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Evaluation of Anti-fungal activity of Hydro-alcoholic extract of *Leonotis nepetaefolia* (L) R.Br. Root

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Abstract

Fungal infections are one of the most prominent infection and causes a wide number of disease. It occurs in almost every person once in their life. *Leonotis nepetaefolia* (L) R.Br. belongs to the genus *Leonotis* and family Lamiaceae. It is native to tropical Africa and India. The rootof the plant are used medicinally for the treatment of several skin infections. The present paper deals with the antifungal activity of root of the selected plant. Hydro-alcoholic root extract *Leonotis nepetaefolia* were evaluated for anti-fungal activity and zone of inhibition were recorded.

Key words: *Leonotis nepetaefolia*, Fungal infections, Roots

Introduction

Skin disease is a serious issue around the world, and treating bacterial and fungal skin infections is the most difficult chore. Various pharmaceutical businesses produce a variety of treatments and/or medications to treat skin disorders. However, due to microbial drug resistance issues, this technique necessitates the hunt for alternative sources of chemically synthesised drugs. Many researchers have worked on medicinal plants using traditional knowledge, and this study has yielded a wealth of bioactive chemicals. These chemicals have varying biological action against skin disease-causing bacteria and fungus, as well as a variety of health-promoting properties. Attention to these features should lead in a new approach for commercialisation and provide insight into the understanding of some potential plant species used for the treatment of skin problems.

Fungal diseases are a global public health problem. Although fungal diseases can affect anyone, including travelers, they pose a serious threat to people who have weakened immune systems, such as those who have cancer or HIV/AIDS. Fungal infection, also called mycosis, is a skin disease caused by a fungus. There are millions of species of fungi. They exist in the earth, on plants, on household surfaces, and on your skin. Sometimes, they might lead to skin concerns like rashes or pimples.

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Leonotis nepetaefolia (L) R.Br., often known as barchibuti, is a lesser-known medicinal plant belonging to the Lamiaceae family. It is nearly exclusively found in India's hottest regions. Traditionally, all parts of the plant, particularly the roots, leaves, and flowers, were used to treat rheumatic conditions and as a tonic. Scalds, burns, ringworm, and some skin ailments can all be treated with roots. [3-5]

Material and Methods

Collection of herbs and their authentication

The roots of Leonotis nepetaefolia (L) R.Br. were collected from various local sites in the Malwa region of Madhya Pradesh between July and September 2024, identified and authenticated by Dr. S. N. Dwivedi, Prof. and Head, Department of Botany, Janata PG College, A.P.S. University, Rewa, (M.P.), and deposited in our Laboratory. Voucher specimen number J/Bot/2020-LNR 10 was assigned.

Successive extraction of selected herb

The samples were fragmented and screened using 40 mesh. The shade dried coarsely powdered roots (250 gms) were placed into the Soxhlet apparatus and extracted with ethanol and water (90:10) until the extraction was complete. Distillation was used to eliminate the solvent after extraction was complete. The extract was dried using a rotating evaporator. The residue was then kept in a dessicator and the percentage yield was calculated. [6]

Anti-fungal of extracts [7]

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

Root extracts were properly weighed and diluted in methanol to make stock solutions (10, 20, 30, 40, 50 µg/ml). Using a micropipette, I applied all of the created dilution to a Whatsmann filter paper disc. The disc was later dried and sterilised.

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^{o}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 tested for antifungal properties. The strains were streaked on the Mueller Hinton media, and the drug-entrapped patches were applied. The negative control disc was distilled water, while the positive control disc contained 10 µg of amphotericin B. The petri plates were incubated in an incubator for 24 hours. After 24 hours, the petri plates were examined for zones of inhibition. The zone of inhibition diameter was measured using the zone reader scale. The zone of inhibition was determined by subtracting the diameter of the sample, standard, or control from the diameter of the disc. The larger the zone of inhibition, the greater the antifungal activity.

Results and Discussion

Anti-fungal activity of hydroalcoholic extract of *Leonotis nepetaefolia* (L) R.Br. were evaluated. The zone of inhibition of HAELNR on *Candida albicans, Cryptococcus neoformans* and *Aspergillus flavus* were presented in table 1. Results indicate (Graph 1) that extract have significant anti-fungal activity when compared with standard drug Fluconazole.

Conclusion

The potent plants demonstrated biological activity as a result of the phytoconstituents present. In the current study, antifungal activity of HAELNR was tested against three fungus strains: Candida albicans, Cryptococcus neoformans, and Aspergillus flavus. The results show that the extract has strong anti-fungal action when

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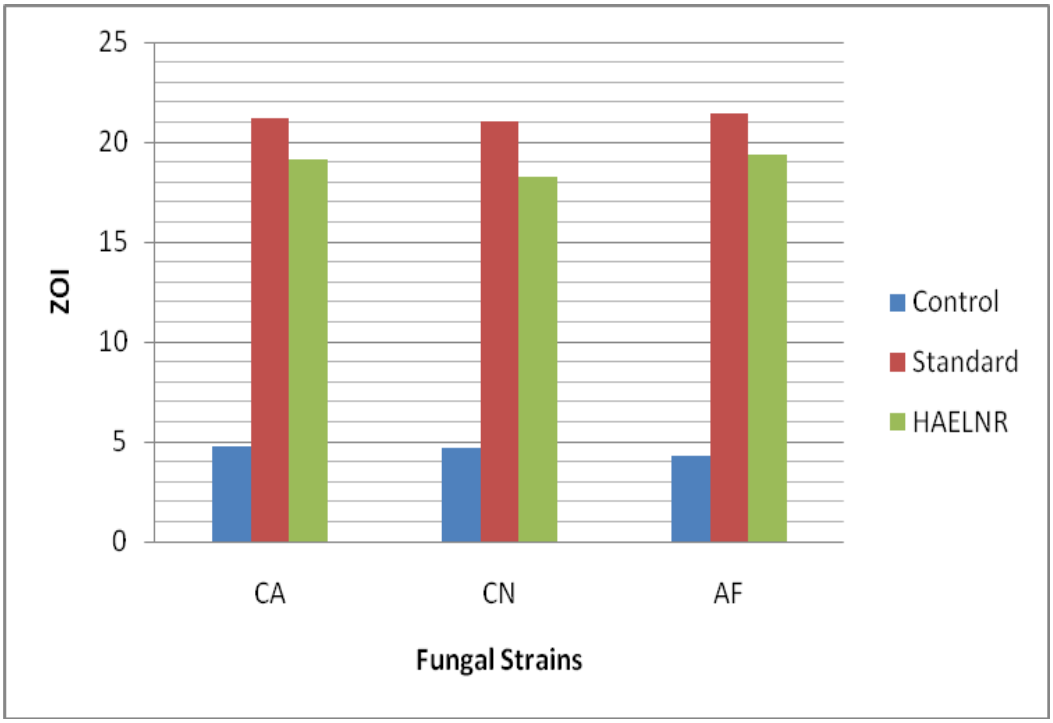
compared to the conventional medicine. More research is needed to separate the chemicals responsible for the reported biological activity, which will be of significant relevance in developing new phytoformulations.

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

S/No.	Treatment	Zone of Inhibition (mm)		
		CA	CN	AF
1.	Control	4.75±0.18	4.66±0.08	4.32±0.13
2.	Standard	21.22±0.13**	21.02±0.11**	21.39±0.33**
3.	HAELNR	19.11±0.16*	18.27±0.22*	19.36±0.10*

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.
Std: Standard Drug [Fluconazole]



Graph 1: Evaluation of Antifungal Activity

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