The CO_2 Conversion by an Electroative *Clostridium* strain Induced by Electrochemical Reducing Equivalent

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In this study, we reports a *Clostridium* strain revealing a distinct reduction peak in cyclic voltammogram when three electrodes with grassy carbon electrode (working electrode), platinum electrode (counter electrode), and Ag/AgCl reference electrode were immersed into the culture of the *Clostridium* strain. This electroactive behavior of the strain supports the direct electron transfer from a cathode to the strain. From further analysis, we found increasing $NADH/NAD^+$ ratio, an intracellular factor representing a reducing power for the fermentation. CO_2 reduction was tested using the electroative strain poised at −160 mV vs. Ag/AgCl under CO_2:H_2 (2:8) gas. Interestingly, an area of unknown peak increased over time on a high performance liquid chromatography, whereas there was no peak without an electrical power, implying the biotransformation of CO_2 by the strain using electrons from the cathode. Further study is ongoing to identify an unknown product using gas chromatography/mass spectrometry (GC/MS) and searching candidates using the GC/MS library.