

PROJECT PROFILE

Title of the Project: Identification of Broad Spectrum Antifungal Proteins from Elite Medicinal Plants for Control of Plant Pathogens

Principle Investigators: Dr. Modhumita Ghosh

Co Investigators: Dr. K. Gurumurthi (till August 2004)

Duration: 2003 – 2007

Objectives:

1. Identification and purification of antifungal protein(s) from *Acorus calamus*, *Rouwolfia tetraphylla*, *Withania somnifera* and *Piper longum*
2. Determination of the efficacy of the antifungal proteins purified against *R. solani*, *M. phaseolina*, *A. favus*, *F. moniliforme* and *T. vesiculosum*.
3. Characterization of the most potent antifungal protein

Funding Agency: Department of Biotechnology, Govt. of India

Summary

- Purified a 32 KDa antifungal protein from leaves of *Acorus calamus* with pI value of 7.93, pH optima at 5.6 and temperature optima at 36°C. The protein was localized in the epidermal layers and xylem lumen of the leaf tissues. The protein was toxic to hyphal extension of potent phytopathogens like *T. vesiculosum*, *M. phaseolina* and *F. moniliforme*.
- The protein was characterized by peptide sequencing using LC MS MS. It showed 37% sequence homology with putative – bacterial induced Peroxidase from *Oryza sativa*. The conserved functional domain of the enzyme was also identified and showed 66.7% homology with secretory peroxidase domain and 57.8% homology to heme-dependent peroxidases.
- An acidic lectin with 30 KDa size and pI value of 4.0 was purified from leaves of *Withania somnifera*. It was determined to be highly toxic to hyphal growth of major pathogens. The SEM studies revealed a significant distortion of protein treated hypha

with distinct cell adhesion. It showed a similarity with concanavalin A like lectin from *Canavalia virosa* and also harbored the conserved domain showing similarity to legume lectin.

- Purified a 35 KDa peroxidase from leaves of *Andrographis paniculata* with pI value of 6.0. However, the enzyme did not show any distinct antifungal activity