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ASSESSMENT OF THE ANTIFUNGAL POTENTIAL OF CURCUMA LONGA EXTRACTS AT DIFFERENT CONCENTRATIONS AGAINST SELECTED LABORATORY FUNGAL ISOLATES: AN IN VITRO STUDY

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ABSTRACT

The increasing occurrence of fungal resistance to commonly prescribed antifungal medications has created an urgent need for alternative therapeutic options. Plant-derived compounds are being investigated extensively due to their diverse bioactive properties and reduced adverse effects. The present study was designed to experimentally evaluate the inhibitory effect of Curcuma longa rhizome extract on selected fungal isolates under laboratory conditions.

Turmeric rhizomes were processed, extracted using suitable solvents, and tested at graded concentrations. Antifungal activity was determined by measuring growth inhibition through diffusion-based and dilution techniques. The extent of fungal suppression was recorded and compared with a standard antifungal agent.

A gradual increase in inhibitory activity was observed with increasing extract concentration. Differences in susceptibility among the fungal species were evident. The antifungal effect may be associated with naturally occurring phytochemicals present in turmeric. These findings indicate that Curcuma longa extract demonstrates measurable antifungal potential and warrants further pharmacological investigation.

Keywords: Curcuma Longa, Turmeric Rhizome, Antifungal Evaluation, Laboratory Isolates, Plant-Derived Compounds, Concentration Response

INTRODUCTION

Fungal infections represent a growing concern in both clinical and environmental settings. The reduced effectiveness of certain antifungal drugs due to resistance has limited treatment options. Moreover, prolonged administration of synthetic antifungal agents may lead to undesirable reactions, highlighting the importance of identifying safer alternatives.

Medicinal plants have long been recognized for their therapeutic value. Curcuma longa, commonly known as turmeric, has been traditionally used for its healing properties. The rhizome contains several biologically active constituents including phenolic compounds and essential oils. These substances are known to possess antimicrobial characteristics.

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Transparency: The authors affirm that this manuscript presents an honest, accurate, and transparent account of the study. All essential aspects have been included, and any deviations from the original study plan have been clearly explained. The writing process strictly adhered to established ethical standards.

Although turmeric has been studied for various pharmacological effects, detailed evaluation of its antifungal performance at different concentration levels against common fungal isolates remains necessary. Therefore, this study aimed to experimentally assess the growth inhibitory effect of Curcuma longa extract under controlled laboratory conditions.

MATERIALS AND METHODS

PLANT MATERIAL PROCESSING

Turmeric rhizomes were purchased from a local market in Chennai. The samples were cleaned thoroughly to eliminate surface contaminants and were allowed to dry in shade conditions for nearly two weeks. Once dried completely, the material was pulverized into fine powder using sterilized equipment and stored in sealed containers.

PREPARATION OF EXTRACT

A measured quantity of turmeric powder was immersed in an appropriate solvent and kept under continuous agitation for sufficient time to enable extraction of active components. The mixture was subsequently filtered, and the solvent was evaporated carefully to obtain a concentrated crude extract. The extract was preserved at low temperature until further experimentation.

PREPARATION OF TEST CONCENTRATIONS

The crude extract was reconstituted using sterile diluent to prepare multiple concentration levels, ensuring uniform mixing before antifungal testing.

FUNGAL ISOLATES

The antifungal assessment was conducted using laboratory-maintained cultures of:

- Aspergillus niger
- Candida albicans
- Fusarium oxysporum

Fresh fungal inoculum was prepared from actively growing cultures, and the density was standardized to maintain consistency in testing.

ANTIFUNGAL ASSAY

The antifungal potential of the extract was examined using standard in vitro evaluation techniques. Treated plates were incubated under suitable conditions, and the extent of growth inhibition was recorded. For quantitative confirmation, inhibitory concentrations were determined using dilution-based methods.

STATISTICAL EVALUATION

All experiments were carried out in replicates. The results were expressed as mean values with corresponding standard deviations. Statistical comparison among groups was performed to determine significant differences, considering $p < 0.05$ as statistically meaningful.

RESULTS

The extract demonstrated visible growth suppression against all tested fungal isolates. A direct relationship was observed between extract concentration and antifungal activity. Higher concentrations resulted in more pronounced inhibition.

Among the tested organisms, Candida albicans exhibited greater sensitivity, whereas Fusarium oxysporum showed comparatively lower inhibition. Aspergillus niger displayed moderate response.

Control comparisons confirmed that the solvent control did not produce inhibitory effects, while the standard antifungal drug showed stronger activity than the plant extract. Nevertheless, the turmeric extract displayed notable antifungal potential.

DISCUSSION

The experimental findings of this investigation confirm that Curcuma longa extract possesses antifungal properties when tested under laboratory conditions. The gradual increase in inhibition with increasing concentration suggests a dose-responsive effect of the extract.

The antifungal activity observed may be related to the presence of naturally occurring phytochemicals within turmeric rhizomes. These compounds may interfere with fungal growth processes, potentially affecting membrane stability or intracellular metabolic pathways. Variations in sensitivity among fungal species may be influenced by structural differences in their cellular composition.

Although the extract did not surpass the efficacy of the standard antifungal drug, it demonstrated measurable inhibitory potential. As a natural product containing multiple bioactive constituents, turmeric may offer advantages in terms of reduced toxicity and lower likelihood of resistance development.

It is important to note that this investigation was limited to in vitro evaluation. The biological behavior of the extract in living systems may differ due to absorption and metabolic factors. Further research involving isolation of active constituents and in vivo assessment is recommended.

CONCLUSION

The present study demonstrates that Curcuma longa rhizome extract exhibits concentration-dependent antifungal activity against selected laboratory fungal isolates. The findings indicate that higher concentrations produce stronger inhibitory effects.

The results support the potential use of turmeric as a natural source for antifungal development. Future investigations should focus on purification of active compounds and evaluation of their therapeutic applications.

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REFERENCES

Aggarwal, B. B., Sundaram, C., Malani, N., and Ichikawa, H. (2007). Curcumin: The Indian Solid Gold. Advances in Experimental Medicine and Biology, 595, 1–75. https://doi.org/10.1007/978-0-387-46401-5_1

Gupta, S. C., Patchva, S., and Aggarwal, B. B. (2013). Therapeutic Roles of Curcumin: Lessons Learned from Clinical Trials. AAPS Journal, 15(1), 195–218. https://doi.org/10.1208/s12248-012-9432-8

Jayaprakasha, G. K., Rao, L. J. M., and Sakariah, K. K. (2005). Chemistry and Biological Activities of Curcuma Longa. Trends in Food Science and Technology, 16(12), 533–548. https://doi.org/10.1016/j.tifs.2005.08.006

Moghadamtousi, S. Z., Kadir, H. A., Hassandarvish, P., Tajik, H., Abubakar, S., and Zandi, K. (2014). A Review on Antibacterial, Antiviral, and Antifungal Activity of Curcumin. BioMed Research International, 2014, Article 186864. https://doi.org/10.1155/2014/186864

Prasad, S., Gupta, S. C., and Tyagi, A. K. (2014). Curcumin, a Component of Golden Spice: From Bedside to Bench and Back. Biotechnology Advances, 32(6), 1053–1064. https://doi.org/10.1016/j.biotechadv.2014.04.004

Singh, G., Kapoor, I. P. S., Singh, P., de Heluani, C. S., de Lampasona, M. P., and Catalán, C. A. N. (2010). Chemistry, Antioxidant, and Antimicrobial Investigations on Essential Oil and Oleoresins of Curcuma Longa. Food and Chemical Toxicology, 48(4), 1026–1031. https://doi.org/10.1016/j.fct.2010.01.015