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INVITRO ANTIMICROBIAL STUDY OF *VIDANGADI VATI*

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ABSTRACT

Introduction

Vidangadi yoga is a classical formulation described in the Yogratnakar Samhita. It is used to treat kustha and dadru as an internal medication. Despite many available yogas, the need for a broad-spectrum and innocuous dressing material is always obligatory.

Aim

To evaluate the antimicrobial activity of Vidangadi yoga against common microbial flora present over the granulation tissue.

Materials and Methods

The drug was prepared according to the standard protocol and subjected to physiochemical and microbiological analyses to standardize the formulation. An in vitro antimicrobial study was conducted to evaluate the drug's activity against fungi.

Results

The prepared drug met the prescribed physiochemical and microbiological parameters as mentioned in the Ayurvedic Pharmacopoeia of India. It was found that a higher concentration (100 mg/mL) of Vidangadi yoga is effective against Blastomyces dermatitidis, Aspergillus terreus, Trichophyton violaceum.

Conclusion

Vidangadi yoga is safe and effective in preventing infection over the granulation surface. The drug's standardization with physiochemical analysis and microbial testing suggests that the classical method of yoga preparation is up to the mark. Further clinical studies are recommended to evaluate the effect of yoga in the chronicity of fungal infection.

Keywords: Anti-microbial, *dadru*, In vitro, Tenia corporis, *Vidangadi yoga*

INTRODUCTION

Ayurveda emphasizes the proper understanding of drugs, including identification, procurement, and collection of raw materials as well as the final product. Herbal medicines are derived from natural sources and are used to prepare medicines that require standards and quality control.

In the era of globalization, there is a need for standardization of Ayurvedic medicine to provide good-quality drugs with higher effectiveness and potency. Herbal medicines have attracted much attention in Western countries due to their high medicinal activity, low toxicity and rare complications.

Vati Kalpana is a dosage form that is easy to administer, palatable, convenient to transport, and has a better shelf life. It is classified into two types based on the use of fire: *Sagni Vati Nirmana* and *Niragni Vati Nirmana*.

Skin diseases are common in tropical and developing countries. Skin diseases are common in tropical and developing countries. All skin diseases in Ayurveda are classified under the broad heading of *Kustha*, which are further classified into *Mahakushtha* and *Kshudra Kushtha.***[1]** *Dadru* is one of the *Kshudra Kushtha* according to Acharya Charaka. The main symptoms of *Dadru* are itching, elevated circular lesion, circular patches, and redness.

Vidangadi Churna is a herbal formulation that is used to treat *Dadru* **[2]**. However, it is difficult to administer to children due to its bitter taste. For the convenience of pediatric patients, the composition was converted into *Vati* form.
In this study, an attempt was made to prepare *Vidangadi yoga*. The analytical profile of the formulation was developed, and its antimicrobial efficacy was assessed.

MATERIALS AND METHODS:

Procurement, Identification and authentication of raw drugs:

All the raw materials used for *Vidangadi Vati* were procured from the local market of Vadodara, Gujarat. Identification and authentication of the raw drugs were done at the Pharmacy of Parul Institute of Ayurved, Vadodara, Gujarat (GMP certified).

Methodology of preparation of *Vidangadi Vati* **[3, 4]**

● All the raw material were collected and all physical impurities were removed.

● Raw material was authenticated in Pharmacognosy laboratory of Pharmacy, Parul Institute of Ayurveda, Vadodara, Gujarat, India.

●Fine powder of all the ingredients were prepared using a 60# mesh.

●Then, the fine powder was used to make granules.

●Wet granules were made by triturating with distilled water in an edge runner.

●Granules were dried in hot air oven.

●Gum acacia powder was added as binding agent and tablets were prepared using tablet

making machine.

Phytochemical and analytical study:

Phytochemical properties are essential for the primary evaluation of the final product to reveal the presence of the original drug in the final product, while analytical study is very essential for validating the exact proportion of the ingredients in the final product. Organoleptic characters such as color, odor, and consistency were determined. Physicochemical studies were carried out for loss on drying at 110°C, total ash value, acid-insoluble ash, pH, specific gravity, refractive index, and total solids content **[5, 6]**.

Antimicrobial activity

The antimicrobial activity was carried out by opting for standard methods.

Test organisms used

Cultures of the microorganisms Blastomyces dermatitidis, Aspergillus terreus MTCC 1344, and Trichophyton violaceum MTCC 296 were used. The viable microorganisms used in the test must be no more than five passages removed from the original MTCC culture or any other equivalent culture.

Preparation of media

Cool the sterile NA media to 55°C and label the plates. Then, pour 25 mL of media into each plate using a sterile measuring cylinder. Allow the plates to solidify and add 10 µL of fungal culture to different plates. Spread the culture slowly and make required wells at a proper distance using a sterile borer. Add test samples and blanks to the respective labeled wells. Once the samples have diffused completely in the wells, incubate the NA plates in an incubator at room temperature for 48-72 hours to observe the zone of inhibition.

Test procedure

The in vitro antibacterial activity of the formulations was determined using the Kirby–Bauer agar well-diffusion method **[7]**. This classic method yields a zone of inhibition (ZOI) in millimeters, which represents the amount of antibacterial agent needed to inhibit the growth of specific

microorganisms. The prepared *vati* was diluted in dimethyl sulfoxide (DMSO) at 50 and 100 mg/mL. A 100 µL sample of the *vati* in DMSO was placed in each well of an agar plate. To determine the ZOI, a liquid suspension culture of each fungal strain was poured into each well (well diameter: 8 mm). Terbinafine (2.5 µg/mL) was used as a standard antifungal agent, and DMSO was used as a control. The plates were incubated at 25°C for 48–72 hours, and the zones of growth inhibition around the wells were then measured. The sensitivity of the microorganism species to the formulation was determined by measuring the sizes of the inhibitory zones (including the diameter of the well) on the agar surface and comparing them to the standard antifungal zones.

RESULTS

It was observed that there was a 5.498% loss of contents during the process. The organoleptic characteristics of *Vidangadi vati* are shown in **[Table 3]** The results obtained in the analytical study are depicted in **[Tables 4]**, showing that the prepared drug is innocuous as the values of physiochemical parameters are equal to the standard values. **[Table 5]** and **[Figure 1]** represent the antimicrobial activity against three species of fungus at various concentrations.

Ingredient of *Vidangadi Vati*.

Table 1: Formulation Composition of *Vidangadi Vati*

	DRUGS	Botanical name	Family name	Part used
1	*Vidanga*	*Embelia ribes* Burm F.	*Myrsinaceae*	Fruit
2	Amalaki	*Embelia officinale*	*Euphorbiaceae*	Fruit
3	Haritaki	*Terminalia chebula*	*Combretaceae*	Fruit
4	Bibhitaki	*Terminalia belerica*	*Combretaceae*	Fruit
5	Pippali	*Piper longum*	*Piperaceae*	Fruit

Table 2: Formulation Composition of *Vidangadi Vati*

Sr. No.	ingredient	Quantity
1.	Each drug	300gm
2.	Acasia gum powder	150gm
3.	Distilled water	12 lit.
4.	loss	200gm
	obtain	1.3kg

Table 3: Organoleptic characters of *Vidangadi Vati* [5]*:*

Sr. No.	Parameters	Results
1	Color	Dark brown
2	Odour	Sour
3	Taste	Sour and Astringent
4	Consistency	Tablet form (solid)
5	Touch	Rough
6	Shape	Round

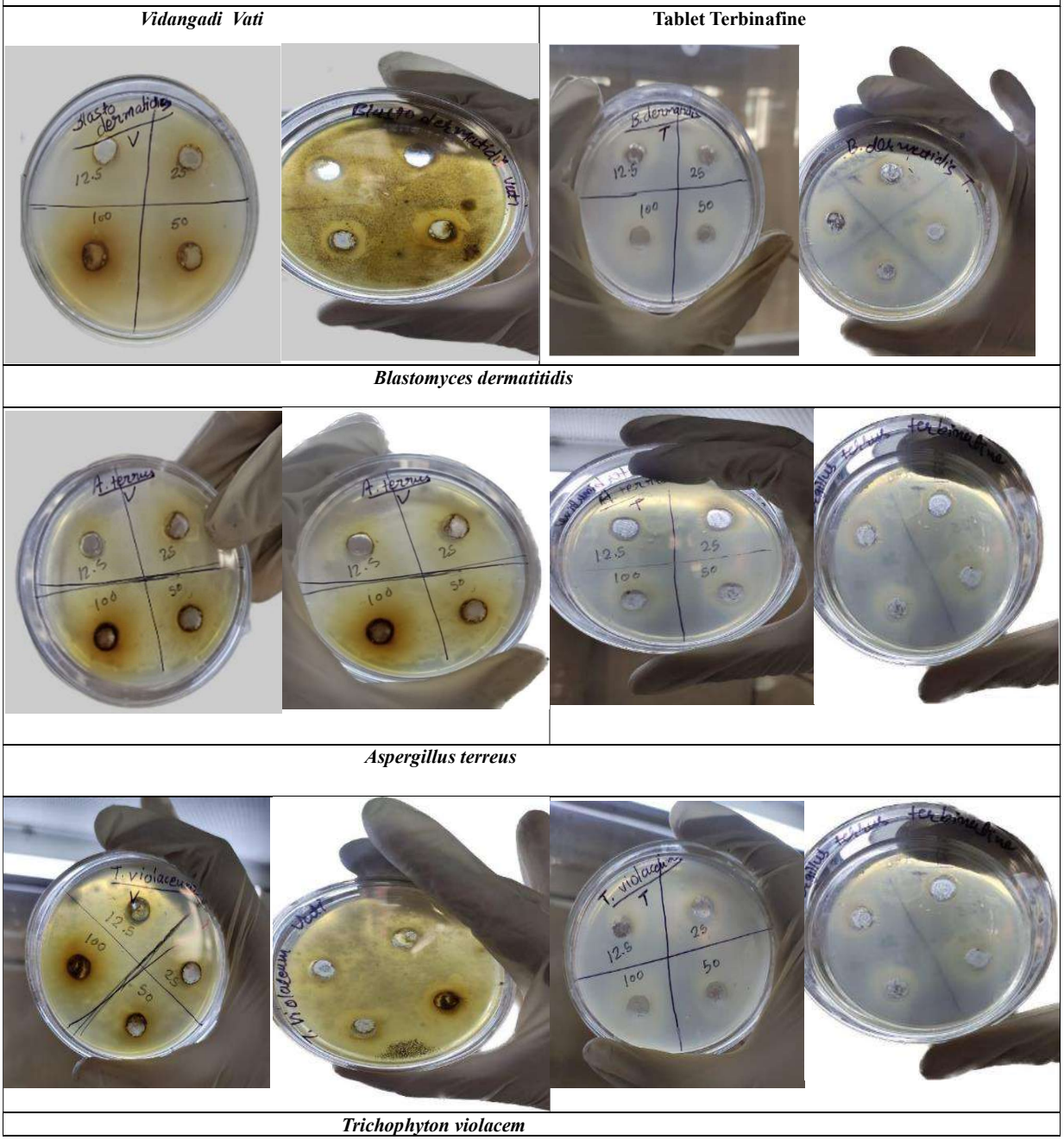
Table 4: Physico-chemical parameters of *vidangadi vati* [6]:

Sr. No.	Parameters	Value
1.	Loss on drying at 110c (%w/w)	12.81
2.	Total ash value (%w/w)	7.15
3.	Acid insoluble ash (%w/w)	4.50
4.	Water soluble extractive (%w/w)	44
5.	Alcohol soluble extractive (%w/w)	38.1
6.	P^H value (10% aqueous)	5.5 (10 % Aqueous)
7.	Tablet hardness	4.3
8.	Tablet weight variation	571 mg
9.	Tablet friability	2.8 gm
10.	Tablet Disintiration test (% W/W)	9 minutes

Table 5: Observations

Sr. No.	fungal name	medicine name	dosage	inhibition zone1	inhibition zone 2	inhibition zone 3	well size	average inhibition zone
1	Blastomyces dermatitidis	*Vati*	12.5	1.3	1.4	1.3	0.8	0.53
			25	1.4	1.2	1.4	0.8	0.53
			50	1.6	1.5	1.6	0.8	0.76
			100	1.6	1.8	1.5	0.8	0.83
		tab.terbinafine	12.5	no growth	no growth	no growth	0.8	no growth
			25	no growth	no growth	no growth	0.8	no growth
			50	no growth	no growth	no growth	0.8	no growth
			100	no growth	no growth	no growth	0.8	no growth
2	Aspergillus terreus	*Vati*	12.5	1.3	1.4	1.2	0.8	0.5
			25	1.4	1.2	1.2	0.8	0.46
			50	1.3	1.6	1.3	0.8	0.6
			100	1.7	1.5	1.4	0.8	0.73
		tab.terbinafine	12.5	no growth	no growth	no growth	0.8	no growth
			25	no growth	no growth	no growth	0.8	no growth
			50	no growth	no growth	no growth	0.8	no growth
			100	no growth	no growth	no growth	0.8	no growth
3	trichophyton violence	*Vati*	12.5	2	1.1	1.5	0.8	0.73
			25	1.3	2	1.7	0.8	0.86
			50				0.8	0.93
			100	1.7	2.1	1.9	0.8	1.1
		tab.terbinafine	12.5	no growth	no growth	no growth	0.8	no growth
			25	no growth	no growth	no growth	0.8	no growth
			50	no growth	no growth	no growth	0.8	no growth
			100	no growth	no growth	no growth	0.8	no growth

Figure 1: Observations



DISCUSSION

The results suggest that *Vidangadi Vati* has potential antifungal properties that warrant further exploration. The dose-response relationship observed against Blastomyces dermatitidis, Aspergillus terreus, Trichophyton violaceum highlights the importance of optimizing the concentrations for enhanced efficacy. *Vidangadi Vati's* selective activity against certain strains suggests the need for a more

comprehensive understanding of its mechanisms of action and formulation.

In recent times, skin diseases have become more common and important due to their widespread occurrence. Dermatophytosis, also known as ringworm, is a fungal infection of the skin that can cause an itchy, circular rash. It is spread by the shedding of fungal spores from infected skin and can be facilitated by a warm, moist environment.

In Ayurveda, skin diseases are classified as "*Kushta*" or "*Tridoshaja Vyadhi." Dadru* is a common and severe type of *Kushta* that affects people of all ages. *Vidangadi Vati* is an herbal drug that has anti-inflammatory, antibacterial, antifungal, antimicrobial, and antioxidant properties. It has been evaluated according to WHO guidelines and no foreign matter was found in it.

Vati

Here are some observations that can be made from the data:

Blastomyces dermatitidis.

The inhibition zone was consistent at both 12.5 mg and 25 mg, suggesting that these doses may be equally effective. The inhibition zone increased by 0.23 mm at a dose of 50 mg, and by 0.3 mm at a dose of 100 mg. This suggests that there is a dose-response relationship between the dose of *Vidangadi Vati* and its antifungal activity against Blastomyces dermatitidis.

Aspergillus terreus

The inhibition zone was consistent at both 12.5 mg and 25 mg, suggesting that these doses may be equally effective. The inhibition zone increased by 0.23 mm at a dose of 50 mg, and by 0.3 mm at a dose of 100 mg. This suggests that there is a dose-response relationship between the dose of *Vidangadi Vati* and its antifungal activity against Aspergillus terreus.

Trichophyton violaceum

The data shows that the antifungal activity of *Vidangadi Vati* against Trichophyton violaceum increases with increasing dose. At a dose of 12.5 mg, the inhibition zone was 0.73 mm. This increased to 0.86 mm at a dose of 25 mg, 0.93 mm at a dose of 50 mg, and 1.1 mm at a dose of 100 mg. This suggests that *Vidangadi Vati* has the potential to be an effective antifungal agent against Trichophyton violaceum.

Tab Terbinafine

Terbinafine was found to be highly effective against three different fungal strains: Blastomyces dermatitidis, Aspergillus terreus, and Trichophyton violaceum. When terbinafine was applied to these fungal strains, no growth was observed. This suggests that terbinafine may be a promising treatment option for infections caused by these fungi.

CONCLUSION

This study underscores the potential antifungal activity of *Vidangadi Vati* against Blastomyces dermatitidis, Aspergillus

terreus, and Trichophyton violaceum. Their inhibitory zones, although smaller than those of conventional antifungal agents, indicate a noteworthy effect. Further investigation and refinement of *Vidangadi Vati* and *Vidangadi* Ointment are necessary to harness their full antimicrobial potential. These findings encourage continued research in Ayurvedic formulations for modern antifungal therapies.

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Conflicts of interest

There are no conflicts of interest.

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