

## Group leader



Professor Jiang holds the assistant secretary-general of Biotechnology Association of Jiangsu province. He obtained his doctorate degree from Nanjing University of Chemical Technology in 2000 and was as a postdoctoral fellow in KAIST from 2000 to 2002. He is now deputy dean at department of Biotechnology and Pharmaceutical Engineering of Nanjing University of Technology. He is the coordinator of China-Germany bilateral cooperation.

## Research Interests:

- 1)Utilization of biomass resources on succinic acid production
- 2)The study on succinic acid and butanol of their fermentation process and separation process
- 3) Construction of engineered *Escherichia coli* for C4 organic acid
- 4) Metabolic analysis of the succinic acid producers



**Laboratory Staff**  
7 Ph.D Candidates  
30 M.Sc. Candidates

Project Titles	Source of Funds
Research on process coupling synthesis of succinic acid with a new type of anaerobic bioreactor (20606017)	National Natural Science Foundation of China
Research on succinic acid production with genetic modification and fermentation regulation of NAD(H) by metabolically engineered <i>Escherichia coli</i> (21076105)	National Natural Science Foundation of China
Foundations of science on a new generation of biocatalysis and bioconversion (2009CB724701)	“973” Program of China
Research on the key scientific problems of biodegradation and bioconversion with cellulosic resource (2011CB707405)	“973” Program of China
Production of poly butylene succinate with the technology of combinatorial synthesis by biology and chemistry (2011AA02A203)	“863” Program of China
Research on succinic acid production with renewable resources by carbon dioxide fixation (2006AA02Z235)	“863” Program of China

## Contact Information

Professor Min Jiang

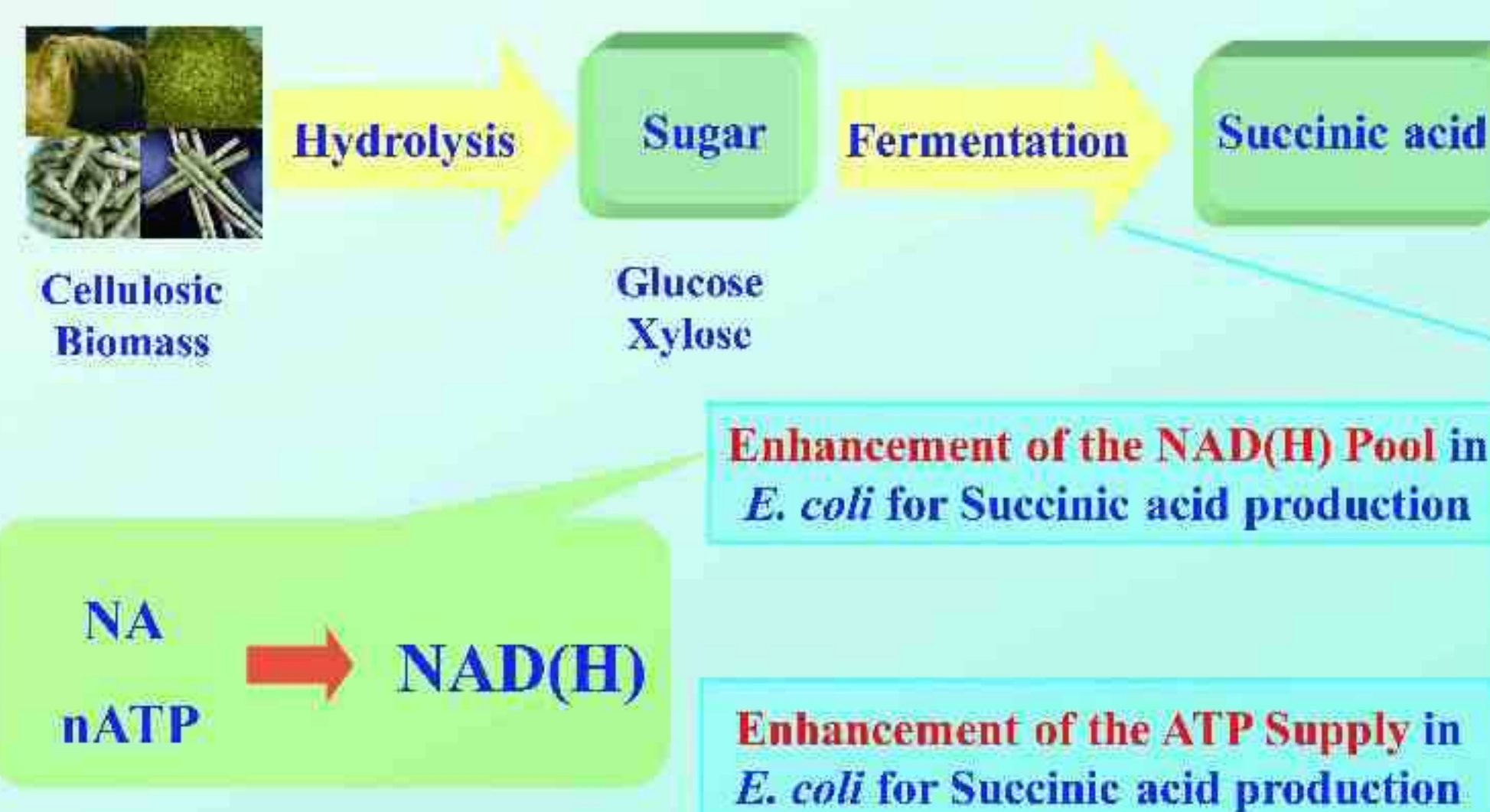
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## Microbial Cell Factories for Production of Succinic Acid

### Introduction

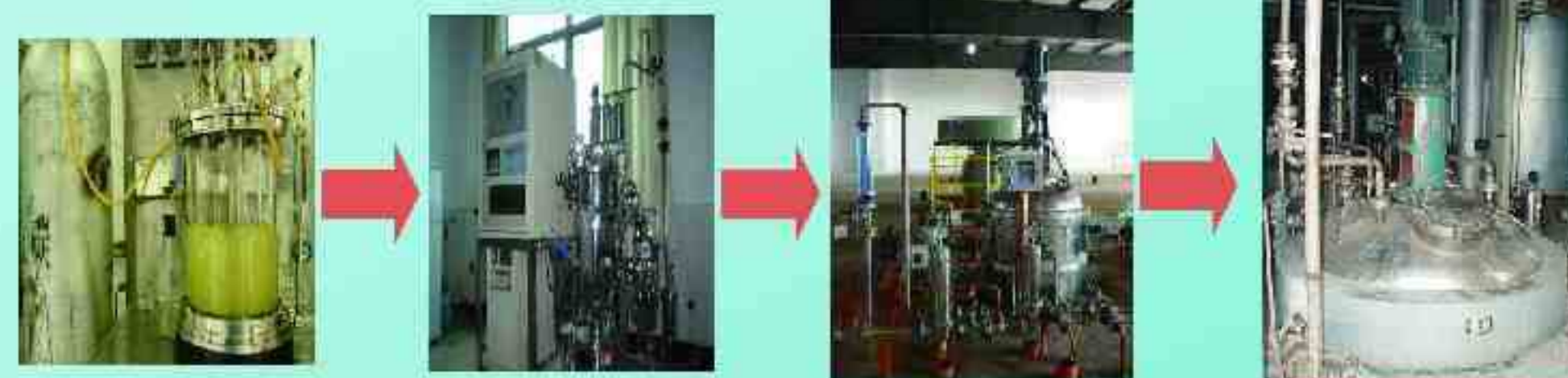
Succinic acid is one of the key C4 platform chemicals and is a reductive end product in the anaerobic mixed acid fermentation of *Escherichia coli*. The reducing power which is based on the total amount of NAD(H) and NADH/NAD<sup>+</sup> ratio is an important factor for the production ability of cells. Thus there is important theoretic and practical value for production of succinic acid by modification and regulation of the NAD(H) system. First, we will elucidate the mechanism of the change of total amount of NAD(H) and NADH/NAD<sup>+</sup> ratio by analyzing the expression of related genes under different levels of redox potential (ORP), with different reduced carbon sources or under carbon-limitation conditions. Next, we will modify the synthesis and degradation of NAD(H) of the strains by genetic manipulation to increase the amount of NAD(H). Moreover, we will improve the amount of NAD(H) and maintain suitable NADH/NAD<sup>+</sup> ratio by manipulating the ORP or adopting other fermentation regulation methods comprehensively. Based on coenzyme regulation, succinic acid can be produced with high mass yield and productivity.

### Technical Line



## The Pilot Project of 1 000 t/a Succinic Acid Production

### Introduction



Fermentation Pattern	5L bioreactor	50L bioreactor	800L bioreactor	5m <sup>3</sup> bioreactor
Fermentation Time (h)	34	38	40	39
Yield (g/g)	81.8	82.5	81.6	81.9
Productivity (g/L·h)	1.8	2.0	2.0	2.1



Succinic acid production plan 1 000 t/a.

Sinopec Yangzi Petrochemical Company Ltd.  
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