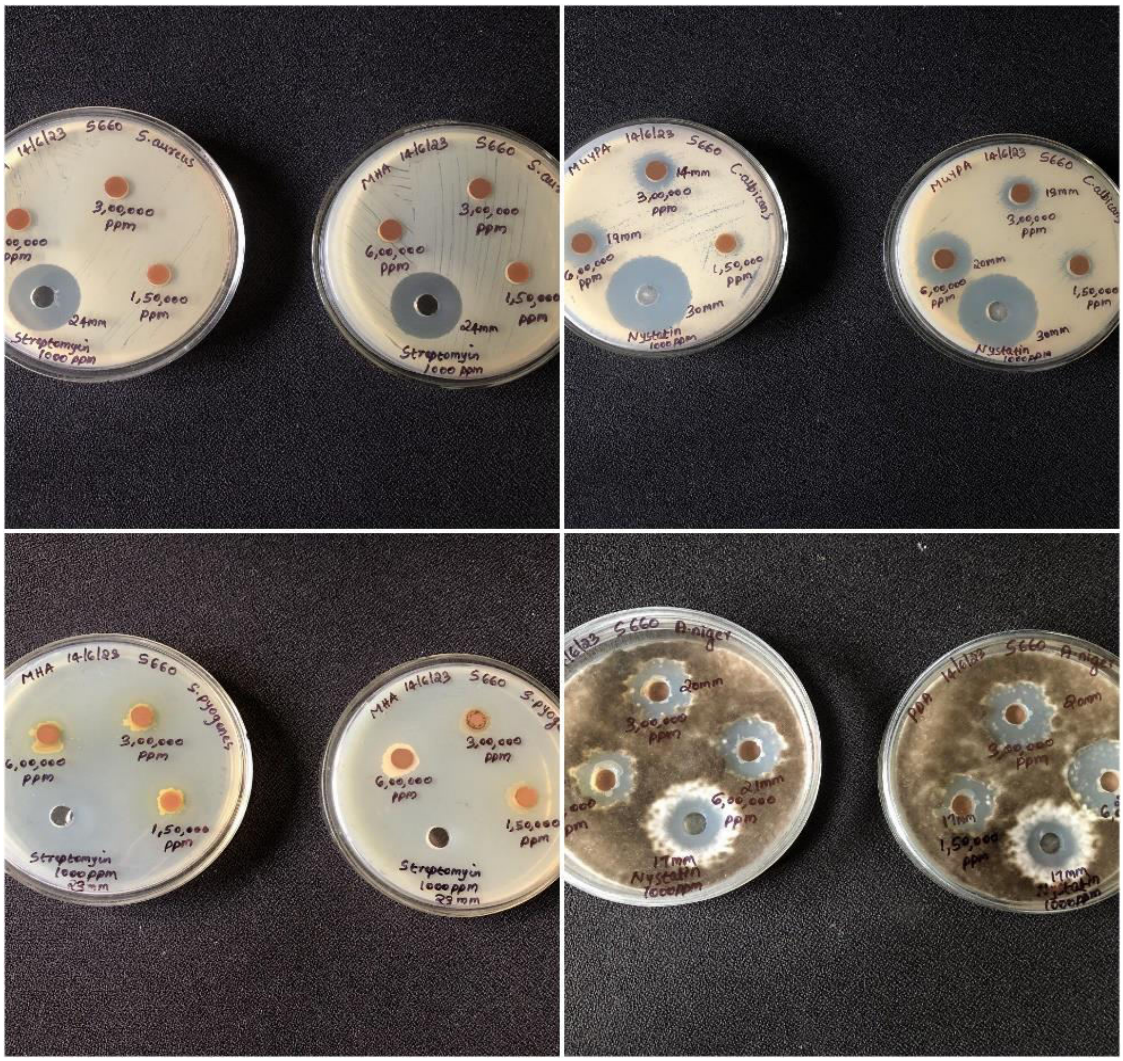

Fig. 4: Showing the antimicrobial activity of *kushta amruthasangadi avachurnana* (dusting powder)

Table 2: Antimicrobial study of *Kushta amruthasangadi avachurnana* (dusting powder)

Sl no	Test organism	Test result(zone of inhibition in mm)				Test method
		6,00,000 ppm	3,00,000 ppm	1,50,000 ppm	Standard drug	
1	*Staphylococcus aureus* (NCIM 2127)	NZ,NZ	NZ,NZ	NZ,NZ	Streptomycin (1000ppm)24,24	CKL/MB/ MOA-044
2	*Streptococcus pyogenes* (MTCC 442)	NZ,NZ	NZ,NZ	NZ,NZ	Streptomycin (1000ppm)24,24	
3	*Candida albicans* (NCIM 3102)	19,20	14,13	NZ,NZ	Nystatin (1000ppm)30,30	
4	*Aspergillus niger* (NCIM1004)	21,23	20,20	17,17	Nystatin (1000ppm)30,30	

NZ- no zone

Total number of determination: 4 only

Table 3: Antimicrobial study of *Kushta Amruthasangadi Malahara* (oinment)

Sl no	Test organism	Test result(zone of inhibition in mm)		Test method
		Sample (80% hexane)	Standard drug	
1	*Staphylococcus aureus* (NCIM 2127)	11,11	Streptomycin (1000ppm)23,23	CKL/MB/ MOA-044
2	*Streptococcus pyogens* (MTCC 442)	21,21	Streptomycin (1000ppm)23,23	
3	*Candida albicans* (NCIM 3102)	NZ,NZ	Nystatin (1000ppm)33,33	
4	*Aspergillus niger* (NCIM1004)	NZ,NZ	Nystatin (1000ppm)17,17	

NZ- no zone

Total number of determination -4 only

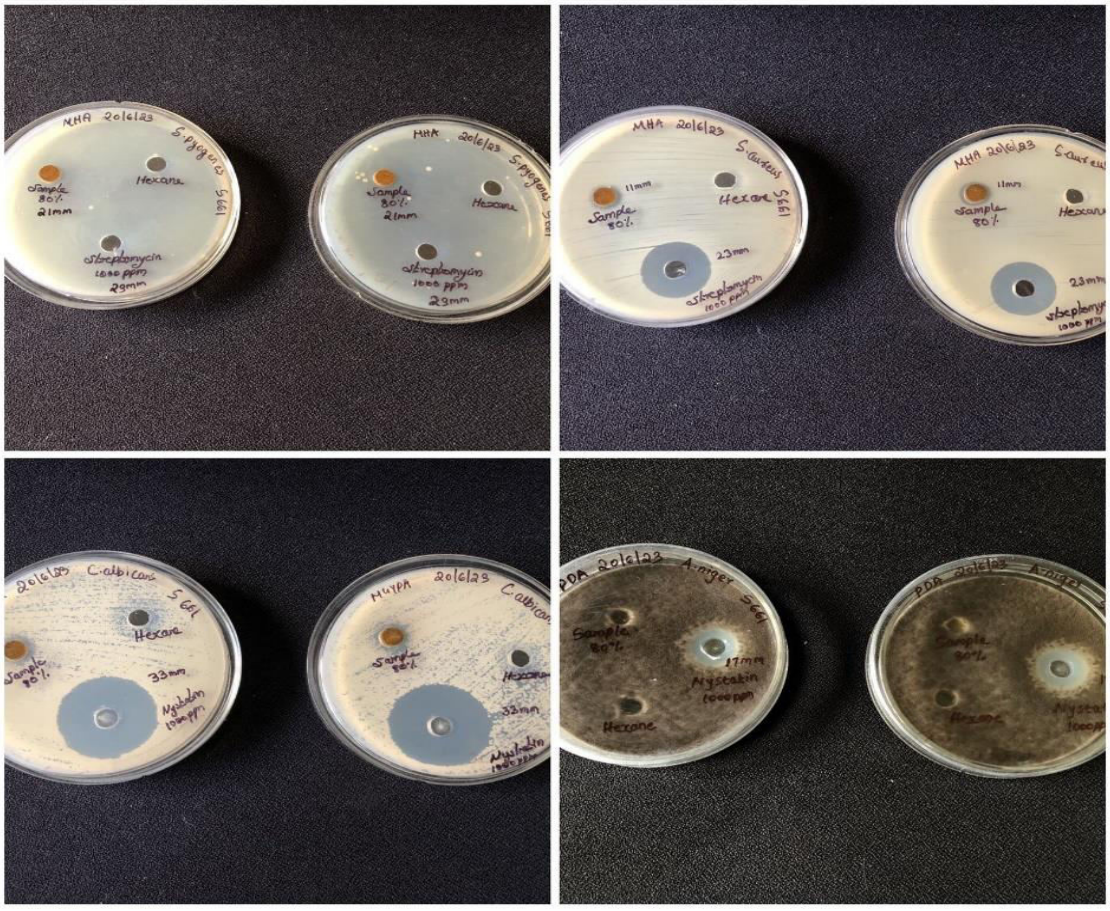

Fig. 5: Showing the antimicrobial activity of *kushta amruthasangadi Malahara* (oinment)

4. CONCLUSION

The results suggest varying levels of antimicrobial activity for *Kushta amruthasangadi avachurnana* (dusting powder) and *Kushta amruthasangadi Malahara* (oinment) against different microorganisms. *Kushta amruthasangadi avachurnana* (dusting powder) appears to be more effective against fungi, especially *Candida albicans* and *Aspergillus niger*, while *Kushta amruthasangadi Malahara* (oinment) shows some activity against specific bacteria, particularly *staphylococcus aureus* and *streptococcus pyogenes*. The presence of mustard oil in *Kushta amruthasangadi Malahara* (oinment) may contribute to its antimicrobial effects, given its known antifungal properties. These medicines can be prescribed on the microbes causing the skin disease. It is the choice of doctor/physician to determine whether the patient requires *avachurnana* (dusting powder) or *malahara* (oinment) form. Further study on the same can add more information.

Conflict of interest

None declared

Source of funding

None declared

5. REFERENCES

1. Agnivesa. Chakrapanidatta.Charaka Samhitha With Ayurveda Dipika Commentary .Reprint Edition. Suthrasthanam , 3rd chapter,10-11th verse. Varanasi. Chaukambha Surabharathi Prakashan; 2005.p.28.
2. Rashmi Yadav, Malavi Shayan, Vikram S. *Journal of Ayurveda Integrated Medical Sciences*, 2021; **2**:148-162.
3. Dattatreya Anand Kulkarni, Acharya Vagbhata. Rasaratnasamucchaya.1st Volume, 3rd Chapter, 93rd Verse. New Delhi:Meherchand Lachmanadas Publications; 2007.p.57.
4. Damodar Joshi, Vaidya Yadavji Trikamji Acaharya. Rasamritam. 2nd Chapter, 158th Verse.Varanasi: Chaukambha Sanskrit Sansthan;2021.p.99.
5. Siddhinandan Mishra, Acharya Yashodhara. Rasaprakasha Sudhakara. 6th Chapter, 265 Verse. Varanasi:Chaukambha Orientalia ;2004.p114.
6. Dattatreya Anand Kulkarni, Acharya Vagbhata. Rasaratnasamucchaya. 1st Volume,3rd Chapter ,70th Verse.New Delhi:Meherchand Lachmanadas Publications;2007.p55.
7. Vaidyavachaspathi Sri Gulraj Sharma, Sri Madhava. Ayurveda Prakasha. 2nd Chapter, 26-29 Verse.Varanasi:Chaukambha Baharti Academy;2020.p.262-63.
8. Anonymous. The Ayurveda Pharmacopoeia Of India. Part 1, 2nd Edition, part B. Government Of India. Ministry Of Health And Family Welfare, Department Of Ism And Homeopathy ,
9. Agnivesa, Chakrapanidatta. Charaka Samhitha. Suthrasthanam 3rd chapter, 10-11th verse. Varanasi:Chaukambha Surabharathi Prakashan;2005.p.28.
10. Pandit Kashinath Sastri, Sri Sadanand Sharma.Rasatarangini. 6th Taranga, 64th Verse. New Delhi:Motilal Banarasidas;2014.p.115.