

The effect of glucose concentration on fermentative hydrogen production by
Citrobacter amalonaticus Y19

설은희, 김서형, 오유관¹, 박성훈*
부산대학교 화학공학과; ¹한국에너지기술연구원
(parksh@pusan.ac.kr*)

Fermentative H₂ production is fast, but a low yield on various carbohydrate substrates is obtained. In fermentative H₂ production, a large amount of a complex nitrogen source such as yeast extract is usually added to fermentation medium for fast cell growth and high H₂ production. However, due to unknown composition, the inclusion of yeast extract makes it very difficult to quantitatively analyze metabolic pathways of carbon metabolism during fermentation. In this study, carbon metabolism in *Citrobacter amalonaticus* Y19 was analyzed at a significantly low yeast extract concentration of 0.3 g/L. Carbon balance was obtained with a satisfactory carbon recovery yield in the range of 95.5 – 100.2%. As glucose concentration increased from 1.5 g/L to 9.5 g/L, the biomass concentration increased from 0.2 to 0.5 g/L while H₂ production yield decreased from 1.6 mol H₂/mol glucose to 0.7 mol H₂/mol glucose. In addition, with increasing glucose concentration, the yield for lactate production increased while that for ethanol or acetate production decreased. It was concluded that the cellular metabolic pathways leading to lactate should be minimized to achieve a high H₂ yield.