Electronic supplementary information (ESI)

Fig. S1 Current signal, pH and total concentration of acetate and ethanol in the reactor 1. Black inverted triangles on the top part of the figure indicate sampling and subsequent flushing with CO_2.

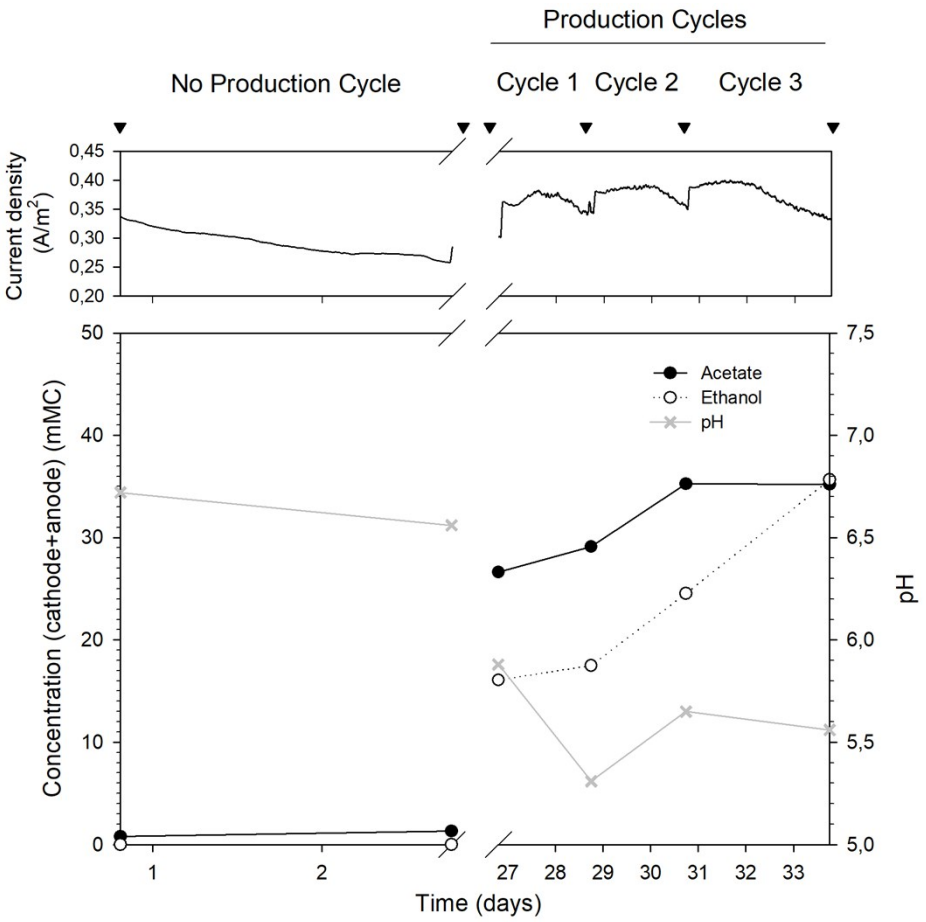

Table S.1. Composition of the modified ATCC1754 ETC medium used in the BES reactors.

Medium component	(g L^{-1})	Trace metal solution component	(mg L^{-1})	Vitamin solution component	(µg L^{-1})
KH_2PO_4	0.1	Nitrilotriacetic acid	20.0	Biotin	20.0
NaCl	0.8	$MnSO_4 \cdot H_2O$	10.0	Folic acid	20.0
NH_4Cl	1.0	$Fe(SO_4)_2(NH_4)_2 \cdot 6H_2O$	8.0	Pyridoxine hydrochloride	100.0
$MgCl_2 \cdot 6H_2O$	0.2	$CoCl_2.6H_2O$	2.0	Thiamine hydrochloride	50.0
KCl	0.1	$ZnSO_4 \cdot 7H_2O$	0.002	Riboflavin	50.0
$CaCl_2 \cdot 2H_2O$	0.02	$CuCl_2 \cdot 2H_2O$	0.2	Nicotinic acid	50.0
MES	1.95	$NiCl_2 \cdot 2H_2O$	0.2	DL- calcium pantothenate	50.0
Cysteine HCl	0.4	$Na_2MoO_4 \cdot 2H_2O$	0.2	Vitamin B12	1.0
		Na_2SeO_4	0.2	p-aminobenzoic acid	50.0
		Na_2WO_4	0.2	Lipoic acid (Thioctic acid)	50.0

Table S.2. Overview of the main features and performance of ethanol-producing biocathodes fed with CO_2 as the sole carbon source.

Voltage (V vs. SHE)	T (ºC)	pH	Inoculum	Feeding	Products	Maximum [ethanol] (mmol C ethanol)	Maximum Ethanol-to-acetate ratio (**)	Ref.
-0.9	30	7.0-4.5	Anaerobic sludge	20:80 (CO_2:N_2)	Acetate, butyrate, ethanol	2.56	<1	1
-0.8/-0.9	37	7.0	Anaerobic sludge + *C. ljungdahlii*	80:20 (CO_2:N_2)	Acetate, butyrate, ethanol	21.71	<1	2
-0.69	25	<5.0	*Sporomusa ovata* DSM-2662	80:20 (CO_2:N_2)	Acetate, ethanol	26.3	<1	3
-0.40	30	7.3	Anaerobic bog sediment	80:20 (CO_2:N_2)	Butanol, ethanol, acetate, propionate, butyrate	0.7	<1 (0.084)	4
-0.6	30	7.0	Enriched homoacetogenic consortia	20:80 (CO_2:N_2)	Acetate, ethanol	3.52	<1	5
-50 mA / -5 $A \cdot m^{-2}$(*)	30	7.6-5.0	Anodic effluent of a MFC and a UASB digesting microalgae (1:1)	90:10 (N_2:CO_2)	Butyrate, isopropanol, ethanol, acetate, formate, propionate, acetone	11.72	<1	6
-0.8	38	4.2-6.3	Carboxydotrophic mixed culture (dominated by *Clostridium* spp.)	CO_2	Acetate, butyrate, ethanol, butanol	20.4	<1 (0.522)	7
-0.8	29	6.0	Mixed culture obtained from corroded metal surface	CO_2	Acetate, butyrate, propionate, ethanol, butanol, methanol	n.r.	<1	8
-0.8	29	8.0– 4.36	Mixed culture obtained from corroded metal surface	CO_2	Methanol, ethanol, butanol, acetate, butyrate, formic acid	n.r.	>1	9
-0.8	35	4.9-5.2	Mixed culture obtained from a BES performing acetatogenesis from bicarbonate	CO_2	Acetate, butyrate, isobutyrate, caproate, ethanol, butanol, isobutanol, hexanol	56.1	<1	10
-0.8	25	7.0-5.3	Enriched culture of Isolate I-19	CO_2	Acetate, ethanol	35.65	>1 (1.54)	This study

*: fixed reducing current; **: calculated with the maximum of ethanol and acetate reported; n.r.: not reported.

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