Improve Product Yield and Productivity through Insilico Cells™

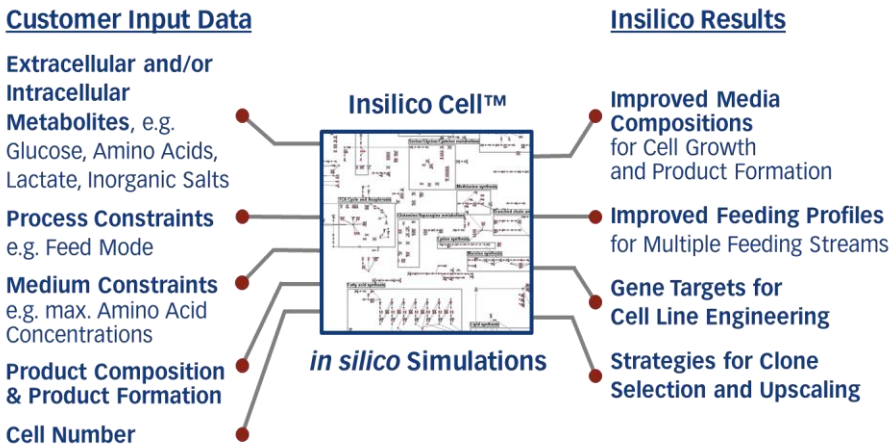
Insilico Biotechnology improves biotechnological production processes in two ways: (i) by optimising the producing organism and (ii) by optimising process conditions.

For the optimisation of the producing organism, Insilico offers an advanced cell line engineering strategy which can generate microbial strains as well as mammalian cell lines with enhanced product yield and productivity. Existing production strains are optimised by identifying multiple gene targets for enhancement or attenuation of expression. Furthermore, Insilico designs new cells from scratch which feature alternative biosynthesis pathways.

The optimisation of the process conditions aims at increasing product yield and titre, boosting cell growth, and/or reducing byproduct formation. For this purpose, Insilico designs optimised media and feeding strategies. In addition, Insilico helps its customers identify the most appropriate clone for large-scale fermentations.

Insilico's technology platform can be applied to a wide range of production hosts including, but not limited to, *Escherichia coli*, *Bacillus subtilis*, *Saccharomyces cerevisiae* and CHO cells. In case your organism of interest is not yet included in our repository of Insilico Cells™, a genome-based network model can be reconstructed *de novo* according to your specifications.

A thorough quantitative characterisation of your existing process provides the basis for Insilico's optimisation strategies, which cover multiple steps of process development.



Insilico predicts cellular phenotypes by using fermentation data, metabolite data, and genomic data.

Challenge

- Low Product Yield and/or Productivity
- High By-Product Formation
- Early Decrease of Viable Cells
- Limited Understanding of Complex Intracellular Processes
- Long Process Development Time

Solutions

- Customised Adaptation of Insilico Cells™
- Cell line engineering
- Design of optimised media and feeding strategies
- Development of strategies for clone selection and upscaling

Benefits

- Improved Product Yield and Productivity
- Reduced By-Product Formation
- Prolonged Cell Viability
- Enhanced Process Understanding
- Shortened Time to Market
- Reduced Development Risk
- New Know-How and IP

Contact

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Identification of Multiple Gene Targets

Insilico is able to identify and prioritise the most promising gene target combinations by automatic simulation of hundreds of thousands of different expression scenarios. For each target gene, Insilico provides recommendations stipulating whether it should be over-expressed, deleted or attenuated in expression and to which degree.

Media Design and Feeding Strategies

Insilico improves process performance by optimising feed media compositions and feeding strategies.
Based on metabolite data from your existing process, Insilico classifies significant process phases and aligns nutrient supply exactly with the true demand of your cells in each process phase by simulating and evaluating millions of feeding scenarios.

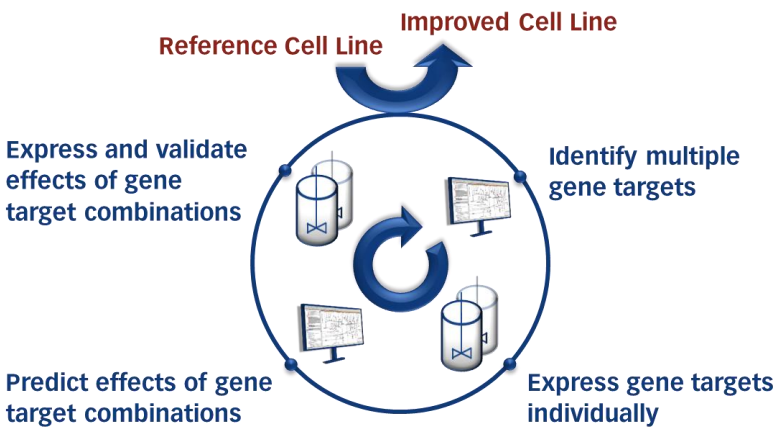
Design of Novel Metabolic Pathways

Insilico designs innovative synthesis routes for already existing biotechnological products as well as synthesis pathways for new bio-products.
Host metabolism is augmented *in silico* using our proprietary reaction database containing more than 8,000 enzymatic and non-enzymatic reactions from over 60 different organisms. The resulting "supernetworks" are screened on high performance computer clusters for novel biochemical pathway solutions leading to the desired product.

Clone Selection and Upscaling

Insilico makes an early selection of promising robust candidate clones for large-scale production possible by providing an extensive range of indicators characterising clone performance. These are based on fermentation data collected in scale-down cultivation systems and include time-resolved indicators not only for cell growth and product synthesis, but also for metabolic efficiency, intracellular fluxes and byproduct formation.
This method reduces the risk of carrying poor candidates for too long along the process development pipeline.

Insilico improves your process efficiency for example by **identifying multiple gene targets**. For this purpose, a cyclic optimisation process is applied, which consists of alternating steps of ***in silico* simulations**, and **implementation of gene modifications** as well as **testing of the respective clones** at the customer's site. Through this individual and combined implementation and validation of gene targets, **process development speed is increased** while **project risks are reduced**.



Insilico Biotechnology is a market-leading company providing solutions and software for the simulation of living cells. An interdisciplinary team of experts offers customised solutions for the efficient manufacturing of biotechnological products and for the testing of pharmaceuticals by using high-performance computing and Insilico's proprietary software. For world-leading companies from the chemical and pharmaceutical industries, Insilico's technology lowers time, risk and costs of development processes. Founded in 2001, Insilico is a privately held company based in Stuttgart, Germany.