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ANTIMICROBIAL ACTIVITY OF JATIPATRADI CHURNA

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ABSTRACT

Plants are the sources of medicinal compounds and have continued to play a predominant role in the maintenance of human health since ancient times. Candidiasis is an infection caused by a yeast (a type of fungus) called Candida. *Jatipatradi churna* is a potent Ayurvedic medicine being explained in *Yogaratnakar* text in the context of *mukharogadhikara*. It's composed of 10 medicinal plants which are used traditionally in the treatment of *Dantagata, Jihvagata* and *Mukhagata rogas.* The present study was designed to evaluate the antimicrobial activity of *Jatipatradi churna* using Disc diffusion and MIC method. The *Jatipatradi churna* was found active against the organism *Candida Albicans* and *Aspergilus Niger.*

KEYWORDS: *Jatipatradi Churna*, Candidiasis, MIC, Disc diffusion method.

INTRODUCTION

India has a heritage of traditional herbal medicine. The Ayurvedic system of medicine has described various herbal formulations in the treatment of diseases, which play an important role in modern health care and curing various ailments. Ayurveda in recent era is attracting global attention due to its holistic approach in the treatment of disease and with minimal adverse drug reaction. *Panchavidha kashaya Kalpana* are being explained in classics for the purpose of making them compatible without losing potency or efficiency of the drugs considering all the aspects like Desha, Kala, Bala[1] etc. Thus, various dosage forms evolved to make the drugs compatible, palatable and easy for absorption.

Oral thrush is an opportunistic infection of the oral cavity. It is common and under diagnosed among the elders. It is also called as oral candidiasis. It's a condition in which the fungus Candida albicans accumulates on the lining of mouth[2]. Candida normally lives on the skin and inside the body in places such as mouth, throat, gut and vagina without causing any problems. Candidiasis

in the mouth and throat is also called Oral thrush or oropharyngeal candidiasis. It causes creamy white lesions, usually on tongue or inner cheeks. Sometimes oral thrush may spread to the roof of mouth, gums or tonsils or the back of throat. The incidence of C Albicans is 45% in neonates, 45-65% in healthy children, 30-45% of healthy adults, 50-65% of people who wear removable dentures, 90% of patients with acute leukemia and undergoing chemotherapy and 95% of HIV infected patients[3].

Practice of *dinacharya* (like *gandoosha)* with *Ayurvedic aushadhies* will be of great benefit if done regularly. Daily practices serve as curative and preventative measures for many kinds of oral health issues. Jaatipatradi choorna being one of the formulations explained in Yogaratnakara in Dantaroga Chikitsadhaya[4], contains the ingredients like *Jaatipatra, Punarnava, Gajapippali, Kushta, Vacha, Shunti, Ajamoda, Haritaki, Badara and Tila* which are having krimighna and Khandughna Property.

AIMS AND OBJECTIVES

-To prepare Jatipatradi Churna according to classics.

-In Vitro Antimicrobial activity of Jatipatradi Churna.

MATERIALS AND METHODS

-The raw materials required for the preparation of the Jatipatradi churna were collected from reliable sources.

-Authentication of the ingredients was done from Dravyaguna department of BVVS Ayurvedic Medical College Bagalkot.

-Preparation of Jatipatradi Churna was carried out at the Pharmacy of BVVS Ayurvedic Medical College and Hospital, Bagalkot-Karnataka.

-The Antimicrobial Activity of the drug was carried out at the Maratha Mandal's Dental College and Research Institute, Belagavi. Karnataka.

Ingredients of Jatipatradi Churna:

Sl No	Ingredient	Botanical Name	Part used	Quantity
1.	*Jatipatra*	*Jasminum grandiflorum Linn*	Leaf	1 part
2.	*Punarnava*	*Boerhavia diffusa*	Root	1 part
3.	*Gajapippali*	*Scindapsus officinalis*	Fruit	1 part
4.	*Badara twak*	*Ziziphus mauritiana*	Bark	1 part
5.	*Kusta*	*Saussurea lappa*	Rhizome	1 part
6.	*Vacha*	*Acorus calamus Linn*	Root	1 part

7.	*Shunti*	*Zingiber officinale*	Rhizome	1 part
8.	*Ajamoda*	*Trachyspermum ammi*	Fruit	1 part
9.	*Haritaki*	*Terminalia chebula*	Fruit	1 part
10.	*Tila*	*Sesamum indicum*	Seed	1 part

Pharmaceutical Procedure[5]:

Each drug was identified, collected and authenticated individually. Each drug was taken separately in the *ulukhala yantra* and pounded to reduce in its particle size and then put in the pulveriser to make *sookshma* (fine) *churna*. The fine *churnas* of all the drugs like *Jatipatra, Punarnava, Gajapippali, Badara twak, Kusta, Vacha, Shunti, Ajamoda, Haritaki* and *Tila* were taken in 100 gm quantity each in a large stainless-steel vessel. It was then completely mixed to attain homogenous mixture, it was put in grinder and collected. Obtained *Jatipatradi churna* was weighed and then packed in air tight plastic containers.

Antimicrobial study:

Antimicrobial study of Jatipatradi Churna was carried out against *Candida Albicans* and *Aspergilus Niger* by Disc diffusion method and Minimum inhibition concentration method.

Disc diffusion method[6]- The strains were inoculated in nutrient broth and incubated at 37°C overnight. The culture was then adjusted to 0.5 McFarland turbidity standards. 23–26 lawn culture of the test organism was made on the Brain Heart Infusion agar plates using a sterile cotton swab, and the plates were dried for 15 min. A sterile cork borer was then used to make wells (6 mm diameter) for different concentrations of the extracts, with the help of micropipette 75µl, 50µl, 25µl, 10µl and 5µl of the extracts were introduced into the wells. The culture plates were made stand on the working bench for 30min for pre-diffusion and were incubated in an upright position at 37°C for 24 h. After 24 h, antifungal activity was determined by measurement of the diameter of zones of inhibition (mm). Standard antifungal discs of Fluconazole (30 µg) was used as Standard drug.

Minimum inhibition concentration method[7]- 9 dilutions of each drug have to be done with BHI for MIC. In the initial tube 20microliter of drug was added into the 380 microliter of BHI broth. For dilutions 200 microliter of BHI broth was added into the next 9 tubes separately. Then from the initial tube 200microliter was transferred to the first tube containing 200 microliters of BHI broth. This was considered as 10-1 dilution. From 10-1 diluted tube 200microliter was transferred to second tube to make 10-2

dilution. The serial dilution was repeated up to 10-9 dilution for each drug. From the maintained stock cultures of required organisms, 5microliter was taken and added into 2ml of BHI (brain heart infusion) broth. In each serially diluted tube 200microliter of above culture suspension was added. The tubes were incubated for 24 hours and observed for turbidity.

RESULT

The investigation of antimicrobial activity of *Jatipatradi Churna* on *Candida Albicans* and *Aspergilus Niger* was carried out by Disc diffusion method and MIC. In Disc diffusion method the zone of inhibition of test drug against *Candida Albicans* is 23mm, 20mm, 10mm with the dilution of 75µg/ml, 50µg/ml and 25µg/ml respectively. The zone of inhibition of test drug against *Aspergilus Niger* is 18mm and 15 mm with the dilution of 75µg/ml and 50µg/ml respectively. Zones of inhibition of different concentrations were measured and compared with the control and showed potential anti-fungal activity.

In MIC the interpretation is done based on the turbidity. Lesser the turbidity more the activity of drug & more the turbidity lesser the activity of drug. In this test ten dilutions are being made starting from the 100µg/ml to 0.2 µ g/ml. The test drug Jatipatradi Churna has shown its sensitivity for the *Candida Albicans* fungi with the dilution rate of 100µg/ml, 50µg/ml, 25µg/ml, 12.5µg/ml, 6.25µg/ml and 3.12µg/ml. It has shown its sensitivity for the *A.niger* with the dilution rate of 100µg/ml, 50µg/ml, 25µg/ml, 12.5µg/ml, 6.25µg/ml, 3.12µg/ml, 1.6µg/ml, 0.8µg/ml and 0.4µg/ml. This shows that the solution remains clear with higher concentration and then gradually becomes turbid. The test drug Jatipatradi Churna is sensitive against *Candida Albicans* for dilution rate as low as 3.12µg/ml and *A.niger* for dilution rate as low as 0.4µg/ml.

Disc Diffusion Results

Sl. No.	Samples	75µl/ml	50µl/ml	25µl/ml	10µl/ml	5µl/ml
Jatipatradi Churna						
1	*Candida*	23mm	20mm	10mm	R	R
2	*A.niger*	18mm	15mm	R	R	R

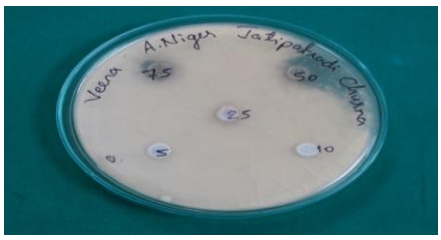
Note:

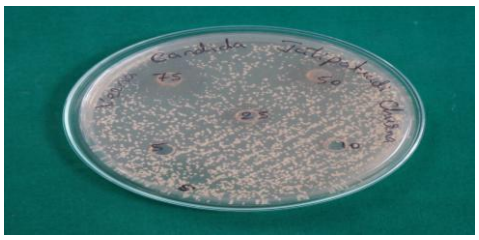
S – Sensitive
R – Resistant

Minimum Inhibition Concentration Method

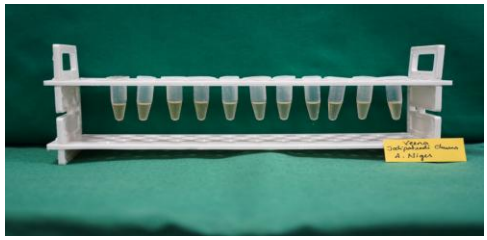
Sl. No.	Samples	100 µg/ml	50 µg/ml	25 µg/ml	12.5 µg/ml	6.25 µg/ml	3.12 µg/ml	1.6 µg/ml	0.8 µg/ml	0.4 µg/ml	0.2 µg/ml	0.1 µg/ml
Jatipatradi Churna												
1	*Candida*	S	S	S	S	S	S	R	R	R	R	R
2	*A.niger*	S	S	S	S	S	S	S	S	S	R	R

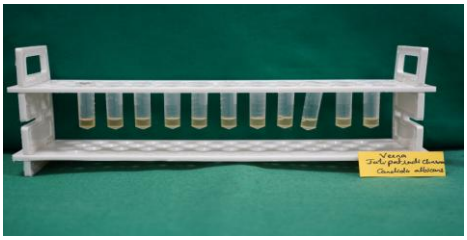
Disc Diffusion Method





Minimum Inhibition Concentration





PHARMACEUTICAL PROCEDURE OF JATIPATRADI CHURNA

DISCUSSION

Globally there is burden of infectious diseases caused by fungal agents causing serious threat to public health. Antibiotic treatment is a preferred choice to treat bacterial infections. However, the emergence of fungal resistance and toxicity issues subside the use of antifungal agents. Due to safety and efficacy related limitations of antibiotics, there is an upsurge in biological research on the antimicrobial role of plants and their efficacy.

In the present study, the sample was tested for their antifungal properties against the fungal human pathogen and was found active. This may be due to the presence of active principles present in the poly herbal preparations recorded in the present investigations.

Jati possesses tikta and kashaya rasa; mrudu, laghu and snigdha guna; ushna veerya and katu vipaka. It has varied uses in shiroroga, akshiroga, visharoga, kushta, vrana, arsha, mukhapaka, putikarna, sthana shotha, rakta vikara[8]. Jati is included in kushtaghna gana by Acharya Charaka[9]. Whereas Acharya Susruta has used Jati as an ingredient of samshodana and ropana ghritha[10]. Author also explained its therapeutic use in atisara pratisheda shlemabhishyanda pratisheda and mukha roga chikitsa[11]. Leaves of Jati contain the resin, salicylic acid, ascorbic acid and alkaloids, used for the treatment of ulcer, fever and skin diseases[12]. This study revealed the presence of antimicrobial activity against pathogenic microbes, which may be used to control the infectious diseases.

CONCLUSION

The use of herbal medicine is increasing in the present scenario with the development of drug resistance among the fungal population. Herbal medicines are safe and having no side effects against fungi and other microorganisms. Based on the results recorded in the present findings, it is concluded that Jatipatradi Churna has a potential antifungal activity on human oral pathogenic microorganisms and hence the herbal drug may serve as one of the potential antimicrobial agents.

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