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Harnessing the biomass recalcitrance for fuels and chemicals: Current state of the arts and our strategies in China

In line with the requirements for sustainable economics and clean environments, biofuels from cellulosic biomass have recently received tremendous attention both in industry and academic communities worldwide. However, despite the surging popularity of biofuels as transportation alternatives, they in current have barely put a dent in our use of oil. It is clear that breakthrough technologies are still needed to overcome barriers, particularly for deeper understanding of biomass recalcitrance, developing cost-effective processes for converting biomass to fuels and chemicals. At present, it has become a world leading-edge research field to evaluate and mimic a variety of natural lignocellulosic systems, such as cellulose-eating animals, wood-feeding termites/insects, or other biomass utilization systems, to achieve efficient conversion and utilization of lignocellulosic biomass for fuels and chemicals. This review addresses various lignocellulolytic systems, their potential values, challenges, and opportunities that exist for scientists and industries to advance the biofuel technology, where the following topics will be further addressed: 1) Scientific and industrial potentials of the natural biomass utilization systems; 2) Novel biocatalysts explored from natural biomass utilization systems and their engineering potential for industrial uses; 3) Novel microbial symbionts discovered from natural biomass utilization systems by “omics” technologies; 4) Bioreactor innovations mimicked and advanced from the efficient biomass utilization systems by nature-inspired technology. With this overview, I hope that you can sense the excitement of the scientific endeavors both from China and the rest of world to crack the hard nut in developing lignocellulosic biofuels.

Biography

Jianzhong Sun has completed his PhD from Louisiana State University, USA and 2 year further Postdoctoral career at same university. He then served as an Assistant Professor for 5 years at Mississippi State University, USA, and later, since 2009, he has served as an Outstanding Professor at Jiangsu University, China till date. Also, he is a Director and Founder of Biofuels Institute, Jiangsu University, a professional research organization that has hired more than 20 faculty and professionals with some graduate students. He has published more than 90 peer-reviewed papers in reputed SCI journals, 7 professional books (both in English and in Chinese) and has also served as a guest editor, editorial board member, as well as a referee for more than 20 international SCI journals. He is also currently serving as a Vice-President of China Energy Association.

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