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Production of Long Chain Alkyl Esters from Carbon Dioxide and Electricity by a Two-Stage Bacterial Process

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1 **Production of Long Chain Alkyl Esters from Carbon Dioxide and Electricity by a Two-**
2 **Stage Bacterial Process**

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12 **Abstract**

13 Microbial electrosynthesis (MES) is a promising technology for the reduction of carbon
14 dioxide into value-added multicarbon molecules. In order to broaden the product profile
15 of MES processes, we developed a two-stage process for microbial conversion of carbon
16 dioxide and electricity into long chain alkyl esters. In the first stage, the carbon dioxide is
17 reduced to organic compounds, mainly acetate, in a MES process by *Sporomusa ovata*. In
18 the second stage, the liquid end-products of the MES process are converted to the final
19 product by a second microorganism, *Acinetobacter baylyi* in an aerobic bioprocess. In this
20 proof-of-principle study, we demonstrate for the first time the bacterial production of
21 long alkyl esters (wax esters) from carbon dioxide and electricity as the sole sources of

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