

Cheese whey to electricity generation: Application of enzymatic fuel cell using cellobiose dehydrogenase

최한석, 이수권, 이주훈, 김형렬, 김동섭, 박세희¹, 유하영²,
이자현¹, 김승욱[†]
고려대학교; ¹동양미래대학교; ²상명대학교
(kimssw@korea.ac.kr[†])

Cheese Whey is a by-product of the cheese manufacturing after process of milk casein removed in the dairy industry which produces large volumes of waste. The major constituent of cheese whey is lactose (4.5 to 5%w/v), which causes environmental pollution due to its high biological oxygen demand (BOD) and chemical oxygen demand (COD). In this study cheese whey was demonstrated as a fuel of an enzymatic fuel cell (EFC) system using cellobiose dehydrogenase from *Phanerochate chrysosporium* (PcCDH). The EFC was established with Au electrodes developed by GO/Co/chitosan mediator. Enzymes, PcCDH and laccase, was immobilized on anode and cathode respectively. To enhance the EFC system, the effect of the substrate, as well as its initial concentration and reaction pH were evaluated. With the optimal reaction conditions, EFC system generated electricity using the raw material of cheese whey from dairy industry. This performance indicated the bright potential of cheese whey in further electrochemical applications of EFC.