Chapter 7

# Conclusions

## Conclusions

Mitogen activated proteins (MAPK) are involved in transduction of extracellular signals involved in the various growth and differentiation processes. Yeast pheromone response pathway also known as mating pathway is a well understood MAPK pathway. This pathway is initiated when a mating pheromone binds to a receptor and activates a cascade of downstream kinases including Fus3. PMK1 is a homolog of *S. cerevisiae* FUS3 and has been reported to be involved in regulation of appressorium development and plant infection. Fus3 regulates the mating process by phosphorylating downstream proteins including Ste12 and Far1 in yeast. Gene deletion mutants of MST12, homolog of the yeast Ste12 in *M. oryzae*, are non-pathogenic. FAR1was originally identified in a mutant screening for growth of *S. cerevisiae* cells in presence of mating pheromone. It causes inhibition of cdc28 activity in yeast, leading to cell cycle arrest and defect in mating. This protein has not yet been identified in filamentous fungi, therefore we tried to functionally characterize this protein and investigate its possible role in infection and development of *M. oryzae*. Our results suggest that Far1 homolog in *M. oryzae*, MFAR1, complements mating defect in the yeast Far1 deletion mutant. *Δmfar1* shows decrease in conidiation, loss of female fertility and some other morphological defects. This protein is induced by the yeast pheromones, suggesting the inter-specific pheromone response between the two fungi. Overexpression of MFAR1 leads to decrease in the pathogenicity related development of *M. oryzae*. MFAR1 overexpression also leads to a drastic decrease in the expression of a putative cyclin MoCyb1 in the rice blast fungus indicating that downregulation of this cyclin can have direct correlation with the inhibition of appressorium formation. Functional characterization of this putative cyclin can open new avenues in understanding of the mechanism of fungal pathogenicity and development, as cyclins have already been reported to play a vital role in appressorium development.