

Isolation of electroactive CO converting microorganism using zero valent iron for bioelectrochemical system (BES)

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Carbon monoxide (CO) is one of the main gas component of steel industry and biomass gasification process. CO has also been highlighted as a feedstock for biological conversion to platform and value-added chemicals. The conventional CO converting strains have drawbacks of slow growth rate and high sensitivity to oxygen as well as low conversion yield. Most CO conversion microbe harbor wood-ljungdahl pathway (WL pathway) and CO-dehydrogenase, and the reducing equivalent is significantly limited for acetyl-CoA synthesis. In this study, we attempted to isolate and characterize an electrochemically active CO converting strains using the iron granules (Fe⁰) as external electron donor. We hypothesize that the CO uptake with iron oxidizing is be able to enhance bioelectrochemical activity in electrosynthesis of CO. As a result, 9 strains were isolated and most of the strains were characterized as Clostridium species. We also examined the VFA production in a bioelectrochemical system (BES) using CO as substrate, and identified their electrochemical performance.