

Strain improvement

- Long term know-how in Strain Improvement
 - **Classical approach**
 - 4000 mutations per day (UV or other mutagens)
 - Screening of mutations by robotic system
 - E.g. penicillin: increase of several percent per year
 - **Genetic modification**
 - Over 20 years of experience
 - Different host organisms (PlugBug™)
 - E.g. *E.coli* for heterologous enzyme production

Strain Improvement - Microorganisms

Filamentous fungi

- *Aspergillus niger*
- *Mortierella alpina*

Bacteria

- *Escherichia coli*
- *Bacillus sp.*
- *Propionibacterium sp.*
- *Streptomyces sp.*

Yeasts

- *Saccharomyces cerevisiae*
- *Kluyveromyces lactis*
- *Pichia ciferrii*
- *Phaffia rhodozyma*