Table S1. Volatile compounds (mg L^{-1}) of beers (GC-MS analysis) with thermally-dried immobilized *S. cerevisiae* cells on tubular cellulose from coconut shells

Storage (months)	0	0	0	0	1	3
Fermentation temperature (°C)	25	15	10	5	15	15
Esters						
Ethyl acetate	25.40 ± 1.13	19.30 ± 0.99	17.15 ± 0.78	13.20 ± 1.13	15.05 ± 0.49	16.15 ± 0.35
Ethyl butanoate	4.00 ± 0.42	2.50 ± 0.21	2.00 ± 0.07	1.20 ± 0.14	2.30 ± 0.21	1.50 ± 0.07
Isoamyl acetate	5.00 ± 0.71	2.98 ± 0.11	3.50 ± 0.14	1.81 ± 0.08	2.03 ± 0.18	2.40 ± 0.11
Ethyl hexanoate	4.15 ± 0.21	4.50 ± 0.14	2.00 ± 0.14	1.80 ± 0.14	2.31 ± 0.02	2.01 ± 0.16
Ethyl octanoate	1.90 ± 0.16	1.00 ± 0.08	1.50 ± 0.07	0.80 ± 0.17	0.69 ± 0.11	1.08 ± 0.11
Ethyl decanoate	4.40 ± 0.71	2.91 ± 0.13	2.00 ± 0.28	1.55 ± 0.11	0.72 ± 0.04	0.94 ± 0.11
Ethyl dec-9-enoate	0.90 ± 0.14	1.18 ± 0.09	0.50 ± 0.07	0.40 ± 0.11	0.72 ± 0.06	0.79 ± 0.11
Phenylethyl acetate	nd	nd	0.32 ± 0.04	0.21 ± 0.01	0.39 ± 0.05	0.20 ± 0.04
Ethyl dodecanoate	nd	0.18 ± 0.01	0.13 ± 0.02	nd	0.20 ± 0.02	0.17 ± 0.02
Ethyl tetradecanoate	0.15 ± 0.01	0.20 ± 0.03	0.20 ± 0.01	0.06 ± 0.06	0.05 ± 0.04	0.15 ± 0.04
Ethyl hexadecanoate	0.19 ± 0.03	0.21 ± 0.04	0.16 ± 0.05	0.10 ± 0.03	0.25 ± 0.06	0.20 ± 0.01
Acids						
Acetic acid	2.10 ± 0.28	2.50 ± 0.28	3.00 ± 0.57	3.98 ± 0.59	2.00 ± 0.28	2.25 ± 0.35
Butanoic acid	1.51 ± 0.27	1.35 ± 0.21	0.50 ± 0.03	0.80 ± 0.25	1.50 ± 0.25	0.97 ± 0.21
Hexanoic acid	0.30 ± 0.01	0.20 ± 0.04	nd	0.10 ± 0.03	0.11 ± 0.02	0.12 ± 0.03
Octanoic acid	1.23 ± 0.18	0.88 ± 0.04	0.51 ± 0.02	0.21 ± 0.04	0.82 ± 0.04	0.63 ± 0.09
Nonanoic acid	0.10 ± 0.03	nd	0.16 ± 0.01	0.20 ± 0.04	0.24 ± 0.04	0.30 ± 0.03
Decanoic acid	0.30 ± 0.04	0.30 ± 0.06	0.21 ± 0.01	0.15 ± 0.01	0.21 ± 0.03	0.16 ± 0.08
Alcohols*						
n-propanol	9.80 ± 0.28	10.85 ± 1.06	10.20 ± 0.99	4.30 ± 0.85	7.31 ± 0.86	6.52 ± 0.36
2-methyl-propanol	49.65 ± 6.15	46.35 ± 2.33	40.85 ± 1.91	35.60 ± 1.98	40.25 ± 1.63	40.55 ± 1.91
2- and 3-methyl butanol	71.15 ± 8.70	55.30 ± 7.21	50.10 ± 1.41	40.95 ± 7.14	59.30 ± 5.09	45.40 ± 2.12
2-phenylethanol	20.20 ± 1.41	10.35 ± 1.34	15.65 ± 1.63	7.45 ± 1.06	10.55 ± 1.48	12.10 ± 2.12

*Ethanol was detected in all cases; nd: not detected

Table S2. Volatile compounds (mg L^{-1}) of beers (GC-MS analysis) with thermally-dried immobilized *S. cerevisiae* cells on tubular cellulose from peanut shells

Storage (months)	0	0	0	0	1	3
Fermentation temperature (°C)	25	15	10	5	15	15
Esters						
Ethyl acetate	21.00 ± 1.41	17.30 ± 0.71	14.20 ± 0.57	10.10 ± 1.41	17.10 ± 1.70	15.20 ± 1.70
Ethyl butanoate	3.00 ± 0.42	2.00 ± 0.14	2.10 ± 0.07	1.50 ± 0.14	1.80 ± 0.21	2.30 ± 0.14
Isoamyl acetate	4.50 ± 0.71	2.90 ± 0.21	2.50 ± 0.14	1.70 ± 0.07	3.15 ± 0.28	1.50 ± 0.25
Ethyl hexanoate	4.00 ± 0.42	2.70 ± 0.14	2.30 ± 0.07	1.80 ± 0.14	2.36 ± 0.08	2.06 ± 0.24
Ethyl octanoate	1.00 ± 0.28	0.70 ± 0.07	0.50 ± 0.07	0.40 ± 0.08	0.49 ± 0.09	0.79 ± 0.05
Ethyl decanoate	3.00 ± 0.14	2.30 ± 0.14	2.00 ± 0.28	1.70 ± 0.10	2.51 ± 0.23	1.72 ± 0.14
Ethyl dec-9-enoate	0.90 ± 0.14	0.70 ± 0.07	0.40 ± 0.07	0.50 ± 0.03	nd	0.34 ± 0.16
Phenylethyl acetate	0.40 ± 0.07	0.10 ± 0.03	nd	nd	nd	0.19 ± 0.04
Ethyl hexadecanoate	0.21 ± 0.01	0.17 ± 0.01	0.11 ± 0.01	0.15 ± 0.04	0.22 ± 0.02	nd
Acids						
Acetic acid	3.00 ± 0.28	3.50 ± 0.28	3.90 ± 0.42	5.20 ± 0.35	3.00 ± 0.28	2.04 ± 0.26
Butanoic acid	1.00 ± 0.07	0.70 ± 0.07	0.80 ± 0.08	0.40 ± 0.04	nd	0.79 ± 0.05
Hexanoic acid	0.20 ± 0.01	0.15 ± 0.03	nd	0.10 ± 0.03	0.11 ± 0.01	0.21 ± 0.03
Octanoic acid	0.61 ± 0.06	0.55 ± 0.07	0.40 ± 0.03	0.31 ± 0.05	0.66 ± 0.05	0.53 ± 0.05
Nonanoic acid	0.20 ± 0.03	0.15 ± 0.01	nd	nd	0.10 ± 0.01	nd
Decanoic acid	0.20 ± 0.04	0.23 ± 0.04	0.18 ± 0.03	0.15 ± 0.01	0.20 ± 0.02	0.09 ± 0.05
Alcohols*						
n-propanol	9.30 ± 0.42	8.00 ± 0.42	7.10 ± 0.28	5.60 ± 0.14	7.99 ± 0.11	7.54 ± 0.39
2-methyl-propanol	50.00 ± 4.24	45.00 ± 0.99	40.15 ± 1.77	35.80 ± 0.99	40.65 ± 1.06	41.05 ± 1.20
2- and 3-methyl butanol	65.10 ± 7.07	57.20 ± 9.90	55.10 ± 5.66	49.10 ± 2.69	59.85 ± 4.31	50.10 ± 4.94
2-phenylethanol	18.20 ± 2.83	12.30 ± 1.41	11.00 ± 1.56	9.00 ± 0.92	13.17 ± 0.68	9.45 ± 0.64

*Ethanol was detected in all cases; nd: not detected

Table S3. Volatile compounds (μg kg^{-1}) of fermented milks (GC-MS analysis) with thermally-dried immobilized *L. casei* cells on tubular cellulose from coconut shells

Storage (months)	0	0	0	1	3
Fermentation temperature (°C)	37	18	10	18	18
Esters					
Ethyl acetate	0.30 ± 0.14	nd	nd	nd	nd
Ethyl butanoate	0.60 ± 0.28	0.30 ± 0.14	0.40 ± 0.28	nd	nd
Acids					
Acetic acid	25.05 ± 2.62	31.00 ± 3.25	18.00 ± 1.41	29.00 ± 2.12	27.00 ± 2.97
Butanoic acid	39.00 ± 4.95	50.00 ± 3.54	25.00 ± 1.70	20.30 ± 3.25	24.30 ± 3.25
Hexanoic acid	47.20 ± 3.11	83.30 ± 3.39	79.30 ± 4.24	59.30 ± 2.69	66.20 ± 4.38
Octanoic acid	19.50 ± 2.12	37.20 ± 4.53	23.20 ± 3.11	42.10 ± 5.66	40.30 ± 4.81
Nonanoic acid	9.10 ± 1.84	nd	nd	nd	nd
Decanoic acid	51.30 ± 3.54	60.20 ± 2.69	55.40 ± 4.81	63.20 ± 4.81	57.20 ± 5.80
Dodecanoic acid	nd	7.60 ± 1.70	nd	nd	3.20 ± 0.71
Alcohols*					
1-hexanol	6.20 ± 0.99	nd	nd	1.40 ± 0.57	nd
3-methyl-1-butanol	1.40 ± 0.57	0.80 ± 0.28	0.60 ± 0.14	nd	0.90 ± 0.28
2-heptanol	nd	1.00 ± 0.42	nd	nd	nd
2-nonanol	2.80 ± 0.57	6.90 ± 0.42	2.50 ± 0.42	4.90 ± 0.57	nd
2-ethyl-1-hexanol	12.80 ± 1.41	24.70 ± 3.54	19.30 ± 3.25	18.40 ± 1.70	12.30 ± 1.27
Aldehydes					
acetaldehyde	9.30 ± 1.70	9.40 ± 1.41	8.20 ± 1.27	12.10 ± 1.41	10.30 ± 1.27
hexanal	12.10 ± 1.6	8.30 ± 1.70	9.40 ± 1.27	7.00 ± 1.41	6.70 ± 0.57
heptanal	2.10 ± 0.57	nd	nd	1.20 ± 0.42	nd
octanal	15.10 ± 2.69	14.30 ± 1.70	12.10 ± 1.27	9.00 ± 1.27	9.50 ± 1.41
nonanal	10.20 ± 1.70	16.10 ± 1.41	14.00 ± 2.12	9.30 ± 1.27	10.00 ± 2.12
(E)-2-nonenal	nd	1.90 ± 0.28	0.90 ± 0.14	nd	nd
Ketones					
acetone	10.20 ± 1.70	12.30 ± 1.27	nd	8.20 ± 0.57	nd
2-butanone	53.10 ± 4.10	60.20 ± 4.38	45.30 ± 2.12	46.10 ± 2.97	33.20 ± 0.57
2-pentanone	43.90 ± 3.54	41.30 ± 4.38	23.40 ± 2.69	30.50 ± 4.24	27.30 ± 3.11
2-heptanone	15.90 ± 2.12	20.30 ± 2.97	19.30 ± 1.98	13.40 ± 2.12	15.10 ± 2.12
2-undecanone	7.50 ± 0.57	10.10 ± 1.41	nd	3.90 ± 0.57	4.00 ± 0.42
2-tridecanone	nd	6.10 ± 0.57	nd	4.30 ± 0.42	nd
3-hydroxy-2-butanone (acetoin)	43.50 ± 4.24	54.30 ± 4.67	50.20 ± 4.24	55.10 ± 4.24	35.10 ± 2.12
2,3-butanedione (diacetyl)	20.30 ± 2.12	31.50 ± 4.24	15.40 ± 1.41	28.20 ± 2.83	10.90 ± 1.41
2,3-pentanedione	nd	4.50 ± 0.57	nd	nd	2.10 ± 0.57

*Ethanol was detected in all cases; nd: not detected

Table S4. Volatile compounds (μg kg^{-1}) of fermented milks (GC-MS analysis) with thermally-dried immobilized *L. casei* cells on tubular cellulose from peanut shells

Storage (months)	0	0	0	1	3
Fermentation temperature (°C)	37	18	10	18	18
Esters					
Ethyl acetate	0.50 ± 0.14	1.20 ± 0.71	nd	0.60 ± 0.28	nd
Ethyl butanoate	0.80 ± 0.28	0.40 ± 0.14	0.20 ± 0.14	nd	0.20 ± 0.14
Acids					
Acetic acid	30.00 ± 2.83	25.00 ± 3.96	nd	32.00 ± 2.97	16.00 ± 1.41
Butanoic acid	42.00 ± 3.54	54.00 ± 2.83	33.00 ± 10.04	15.00 ± 0.7	20.00 ± 1.41
Hexanoic acid	61.00 ± 4.38	72.00 ± 3.96	58.00 ± 2.12	70.00 ± 4.24	78.00 ± 4.10
Octanoic acid	38.00 ± 3.39	48.00 ± 4.24	35.00 ± 0.71	54.00 ± 2.83	50.00 ± 4.95
Nonanoic acid	7.80 ± 0.71	nd	1.30 ± 0.28	nd	2.10 ± 0.71
Decanoic acid	42.00 ± 3.54	57.00 ± 4.38	40.00 ± 1.27	60.00 ± 2.12	50.00 ± 3.68
Dodecanoic acid	nd	10.00 ± 1.70	nd	7.50 ± 0.85	7.00 ± 0.57
Alcohols*					
1-hexanol	5.20 ± 1.41	3.10 ± 0.71	nd	nd	2.50 ± 0.57
3-methyl-1-butanol	nd	0.90 ± 0.14	0.40 ± 0.28	1.20 ± 0.71	nd
2-heptanol	nd	1.80 ± 0.28	nd	0.90 ± 0.14	0.50 ± 0.14
2-nonanol	3.00 ± 0.71	4.10 ± 1.13	3.00 ± 0.7	3.50 ± 0.57	nd
2-ethyl-1-hexanol	10.20 ± 1.70	17.40 ± 2.83	10.00 ± 1.41	16.30 ± 2.12	8.90 ± 0.71
Aldehydes					
acetaldehyde	10.00 ± 1.70	12.00 ± 2.83	9.50 ± 1.84	9.00 ± 1.41	10.80 ± 2.12
hexanal	9.30 ± 1.41	7.80 ± 1.70	10.30 ± 3.54	nd	7.30 ± 2.12
heptanal	nd	1.30 ± 0.71	nd	0.80 ± 0.57	nd
octanal	13.20 ± 2.12	11.50 ± 1.27	14.00 ± 2.97	10.30 ± 2.97	nd
nonanal	9.00 ± 1.41	13.40 ± 2.12	12.30 ± 2.40	5.10 ± 0.57	10.30 ± 1.27
(E)-2-nonenal	nd	4.30 ± 0.28	nd	nd	3.10 ± 0.71
Ketones					
acetone	13.20 ± 2.12	11.50 ± 1.41	4.50 ± 0.85	9.00 ± 1.98	nd
2-butanone	49.30 ± 1.84	55.10 ± 2.83	40.00 ± 1.41	39.00 ± 2.12	28.30 ± 3.54
2-pentanone	60.00 ± 4.24	45.10 ± 2.12	30.00 ± 2.97	50.00 ± 2.97	55.00 ± 3.96
2-heptanone	35.30 ± 3.25	25.30 ± 2.83	20.00 ± 2.12	10.00 ± 1.13	11.00 ± 1.27
2-undecanone	12.10 ± 1.27	9.00 ± 1.41	nd	1.85 ± 0.35	4.30 ± 0.57
2-tridecanone	nd	8.20 ± 1.13	nd	8.00 ± 1.41	nd
3-hydroxy-2-butanone (acetoin)	75.30 ± 4.67	91.20 ± 4.10	60.30 ± 3.82	90.00 ± 4.24	59.30 ± 2.83
2,3-butanedione (diacetyl)	31.30 ± 3.82	42.30 ± 4.38	25.20 ± 2.12	35.20 ± 2.12	17.30 ± 1.27
2,3-pentanedione	10.30 ± 2.12	7.50 ± 1.13	nd	nd	4.30 ± 0.71

*Ethanol was detected in all cases; nd: not detected