

## Main research achievements

The publication list contains 140 original publications in peer-reviewed journals, most of them in the following main areas:

- 1980th: *Physiological effects of CO<sub>2</sub>*. It was shown that CO<sub>2</sub> and anaesthetic gases inhibit the germination of *Bacillus* spores. This formed the basis for a hypothesis that the antimicrobial effect of CO<sub>2</sub>, which is used in food preservation, is due to interference with membrane fluidity. The susceptibility of several food spoilage microorganisms was studied. 9 original papers.
- 1980-90ths: *Enzyme electrodes* were developed for on-line glucose and penicillin monitoring in bioreactors. 12 original publications. Two patents (oxygen stabilised glucose electrode, and in situ sterilizable penicillin electrode) were granted and sold.
- 1990ths- *Production of recombinant proteins*, with emphasis on the proteolysis problem and process control. More than 30 original papers. Patent application on the TLFB-technique to suppress endotoxin release from *E. coli* sold to Novozymes Biopharma AB. This technique was also shown to be very useful for controlling viability and proteolysis in *Pichia* processes.

1990ths- *Physiological aspects of scale-up of bioprocesses (E. coli)*. I initiated and co-ordinated the EU-project Bioprocess Scale-up Strategy Based On Integration of Microbial Physiology and Fluid Dynamics (BIO4-CT95-0028). This work pioneered in demonstrating physiological stress responses induced by large-scale process conditions. Approx. 20 original publications are related to analysis and modelling of scale-up and physiological scale-up responses. It also brought me into the area of DNA and mRNA analysis.

- 2000- 2007 *Electric DNA-chips*. Through the co-ordination of the EU project Bioprocess chips (QLK3-CT-1999-00533) much of my research became focussed on analytical applications, using silicon based DNA chips for mRNA analysis in bioreactors. I used the experiences from this project to initiate the eBIOSENSE project (LSHB-CT-2004-512009), in which the focus was on analysis of pathogenic microorganisms in food. At KTH we specialised on analysis of EHEC and pathogenic *Bacillus cereus*. The publication list includes 8 original papers on electronic DNA chips.
- 2003- 2007 *Integrating downstream processing with Pichia fermentation*: Modification of the standard *Pichia* fermentation process enabled product recovery and purification in one single unit operation (expanded bed adsorption) connected on-line to the fermentor effluent. 8 original publications and one review were produced.

Download a publication list covering the above activities. (From the start page)

Some of the PhD thesis of my previous PhD students are also available for downloading.

In 2008 I retired from research activities and I continue now with developing teaching tools and textbooks.