

Engineering *Shewanella oneidensis* MR-1 for the production of 3-hydroxy propionic acid and its prospect in Bioelectrochemical System

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Biological production of platform chemicals from sustainable feedstock has been the central interest for alternative conventional chemical refinery process as well as an important attribute in developing clean technology. Internal redox imbalance is one of the bottleneck in biological production. We demonstrated the controlling of intracellular NADH/NAD⁺ redox balance using chemical mediators and terminal electron acceptors (TEA). *Shewanella oneidensis* MR-1, an electrochemically active bacterium can be employed to regulate redox imbalance. *S. oneidensis* MR-1 can intrinsically transfer electrons directly to electrodes through a process called extracellular electron transfer (EET) there by regulating internal redox status of the cells. In this study, we demonstrated the prospects of biological production of 3-HP by a recombinant *S. oneidensis* MR-1dhaB gdrAB KGSADH strain with chemical mediators and TEA. The production of 3-HP proved a promising aspect to proceed further with Electrochemical Bioreactor Array (EBA).