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Ethanol production in microbial electrosynthesis using *Sporomusa ovata* as biocatalyst

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Microbial electrosynthesis (MES), a new promising process based on the use of bacteria as catalysts and electrical current as energy to reduce CO_2 to multi-carbon organic compounds, has emerged during the last decade as a route of excellence for exploitation of CO_2 as a chemical feedstock. To date, a few microorganisms mainly homoacetogens have been reported to be able to accept electrons from the cathode and to reduce CO_2 to mainly acetate and traces of 2-oxobutyrate. Acetogens use the Wood_Ljungdahl pathway to convert CO_2 to acetyl-CoA, which plays a central intermediate for the production of a diversity of useful organic products, including fuels. It´s well established that under appropriate conditions, the metabolic flux in acetogens can be redirected to others products than acetate. The objective of this study is to investigate the impact of the growth conditions, including medium composition on the end-products generation in MES process. By variating trace metals concentrations in the growth medium, we were able to identify a positive effect of tungstate on the growth, acetate and ethanol production in H_2:CO_2 condition. A maximum production of 52 mM and 14 mM of acetate and ethanol were respectively produced when the concentration of tungstate was increased 10 fold. The optimized medium has also showed a better acetate production in MES, with 5 times increase comparing to the standard medium. Tungstate-optimized medium promoted also the production of ethanol in MES. These results demonstrate that trace elements could have a positive effect on the end-products generation from acetogens both in H_2:CO_2 and MES conditions.