Supporting Information

Tables

Table S1 Strains and plasmids used in this work

Strains or plasmids	Relevant features	Reference or source
Plasmids		
pEASY-E1	Vector for protein expression in *E. coli*, Amp^R	TRANSGEN Inc., Beijing, China
pYES-pgk	pYES2-derived expression vector in yeast controlled by a 3-phosphoglycerate kinase promoter from *S. cerevisiae*, Amp^R, $G418^R$	Laboratory collection
pYES-pgk-ADH4	*ADH4* gene amplicons cloned in pYES-pgk, Amp^R, $G418^R$	This work
pEASY-E1-ADH4	*ADH4* gene amplicons cloned in pEASY Blunt E1, Amp^R	This work
Strains		
E. coli Trans-T1	Host for cloning	TRANSGEN Inc., Beijing, China
E. coli DH5α	Host for cloning	TIANGEN Inc., Beijing, China
E. coli BL21 (DE3)	Host for protein expression	TIANGEN Inc., Beijing, China
E. coli ADH4-BL21	*E. coli* BL21 harboring pEASY-E1-ADH4, Amp^R	This work
S. cerevisiae S288c (ATCC 204508)	*MATα SUC2 gal2 mal mel flo1 flo8-1 hap1 ho bio1 bio6*; donor of *ADH4* gene	Laboratory collection
S. cerevisiae S0	*S. cerevisiae* S288c harboring pYES-pgk, $G418^R$	9
S. cerevisiae S4	*S. cerevisiae* S288c harboring pYES-pgk-ADH4, $G418^R$	This work

Table S2 Primers used in this work

Primers	Sequences(5'-3')
RT-P1 (F-ADH1)	CTTGATTGGAGACTTGAC
RT-P2 (R-ADH1)	TCTATTGTTGGTTCTTACG
RT-P3 (F-ADH2)	TCTAAGGCTTCTCTGGTA
RT-P4 (R-ADH2)	TCCTCTGATGTCTTCAAC
RT-P5 (F-ADH3)	AGAGTTCTAGGTATTGAT
RT-P6 (R-ADH3)	GTCTAACATATTCCGTAG
RT-P7 (F-ADH4)	TTCAACAATGCTTCTCTA
RT-P8 (R-ADH4)	TCACCTAATCTCTTCTTG
RT-P9 (F-ADH5)	TGGTGTTGTTGTTAAGTTG
RT-P10 (R-ADH5)	TAAGGACATTGAGATTCATTAC
RT-P11 (F-ADH6)	CTGGTATAGAGATTGAGA
RT-P12 (R-ADH6)	ATTAGAAGAAGGTGATTG
RT-P13 (F-ADH7)	TCGTTAAGATTATGAAGATTGG
RT-P14 (R-ADH7)	ACTGCTTGAGATTGATACT
RT-P15 (F- ACT1)	GCCAAGATAGAACCACCAATCC
RT-P16 (R- ACT1)	CTGATGTCGATGTCCGTAAGG
P17 (F-ADH4-*Bam*H I)	CGGGATCCATGTCTTCCGTTACTG
P18 (R-ADH4-*Eco*R I)	CGGAATTCTTAATATTCATAGGCTTTCTTG
P19 (F-ADH4)	ATGTCTTCCGTTACTGGG
P20 (R-ADH4)	ATATTCATAGGCTTTCTTGATA
P21 (F-T7)	CGAAGGAAGACTCTCCTCCG
P22 (R-CYC1)	TTCTCAAGCAAGGTTTTCAGTAT

Table S3 Factors and levels for $L_9(3^3)$ orthogonal experimental design

Factor	Level		
	1	2	3
A (inducing temperature)	16	20	25
B (inducing time)	7	9	11
C (IPTG concentration)	0.2	0.2	0.4

Table S4 The design matrix and experimental data for optimization of induced expression of Adh4p

Run	Factors			Dehydrogenase activtity (U/g)
	A	B	C	
1	1	1	1	1.55
2	1	2	2	1.68
3	1	3	3	1.75
4	2	1	2	1.83
5	2	2	3	1.88
6	2	3	1	2.09
7	3	1	3	1.87
8	3	2	1	1.47
9	3	3	2	1.64
k1	1.66	1.75	1.70	
k2	1.93	1.68	1.72	
k3	1.66	1.83	1.83	
R	0.27	0.15	0.13	
Q		$A_2B_3C_3$		

K, the average value of each level; R, the range value for each factor; Q, the best group.

Identification of methionol and MMP by GC-MS

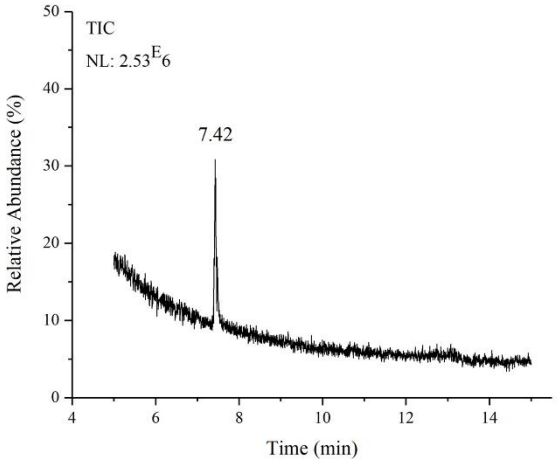

Figure S1. GC-MS chromatograms of the standard substance of MMP (7.42 min)

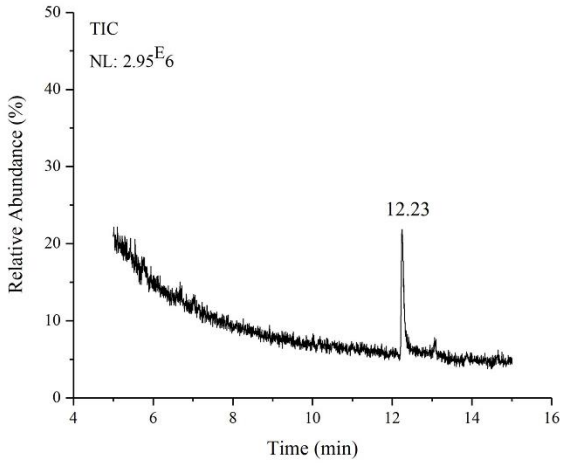

Figure S2. GC-MS chromatograms of the standard substance of methionol (12. 23 min)

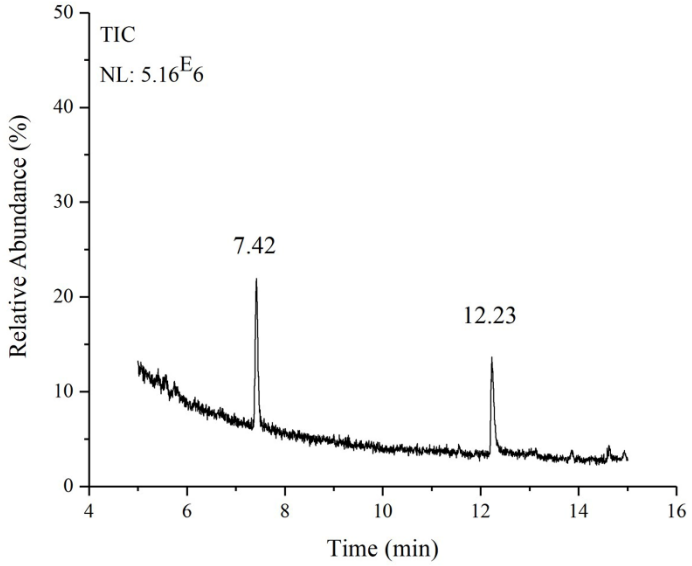

Figure S3. GC-MS chromatograms of MMP (7.42 min) and methionol (12. 23 min) in the fermentation sample

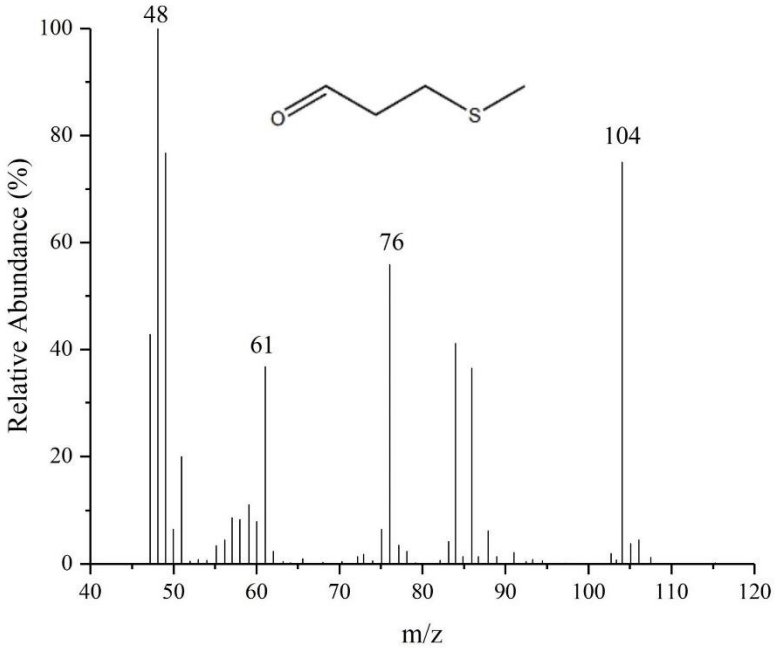

Figure S4. Full-scan MS spectra recorded at 7.42 min on MMP

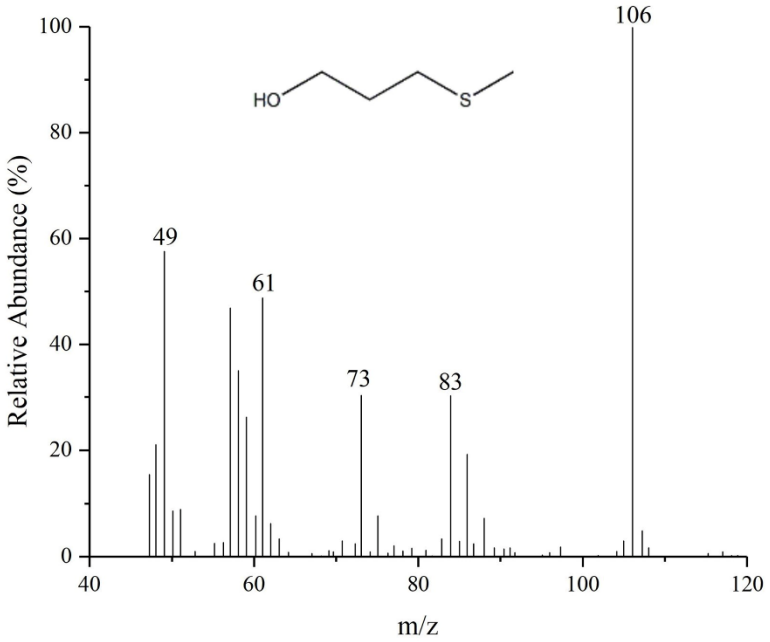

Figure S5. Full-scan MS spectra recorded at 12.23 min on methionol