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Bioinformatics data mining of metagenomes for bioenergy-related enzymes

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Abstract

The lignocellulosic biofuels have drawn a lot of attentions in the past few years mainly because the fossil-based oil price continues going up and starch-based biofuels compete with human food consumption. However the lignocellulosic biofuels are currently too expensive because plant biomass is recalcitrant to microbial/enzymatic deconstruction. Two parallel approaches are being undertaken to reduce the cost: 1) genetically modify plants to make their biomass (plant cell walls) easier to be degraded and 2) develop more robust microbial systems to get higher biofuel yield with lower cost. We are employing bioinformatics data mining techniques to mine the public microbial metagenome data from various environments, e.g. animal guts and decomposed biomass, for novel enzymes involved in biomass degradation. We are also building a web-based database to host and annotate all these bioenergy-related enzymes so that researchers all around the world can freely access these data.

Biography

Dr. Yin received his Ph.D. in Biology with a specialization in Bioinformatics from Peking University in Beijing, China in 2005. He then did two postdocs both in Bioinformatics first in the State University of New York at Buffalo and then in the University of Georgia at Athens. In 2012, Dr. Yin joined the Department of Biological Sciences of Northern Illinois University as an Assistant Professor. His lab focuses on applying bioinformatics approaches to the bioenergy research. Dr. Yin has published ~40 research papers and book chapters. He is also on the editorial board of three international journals.