

BIOLOGICAL CONTROL OF PATHOGENIC FUNGI ISOLATED FROM EAR INFECTIONS (OTOMYCOSIS) *IN VITRO*

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In this work an attempt has been made to access the ability of antagonistic fungi on some pathogenic fungi isolated from ear infections (otomycosis) in-vitro. Three different species of pathogenic fungi viz. *Aspergillus niger*, *A. fumigatus* and *Candida albicans*. Three antagonistic fungi viz. *Trichoderma viride*, *T. hamatum* and *Gliocladium sp.* and their activity resulted in the suppression of pathogenic fungi. The percentage inhibition of growth was found to be different for all the test fungi. In these investigations it is found that *T. hamatum* over all showed an excellent suppression of *A. niger*, *A. fumigatus* and *C. albicans* producing an inhibition of growth 72.2%, 71.1% and 94.4% respectively. All three antagonistic fungi were found excellent inhibitor for *C. albicans*, where growth inhibition was reported over 92.2%, *T. viride* and *T. hamatum* showed 67.7% and 72.2% inhibition of growth in case of *A. niger* and 70%, 71.1% inhibition respectively in case of *A. fumigatus*. In contrast *Gliocladium sp.* was found less effective against *A. niger* and *A. fumigatus* producing only 61.1% and 55.5% growth inhibition.

Keywords : Antagonism; Otomycosis; Pathogenic fungi.

The use of one biological agent to suppress another is a strategy which receives periodic attention. The microbial antagonism that is seen in biological control of fungal pathogens is broadly based on the categories of competition, parasitism and antibiosis. All of these mechanism may operate together or independently and their activities can result in suppression of microbial disease.

A little work has been done on biological control of human pathogenic fungi specially on otomycosis. Therefore, the present study was carried out employing a "Dual culture test" method¹. Fungi such as *Trichoderma viride*, *T. hamatum* and *Gliocladium sp* were tested for their antagonistic interaction against three pathogenic fungi viz. *Aspergillus niger*, *A. fumigatus* and *C. albicans*.

The isolates of pathogenic and antagonistic fungi were grown in petridishes. In this study, the agar discs of 3mm. diameter size were cut from the margins of three days old vigorously growing cultures of antagonistic and test fungi and were inoculated 3 cm apart in triplicate in petridishes containing 15 mlzzzz each of PDA medium and inoculated for 5 days at 28°C. Controls were also maintained along with them. The interactions between test fungi and antagonistic fungi were assayed using a key based on the observations² and

categorized in to five separate modes of interaction of colony growth.

Grade A = Homogenous; B = Overgrowth
C = Intermingling growth,
D = Checking of growth at line of contact; E = Aversion.

Interaction between the two fungal colonies was examined with the help of microscope. The comparisons were made with control and percent inhibition of fungi was calculated by the following formula.
Percent Inhibitor ((I) = $\frac{C-T}{C} \times 100$

C = Growth in control; T = Growth in treatment (mm); I = Inhibition of fungal growth.

In the present study it is found that all three antagonistic fungi (*T. viride*, *T. hamatum* and *Gliocladium sp.*) showed more than 55% inhibition of growth against all test fungi. Maximum inhibition of mycelial growth of *C. albicans* (94.4%) was obtained with *T. hamatum* 93.3% by *T. viride* and 92.2% by *Gliocladium sp.*

T. hamatum showed maximum inhibition of mycelial growth of *C. albicans* (94.4%). *A. niger* (72.2%) and *A. fumigatus* (71.1%) as compared to *T. viride* and *Gliocladium sp.* It was also observed that *T. hamatum* showed Grade B antagonism against *C. albicans* and Grade D against

Table 1. Antagonistic behaviour of *Trichoderma* and *Gliocladium* against the Pathogenic fungi.

Antagonistic Fungi	Pathogenic Fungi	Growth of Pathogenic Fungi		Percent Inhibition (%)	Grade of antagonism
		In Control	In Treatment		
<i>Trichoderma viride</i>	<i>Aspergillus niger</i>	9.0	2.9	67.7	D
	<i>A. fumigatus</i>	9.0	2.7	70.0	B
	<i>C. albicans</i>	9.0	0.6	93.3	D
<i>T. hamatum</i>	<i>A. niger</i>	9.0	2.5	72.2	D
	<i>A. fumigatus</i>	9.0	2.6	71.1	D
	<i>C. albicans</i>	9.0	0.5	94.4	B
<i>Gliocladium sp.</i>	<i>A. niger</i>	9.0	3.5	61.1	D
	<i>A. fumigatus</i>	9.0	4.0	55.5	D
	<i>C. albicans</i>	9.0	0.7	92.2	B

B = Overgrowth, D = Checking of Growth at line of contact

Aspergillus sp. T. viride and *Gliocladium sp.* also showed overgrowth (Grade B) against *C. albicans* and checked the growth (Grade D) of *Aspergillus sp.*

In the dual culture study, three known antagonistic fungi viz. *T. hamatum*, *T. viride* and *Gliocladium sp.* have been employed to the antagonism with test fungi of otomycosis. It is apparent from the results (Table 1) that all the three antagonistic fungi against *C. albicans* and *Aspergillus sp.*, *Trichoderma hamatum* showed a distinct antagonism of Grade B against *C. albicans* and Grade D against *Aspergillus sp.* *Trichoderma viride* and *Gliocladium sp.* also showed grade D type antagonism against *C. albicans* and *Aspergillus sp.* The above observations have also been supported by many authors³⁻⁴.

The mycelial growth and sporulation of *A. niger*, *A. fumigatus* was effectively inhibited by *T. hamatum* showing Grade D Antagonism by checking the growth of test fungi at the line of contact. *Gliocladium sp.* was least antagonistic to all the *Aspergillus sp.* which is used as test fungi. These observations have been supported by many workers⁵⁻⁶.

The results showed the occurrence of two types of antagonistic properties viz.

Grade D, checking of growth at line of contact and Grade B, overgrowth exhibited by the antagonistic fungi against the test fungi. All the tested antagonists minimized the growth of pathogenic fungi.

In this investigation it is found that *T. hamatum* over all showed an excellent suppression of pathogenic fungi. (*A. niger*, *A. fumigatus* and *C. albicans*). In contrast *Gliocladium sp.* was found less effective against *Aspergillus sp.* and *C. albicans*.

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