Electricity-driven Production of Reduced Compound in Microbial Fermentation

최옥경*, 우한민, 엄영순
한국과학기술연구원
(okgii77@hanmail.net*)

The electron transfer between electrode and microbe has been applied for the conversion of chemical energy to electrical energy (e.g., microbial fuel cell). Recently, the study of inverse-direction, from solar energy to chemical energy via electricity, has received great attention in accordance with utilization of renewable energy and CO_2 fixation. However, only several microorganisms were found to be able to directly receive electron from cathode and the amount of biochemical product was also small. Here, we report that current-consuming *Clostridium* strain and under bioelectrochemical system, electricity changed its final product distribution. The ratio of $NADH/NAD^+$ definitely increased in electrofermention and it showed an increase of NADH-consuming metabolite production. The metabolic shift to produce reduced compound was more definitely shown in glycerol electrofermentation than in glucose fermentation. It suggested the possibility of efficient and enhanced production of electron-dense metabolites using electricity and it can be applied for controlling metabolism and electrofuel production.