

Oral Presentation

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## Filamentous fungi as cell factories for protein production

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Filamentous fungi have been used as sources of metabolites and enzymes for centuries. In the last few decades molecular genetic tools have enabled us to improve metabolite and protein production in these organisms. The use of gene-transfer systems and the development of efficient and versatile fungal expression and secretion vectors has allowed the generation of protein overproducing host strains. Also in the field of strain development for fungal metabolite production (e.g. beta-lactam antibiotics) and bioconversion processes (e.g. P450 based reactions) molecular genetic tools have resulted in significant improvements.

For the production of secreted proteins further improvements of the first generation strains have been obtained by rational strain design. The development of protease deficient host strains obtained by classical or molecular approaches has been very successful. The recent development of fungal High Throughput Screening approaches will allow further improved strain development in this area. For the secretion of proteins of non-fungal origin specific carrier-protein strategies have been developed.

In several cases strain design in combination with fermentation process development has resulted in achieving commercially relevant quantities of protein.

Also solid state fermentation strategies for filamentous fungi are being explored for protein production and as a source of new metabolites and enzyme activities. Given the complex nature of fungal solid state and submerged fermentation processes, due to the metabolic versatility and hyphal growth phenotype of these organisms, the

newly emerging 'genomics' technologies are ideally suited to reach a further understanding and subsequent improvement of these processes.