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Conversion of crude glycerol, the biodiesel production by-product, into value-add chemical 2, 3-butanediol through microbial fermentation

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The CPC Corporation, Taiwan (CPC) is the foremost energy enterprise in Taiwan and is dedicated to the development of advanced technologies for green and sustainable future. Starting from 2008, the Taiwan government has implemented the nationwide Biodiesel Project policy for B1, and since the implementation of the B2 policy in 2010, a total of 10 kiloliters B100 biodiesel is being consumed annually. Accordingly, the amount of crude glycerol, a by-product from biodiesel production, has increased dramatically. Rather than been discarded as industrial wastes, crude glycerol can be used as carbon sources for microbes to produce valuable chemicals, such as polyols or polyacids. Here we evaluate and compare the ability of our locally-isolated strains in converting crude glycerol into 2, 3-butanediol. We have found that all five strains, namely CPCHYC001, CPCHYC002, CPCHYC003, CPCHYC004 and CPCHYC005, were capable of utilizing both pure and crude glycerol as the sole carbon source for growth. Except for CPCHYC003, all the strains can consume glycerol completely within 48h. CPCHYC002 and CPCHYC005 consumed crude glycerol faster than pure glycerol, implying that the unidentified substances in crude glycerol may be beneficial for their growth. The maximum diol (acetoin and 2, 3-BDO) productivity of CPCHYC005 was 0.74g/L/h which is much higher than those of all the other strains (0.34~0.39 g/L/h). Future directions will be strain modification and optimization of fermentation conditions for subsequent scaling-up production.

Biography

Hsin-Yao Cheng has completed his PhD from National Chiao-Tung University in Taiwan, R.O.C. and Postdoctoral researches in the Pennsylvania State University Department of Chemical Engineering. He is currently a researcher of CPC Corporation, Taiwan, a premier energy enterprise in Taiwan.

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