Developing fungal cells as factories





Molecular enzymology and fungal metabolic regulation form the core strengths of our research. An emerging approach to understand and exploit metabolic processes is metabolic / pathway engineering. This implies a targeted and purposeful manipulation of the capabilities of an organism. Our group is pursuing this broad research objective with the acidogenic metabolism of Aspergillus niger (A. niger) serving as the paradigm. Functional genomics of this industrial workhorse is another objective. Biochemical, molecular and genetic tools are being employed to understand and / or manipulate aspects of fungal carbon and nitrogen metabolism. This expertise, very poorly represented in India, is expected to provide research leadership to Indian industry in the field of fungal biotechnology. With extramural funding and industry interaction, indigenous tools for filamentous fungal genetic engineering have been put in place. One strong promoter for protein expression was developed and patented. Anticipation is that these efforts would lead to microbial strains with improved / desirable properties. Fungal strains with select gene deletions, insertions and expressing useful enzymes were designed and developed. For instance, a lactic acid producing A. niger was constructed.

The following technologies evolved from our current research interests and were patented:

- Novel recombinant protein expression system involving a strong, constitutive promoter of citrate synthase from *Aspergillus*
- Process for the production of lactic acid from Aspergillus niger
- Affinity resins for use in protein purification on the basis of anthraquinone dye-ligands

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