

## ANTIFUNGAL ACTIVITIES OF TRADITIONAL MEDICINAL PLANT EXTRACTS - A PRELIMINARY SURVEY

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The purpose of this investigation was to establish the antifungal activities of ethanolic extract of nine medicinal plants against *Aspergillus flavus*, *A. terreus* and *Mucor* species. All the extracts in different concentrations exhibited good fungicidal properties.

**Keywords:** Antifungal activity; Ethanol extracts; Medicinal plants.

Traditional medicine is an important source of potentially useful new compounds for the development of chemotherapeutic agents<sup>1</sup>. The first step towards this goal is the screening of plants used in popular medicine. Thus, antimicrobial research is geared towards the discovery and development of novel antibacterial and antifungal agents. Because of the side effects and the resistance that pathogenic micro organisms build against antibiotics, much recent attention has been paid to extracts and biologically active compounds isolated from plant species used in herbal medicine<sup>2</sup>. Plant based antimicrobials represent a vast untapped source for medicines and further exploration of plant, antimicrobials need to occur. Antimicrobials of plant origin have enormous therapeutic potential. They are effective in the treatment of infectious diseases while simultaneously mitigating many of the side effects that are often associated with synthetic antimicrobials<sup>3</sup>. Hence, the present study was carried out to investigate antifungal activities of ethanolic extracts of nine medicinal plants.

**Source of fungi :** The fungi used in this study are *Aspergillus flavus*, *A. terreus* and *Mucor* sp. They were obtained from Microbial Type Culture Collection (MTCC), IMTECH, Chandigarh and cultures were maintained on Sabouraud Dextrose Agar (SDA) plates for the further use.

**Extract preparation :** The method was followed as per Kumar and Prasad<sup>4</sup> with slight alterations. Fresh, healthy plant parts such as *Coleus aromaticus* (leaves), *Euphorbia tirucalli* (stem), *Trigonella foenum-graecum* (leaves), *Curcuma longa* (rhizome), *Aloe vera* (aerial parts), *Allium sativum* (stem), *Zingiber officinale* (rhizome), *Centella asiatica* (leaves) and *Solanum trilobatum* (leaves) were collected and processed for the study. Ten grams of each plant material was weighed and surface sterilized with 0.1% Mercuric chloride and washed 3 times with distilled water. Then the material was grinded in pestle and mortar with 50% Ethanol. The extracts were filtered using

Whatman No.1 filter paper and then centrifuged at 5000rpm for 5 minutes and finally evaporated. The residue was collected and it was made up to 40ml using distilled water. Further the extract was diluted to 25%, 50%, 75% and 100% concentrations.

**Antifungal assay:** About 15ml of SDA medium with 5ml of extract of different concentrations was poured into each sterilized petridishes. A set of three plates (replicates) was used in each concentration of extract and test organisms. The plates were gently shaken for the thorough mixing of the medium and the extract. After solidification of the medium, the test fungi were aseptically inoculated at the centre of the plate. From the 4th day onwards the fungal growth was observed in various concentrations of extracts and control. At the end of 10th day, results were recorded and tabulated.

Ethanolic extracts of nine traditional medicinal plants were screened for their antifungal activity against the fungal pathogens namely *Aspergillus flavus*, *A. terreus* and *Mucor* species were given in the table 1.

Among these extracts *E. tirucalli* and *C. longa* exhibited significant antifungal activity against *A. flavus* whereas other plant extracts found to be less active. But in case of *T. foenum-graecum*, *C. longa*, *A. vera*, *C. asiatica* and *S. trilobatum*, they produced maximum growth inhibition of *A. terreus*. All the other extracts showed minimum inhibitory activity against the test fungus. Similarly Satya *et al.*<sup>5</sup> has proved that alcoholic extracts of *Memecylon umbellatum* showed slight antifungal activity including *A. flavus*. Abubacker and Ramanathan<sup>6</sup> studied that the effect of *Euphorbia splendens* and *Leonotis nepetaefolia* extracts showed the maximum inhibitory activity against the *Aspergillus* species on varying concentrations of the extracts. Natarajan and Francis Xavier<sup>7</sup> reported that the antifungal activity of ethanol and chloroform extracts from *Tinospora cordifolia*, showed good growth inhibition of *A. niger* and *A. flavus*. Like wise Alade and Irobi<sup>8</sup> who showed that

**Table 1.** Antifungal activities of ethanolic extracts of traditional medicinal plants.

S.No	Name of the plant	Concentration of extract (%)	Growth inhibition <i>A. flavus</i>	<i>A. terreus</i>	<i>Mucor sp.</i>
1.	<i>Coleus aromaticus</i>	Control	++++	++++	++++
		25	+++	+++	++
		50	++	++	+
		75	+	+	-
		100	+	-	-
2.	<i>Euphorbia tirucalli</i>	Control	++++	++++	++++
		25	++	+++	+++
		50	++	++	+
		75	-	+	-
		100	-	-	-
3.	<i>Trigonella foenum-graecum</i>	Control	++++	++++	++++
		25	+++	++	+++
		50	++	-	++
		75	+	-	-
		100	+	-	-
4.	<i>Curcuma longa</i>	Control	++++	++++	++++
		25	+++	+	+
		50	+	-	+
		75	-	-	-
		100	-	-	-
5.	<i>Aloe vera</i>	Control	++++	++++	++++
		25	+++	++	++++
		50	+++	-	+++
		75	++	-	+++
		100	-	-	++
6.	<i>Allium sativum</i>	Control	++++	++++	++++
		25	++++	++	++
		50	+++	+	-
		75	++	-	-
		100	++	-	-
7.	<i>Zingiber officinale</i>	Control	++++	++++	++++
		25	+++	++	++
		50	++	+	-
		75	+	-	-
		100	-	-	-
8.	<i>Centella asiatica</i>	Control	++++	++++	++++
		25	++++	++	++
		50	+++	-	-
		75	++	-	-
		100	+	-	-
9.	<i>Solanum trilobatum</i>	Control	++++	++++	++++
		25	+++	++	++
		50	+++	-	-
		75	++	-	-
		100	-	-	-

++++ - maximum growth

+++ - 25% growth inhibition

++ - 50% growth inhibition

+ - 75% growth inhibition

- - 100% growth inhibition  
(or) no growth

the alcoholic extracts of *Acalypha wilkesiana* has antifungal activity against *A. flavus*.

In contrast, *C. longa* was found to be more effective against *Mucor* sp. by inhibiting the growth even at 25% concentration onwards, which is followed by *A. sativum*, *Z. officinale*, *C. asiatica* and *S. trilobatum* extracts. The extract from *A. vera* showed poor response against the test fungus. Irobi and Adedayo<sup>9</sup> reported that extracts of *Hyphaene thebaica*, was found to produce significant antifungal activity of *Mucor* sp. at a concentration between 3.1 to 25% of the extract.

The present and preliminary investigation was tested out *in vitro* screening of ethanolic extracts of nine medicinal plants against the growth of three pathogenic fungi. However, this study recommends that further phytochemical analysis of these medicinal plants for the role of active compounds used to cure diseases.

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