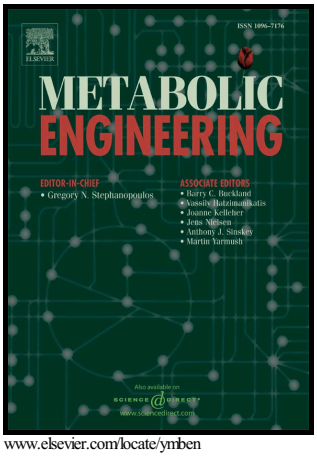

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Balancing cellular redox metabolism in microbial electrosynthesis and electro fermentation – a chance for metabolic engineering

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Abstract

More and more microbes are discovered that are capable of extracellular electron transfer, a process in which they use external electrodes as electron donors or acceptors for metabolic reactions. This feature can be used to overcome cellular redox limitations and thus optimising microbial production. The technologies, termed microbial electrosynthesis and electro-fermentation, have the potential to open novel bio-electro production platforms from sustainable energy and carbon sources. However, the performance of reported systems is currently limited by low electron transport rates between microbes and electrodes and our limited ability for targeted engineering of these systems due to remaining knowledge gaps about the underlying fundamental processes.