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## Production of 1,3-propanediol from glycerol by mutant *Klebsiella pneumoniae* J2B devoid of 2,3-butanediol formation

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The 2,3-butanediol (BDO) is produced as a major byproduct during the production of 1,3-propanediol (PDO) from glycerol under limited aeration conditions by *Klebsiella pneumoniae*. In the present study, The BDO pathway genes, *budA*, *budB*, *budC* and *budO* (whole-*bud* operon), were deleted from *K. pneumoniae* J2B  $\Delta$ *ldhA* and the mutants were studied for glycerol metabolism and alcohols (PDO, BDO) production. Only the *budO* deletion mutant could completely abolish BDO production but it exhibited serious reduction in cell growth and PDO production. By modifying culture medium such as increasing buffering capacity (from 29 mM phosphate to 100 mM phosphate) and adding bicarbonate (50 mM), the performance of the *budO* deletion mutant could be recovered to a similar level of the base strain (91.1 mM PDO under microaerobic condition) on flask scale. However, in fed-batch bioreactor experiment, the *budO* deletion mutant produced significantly less PDO (502 mM) than the base strain (753 mM). In addition, the *budO* deletion mutant produced significant amount of pyruvate (>73 mM) and lactate (>38 mM). The low PDO production in *K. pneumoniae* J2B  $\Delta$ *ldhA* $\Delta$ *budO* was attributed to the accumulation of glycolytic intermediates such as dihydroxyacetone and glyceraldehyde-3-phosphate, which are highly inhibitory to glycerol dehydratase.

### Biography

Vinod Kumar is currently working as Marie Curie Fellow at Synthetic Biology Research Centre, The University of Nottingham, UK. He is working in the area of Biorefinery using metabolic engineering and synthetic biology tools for the sustainable production of biofuels and biochemicals through second generation biorefinery. He has published 19 research articles, two book chapters and two review articles. He has completed his PhD in Biochemical Engineering & Biotechnology and MSc in Chemistry from Indian Institute of Technology Delhi, India. He has more than 13 years of research experience including his PhD and 5 year Post-doctoral experience in France, South Korea & UK. He has worked on different biological systems, fungal, yeast and bacterial and carried out research in multidimensional projects aiming at development of low cost, energy efficient and sustainable bioprocesses for production of biofertilizers, biopesticides, biofuels and biochemicals.

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