

Simultaneous Cell and Gas Recycled (SCGR) continuous reaction as an innovative system for high cell density and product formations in syngas fermentation

이문규, 장누리, yasin muhammad, 장인섭[†]
광주과학기술원(gist)
(ischang@gist.ac.kr[†])

Syngas fermentation is a promising technology to produce valuable chemicals, and fuels. However, there are several issues, yet to address for scale-up of the technology. These include: low mass transfer of gaseous substrate (CO, H₂, and CH₄) and low cell, and product concentrations. In this study, we proposed a new and innovative reaction system to achieve high cell and product formations called “Simultaneous Cell and Gas Recycled (SCGR) continuous reaction” in syngas fermentation. A high gas-liquid mass transfer system assisted with continuous recycling of cell is employed to ferment CO using *Eubacterium limosum* (Elm) KIST612. Elm strain uses CO as sole carbon and energy source and produces acetate, and butyrate. During the SCGR continuous reactor operation, Elm was cultivated on carbonate-buffered basal medium (CBBM), while gaseous mixture (CO:CO₂:4:1) was sparged in BCR at a constant flow rate of 5 ml/min. The reactor was operated under fed-batch mode before being shifted to SCGR mode. SCGR mode finally resulted in high cell concentration (5.0 g/L) and acetate production (8.1 g/L), respectively.