

Bioconversion of lignin into high value aromatic compounds by bacteria

Daochen Zhu

Associate Professor

Biofuels Institute, School of the Environment and Safety
Engineering, Jiangsu University, Zhenjiang, 212013, China

Email: dczhucn@hotmail.com



Abstract

Lignin is the largest source of natural aromatic compounds, how to convert lignin into high-value aromatic compounds remains a huge challenge. Microorganisms have developed a variety of strategies for the degradation of lignin in the long-term evolution process, involving complex metabolic pathways and a variety of enzymes. Vanillic acid is an important lignin depolymerization product and is often been identified from the mixture of lignin fragments. The metabolic network of lignin in *Bacillus* sp. L1 was elucidated and at least five pathways have been discovered including a new route that has not been reported-the *p*-hydroxybenzoic acid pathway, all the pathways were pooled into to the common intermediate vanillic acid. It means that there is a biological funnel in strain L1 which can funnel lignin fragments into target aromatic compounds. In addition, reconstruction of the metabolic network of lignin by gene knockout to block the conversion or degradation of target compound can achieve a large accumulation of product. Overall, this work demonstrates that the biorefinery process of lignin into chemicals can be achieved through the biological funnel of lignin in strain L1.

Brief Biography

Dr. Daochen Zhu earned Ph.D. in Kobe University, and worked in Jiangsu University as Associate Prof. and MS supervisor of School of Environment. His research mainly focuses on the microorganism resource and diversity, lignin biodegradation and chemicals product, bio-degradation of organic pollutants. He has published more than 30 SCI papers in reputational journal, 12 invention patents with 6 authorized, 2 English book chapters.

Brief CV

Daochen Zhu, Ph.D.

Biofuels Institute, School of the Environment and Safety Engineering, Jiangsu University

Education:

B.S Fermentation Engineering, Dalian Polytechnic University, China, 2004

Ph.D. Environmental biochemistry, Kobe University, Japan, 2008

Professional Career:

2015-2016: Washington State University, Visiting scholar

2009-Present: Jiangsu University, China, Associate Professor

Research Interests:

1. Microorganism resource and diversity
2. lignin biodegradation and valorization
3. bio-degradation of organic pollutants

Selected publications

1. Zhu, D* . et al. *Annals of Microbiology*, 2019: 1-10.
2. Zhu, D* . et al. *BioResources*, 2019, 14: 1992-2012.
3. Zhu, D* . et al. *Biotechnol Biofuels*, 2018,11, 338.
4. Zhu, D* . et al. *Biotechnol Biofuels*, 2017, 10: 44.
5. Zhu, D* . et al. *Int J Syst Evol Microbiol*, 2016, 66: 1857-1861.
6. Zhu, D* . et al. *Int J Syst Evol Microbiol*, 2016, 66: 616-622.
7. Zhu, D* . et al. *Int J Syst Evol Microbiol*, 2016, 66: 4760-4765.