

Mycoviruses infecting human pathogenic fungus.

Sakshi Sharma and Sharmita Gupta
Virology Lab, Department of Botany, Faculty of Science,
Dayalbagh Educational Institute, Dayalbagh, Agra – 282005, INDIA.

Introduction

- *Candida albicans* is widespread yeast.
- The infections can be short lived, superficial skin irritations to devastating, fatal systemic diseases.
- The confirmation of viruses in fungi, commonly called Mycoviruses or VLP's.
- Their possible effects on the level of toxins and metabolites produced by fungi enhanced their significance in environmental health research.
- Viruses of higher fungi were first suspected in 1950 when Sinden and Hauser reported a degenerative disease of mushroom.
- The isometric mycoviruses are classified into four families including *Totiviridae* (*Totivirus*), *Partitiviridae* (*Partitivirus*), *Chrysoviridae* (*Chrysovirus*) and *Reoviridae* (*Mycoreovirus*).
- *Candida albicans* is a popularly known fungal organism that can cause several fungal infections in humans.
- *Candida* colonizes the mucosal surfaces of all humans soon after birth and the risk of endogenous infection is ever present.
- *C. albicans* continues to be important commensal and a constituent of the normal gut flora comprising microorganisms that live in the mouth and gastrointestinal tract.
- *C. albicans* lives in 80% of the human population without causing harmful effects, although overgrowth of the fungus results in candidiasis.
- Lisa H. Amir *et al.*, (2013) suggested that the CASTLE (*Candida* and *Staphylococcus* Transmission: Longitudinal Evaluation) study will investigate the micro-organisms involved in the development of mastitis and "breast thrush" among breastfeeding women.

References

- Lisa H Amir, Susan M Donath, Suzanne M Garland, Sepehr N Tabrizi, Catherine M Bennett, Meabh Cullinane, Matthew S Payne (2013). Does *Candida* and/or *Staphylococcus* play a role in nipple and breast pain in lactation? A cohort study in Melbourne, Australia. *BMJ Open* 2013;3:e002351 doi:10.1136/bmjopen-2012-002351. Volume 3, Issue 3.

Objectives

The objective of the proposed work is to be examined:

- 1) Screening and indexing of *Candida albicans* for the presence of virus like particles.
- 2) Identification of VLPs through transmission electron microscopy.
- 3) Elimination of VLPs from *Candida albicans*.
- 4) Purification and characterization of VLPs from *Candida albicans* through:
Clarification
Concentration
Extraction
Ascertaining nature of nucleic acid
- 5) Extraction and purification of protein.

Methodology

Harvest and Disruption of mycelial mats

Centrifugation and Identification through TEM

Elimination of VLPs from cycloheximide treatment

Extraction of nucleic acids and purification of dsRNA by cellulose CF11 chromatography

Extraction and characterization of proteins by SDS PAGE.

Conclusions

1. Absorption spectra of crude extracts confirmed the nucleoprotein nature of VLP in *Candida albicans*.
2. Through TEM and CF 11 chromatography, confirmed the nature of virus of *Candida albicans*.
3. It is evidenced that nature of nucleic acid is dsRNA and 10 kb molecular weight.
4. Viral protein sample extracted from nucleoprotein extract is found to be 42 kDa.
5. Occurrence of virus in *Candida albicans* was found to be the first report from India.
6. Presence of virus in this important human pathogenic fungus can be a matter of interest.

Results & Discussion

Screening studies

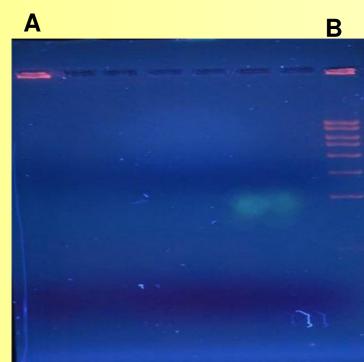


Candida albicans in a liquid medium



Candida albicans on SDA medium

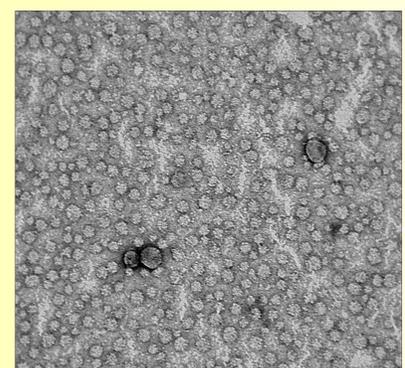
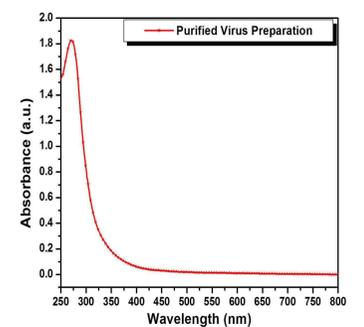
Characterization of Adsorbent



Agarose gel electrophoresis for the purified virus sample

- (A) Band showing nucleic acid in *Candida albicans*.
(B) DNA ladder

UV Vis spectrophotometric analysis studies



TEM analysis of *Candida albicans* showing Virus particles.

Acknowledgement

- Authors acknowledge DEI – for the facility provided,
- Dr. Jasvir Singh, Indian Agricultural Research Institute for the Transmission Electron Microscopy analysis.