Table S1 Chemically defined medium (CDM) by Otto *et al*[1]

Substance		Concentration
Glucose	$C_6H_{12}O_6$	10 or 40 g·L^{-1}
Dipotassium phosphate	K_2HPO_4	2.5 g·L^{-1}
Monopotassium phosphate	KH_2PO_4	3 g·L^{-1}
Triammonium citrate	$C_6H_{17}N_3O_7$	0.6 g·L^{-1}
Sodium acetate	$C_2H_3NaO_2$	1 g·L^{-1}
Cysteine hydrochloride	$C_3H_8ClNO_2S$	0.25 g·L^{-1}
Salt-free, vitamin-free casein hydrolysate		5 g·L^{-1}
100x Vitamin solution		10 mL·L^{-1}
100x Metal solution		10 mL·L^{-1}
100x Nucleic acid bases solution		10 mL·L^{-1}

Vitamin solution for the CDM by Otto *et al.*

Substance		[mg·L^{-1}]
Pyridoxine hydrochloride	$C_8H_{12}ClNO_3$	200
Nicotinic acid	$C_6H_5NO_2$	100
Thiamin hydrochloride	$C_{12}H_{18}Cl_2N_4OS$	100
Riboflavin	$C_{17}H_{20}N_4O_6$	100
Calcium D-pantothenate	$C_{18}H_{32}CaN_2O_{10}$	100
Sodium p-aminobenzoate	$C_7H_6NNaO_2$	1000
D-biotin	$C_{10}H_{16}N_2O_3S$	1000
Folic acid	$C_{19}H_{19}N_7O_6$	100
Vitamin B12	$C_{63}H_{88}CoN_{14}O_{14}P$	100
Orotic acid	$C_5H_4N_2O_4$	500
2-deoxythymidine	$C_{10}H_{14}N_2O_5$	500
Inosine	$C_{10}H_{12}N_4O_5$	500
DL-6,8-thioctic acid	$C_8H_{14}O_2S_2$	250
Pyridoxamine hydrochloride	$C_8H_{13}ClN_2O_2$	500

Metal solution for the CDM by Otto *et al.*

Substance		[mg·L^{-1}]
Magnesium chloride hexahydrate	$MgCl_2$ $6H_2O$	20
Calcium chloride dihydrate	CaCl2 $2H_2O$	5
Iron chloride tetrahydrate	FeCl2 $4H_2O$	0.5
Zinc sulfate heptahydrate	ZnSO4 $7H_2O$	0.5
Cobalt chloride hexahydrate	CoCl $6H_2O$	0.25

Nucleic acid solution for the CDM by Otto *et al.*

Substance		per 10 mL 0.1 M NaOH [g]
Adenine	$C_5H_5N_5$	10
Uracil	$C_4H_4N_2O_2$	10
Xanthine	$C_5H_4N_4O_2$	10
Guanine	$C_5H_5N_5O$	10

Addition of amino acids in the CDM by Poolman and Konings

Substance		Concentration [mg·L^{-1}]
L-Alanine	$C_3H_7NO_2$	240
L-Arginine	$C_6H_{14}N_4O_2$	125
L-Asparagine	$C_4H_8N_2O_3$	350
L-Glutamine	$C_5H_{10}N_2O_3$	390
Glycine	$C_2H_5NO_2$	175
L-Histidine	$C_6H_9N_3O_2$	150
L-Isoleucine	$C_6H_{13}NO_2$	210
L-Leucine	C_6H13NO_2	475
L-Lysine	$C_6H_{14}N_2O_2$	440
L-Methionine	$C_5H_{11}NO_2S$	125
L-Phenylalanine	$C_9H_{11}NO_2$	275
L-Proline	$C_5H_9NO_2$	675
L-Serine	$C_3H_7NO_3$	340
L-Threonine	$C_4H_9NO_3$	225
L-Tryptophan	$C_{11}H_{12}N_2O_2$	50
L-Tyrosine	$C_9H_{11}NO_3$	200
L-Valine	$C_5H_{11}NO_2$	325

Table S2 CDMPC medium[2]

Price *et al.* developed a chemically defined medium for prolonged cultivation (CDMPC) of *L. lactis*. The amino acid, metal, vitamin, and alkaline solutions were prepared as stock solutions. After the addition of all components and stock solutions, the medium was sterilized via filtration. Detailed instructions for the preparation are provided by the authors.

Composition of the CDMPC

Substance		Concentration
Glucose	$C_6H_{12}O_6$	10 or 40 g·L^{-1}
Potassium phosphate	KH_2PO_4	2.75 g·L^{-1}
Sodium Chloride	NaCl	2.90 g·L^{-1}
Sodium phosphate	NaH_2PO_4	2.85 g·L^{-1}
10x amino acid solution		100 mL·L^{-1}
100x metal solution		10 mL·L^{-1}
100x vitamin solution		10 mL·L^{-1}
100x alkaline solution		10 mL·L^{-1}

10x amino acid solution for the CDMPC

Substance			Concentration [g·L^{-1}]
L-Alanine	$C_3H_7NO_2$		1.3
L-Arginine	$C_6H_{14}N_4O_2$		2.44
L-Asparagine	$C_4H_8N_2O_3$		0.8
L-Aspartic acid	$C_4H_7NO_4$		1.37
L-Cysteine hydrochloride monohydrate	$C_3H_7NO_2S$ HCl	H_2O	0.61
L-Glutamic acid	$C_5H_9NO_4$		0.97

L-Glutamine	$C_5H_{10}N_2O_3$	0.96
Glycine	$C_2H_5NO_2$	0.29
L-Histidine	$C_6H_9N_3O_2$	0.24
L-Isoleucine	$C_6H_{13}NO_2$	0.82
L-Leucine	$C_6H_{13}NO_2$	1.17
L-Lysine monohydrochloride	$C_6H_{14}N_2O_2$ HCl	1.87
L-Methionine	$C_5H_{11}NO_2S$	0.38
L-Phenylalanine	$C_9H_{11}NO_2$	0.64
L-Proline	$C_5H_9NO_2$	4.12
L-Serine	$C_3H_7NO_3$	1.72
L-Threonine	$C_4H_9NO_3$	0.68
L-Tryptophan	$C_{11}H_{12}N_2O_2$	0.36
L-Valine	$C_5H_{11}NO_2$	0.86

100x metal solution for the CDMPC

Substance	Molecular formula	Concentration [mg·L^{-1}]
Ammonium molybdate tetrahydrate	$(NH_4)6Mo_7O_{24}$ $4H_2O$	30
Calcium chloride dihydrate	$CaCl_2$ $2H_2O$	300
Cobalt sulfate heptahydrate	$CoSO_4$ $7H_2O$	30
Copper sulfate pentahydrate	$CuSO_4$ $5H_2O$	30
Iron chloride tetrahydrate	$FeCl_2$ $4H_2O$	400
Magnesium chloride hexahydrate	$MgCl_2$ $6H_2O$	20,000
Manganese chloride tetrahydrate	$MnCl_2$ $4H_2O$	400
Zinc sulfate heptahydrate	$ZnSO_4$ $7H_2O$	30

100x vitamin solution for the CDMPC

Substance		[mg·L^{-1}]
α-Lipoic acid	$C_8H_{14}O_2S_2$	200
D-Pantothenic acid hemicalcium salt	$C_9H_{16}NO_5$ 1/2 Ca	50
Nicotinic acid	$C_6H_5NO_2$	100
Pyridoxal hydrochloride	$C_8H_9NO_3$ HCl	100
Pyridoxine hydrochloride	$C_8H_{11}NO_3$ HCl	100
Thiamine hydrochloride	$C_{12}H_{17}ClN_4OS$ HCl	100

100x alkaline solution for the CDMPC

Substance		[mg·L^{-1}]
Biotin	$C_{10}H_{16}N_2O_3S$	10
L-Tyrosine	$C_9H_{11}NO_3$	5000

Table S3 Resting cell buffer

Resting cell experiments were conducted in a buffer solution. The phosphate buffer, trace elements, and magnesium solution were prepared as individual stock solutions in 100x concentration. The glucose solution was prepared as a 500 g·L^{-1} stock solution. All stock solutions were autoclaved except for the trace element solution which was sterile filtered. For the preparation of the washing buffer, used for the washing step during resting cell experiments, glucose was omitted.

Composition of the resting cell buffer

Phosphate buffer

Dipotassium phosphate	K_2HPO_4	3.88 $g \cdot L^{-1}$
Monosodium phosphate	NaH_2PO_4	1.63 $g \cdot L^{-1}$
Magnesium sulfate	$MgSO_4$	0.25 $g \cdot L^{-1}$

Trace elements

EDTA	$C_{10}H_{16}N_2O_8$	10 $mg \cdot L^{-1}$
Magnesium chloride hexahydrate	$MgCl_2\ 6H_2O$	0.10 $g \cdot L^{-1}$
Zinc sulfate heptahydrate	$ZnSO_4\ 7H_2O$	2 $mg \cdot L^{-1}$
Calcium chloride dihydrate	$CaCl_2\ 2H_2O$	1 $mg \cdot L^{-1}$
Iron sulfate heptahydrate	$FeSO_4\ 7H_2O$	5 $mg \cdot L^{-1}$
Sodium molybdate dihydrate	$Na_2MoO_4\ 2H_2O$	0.2 $mg \cdot L^{-1}$
Copper sulfate pentahydrate	$CuSO_4\ 5H_2O$	0.2 $mg \cdot L^{-1}$
Cobalt chloride hexahydrate	$CoCl_2\ 6H_2O$	0.4 $mg \cdot L^{-1}$
Manganese chloride dihydrate	$MnCl_2\ 2H_2O$	1 $mg \cdot L^{-1}$
Carbon source glucose	$C_6H_{12}O_6$	40 $g \cdot L^{-1}$

Table S4 Variation of filling volume in 500 mL shake flasks to vary the oxygen transfer for cultivations of *L. lactis* VJ017 and the corresponding process parameters. [a]The oxygen transfer rate was calculated according to Meier *et al*[3].

Filling volume [mL]	Glucose concentration [$g \cdot L^{-1}$]	OTR [$mmol \cdot L^{-1} \cdot h^{-1}$][a]	Acetoin titer [$g \cdot L^{-1}$]	Acetoin yield [$g_{acetoin}^{-1} \cdot g_{glucose}^{-1}$]	Specific acetoin yield [$g_{acetoin}^{-1} \cdot g_{CDW}^{-1}$]
50	40	28.62	13.8 ± 0.1	0.35 ± 0.0	2.26 ± 0.03
25	40	47.80	16.5 ± 0.3	0.41 ± 0.01	2.97 ± 0.16
25	10	47.80	4.8 ± 0.1	0.48 ± 0.00	1.85 ± 0.13

Table S5 Acetoin concentration in the respective media and applied current densities for electrochemical conversion of acetoin to 2-butanone.

Medium	Concentration [$g \cdot L^{-1}$]	Current Density [$mA \cdot cm^{-2}$]
M17	6	10
HS	7	10
LB	8	10
YEP	14	25
M17	16	25
Resting cell buffer	19	25

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