

Accepted Manuscript

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PII: S0960-8524(17)31993-4

DOI: <https://doi.org/10.1016/j.biortech.2017.11.019>

Reference: BITE 19169

To appear in: *Bioresource Technology*

Received Date: 5 October 2017

Revised Date: 6 November 2017

Accepted Date: 7 November 2017

Please cite this article as: Parate, R., Mane, R., Dharne, M., Rode, C., Mixed bacterial culture mediated direct conversion of bio-glycerol to diols, *Bioresource Technology* (2017), doi: <https://doi.org/10.1016/j.biortech.2017.11.019>

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Mixed bacterial culture mediated direct conversion of bio-glycerol to diols

Roopa Parate^{a,b}, Rasika Mane^a, Mahesh Dharne^b, Chandrashekhar Rode^{a*}

^aChemical Engineering and Process Development Division, CSIR-National Chemical Laboratory, Pune 411008, Maharashtra, India

^bNational Collection of Industrial Microorganisms, CSIR-National Chemical Laboratory, Pune 411008, Maharashtra, India

* Corresponding author. Tel.: 020 25902349. Email: cv.rode@ncl.res.in

ABSTRACT

Direct and economic transformation of biodiesel derived crude glycerol is gaining more significance. During screening of bacterial cultures *Klebsiella pneumoniae* and *Enterobacter aerogenes* were able to convert crude bio-glycerol to 2,3-butanediol (2,3-BDO) and 1,3-propanediol (1,3-PDO), as major compounds, ethanol and acetoin as minor compounds, with a utilization of 69% and 79% respectively. Process optimization could achieve maximum conversion at pH 7.0, 37 °C, 30-40 g/L glycerol and 1.5 g of inoculum until 120 h. Mixed cultures led to complete glycerol conversion with optimal yield and productivity for products. An innovative approach of using crude glycerol for sustained growth and tolerance of bacteria as source of carbon and energy makes this study more significant. In addition to this, a mixed culture concept introduced here is expected to make impact in process economical for industrial scale synthesis for direct transformation of glycerol into C3 and specifically, C4 diols.

Keywords: Bioglycerol; bioconversion; mixed culture; 2,3-butanediol; 1,3-propanediol

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