Evaluation of Anti-fungal activity of Flower Extract of Some Indian Herbal Plants

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Abstract

Fungal infections are one of the most prominent infections and cause a wide number of diseases. It occurs in almost every person once in their life. *Blumea lacera* (Burm.f.) DC., *Leucas cephalotes* Roxb. and *Peristrophe bicalyculata* (L) Merr. are Indian Medicinal Plants. The various part of the plant is used medicinally for the treatment of several skin infections. The present paper deals with the antifungal activity of extract of these plants on *Candida albicans, Cryptococcus neoformans* and *Aspergillus flavus*. The zone of inhibition was recorded and anti-fungal activities of selected plant extract were determined.

Key words: Plant Extract, Fungal infections, Herbs
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Introduction

Fungal infections pose a threat to public health worldwide. While fungi can infect anybody, even travellers, those with compromised immune systems—such as those with HIV/AIDS or cancer—are particularly vulnerable to fungal illnesses. A fungus causes a fungal infection, also known as mycosis, which is a skin condition. Fungi come in millions of species. They reside on your skin, in household surfaces, on plants, and in the earth. They can occasionally result in skin issues like pimples or rashes. [1]

The most difficult task is curing bacterial and fungal skin infections, which are a big problem in the world of skin illness. Different pharmaceutical businesses produce different medicines and/or drugs to combat skin disorders. However, this technique necessitates looking for alternate sources of chemically synthesised ones due to issues with microbial drug resistance. Based on traditional knowledge, a large number of researchers have been studying medicinal plants, and this research has been a great source of bioactive chemicals. These substances have a variety of biological activities against fungus and bacteria that cause skin diseases, as well as several health-promoting benefits. Paying attention to these factors should guide commercialization in a new path and shed light on a few potential plant species that are being used to treat skin conditions. [2]

Blumea lacera is an annual herbaceous plant belonging to the Asteraceae family. It has a wide variety of compounds that have great potential for medicinal use. Numerous beneficial phytochemical components are present in it, such as lupeol and lupeol acetate, hentriacontane, ß-sitosterol, acetates, alpha-amyrin, and stigmasterol. Numerous pharmacological characteristics, including astringent, hepatoprotective, anthelmintic, diuretic, antipyretic, anti-inflammatory, antimicrobial,

cytotoxic, anxiolytic, antiviral, analgesic, hypothermic, anti-bacterial, anti-leukemic, and tranquillizing effects, are displayed by these phytochemicals. [3] *Leucas cephalotes* (Family: Lamiaceae) also known as 'Dronapushpi' in Sanskrit, is an edible rainy season weed. In Ayurveda, it has been recommended for inflammation, psoriasis, scabies, chronic skin eruptions, edema, diaphoresis, chronic malaria, asthma, eye diseases, jaundice, paralysis and obstinate urinary troubles. The plant possess labellenic acid and beta-Sitosterol, stigmasterol, flavones pillion, gonzalitosin, ricin, cosmosin, apigenin, anisofolin A and Luteolin as a major phytochemicals. [4] *Peristrophe bicalyculata,* a member of the Acanthaceae family, can grow to a height of 60 to 180 cm and is widespread in Africa, Afghanistan, and India. It is frequently referred to as kakajangha in Sanskrit and kali aghedi in Hindi. The herb is used to cure ear and eye infections, bone fractures, sprains, fevers, colds, coughs, and snake poison. It also has antibacterial (tuberculostatic) properties. The dried aerial components' chemical makeup revealed 35-hydroxynonatriacontanal and 14-methyl-tritriacont-14-en-15-ol. [5]

During past few years plant derived extracts and their isolated phytochemicals are gaining importance and are also a new emerging area of research. In last two decades anti-fungal effects in the category of anti-microbial is of great interest. The present study was designed to evaluate the these plant extracts used to treat the fungal infection as mentioned in traditional system of medicine.

Material and Methods

Selection and Collection of Plant Material

Three plants i.e., *Blumea lacera* (Burm.f.) DC. (Nirmuli) Flowers, *Leucas cephalotes* Roxb. (Gumma) Flowers and *Peristrophe bicalyculata* (L) Merr. (Chotiharjori) Flowers were collected from Vindhya Region on Madhya Pradesh and was selected f for the present study.

Authentication of Plant/Plant Material

The plant parts viz., BLF= *Blumea lacera* (Burm.f.) DC. (Nirmuli) Flowers, LCF= *Leucas cephalotes* Roxb. (Gumma) Flowers and PBF= *Peristrophe bicalyculata* (L) Merr. (Chotiharjori) Flowers were collected and identified morphologically, microscopically and compared with standard pharmacopoeial monograph. The sample of drug was also identified & authenticated by Dr. S. N. Dwivedi, Retd. Prof. and Head, Department of Botany, Janta PG College, A.P.S. University, Rewa, (M.P.) Voucher Specimen J/Bot/BLF-019; LCF-020; PBF-021 was allotted.

Successive extraction of selected herbs [6-7]

Sample were shattered and screened with 40 mesh. The shade dried coarsely powdered plant matertial (250 gms) were loaded in Soxhlet apparatus and was extracted with petroleum ether (60-62°C), Chloroform, ethanol and water until the extraction was completed. After completion of extraction, the solvent was removed by distillation. The extracts were dried using rotator evaporator. The residue was then stored in dessicator and percentage yield were determined.

Anti-fungal of extracts [8-10]

Fungal strain

Fungal strain i.e., *Candida albicans, Cryptococcus neoformans* and *Aspergillus flavus* were used for the present investigation. The innoculum of strains were transferred to the recultured before staring the lab work.

Screening of Anti-fungal activity (Disc diffusion method)

Preparation of Disc

Disc of whatsmann filter paper of one quarter inch in diameter was prepared and the same was sterilized using autoclave.

Preparation of samples entrapped disc

The accurately weighed flower extracts were dissolved in methanol of different stock solutions (10, 20, 30, 40, 50 µg/ml**)** solutions were prepared. All the dilution prepared was applied to whatsmann filter paper disc using a micropipette. The disc were then dried and sterilized.

Preparation of culture plate

The sabouraund's agar and mueller Hinton agar media were prepared by dissolving media in 1000

ml of distilled water and sterilized by autoclave at 121°C for 1 hour. The media were cooled and poured in sterilized petri plate to solidified at room temperature.

Evaluation of Zone of inhibition

The re-cultured fungal strains were used for antifungal evaluation. The strains were streak on the Mueller Hinton media and the drug entrapped patches were placed. For negative control disc of distilled water and for positive control amphotericin B disc (10 µg) were used. The petri plates were kept in incubator for 24 hrs. After 24 hrs the petri-plates were checked for zone of inhibition. The zone of inhibition diameter was recorded with the help of zone reader scale. The zone of inhibition was calculated by subtracting diameter of sample or standard or control by diameter of disc. The more the zone of inhibition the more will be antifungal activity.

Results and Discussion

Anti-fungal activity of flowers extract of *Blumea lacera* (Burm.f.) DC., *Leucas cephalotes* Roxb. and *Peristrophe bicalyculata* (L) Merr. were evaluated. The zone of inhibition of PEE, CE, EE and AE of flower extract of selected plant on *Candida albicans, Cryptococcus neoformans* and *Aspergillus flavus* were presented in table 1. Results indicate (Graph 1) that EE and AE of flower extract of *Blumea lacera* (Burm.f.) DC., *Leucas cephalotes* Roxb. and *Peristrophe bicalyculata* (L) Merr. have significant anti-fungal activity when compared with standard drug amphotericin B and other extract i.e., PEE and CE.

Conclusion

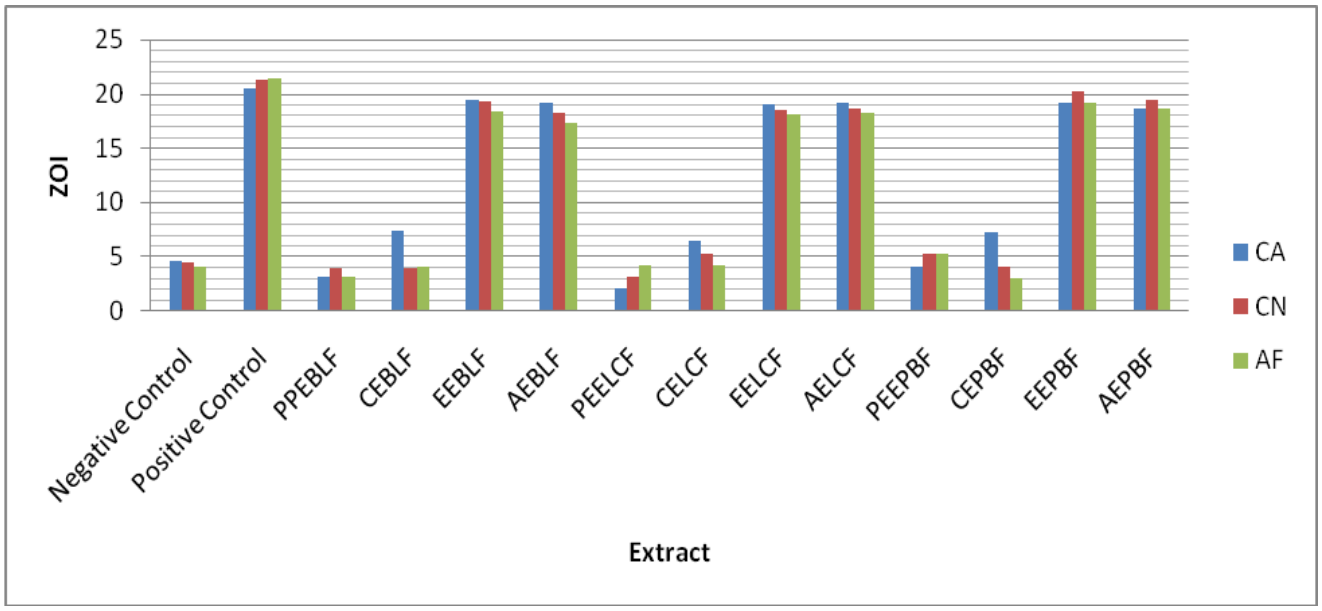
Drugs derived from natural and herbal sources have the potential to treat a wide range of fungal-caused skin conditions, including those that affect many indigenous people who rely on medicinal plants across the nation. To treat skin-related issues, different scientists have focused on different portions of certain medicinal plants using different techniques, all based on traditional knowledge that takes a holistic and systemic approach. A number of intriguing medicinal plants that are utilised in different countries, either by themselves or in conjunction with manufactured medications, may prove useful in the future for treating skin conditions and possibly even as sources of good health maintenance. The phytoconstituents in the powerful plants demonstrated biological action. In the present investigation antifungal activity of PEE, CE, EE and AE of flowers of *Blumea lacera* (Burm.f.) DC., *Leucas cephalotes* Roxb. and *Peristrophe bicalyculata* (L) Merr. were carried out against three fungal strains i.e., *Candida albicans, Cryptococcus neoformans* and *Aspergillus flavus*. The result indicates that EE and AE possess significant anti-fungal activity when compared to standard drug. Further research is warranted to isolate the compounds responsible for the observed biological activity will be of great interest to developed new phyto-formulations.

Table 1: Anti-fungal activity of various Flowers Extract of *Leonotis nepetaefolia* (L) R.Br.

S/No.	Test/Extract	Zone of Inhibition (mm)		
		CA	CN	AF
1.	Negative Control	4.61±0.11	4.54±0.07	4.12±0.10
2.	Positive Control	20.48±0.17**	21.33±0.19**	21.41±0.24**
3.	PPEBLF	3.22±0.11*	4.02±0.02*	3.11±0.14*
4.	CEBLF	7.36±0.11*	4.03±0.01*	4.11±0.36*

5.	EEBLF	19.39±0.16**	19.32±0.17**	18.35±0.32**
6.	AEBLF	19.24±0.33**	18.22±0.14**	17.29±0.28**
7.	PEELCF	2.18±0.43*	3.18±0.28*	4.29±0.38*
8.	CELCF	6.43±0.61*	5.28±0.17*	4.29±0.38*
9.	EELCF	19.07±0.28*	18.48±0.76*	18.18±0.19*
10.	AELCF	19.22±0.28*	18.71±0.29*	18.32±0.11*
11.	PEEPBF	4.10±0.17*	5.29±0.38*	5.27±0.29*
12.	CEPBF	7.21±0.02*	4.09±0.02*	3.10±0.02*
13.	EEPBF	19.22±0.11**	20.21±0.17**	19.23±0.24**
14.	AEPBF	18.60±0.32**	19.49±0.25**	18.62±0.46**

Note: All values are expressed as Mean (X) ±SEM, (n=3). One way ANOVA followed by student test, values are statistically significance *P<0.001, **P<0.01 when compared with control and standard.



Graph 1: Anti-fungal activity of Flowers Extract of *Blumea lacera* (Burm.f.) DC., *Leucas cephalotes* Roxb. and *Peristrophe bicalyculata* (L) Merr.

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