**In-situ removal of solid products during whole-cell biocatalysis**

**PhD-student:** Evelyn M. Buque-Taboada  
**Promotor:** Prof. Dr. Ir. Luuk A.M. van der Wielen, Prof. Dr. Ir. J.J. Heijnen  
**Supervisor:** Dr. Ir. Adrie J.J. Straathof  
**Institute:** Delft University of Technology, Department of Biotechnology, Bioseparation Technology section  
**Project term:** September 2001 – September 2004  
**Financed by:** MHO-USC-DUT Project in Chemical Engineering

**Description**

In-situ product crystallization was considered in this project, as most products that are produced by fermentation are solids, and many inhibit the fermentation or are degraded during fermentation. In-situ crystallization may directly provide the desired product (in already pure form) without the need for an auxiliary phase. The combination of fermentation and product crystallization could be a route to sustainable processes. If the crystals could be separated directly from the cells during fermentation, production costs might be reduced as:

- the number of unit operations is reduced,
- the amounts of solvent and waste streams are minimized, if not eliminated; and
- fed-batch fermentation might become more productive, either if high hold-ups of crystals in the medium are limiting the length of the process, or if crystallization reduces product inhibition and degradation, by lowering the extracellular product concentration.

We considered aerobic fed-batch operation, which is the usual fermentation operation, in our study of coupled fermentation-crystallization processes. The model microorganism was *Saccharomyces cerevisiae* and it was used for enantioselective reductions of precursors.

**Dissertation**

Publications from the dissertation