

Enhancement of electric properties by pretreatment of lactate dehydrogenase prior to immobilization

이진영, 이동환, 전승우, 김승욱*
고려대학교 공과대학 화공생명공학과
(kimsu@korea.ac.kr*)

For the high electric properties lactate dehydrogenase immobilization was improved in enzymatic fuel cell (EFC). In EFC with lactate metabolic system lactate was used as a substrate, lactate dehydrogenase (LDH) as biocatalyst, nicotinamide adenine dinucleotide (NAD) and calcium ion as cofactor and PQQ (Pyrrolo Quinoline Quinone) as an electron mediator. The cyclic voltammetry (CV) was applied to study the tendency of voltage and electric current in EFC electrocatalytic process. Pretreatment of lactate dehydrogenase with substrate (lactate), NAD, and CaCl_2 prior to immobilization showed the best result of CV cycle among other pretreatments. In this study the electric properties were compared at different lactate concentrations for pretreatment of lactate dehydrogenase prior to immobilization. The CV cycle of 5 M lactate was better than other concentrations. And the power density of the pretreatment with 5 M lactate was higher ($2.17 \mu \text{W}/\text{cm}^2$) than the immobilization without pretreatment.