

# A novel process for bioglycerol (C3) upgradation to 2,3-butanediol (C4) by cell free extracts of *E. aerogenes* NCIM 2695

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## Abstract

Production of chemicals from renewable bio-resources is a green and starring approach, which serves as a substitute to petroleum derivatives. Bioglycerol, a C3 triol with its growing production as a co-product of biodiesel, is an attractive low cost feedstock for the synthesis of platform chemicals by microbial fermentation. Upgradation of bioglycerol to C4 diol such as 2,3-butanediol (2,3-BDO) alongwith formation of 1,3-propanediol, acetoin is one of the best alternatives of glycerol value valorization as these products are amongst top biorefinery platform chemicals. Previously, we have reported bioglycerol conversion to 2,3 BDO conversion in 120 h using cell pellets of mixed cultures. While attempting a step closer to “Circular Economy” concept we then focused on utilizing by-product of the process leading to zero waste. Our screening studies showed that cell free extracts of *Enterobacter aerogenes* NCIM 2695 produced 22 g/L 2,3-BDO from glycerol as a sole source of carbon, within 96 h. Further, glycerol dehydrogenase activity combined with protein analysis depicted cell bound nature. This study offers a faster and effective utilization of cell free extract in the form of supernatant for biocatalysing C3 upgradation to C4 diol which significantly contributes to overall economics of the process using crude glycerol as a sole source of carbon (C3) and serves as an simple, and cost effective fermentative medium.

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