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Seawater Based Synthetic Biotechnology

Industrial biotechnology cannot compete with the petrochemical industries as it suffers from high consumptions on energy and freshwater, discontinuous processing, low product concentration and thus high product recovery cost as well as low substrate to product conversion efficiency. Therefore, to make industrial biotechnology competitive, we need develop fermentation platform technology which is energy and fresh water saving and run in a continuous way instead of a batch way. Seawater based fermentation technology has been developed based on *Halomonas* spp. We have been able to assemble several multiple genes containing pathways in *Halomonas* spp. for production of various biopolymer molecules. The growth patterns of the *Halomonas* spp. have been changed from binary fission to multiple fission, and to influence the shapes of *Halomonas* spp. from short rods to long fibers, even further to large spheres, allowing more inclusion bodies accumulation and easy product recovery. The technology has been pilot tested in industrial setting, it has been proven to be able to reduce biopolymer polyhydroxyalkanoates production cost at least 100%. The seawater based technology should be able to improve the economic competitiveness of industrial biotechnology. We expect the technology can play an increasingly important role in the fermentation industries.

Biography

Professor George Guo-Qiang CHEN received his BSc and PhD from South China University of Technology in 1985 and Graz University of Technology (Austria) in 1989, respectively. He also conducted research in 1990-1994 as a postdoc at University of Nottingham in UK and University of Alberta in Canada, respectively. He has been focusing his research on microbial materials polyhydroxyalkanoates (PHA), metabolic engineering and PHA biomaterials application since 1986. After joining Tsinghua University in 1994, he has been actively promoting the microbial Bio- and Material Industries in China. Professor Chen has more than 30 years of R&D experiences on microbial physiology, microbial PHA production and applications, has published over 200 international peer reviewed papers with over 11,000 citations (H-Index 52) as reported in Web of Science. With over 30 issued patents and 40 pending patents, Prof. Chen's technologies have been provided to several companies that succeeded in mass production of microbial polyhydroxyalkanoates (PHA). Prof. Chen serves as editors or editorial board members in many international peer review journals. Since 2014, he has been appointed as Chair Professor of Synthetic biology, Manchester University/UK. He has received many awards for his contributions to the microbial manufacturing fields. Beginning from 2015, he becomes the Funding Director of the Center for Synthetic and Systems Biology, Tsinghua University.

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