

Bioconversion of Carbon dioxide to formate by using *Acetobacterium woodii* as a biocatalyst

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Carbon dioxide (CO₂) is a cheap and abandoned industrial waste, so if carbon dioxide is available as a carbon source, it will be a big advantage. In the case of *Acetobacterium woodii*, the ATP production system is strictly dependent on sodium ion, which can prevent further ATP synthesis in the cell by removing sodium ions. When the ATP synthesis is blocked, acetate is not formed but formate is accumulated instead. To investigate formate productivity according to cell density, we performed conversion in reaction buffer with different cell density samples (OD 10, 20, 30, 40, and 50). Formate production increased up to OD 20, but then gradually decreased with acetate accumulation. In addition, continuous conversion was performed by changing buffers and CO₂ recharging four times. The productivity of the sample with both buffer change and CO₂ recharging was about twice higher than that of the sample with CO₂ recharging only, indicating that formate influenced the productivity. If the problem of formate inhibition effect is solved, it would contribute to conducting continuous conversion and designing reactor for formate production.