

Supplementary table 1 Change of relative peak area of volatile compounds in HMH during storage (mean±SD) and correlation analysis with storage 3-30 days.

Metabolite	ck	3d	7d	15d	30d	Coefficient of correlation(r)
Butanoic acid, methyl ester	0.00±0.00	0.00±0.00	2.00±0.08 ^a	2.03±0.06 ^a	2.03±0.11 ^a	0.869**
3-Pentanone, 2-methyl-	0.00±0.00	2.00±0.09 ^b	2.00±0.10 ^b	2.00±0.05 ^b	2.33±0.03 ^a	0.780**
Toluene	2.00±0.00 ^a	2.00±0.00 ^a	2.00±0.01 ^a	1.99±0.01 ^a	2.00±0.01 ^a	-0.087
Octane	2.00±0.10 ^b	2.21±0.07 ^a	2.13±0.01 ^a	2.17±0.01 ^a	2.00±0.05 ^b	-0.055
p-Xylene	2.00±0.01 ^a	2.00±0.01 ^a	2.00±0.09 ^a	2.05±0.02 ^a	2.03±0.01 ^a	0.343
Tetrahydrofuran, 2-methyl-5-pentyl-	2.00±0.10 ^c	2.00±0.07 ^c	1.97±0.06 ^c	2.41±0.01 ^a	2.13±0.03 ^b	0.557*
o-Xylene	2.00±0.06 ^a	2.00±0.10 ^a	2.00±0.05 ^a	2.00±0.07 ^a	2.00±0.06 ^a	0.000
Nonane	1.90±0.07 ^b	2.00±0.07 ^b	2.00±0.05 ^b	2.51±0.04 ^a	1.97±0.07 ^b	0.403
Pentanoic acid, 3-methyl-, methyl ester	0.00±0.00	0.00±0.00	2.00±0.09 ^a	2.03±0.04 ^a	2.00±0.08 ^a	0.865**
2-Furanmethanol, 5-ethenyltetrahydro- $\alpha,\alpha,5$ -trimethyl-, cis-	2.07±0.00 ^a	2.02±0.00 ^b	2.06±0.00 ^a	2.00±0.01 ^c	2.00±0.01 ^c	-0.746**
α -Methyl- α -[4-methyl-3-pentenyl]oxiranemethanol	2.04±0.05 ^b	2.51±0.06 ^a	2.00±0.08 ^b	2.00±0.03 ^b	2.00±0.05 ^b	-0.401
Linalool	0.00±0.00	2.00±0.08 ^b	2.17±0.01 ^a	2.00±0.06 ^b	2.00±0.05 ^b	0.689**
Nonanal	2.00±0.01 ^c	2.00±0.01 ^c	2.07±0.00 ^a	2.02±0.00 ^b	2.00±0.00 ^c	0.107
Decanal	2.00±0.01 ^c	2.00±0.00 ^c	2.00±0.01 ^c	2.05±0.00 ^b	2.18±0.00 ^a	0.839**
Nonanoic acid, methyl ester	2.03±0.00 ^d	2.04±0.00 ^c	2.04±0.00 ^b	2.05±0.00 ^a	2.05±0.00 ^a	0.936**
2-Nonenoic acid, methyl ester	0.00±0.00	2.00±0.05 ^a	2.03±0.06 ^a	1.97±0.08 ^a	2.00±0.01 ^a	0.700**

Undecanal	0.00±0.00	2.00±0.05 ^a	1.95±0.10 ^a	2.00±0.06 ^a	0.00±0.00	0.000
Undecanoic acid, 10-methyl-, methyl ester	1.98±0.00 ^c	2.00±0.00 ^d	2.03±0.00 ^b	2.04±0.00 ^a	2.01±0.00 ^c	0.672**
Cedrol	0.00±0.00	0.00±0.00	2.06±0.04 ^a	1.97±0.06 ^a	2.00±0.09 ^a	0.856**
Hexadecanoic acid, methyl ester	2.02±0.00 ^b	2.00±0.00 ^c	2.05±0.00 ^a	2.00±0.00 ^c	2.00±0.00 ^c	-0.344
13-Octadecenoic acid, methyl ester	0.00±0.00	0.00±0.00	0.00±0.00	2.00±0.05 ^a	2.00±0.12 ^a	0.865**

Denotes: ck: The blank group of no *Zygosaccharomyces rouxii* was added; **: at the 0.01 level (two-tailed), the correlation is significant; *: at the 0.05 level (two-tailed), the correlation is significant.

Supplementary table 2 Change of relative peak area of volatile compounds in LMH during storage (mean±SD) and correlation analysis with storage 3-30 days.

Metabolite	ck	3d	7d	15d	30d	Coefficient of correlation(r)
Butanoic acid, methyl ester	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	3.94±0.00 ^a	0.707**
3-Pentanone, 2-methyl-	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	2.00±0.34 ^a	0.699**
Toluene	2.00±0.00 ^d	2.00±0.01 ^d	2.06±0.00 ^b	2.01±0.00 ^c	2.07±0.00 ^a	0.684**
Octane	2.03±0.06 ^c	2.00±0.10 ^c	2.00±0.05 ^c	2.20±0.00 ^b	2.90±0.05 ^a	0.787**
p-Xylene	2.00±0.06 ^a	2.00±0.07 ^a	2.00±0.02 ^a	2.00±0.08 ^a	2.00±0.01 ^a	0.000
Tetrahydrofuran, 2-methyl-5-pentyl-	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	2.14±0.03 ^a	0.707**
o-Xylene	2.00±0.14 ^c	2.00±0.05 ^c	2.00±0.10 ^c	2.51±0.02 ^b	12.30±0.05 ^a	0.733**
Nonane	2.31±0.04 ^a	2.00±0.05 ^b	2.00±0.06 ^b	2.00±0.05 ^b	2.30±0.05 ^a	-0.022
Pentanoic acid, 3-methyl-, methyl ester	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	2.51±0.02 ^a	0.707**
2-Octenal, (E)-	0.00±0.00	2.00±0.13 ^a	2.00±0.05 ^a	2.02±0.06 ^a	2.00±0.07 ^a	0.707**
2-Furanmethanol, 5-ethenyltetrahydro- $\alpha,\alpha,5$ -trimethyl-, cis-	2.00±0.00 ^b	2.00±0.01 ^b	2.06±0.00 ^a	2.00±0.01 ^b	2.00±0.01 ^b	-0.021
Linalool	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	2.00±0.07 ^a	0.707**
Nonanal	2.00±0.01 ^b	2.00±0.00 ^b	2.07±0.00 ^a	2.00±0.01 ^b	2.00±0.01 ^b	-0.031
Decanal	1.99±0.01 ^c	2.00±0.00 ^b	2.00±0.00 ^b	2.00±0.01 ^b	2.14±0.00 ^a	0.725**
Nonanoic acid, methyl ester	2.03±0.00 ^c	2.03±0.00 ^d	2.04±0.00 ^a	2.04±0.00 ^b	2.04±0.00 ^c	0.541*
2-Nonenoic acid, methyl ester	0.00±0.00	2.00±0.05 ^b	2.39±0.03 ^a	2.00±0.10 ^b	2.00±0.07 ^b	0.622**

Undecanal	0.00±0.00	2.00±0.08 ^a	2.00±0.05 ^a	2.00±0.06 ^a	0.00±0.00	0.000
Undecanoic acid, 10-methyl-, methyl ester	1.97±0.00 ^c	2.03±0.00 ^c	2.04±0.00 ^b	2.14±0.00 ^a	2.02±0.00 ^d	0.522*
Cedrol	0.00±0.00	0.00±0.00	2.00±0.09 ^a	2.00±0.02 ^a	0.00±0.00	0.289
Hexadecanoic acid, methyl ester	2.00±0.01 ^c	2.00±0.00 ^c	2.00±0.01 ^c	2.01±0.01 ^b	2.04±0.00 ^a	0.739**

Denotes: ck: The blank group of no *Zygosaccharomyces rouxii* was added; **: at the 0.01 level (two-tailed), the correlation is significant; *: at the 0.05 level (two-tailed), the correlation is significant.

Supplementary table 3 Change of relative peak area of volatile compounds in HIH during storge (mean±SD) and correlation analysis with storage 3-30 days.

Metabolite	ck	3d	7d	15d	30d	Coefficient of correlation(r)
Butanoic acid, methyl ester	0.00±0.00	0.00±0.00	0.00±0.00	2.03±0.00 ^a	0.00±0.00	0.354
3-Pentanone, 2-methyl-	0.00±0.00	0.00±0.00	2.00±0.03 ^b	2.00±0.06 ^b	3.24±0.03 ^a	0.974**
Toluene	2.00±0.01 ^b	2.00±0.01 ^b	2.00±0.01 ^b	2.00±0.01 ^b	2.06±0.00 ^a	0.706**
Octane	2.09±0.00 ^b	2.00±0.01 ^c	2.00±0.01 ^c	2.08±0.00 ^b	2.10±0.00 ^a	0.331
p-Xylene	1.91±0.00 ^d	2.00±0.03 ^c	2.00±0.07 ^c	2.37±0.02 ^b	2.19±0.01 ^b	0.779**
Tetrahydrofuran, 2-methyl-5-pentyl-	2.00±0.01 ^b	1.99±0.01 ^b	2.00±0.01 ^b	2.06±0.00 ^a	2.00±0.00 ^b	0.371
o-Xylene	2.00±0.05 ^c	2.00±0.04 ^c	2.00±0.04 ^c	2.33±0.06 ^a	2.19±0.00 ^b	0.726**
Nonane	2.00±0.08 ^b	2.03±0.01 ^b	2.58±0.01 ^a	2.54±0.03 ^a	2.00±0.03 ^b	0.266
Heptanal	2.00±0.08 ^c	2.00±0.09 ^c	2.58±0.01 ^b	3.89±0.05 ^a	2.00±0.02 ^c	0.364
Pentanoic acid, 3-methyl-, methyl ester	2.07±0.00 ^b	2.00±0.01 ^d	2.00±0.01 ^d	2.10±0.00 ^a	2.04±0.01 ^c	0.164
Heptanoic acid, methyl ester	2.00±0.06 ^a	2.00±0.03 ^a	0.00±0.00	0.00±0.00	0.00±0.00	-0.866**
2-Furanmethanol, 5-ethenyltetrahydro- $\alpha,\alpha,5$ -trimethyl-, cis-	2.01±0.00 ^b	2.00±0.01 ^b	2.00±0.01 ^b	2.00±0.01 ^b	2.05±0.00 ^a	0.597*
α -Methyl- α -[4-methyl-3-pentenyl]oxiranemethanol	2.00±0.07 ^a	2.00±0.09 ^a	2.00±0.06 ^a	2.00±0.15 ^a	2.00±0.04 ^a	0.000
Linalool	2.00±0.01 ^c	2.04±0.00 ^b	2.09±0.00 ^a	2.00±0.01 ^c	2.00±0.00 ^c	-0.124
Nonanal	2.07±0.00 ^a	2.00±0.01 ^b	2.00±0.01 ^b	2.07±0.00 ^a	2.00±0.01 ^b	-0.250
Decanal	2.02±0.00 ^c	2.00±0.01 ^d	2.00±0.00 ^d	2.03±0.00 ^b	2.05±0.00 ^a	0.612*

Nonanoic acid, methyl ester	2.07±0.00 ^a	2.07±0.00 ^a	2.07±0.01 ^a	2.03±0.00 ^b	2.03±0.02 ^b	-0.858**
2-Nonenoic acid, methyl ester	0.00±0.00	2.36±0.03 ^a	2.00±0.07 ^c	2.24±0.02 ^b	1.97±0.07 ^c	0.621*
Undecanal	0.00±0.00	2.00±0.06 ^a	2.00±0.08 ^a	0.00±0.00	2.00±0.00	-0.288
Tetradecane, 2,6,10-trimethyl-	2.00±0.03 ^a	2.00±0.07 ^a	0.00±0.00	0.00±0.00	0.00±0.00	-0.866**
Undecanoic acid, 10-methyl-, methyl ester	1.99±0.00 ^c	2.00±0.01 ^b	2.00±0.01 ^b	2.00±0.00 ^b	2.03±0.01 ^a	0.815**
Cedrol	2.00±0.06 ^a	2.00±0.12 ^a	2.00±0.06 ^a	2.00±0.08 ^a	2.00±0.02 ^a	0.146
Hexadecanoic acid, methyl ester	2.00±0.08 ^b	2.19±0.00 ^a	2.00±0.00 ^b	1.97±0.08 ^b	1.97±0.05 ^b	-0.431
13-Octadecenoic acid, methyl ester	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	1.81±0.00 ^a	0.707**

Denotes: ck: The blank group of no *Zygosaccharomyces rouxii* was added; **: at the 0.01 level (two-tailed), the correlation is significant; *: at the 0.05 level (two-tailed), the correlation is significant.

Supplementary table 4 Change of relative peak area of volatile compounds in LIH during storage (mean±SD) and correlation analysis with storage 3-30 days.

Metabolite	ck	3d	7d	15d	30d	Coefficient of correlation(r)
Butanoic acid, methyl ester	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	2.00±0.01 ^a	0.707**
3-Pentanone, 2-methyl-	0.00±0.00	2.00±0.05 ^b	2.42±0.01 ^a	2.00±0.05 ^b	1.90±0.16 ^b	0.629**
Toluene	2.04±0.02 ^c	2.00±0.01 ^d	2.07±0.00 ^b	2.09±0.00 ^a	2.00±0.00 ^d	0.035
Octane	2.00±0.01 ^b	2.00±0.01 ^b	2.05±0.00 ^a	2.07±0.00 ^a	2.00±0.01 ^b	0.332
p-Xylene	2.00±0.00 ^c	2.00±0.05 ^c	2.41±0.05 ^a	2.13±0.06 ^b	2.00±0.00 ^c	0.115
Tetrahydrofuran, 2-methyl-5-pentyl-	2.00±0.01 ^d	2.03±0.00 ^c	2.06±0.00 ^a	2.04±0.00 ^b	2.00±0.01 ^d	0.069
o-Xylene	2.00±0.08 ^b	2.00±0.09 ^b	2.39±0.03 ^a	2.39±0.01 ^a	2.00±0.03 ^b	0.279
Nonane	2.38±0.07 ^a	2.00±0.05 ^d	2.48±0.08 ^a	2.29±0.06 ^b	2.23±0.07 ^c	-0.012
Heptanal	0.00±0.00	0.00±0.00	2.27±0.02 ^b	2.30±0.02 ^a	0.00±0.00	0.290
Pentanoic acid, 3-methyl-, methyl ester	0.00±0.00	2.00±0.01 ^c	2.03±0.00 ^b	2.08±0.01 ^a	2.00±0.00 ^c	0.713**
Heptanoic acid, methyl ester	2.00±0.19 ^a	1.70±0.05 ^b	0.00±0.00	0.00±0.00	0.00±0.00	-0.882**
2-Octenal, (E)-	0.00±0.00	2.00±0.09 ^c	2.46±0.03 ^b	3.35±0.02 ^a	2.00±0.07 ^c	0.689**
2-Furanmethanol, 5-ethenyltetrahydro- $\alpha,\alpha,5$ -trimethyl-, cis-	1.99±0.00 ^b	1.99±0.00 ^c	2.03±0.00 ^a	2.03±0.00 ^a	2.00±0.01 ^b	0.387
Linalool	1.99±0.01 ^b	1.96±0.01 ^c	2.00±0.01 ^b	2.08±0.00 ^a	2.00±0.01 ^b	0.497
Nonanal	2.00±0.01 ^c	1.97±0.00 ^d	2.08±0.00 ^a	2.08±0.00 ^b	1.94±0.00 ^c	-0.042
Decanal	2.00±0.01 ^b	2.00±0.00 ^b	1.97±0.00 ^c	2.06±0.00 ^a	2.00±0.00 ^b	0.282

Nonanoic acid, methyl ester	2.00±0.01 ^b	2.00±0.01 ^b	2.08±0.00 ^a	2.09±0.00 ^a	2.00±0.01 ^b	0.301
2-Nonenoic acid, methyl ester	0.00±0.00	2.00±0.05 ^c	2.37±0.00 ^b	2.66±0.03 ^a	2.00±0.09 ^c	0.703**
Undecanal	0.00±0.00	0.00±0.00	2.96±0.02 ^a	2.00±0.07 ^b	0.00±0.00	0.226
Tetradecane, 2,6,10-trimethyl-	2.00±0.09 ^a	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	-0.706**
Undecanoic acid, 10-methyl-, methyl ester	2.00±0.01 ^b	2.00±0.01 ^b	2.02±0.00 ^a	1.99±0.00 ^b	2.00±0.00 ^b	-0.113
Cedrol	2.00±0.12 ^a	0.00±0.00	0.00±0.00	0.00±0.00	0.00±0.00	-0.706**
Hexadecanoic acid, methyl ester	2.00±0.06 ^a	2.00±0.00 ^a	2.00±0.07 ^a	2.00±0.10 ^a	2.03±0.06 ^a	0.173

Denotes: ck: The blank group of no *Zygosaccharomyces rouxii* was added; **: at the 0.01 level (two-tailed), the correlation is significant; *: at the 0.05 level (two-tailed), the correlation is significant.