

### Improved glycerol utilization ability by overexpression of glycerol dissimilation pathway and introduction of 1,2-propanediol pathway genes in *Saccharomyces cerevisiae*

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Glycerol has become an attractive carbon source in biotechnology industry due to its low price and reduced state. However, glycerol has rarely been used as a carbon source in *Saccharomyces cerevisiae* because of its low utilization rate. In this study, we used glycerol as a main carbon source in *S. cerevisiae* to produce 1,2-propanediol. The introduction of two genes, *mgs* (methylglyoxal synthase) and *gldA* (glycerol dehydrogenase) from *Escherichia coli*, not only made *S. cerevisiae* produce 1,2-propanediol, but also increased the growth rate in glycerol and glycerol utilization rate of *S. cerevisiae*. Further increase of 1,2-propanediol production and glycerol utilization rate were achieved by overexpression of endogenous *GUT1* (glycerol kinase) and *GUT2* (glycerol 3-phosphate dehydrogenase as well as *GUP1* gene which involved in glycerol transport in *S. cerevisiae*. Lastly, we constructed newly glycerol dissimilation pathway as introducing glycerol dehydrogenase gene from *Pichia angusta* to *S. cerevisiae*. By overexpressing six genes in *S. cerevisiae*, 0.98 g/l of 1,2-propanediol concentration was achieved in flask culture with 1%(v/v) glycerol as a main carbon source.