Fungal Viruses: A Promising Prospective Field in the Area of Virology

Sakshi Sharma, Sharmita Gupta

***Abstract*— Virus Like Particles of different shapes mainly isometric and rod shaped were observed in different genera of fungi. VLP's from *Chrysosporium pseudomerdarium*was eliminated through immediate heat treatment and from *Candida albicans* through cycloheximide at 50 ug/ml concentration. Extraction of nucleic acid directly from mycelium gave band in both the isolates through AGE. Nature of nucleic acid was ascertained by RNAse and DNAse treatment. High salt and DNAse treatment did not reveal any band in any of the isolates. Presence of band in low salt (0.01 SSC) RNAse test of *C. pseudomerdarium* led to conclusion that nucleic acid can be dsRNA**

***Index Terms*— Virus, VLP's, Nature of nucleic**

I. INTRODUCTION

Fungal viruses are viruses which infect fungi. They play an important role in the field of virology. The majority of fungal viruses are present in plant pathogenic fungi but few reports arefound in human pathogenic fungi. The literature survey on presence of fungal viruses in human pathogenic is still in its infancyespecially in Indian context. (1) reported viruses associated with a die-back disease of cultivated mushrooms. A few mycoviruses possess single-stranded RNA (ssRNA) or double-stranded DNA (dsDNA) genomes; however the vast majority of mycoviruses have isometric particles of 25– 50 nm in diameter and contain an undivided or segmented double-stranded RNA (dsRNA) genome. Many fungi are pathogenic to higher plants, and viruses are associated with several species of fungi. The pathogenicity of these fungi may be influenced by virus.

II. METHODOLOGY

In the present study, negative staining and electron microscopy positively indexed 17 pathogenic fungal cultures, out of 25 pathogenic fungal cultures for the presence of virus like particles (VLP's). Isometric (short, medium and large ranging from 20, 33-40 and 66-70 nm respectively) VLP's were most commonly associated with positively indexed fungal cultures of *Chrysosporium pseudomerdarium, C. xerophillum, C. keratinophillum, C, anamorph* of , *C. vallenaria, C. geophillum, Microsporum fulvum, Neurospora crassa, Candida albicans, Trichophyton mentagrophyte, Aspergillus. fumigatus, A. candidus, Geomycespannorum*. Both Rods andisometric forms were found in 4 isolates of *Fusarium.*

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III. RESULTS

Chrysosporium pseudomerdarium(Fig. 1) and *Candida albicans*(Fig. 2) were selected for further studies.

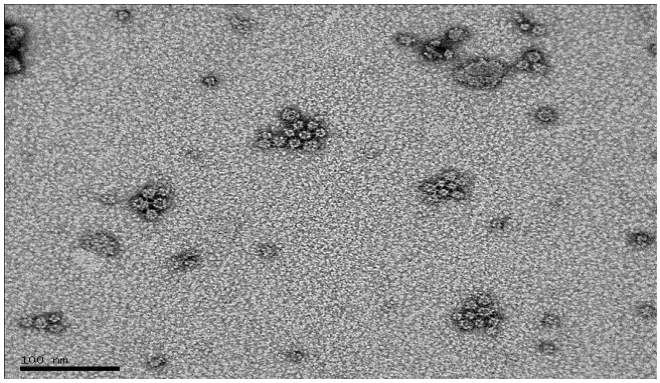

*Fig. 1.*E.M. of *Chrysosporium pseudomerdarium*

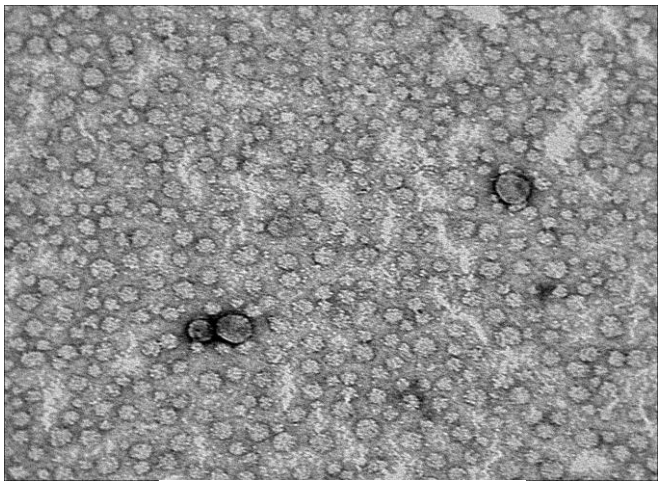

Fig. 2. E.M. of *Candida albicans*

In *C. pseudomerdarium,* VLP's elimination was attempted through hyphal tipping and thermotherapy. Immediate heat treatment was successful in eliminating VLP's from *C. pseudomerdarium*. Similarly,*C. albicans* was treated with cycloheximide at 10, 20, 50, 100, 200 ug/ml concentration.VLP's were eliminated at 50 ug/ml. Elimination of VLP's from both the fungal isolates was confirmed by AGE and E.M. Partial purification of VLP's of *C. pseudomerdarium*and*C. albicans* was

done. Extraction of nucleic acid directly from mycelium gave band in both the isolates through AGE (Fig.3) and (Fig.4).

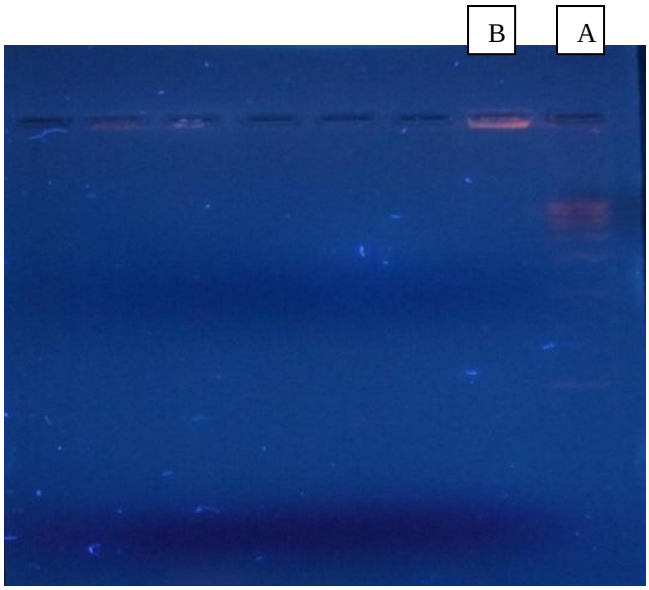

Fig.3 Agarose gel electrophoresis for the nucleic acid extraction directly from mycelium of *Chrysosporium* pseudomerdarium

(A) DNA marker
(B) Band showing nucleic acid extraction directly from mycelium of *Chrysosporiumpseudomerdarium*.

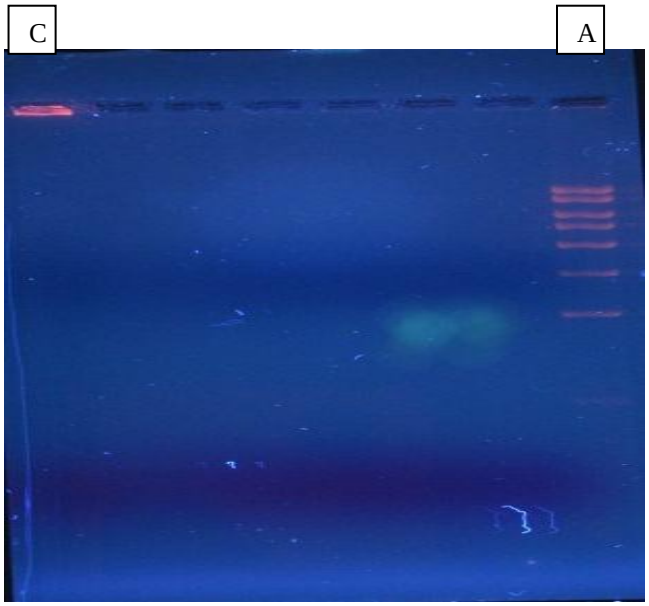

Fig.4 Agarose gel electrophoresis for the nucleic acid extraction directly from *Candida albicans*

(A) DNA marker
(C) Band showing nucleic acid extraction directly from mycelium of *Candida albicans*.

Nature of nucleic acid was ascertained by RNAse and DNAse treatment. High salt and DNAse treatment did not reveal any band in any of the isolates. Presence of band in low salt (0.01 SSC) RNAse test of *C. pseudomerdarium* led to conclusion that nucleic acid can be dsRNA.

IV. DISCUSSION

Our literature survey did not reveal any report on occurrence of VLP's in *Chrysosporium pseudomerdarium.* This is the first report (Sharma S. et al., 2011). VLP's were of isometric types (both medium and small i.e. 20 nm and 33-40 nm). However, large isometric VLP's 50-60 nm have been reported by (Kozlova, T. M., 1973) in *Candida utilis*. Also, in *Candida tropicalis* unusually large isometric particles (100-170 nm) were reported by (Nesterova, G.F et al., 1973).Fekete Csaba et al., 1995 reported that subculturing many times could not remove dsRNA from *Fusarium poae*. Mostly the VLP's characterized were found to be dsRNA. (Karol S. Ellas and Peter J. Cotty 1996); (Hostis L. Brigitte et al., 1984) and (Jom-in, S. and Akarapisan, 2009) reported dsRNA in *Aspergillus* sp, *Endothia parasitica, Trichoderma* sp.respectively.

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