

Supplementary Table S1. Sequences of primers used to quantitate copy numbers of chromosomes by qRT-PCR.

Chr.	Sequence	
	Forward primer	Reverse primer
1	CAGTGTGAAAGAGAGGGCTAT	CAGGGGCAAAGTGAAGATT
2	ATAAATGTGTCCGGATCGC	TATTTTATGGTTTCCCATTCC
3	GGCAAAACTTTACGGTCCAG	TTAGCGGTATGCGTTTTCCA
4	CTGTTCGTGGCGAAAATTTG	CACACAAATCAAAAGTCTGGG
5	GACTGCCATGTCAGGAGGATT	CCGATCGTTTCCTGCGATTTA
6	AAGTGGCAGGAATTTTGCGA	TAGCTGGTGGTTATTGGCAGG
7	GGTTTGGCTCCAAATTTGCT	GGTAAACACGATATTGGTGA
8	TGGTTCATCCATGATTGGTG	AGCCACAGTCAATTCGAAGA
9	TGTCATCGTCATCATCGTCCA	GGCTTCCAGTTATGTCTTCGC
10	AATGACCCTCAGGAGTTTGA	CCATACAATGTACCATGCGA
11	GATGCGAGGGATCAGAAGAT	GCGGCTCGAAAGAAAATTC
12	CCCTTCATTGCAAAATGCA	TCCAGGATCAGTTGTGGAAA
13	ACAACACGATGAATGGCTTT	CCGCTTAAATAATCCTGGAAG
14	AGATTCGTTAGATCTGCTGGG	TCAGCATTAGGATCGGTTGA
15	CGGTGGAGTATCTCACACGTT	TGGTAAAGCTTGGGTTCATCA
16	TAACGGCCACGACGATGAAA	TCGAAGGAGTTCAATGCAAGA

Supplementary Table S2. Conditions of GC-flame ionization detector (GC-FID)

analysis.

	Endogenous metabolites	Hydrophilic metabolites of the brewed broth	Volatile components of the brewed broth
Column	CP SIL 8 CB ^α	CP SIL 8CB ^α	DB-WAX column ^β
Carrier gas (N ₂ , mL/min)	0.84	0.84	1.07
Split ratio (v/v)	2 : 1	5 : 1	3.8 : 1
Oven temperature	80°C (2min) → →15°C/min → 320°C (22min)	80°C (2min) → 15°C/min → 320°C (22min)	40°C (1min) → 5°C/min (12min) → 20°C/min (5min) → 200°C (4min)
Injection temperature	230 °C	230 °C	200 °C
Detector temperature	320 °C	320 °C	320 °C

^α 30 m × 0.25 mm, 0.25 μm film thickness (Agilent Technologies, Santa Clara, CA, USA).

^β 30 m × 0.25 mm, 0.25 μm film thickness (J&W Scientific, Folsom, CA, USA).

Supplementary Table S3. List of identified peaks in the GC-flame ionization detector

(GC-FID) analysis.

Endogenous metabolites		Hydrophilic component of the brewed broth		Aroma component of the brewed broth	
Peak name	RT (min)	Peak name	RT (min)	Peak name	RT (min)
pyruvate-1TMS	6.750	pyruvate-1TMS	6.750	acetone (IS)	3.50
valine-1TMS	7.100	valine-1TMS	7.030	ethanol	4.80
alanine-1TMS	7.280	alanine-1TMS	7.210	1-propanol	6.60
leucine-1TMS	7.837	proline,	8.107	2-metyl-1-	7.80
isoleucine-1TMS	8.050	valine-2TMS	8.420	3-methyl-1-	11.0
valine-2TMS	8.498	serine-1TMS	8.824	ethyl octanoate	15.8
serine-1TMS	8.924	glycerol-1TMS	9.048	ethyl decanoate	17.5
leucine-2TMS, urea,	9.028	isoleucine-	9.215	unknown01	13.2
isoleucine-2TMS	9.230	threonine-1TMS	9.267	unknown02	17.1
threonine-1TMS	9.287	succinate-1TMS	9.320	unknown03	21.0
succinate, glycine-	9.405	glycine-1TMS	9.360		
fumarate-1TMS	9.680	fumarate-1TMS	9.680		
serine-2TMS	9.914	serine-2TMS	9.810		
threonine-2TMS	10.17	threonine-2TMS	10.00		
aspartate-1TMS	10.46	aspartate-1TMS	10.41		
malate-1TMS	11.04	malate-1TMS	11.01		
aspartate-2TMS,	11.32	aspartate-2TMS	11.32		
glutamate-2TMS	12.14	glutamate-	11.37		
ribitol (IS) -1TMS	13.07	glutamate-	11.95		
citrate-1TMS	13.66	ribitol (IS) -	12.98		
lysine-1TMS	13.95	citrate-1TMS	13.71		
glucose-1TMS	14.43	lysine-1TMS	13.95		
lysine-2TMS	14.49	lysine-2TMS	14.49		
glucose-2TMS	14.63	glucose-2TMS	14.54		
unknown01	13.80	unknown01	7.750		
unknown02	19.80	unknown02	11.40		
unknown03	21.40	unknown03	14.61		
unknown04	13.57				
unknown05	8.210				
unknown06	7.357				

unknown07

11.72
