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Bactericidal Activity of Fungal Compounds

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The fungal members are not only treacherous plants and animals, but also damages the other cells (Bacterial) by exhibiting the exploitive activity. The antagonistic activities of fungal compounds on *Escherichia coli* and *Lactobacillus* have reported in this progression. *Aspergillus* species were isolated from decayed fruit sample and inoculate on Czapek media and the fungal compounds extracted. The antimicrobial sensitivity is processed by placing fungal compounds on *E.coli* and *Lactobacillus* cultures by using well puncher method. The inhibition zone is observed with different concentration after one day period of incubation, inhibitory zones obtained with different diameters in length.

Key words: Fungal compounds, Antagonistic activity, Czapek liquid media, Muller Hilton agar, *E.coli* and *Lactobacillus.*

Modern microbiology began a prolific adventure since the beginning of the twentieth century associated with the discovery and development of antibiotics. Many antifungal, antibacterial, insecticidal products which are now used in crop protection have been obtained from microorganisms, especially fungi. Fungal compounds or substances have definite activities capable of being lethal to particular groups of life forms, fungi serves as biocontrol organisms against bacteria (Trigos *et al.*, 2005).

The fungal compounds such as mycotoxins, fungal enzymes and antibiotics show the suppressing activity to wards bacteria. Some of fungal compounds (aflatoxins) have ability to bind the dietary strains of bacteria like lactobacillus and bifidobacteria, to contaminate the dietary products (Peltonen *et al.*, 2001). Toxigenic fungal growth and aflatoxin contamination may occur in various food commodities (Wood *et al.*, 1989). When these aflatoxin contaminated food or feed is consumed, the toxins are metabolized and excreted in to the tissues, biological fluids, and milk of lactating animals, including breast milk (Zarba *et al.*, 1992). When ever the fungal compound binds to the bacterial cell wall forms bacteria/ fungal complexes (El-Nezami *et al.,* 1998). In the present content we have extended the detrimental studies to the strains of *E. coli* and *Lactobacillus*. The main objective is to study the inhibitory concentrations of fungal compounds, which disrupts the growth of the bacterial cell.

MATERIAL AND METHODS

The fungal species is isolated from fruit samples completely rotten, placed on fungal media Potato dextrose agar media, prepared 400 gm of peeled potatoes, 20g of agar–agar (Fisher

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Scientific ltd,Mumbai,07/2009), 20g of dextrose (SD fine Chem ltd,07/2008) IN 500ml distilled water (Biomedicals ltd, Kukatpally, 08/2009). Growth were obtained after 5 days of incubation at 25C, the fungal strain is identified by wet mount staining using lacto phenol blue, *Aspergillus* species were recognized, The fungal isolates be inoculated in czapek liquid media comprising of yeast extract 7g(Sd fineChem ltd,07/2008), sucrose 200g (Universal laboratories ltd, Mumbai, 2008) $NaNO_3$-3g (Finarchemltd,10/2007), K_2HPO_4 -1g (Finarchemltd, 10/2007), KCl 0.5g (Finarchemltd, 10/2007), $FeSO_4.7H_20$-0.01g, $MgSO_4.7H_2O$ 0.5g (SD Fine Chem ltd,07/2008), in 1 liter distilled water (Fabbri *et al.,* 1983). Later on 5-6 of incubation period the media colour changed light yellow to red, using whatts man filter paper the fungal compound is separated and these compounds free from fungal mycelium (Fig. 1 & 2). The *E. coli* strain is obtained from NCIM Pune, Strain No 2810 and *Lactobacillus* strain is obtained from NCIM Pune, Strain No 2372, these strains were grown in peptone water for one day period of incubation, later the motility test and biochemical tests were conducted for both the bacteria. These strains has given positive results

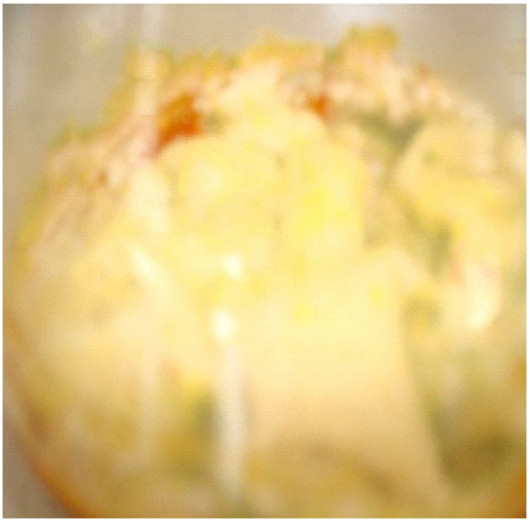

Fig. 1. Fungal mat formation on liquid media (*Aspergillus* sps)

Fig. 2. Fungal compound production on Czapek liquid media

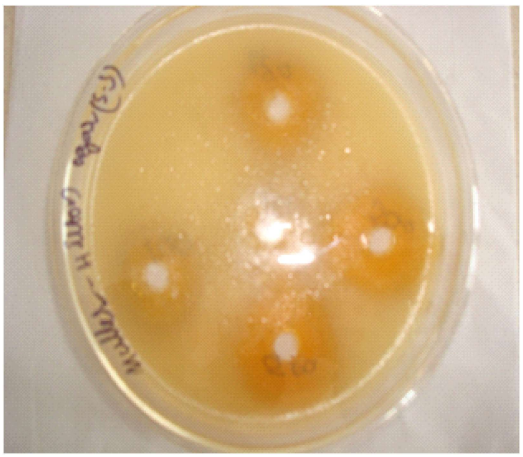

Fig. 3. Bactericidal activity of fungal compound on *Escherichia coli*

for all the tests, afterward the strains was extracted from the peptone water cultured on Muller Hilton agar media (Himedia ltd, 2009) by sterilized swab. Different concentrations of fungal compounds are poured on the media using well puncher method, after pouring the media is incubated for 12-24 hrs at 27°C. The minimum inhibitory concentration (MIC) is measured, a clear inhibitory zone is observed on Muller Hilton Agar media (Reddy *et al*., 2003).

RESULTS AND DISCUSSION

The inhibition zone measurement reveals on *E.coli* culture

At the 50 mm concentration clear zone is not observed, At 100 mm concentration zone is produced. At 150 mm concentration a clear zone is produced with 2cm, At 200 mm concentration 2.5 cm of zone is observed and 2.8 cm of zone is observed at 250 mm concentration (Fig. 3). The inhibition zone measurements on Lactobacillus culture 1 cm of zone is observed at 50mm concentration, 100mm, 150mm, 200 mm and 250 mm concentrations of compound showed 1 cm, 1.2 cm, 1.5 cm and 2.2 cm zone of inhibition respectively.

A mixture of steps were involved in the process of bactericidal activity of fungal compounds on entero bactereacea member i.e. Escherichia coli, taxonomically it is gram negative bacteria. When the compound sample poured on E.coli culture, it binds to the primary cell wall of bacteria, where it creates structural changes in bacteria by lysing the cell wall, after that it cleaves the Trans peptidase enzyme, which attaches the peptide bridge to sugars (NAM, NAG), in a while it disturbs the protein configuration in the meantime it denatures the protein, then leads to cell death initially explained by Ueno *et al.,* 1969. Experimentally it is proved by the Zone of inhibition test. The similar synergistic effects also observed on lactobacillus strain discussed by Haskard *et al.*, 2000.

CONCLUSION

The bactericidal effect of compounds reflects the competence of toxin to exterminate the pathogenic organism, on behalf of this *E.coli* and *lactobacillus* strain collected. The inhibition zones were calculated to scrutinize the aggressive movement of fungal compounds on bacterial cell. The entire observation reveals that fungal compounds are not only perfidious to human, it also generates toxic effects to various organisms and it also has ability to kill the normal flora. The further work is processed to purify the fungal compounds, to classify the type of substance found (fungal enzymes or antibiotics or mycotoxins) in the compounds.

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