Youngsoon Um et al., J Fundam Renewable Energy Appl 2016, 6:3(Suppl)
http://dx.doi.org/10.4172/2090-4541.C1.009

Optimization of Isopropanol-Butanol (IB)-fermentation with *Clostridium* sp. A1424

Youngsoon Um, **Sung Hun Youn** and **Han Min Woo**
Korea Institute of Science and Technology, South Korea

Previously, a newly isolated *Clostridium* sp. A1424 was found to reveal isopropanol-butanol (IB) fermentation with a small amount of acetone. In this study, we attempted to optimize IB fermentation performance of *Clostridium* sp. A1424 by examining pH stat fermentation and adding glycerol in the expectation of no acetone production. When pH was not controlled, the pH profiles showed the biphasic fermentation with the acidogenic phase and the solventogenic phase like other acetone-butanol-ethanol (ABE) producing *Clostridium* sp. When pH was maintained at the set point (6.0, 5.7, 5.5, 5.3, and 5.0), the cell growth was similar to or slightly higher than that with no pH control except the fermentation at pH 6.0. The optimum pH was found to be pH 5.5 revealing 15.37 g/L solvent (9.24 g/L butanol, 4.48 g/L isopropanol, and 1.65 g/L acetone) from 46.63 g/L glucose after 38 hours of cultivation. To achieve acetone-free IB fermentation, the co-substrate system of glucose and glycerol was tried to reduce carbon flux to acetone by increasing NAD(P)H from glycolysis pathway. As the ratio of glycerol was increased, the concentration of butanol was increased from 4.82 to 5.53 g/L and the concentration of isopropanol was decreased from 2.28 to 1.60 g/L. Especially, the ratio of butanol/isopropanol was significantly increased to 3.45 at the glucose and glycerol ratio of 2:1 without acetone production. This result demonstrates that using the mixture of glucose and glycerol with *Clostridium* sp. A1424 was highly efficient for IB fermentation with a higher portion of butanol.

Biography

Youngsoon Um has completed her PhD from Department of Chemical Engineering at University of Maryland and Postdoctoral studies at University of Connecticut. She is a Principal Researcher in Korea Institute of Science and Technology. She has published more than 45 papers in reputed journals and has been serving as an Editorial Board Member of scientific reports.

yum@kist.re.kr

Notes: