Lei Shi, Metabolomics 2014, 4:2
http://dx.doi.org/10.4172/2153-0769.S1.025

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Metabolomics & Systems Biology
March 24-26, 2014 Hilton San Antonio Airport, San Antonio, USA

Carbon source utilization metabolism in an alcohol oxidase-expressing mutant of *Pichiapastoris*

Lei Shi
East China University of Science and Technology, China

Pichiapastoris, amethylotrophic yeast, has been developed as a successful expression platform for heterologous proteins, and the expression of foreign genes is usually drove by the outstanding promoter of the alcohol oxidase I gene (*AOX1*).The *AOX1* promoter (P_{AOX1}) is transcribed only in response to methanol and repressed by other carbon sources, which cause difficulties in the large-scale fermentation due to the toxic and flammable effect of methanol, and the large amount of oxygen consumption. So a mutant host with sugar-inducible $P_{AOX1}$for the expression of recombinant proteins in methanol-free medium is practical interest. This study was conducted to identify metabolic alterations associated with mutant *P. pastois* engineered to express high level recombinant protein regulated by P_{AOX1}in the presence of glycerol without methanol induction. Thus, biochemical analysis of mutant yeast expressing AOX in the presence of glycerol may identify efficient growth conditions for recombinant protein expression. For this study, wild-type and AOX mutant yeast were cultured on glucose, glycerol, or methanol. Due to concerns regarding differences in protein synthesis between genotypes and conditions, samples were normalized to DNA prior to statistical analysis and interpretation. The results suggest the biochemical signature of mutant *P. pastois* may be significantly altered in the presence of glucose and glycerol and support enhanced growth as suggested by differences in polyamine production and phospholipid metabolism. In contrast, metabolic alterations were more subtle between genotypes in the presence of methanol, potentially reflecting AOX expression in WT in the presence of methanol. Notably, mutant yeast in the presence of glycerol exhibited metabolic markers of enhanced glucose metabolism, pentose phosphate pathway activity, and mitochondrial metabolism compared to WT counterparts and other mutants. Furthermore, alterations in amino acid metabolism may support anaplerotic contributions to the TCA cycle, facilitate enhanced protein production, of polyamines, and increase cysteine availability for redox homeostasis and gamma-glutamyl amino acid exchange. Finally, increased NAD synthesis in mutants may support increased energy metabolism for cell growth.

Biography

Lei Shi is pursuing Ph.D. degree from East China University of Science and Technology (ECUST), Shanghai, China. His major research interest is the transcriptomics and metabolomics of Pichiapastoris, and analysis the regulation mechanism of Pichiapastoris promoter of AOX1.

soshilei@qq.com