

Panlabs Biologics



Strain Improvement &

Fermentation Technology

Your preferred partner has over 40 years' experience and reputation for providing integrated and quality contract services on strain improvement, biotransformation, fermentation process development and microbial NP library supply.

What Panlabs Biologics can bring to you:

- ◆ Increase yield of desired microbial metabolites
- ◆ Reduce impurities and by-products
- ◆ Reduce production cost
- ◆ Stabilize production strain
- ◆ Eliminate problems of viscosity, aeration or shear stress
- ◆ Supply microbial NP (Natural Products) library
- ◆ Experience in bacteria, actinomycetes, filamentous fungi, yeast, anaerobic microbes and genetically engineered strains

Solid experience

Client oriented

Industrial focus

Over 40 years

Confidentiality

Efficiency

Hundreds of projects

Satisfaction

Cost effective



Panlabs Biologics, Inc.

Core Services

- Strain Improvement
- Biotransformation
- Fermentation Process Development
- Precise Technology Transfer
- Microbial NP library for New Drug Discovery
- Molecular Biology

Core Strengths

- More than 40 years experience
- Well-trained scientists
- Accomplishment of hundreds of projects
- 5 L, 10 L, 30 L and 125 L fermentors
- Shaker capacity for 20,000 flasks
- HPLC analysis with capacity of 5,000 samples per week
- Proprietary microbial library of over 24,000 strains
- Strict confidentiality
- Flexible pricing

About Panlabs Biologics

In 1973, Dr. Joseph Lein, founder of Panlabs International Inc., established a strain improvement platform division, Panlabs Fermtech Laboratories. Toronto-based MDS Inc. acquired Panlabs Fermtech Laboratories and renamed it MDS Panlabs in 1995. In December 2005, it was reorganized to be Panlabs Biologics, Inc. and spun off from MDS Inc. Panlabs Biologics has been assembled with a seasoned management team and experienced scientists with demonstrated capabilities in the research and development of industrial microorganisms and fermentation process.

Panlabs Biologics, a worldwide leading contract research organization, is offering elaborate fermentation related R&D services. We provide mutant screening and process development to contribute more useful information for production. Panlabs Biologics owns a microbial library of 24,000 strains, by which we offer biotransformation service and supply microbial NP library for new drug discovery.

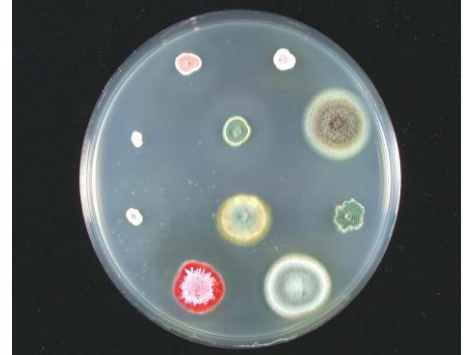
On the basis of over 40 years experience, Panlabs Biologics offers contract services for all types of primary and secondary metabolites produced by microorganisms, including anti-tumor agents, biofuels, immunosuppressive agents, enzymes, hypo-cholesterolemic agents, antibiotics, organic acids, vitamins, pigments, antioxidants, amino acids, enzymes inhibitors, etc. Our clients include pharmaceutical, biotech, food and chemical companies located in Europe, North America, Japan, India, China and Taiwan. Among the 170 accomplished projects, over 90% of our achievements are highly recognized by clients.

Our Services

There are many components from the new drug discovery to the final commercial market. Panlabs Biologics would like to offer our experience and expertise to our client in any of the needed areas, if the skill sets are met and complimentary.

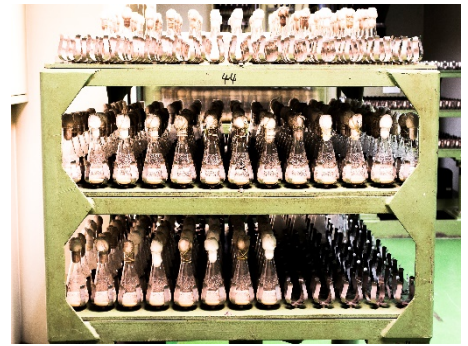
Strain improvement

- Apply various mutagens and know-how for mutation
- Intensive agar plate colony and shake flask fermentation screening
- Anaerobic strain improvement
- Effective medium optimization and process development
- Rigorous control of temperature and humidity for shake flask fermentation
- Shaker capacity with 18,000 x 250 ml flasks with adjustable rpm and temperatures
- HPLC analysis with capacity of 5,000 samples per week
- GC analysis



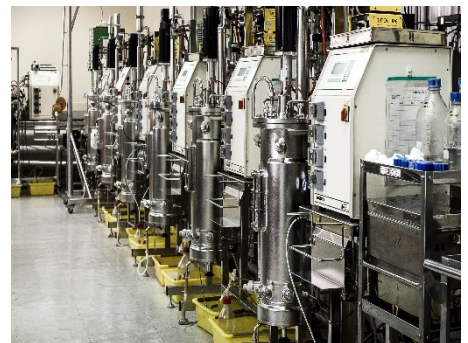
Biotransformation/Bioconversion

We offer biotransformation service with specially designed media and fermentation conditions by accessing to our proprietary diversified microbial library of approximate 20,000 unique strains worldwide.



Fermentation process development

- Tailor-made fermentation process development
- Scale-up from shake flasks to fermentors
- In-house 5 L, 10 L, 30 L and 125 L fermentors
- Effective technology transfer to clients



Molecular Biology

We have organized an elite group of scientist and retained experience industrial consultants from Taiwan and USA. This group's mission is to give the genetic engineering support as required by the clients, which will be a complimentary skill set to assist the classical mutation programs.



Successful Examples

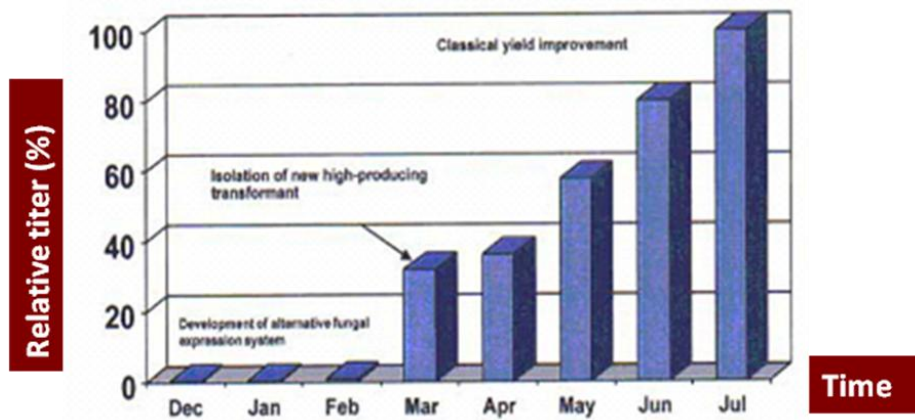
Most of our projects are proprietary in nature and Panlabs Biologics can not disclose the subject and content of the past projects. With very few exceptions which the project owners have published the content and we secured the permissions. Here are a few examples.

Example 1: Yield Improvement of Lactoferrin

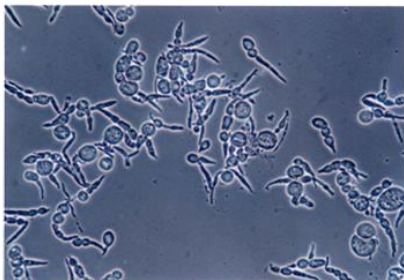
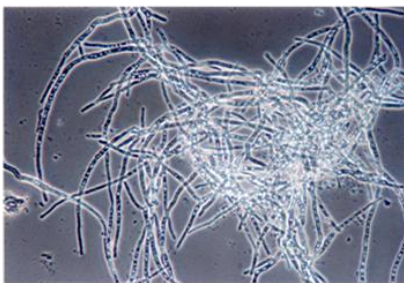
For our client Agennix, Inc. (Houston, TX, USA)

Bio/Technology, 1995, 13:498-503

This project was done in 1995 with biotech company, Agennix, in Houston. This is a recombinant *Aspergillus* strain with high viscosity. And it was very hard to express Lactoferrin in the beginning when Agennix constructed the strain. After a few months of strain improvement by Panlabs, the titer has been increased a lot.



The Viscosity of Fermentation Broth has also been reduced. (Lactoferrin)



Strain	Parent	Mutant
Morphology in Broth	Slender mycelium	Short swollen hypha
Viscosity in Broth at the 7th day	1120 cps	275 cps
Relative yield (%)	100	1,400

Example 2: Yield Improvement of Cephalosporin Intermediate-7ADCA

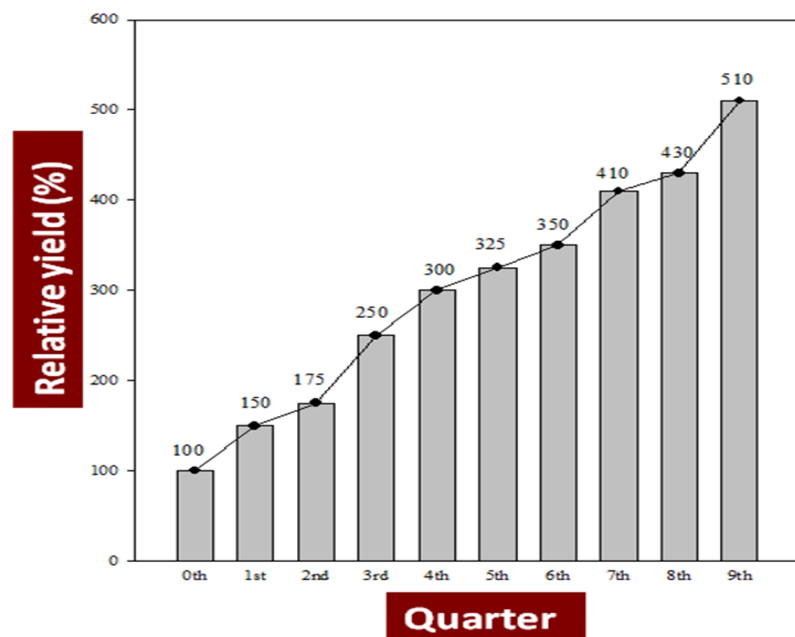
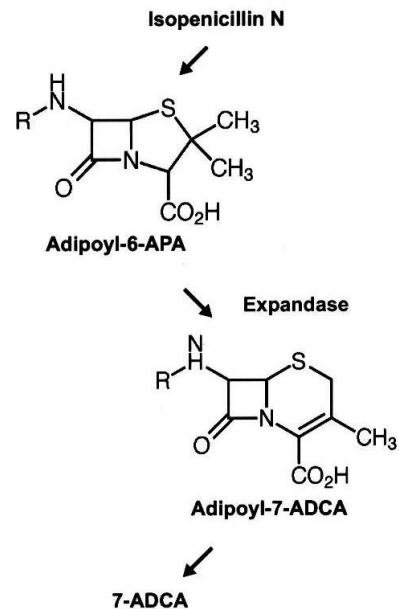
For our client Merck & Co. (Rahway, NJ, USA)

US Patent #5,559,005;

Bio/Technology, 1995, 13(1):58-62

The project was done for Merck. The goal was to develop a low-cost fermentation production process for 7-ADCA to replace chemical synthesis.

Combining targeted pathway engineering and classical yield improvement, a novel process was developed for production of β -lactam intermediates. Panlabs' scientists cloned the Expandase gene from *Streptomyces* and transfer it into *Penicillium* so that the recombinant *Penicillium* strain can produce Adipoyl-7-ADCA. Then, the titer was increased through Panlabs' classical strain improvement program.



Our Commitments

- ☆ **Client's success is our success**
- ☆ **Collaboration not competition**
- ☆ **All project results are property of clients**
- ☆ **Strict confidentiality and security**
- ☆ **Flexible project period, pricing and payment arrangement**



Contact us



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