

Production of ethanol from biodiesel industry derived crude glycerol using a *Klebsiella pneumoniae* mutant strain

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A mutant strain of *K. pneumoniae*, named GEM167, was obtained by irradiation of gamma ray, by which glycerol metabolism was severely affected. Levels of metabolites derived from glycerol reductive pathway, 1,3-propanediol (1,3-PD) and 3-hydroxypropionic acid (3-HP) were decreased in GEM167 strain compared to control strain, whereas levels of metabolites derived from oxidative pathway, 2,3-butanediol (2,3-BD), ethanol, lactate, and succinate, were increased. Especially, enhancement of ethanol production of glycerol was the most extraordinary in the mutant strain up, giving a maximum production level of 21.5 g/l with productivity of 0.93 g/lh, which is the highest capacity of ethanol production from glycerol reported till now. Crude glycerol derived from biodiesel industry was also well utilized for the production of ethanol by the mutant and variant strain at the similar production levels. These results suggested that the strain is promise of an industrial ethanol producer using waste by-product.