

Supplymentary Mterials

Table S1. content of FAAs, threshold value, taste characteristics and TAV value in Jiangxi rice wine

number	name	Taste	Flavor	Free amino acid content of samples (mg/kg)								TAV values of samples							
		Threshold (mg/kg)	characteristic	RW0	RW1	RW2	RW3	RW4	RW5	RW6	RW7	RW0	RW1	RW2	RW3	RW4	RW5	RW6	RW7
1	Asp	100	umami	4.06	5.08	6.57	4.50	10.45	8.26	7.83	6.67	0.04	0.05	0.07	0.05	0.10	0.08	0.08	0.07
2	Thr ⁺	260	sweet	13.34	13.27	9.07	8.96	21.47	13.76	11.55	7.92	0.05	0.05	0.03	0.03	0.08	0.05	0.04	0.03
3	Ser	150	sweet	12.46	9.91	12.03	6.42	15.93	12.94	8.14	6.91	0.08	0.07	0.08	0.04	0.11	0.09	0.05	0.05
4	Glu	30	umami	7.21	7.02	11.05	11.72	18.01	21.88	17.12	14.37	0.24	0.23	0.37	0.39	0.60	0.73	0.57	0.48
5	Gly	130	sweet	0.96	0.83	1.50	2.00	2.59	4.32	6.59	1.37	0.01	0.01	0.01	0.02	0.02	0.03	0.05	0.01
6	Ala	60	sweet	12.38	13.58	23.50	27.40	37.80	64.68	57.05	48.48	0.21	0.23	0.39	0.46	0.63	1.08	0.95	0.81
7	Cys	--	-	5.75	4.24	6.62	4.78	13.55	15.19	10.53	12.04	--	--	--	--	--	--	--	--
8	Val ⁺	40	bitter	21.48	18.93	27.07	21.21	43.92	38.12	7.45	9.32	0.54	0.47	0.68	0.53	1.10	0.95	0.19	0.23
9	Met ⁺	30	bitter	8.83	4.79	6.64	3.25	5.83	0.48	0.57	6.27	0.29	0.16	0.22	0.11	0.19	0.02	0.02	0.21
10	Ile ⁺	90	bitter	2.94	2.57	4.23	2.48	9.56	4.33	0.69	0.00	0.03	0.03	0.05	0.03	0.11	0.05	0.01	0.00
11	Leu ⁺	190	bitter	17.00	20.39	37.10	19.42	60.94	31.42	7.06	7.23	0.10	0.12	0.22	0.11	0.36	0.18	0.04	0.04
12	Tyr	--	bitter	9.11	14.40	24.70	14.82	37.10	29.57	16.74	16.03	--	--	--	--	--	--	--	--
13	Phe ⁺	90	bitter	8.94	13.25	22.10	16.95	40.50	23.13	10.70	7.61	0.10	0.15	0.25	0.19	0.45	0.26	0.12	0.08
14	His	20	bitter	199.24	193.94	228.60	295.12	340.14	398.17	446.87	350.94	9.96	9.70	11.43	14.76	17.01	19.91	22.34	17.55
15	Lys ⁺	--	-	1.02	0.22	2.82	7.58	5.62	18.01	16.60	4.98	--	--	--	--	--	--	--	--
16	Arg	50	sweet	7.63	5.16	11.73	9.17	16.72	15.80	10.12	5.80	0.15	0.10	0.23	0.18	0.33	0.32	0.20	0.12
17	Pro	--	-	0.00	0.00	0.00	0.00	2.75	27.46	27.37	25.92	--	--	--	--	--	--	--	--
18		BAA		332.32	327.59	435.31	455.78	682.88	727.51	662.96	531.87	--	--	--	--	--	--	--	--
19		UAA		11.27	12.10	17.62	16.22	28.46	30.13	24.95	21.04	0.28	0.28	0.43	0.44	0.70	0.81	0.65	0.55

20	SAA	46.76	42.75	57.82	53.95	94.51	111.50	93.44	70.49	0.50	0.45	0.75	0.73	1.17	1.57	1.30	1.01
21	OAA	267.53	268.27	350.44	373.25	537.99	525.21	490.08	397.40	11.03	10.63	12.84	15.72	19.21	21.37	22.72	18.12
22	UAA+SAA	58.03	54.85	75.44	70.17	122.97	141.64	118.40	91.52	0.78	0.74	1.19	1.17	1.88	2.38	1.95	1.56

Note: * denotes essential amino acids, BAA, UAA, SAA, OAA stand for amino with different tastes of bitter, umami, sweet and odorless.

Table S2. Results of GC-MS determination of volatile substances in the fermentation process of Jiangxi rice wine

Formula	CAS	Compound	Relative content (%)							
			RW0	RW1	RW2	RW3	RW4	RW5	RW6	RW7
C ₃ H ₆ O ₃	79-33-4	L-Lactic acid	1.24	15.56	18.29	23.56	7.69	13.43	17.61	4.56
C ₂ H ₄ O ₂	64-19-7	Acetic acid	0.00	0.00	0.00	0.00	0.49	0.00	0.00	0.00
C ₈ H ₁₆ O ₂	124-07-2	Octanoic acid	0.00	0.00	0.00	0.40	0.00	0.97	0.53	0.71
C ₇ H ₅ N ₅ O ₃	948-60-7	Pterin-6-carboxylic acid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
C ₁₀ H ₂₀ O ₂	334-48-5	n-Decanoic acid	0.00	0.00	0.00	0.00	0.58	0.77	0.43	0.50
C ₁₂ H ₂₄ O ₃	1883-13-2	Dodecanoic acid, 3-hydroxy	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20
C ₁₈ H ₃₄ O ₂	112-80-1	Oleic Acid	0.00	0.00	0.00	0.00	0.00	0.44	0.40	0.05
C ₅ H ₁₂ O	123-51-3	3-methyl-1-Butanol	0.00	0.00	0.00	0.00	0.00	8.77	0.00	0.00
C ₅ H ₆ O ₂	4412-91-3	3-Furanmethanol	0.00	0.00	0.00	0.00	0.50	0.00	0.00	0.00
C ₈ H ₁₈ O	58175-57-8	2-Propyl-1-pentano	0.66	0.49	0.00	0.00	0.00	0.00	0.00	0.00
C ₁₄ H ₂₆ O	1000131-00-3	E-11,13-Tetradecadien-1-ol	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00
C ₈ H ₁₀ O	60-12-8	Phenylethyl Alcohol	1.75	3.20	7.03	7.53	15.77	26.48	30.72	39.56
C ₁₅ H ₂₆ O	28400-11-5	α-Acorenol	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
C ₁₅ H ₂₆ O	35727-45-8	3-ethenyl-3-methyl-2-(1-methylethenyl)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23
		-6-(1-methylethyl)-,[1R-(1.alpha.,2.alpha.								
		,3.beta.,6.alpha.)]-Cyclohexanol								
C ₁₈ H ₂₄ O	2529-64-8	Estra-1,3,5(10)-trien-17.beta.-ol	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
C ₇ H ₁₄ O ₂	624-41-9	1-Butanol,2-methyl-, acetate	0.00	0.00	0.00	0.00	1.01	0.00	0.00	0.00

C ₃ H ₄ O ₂	692-45-5	Formic acid, ethenyl ester	0.00	0.00	0.00	0.00	1.44	0.00	0.00	0.00
C ₈ H ₁₆ O ₃	168920-35-2	Methoxyacetic acid,pentyl ester	0.00	0.00	0.00	0.00	4.40	0.00	0.13	0.00
C ₁₀ H ₂₀ O ₂	106-32-1	Octanoic acid, ethyl ester	0.80	0.88	0.97	0.59	0.69	1.17	0.80	3.73
C ₂₅ H ₄₀ O ₂	55130-16-0	9-Octadecenoic acid(Z)-, phenylmethyl ester	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00
C ₁₀ H ₁₂ O ₂	103-45-7	Acetic acid, 2-phenylethyl ester	0.00	0.00	0.00	0.00	0.00	1.13	1.76	0.82
C ₁₂ H ₂₄ O ₂	110-38-3	Decanoic acid, ethyl ester	0.00	0.00	1.04	1.39	0.89	3.09	3.08	5.50
C ₁₄ H ₂₈ O ₂	106-33-2	Dodecanoic acid,ethyl ester	0.00	0.00	0.58	1.91	1.03	1.53	1.04	1.29
C ₂₆ H ₄₄ O ₅	1000043-05-3	Ethyl iso-allocholate	8.99	1.04	0.43	0.95	4.62	2.61	0.32	0.00
C ₁₆ H ₂₈ O ₃	1000131-33-2	Z-(13,14-Epoxy)tetradec-11-en-1-ol acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00
C ₁₆ H ₃₂ O ₂	124-06-1	Tetradecanoic acid,ethyl ester	0.62	2.42	2.77	3.61	3.01	2.18	1.05	0.71
C ₁₇ H ₃₂ O ₂	1000130-99-6	7-Methyl-Z tetradecen-1-ol acetate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09
C ₁₇ H ₃₄ O ₂	41114-00-5	Pentadecanoic acid, ethyl ester	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00
C ₂₁ H ₄₂ O ₂	18281-04-4	Nonadecanoic acid, ethyl ester	0.00	0.00	0.00	0.16	0.00	0.00	0.12	0.00
C ₁₆ H ₃₀ O ₃	101434-22-4	Tridecanoic acid, 13-formyl-, ethyl ester	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00
C ₃₉ H ₇₆ O ₅	504-40-5	Octadecanoic acid, 2-hydroxy-1,3-propanediyl di-ester	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
C ₁₈ H ₃₄ O ₂	54546-22-4	Ethyl 9-hexadecenoate	0.00	0.00	0.06	0.15	0.00	0.20	0.28	0.17
C ₁₈ H ₃₆ O ₂	628-97-7	Hexadecanoic acid, ethyl ester	4.47	15.74	18.80	31.79	22.88	25.61	14.73	15.68
C ₃₅ H ₆₈ O ₅	761-35-3	Hexadecanoic acid, 1-(hydroxyl methyl)-1,2-ethanediyl ester	0.00	0.05	0.12	0.13	0.06	0.13	0.06	0.00
C ₂₈ H ₄₄ O ₄	56599-46-3	9-Octadecenoic acid,(2-phenyl-1,3-dioxolan-4-yl)methyl ester, trans	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10
C ₂₀ H ₃₈ O ₂	111-62-6	Ethyl Oleate	0.00	0.18	0.51	0.40	0.77	0.69	0.71	0.84
C ₂₀ H ₃₆ O ₂	544-35-4	Linoleic acid ethyl ester	0.00	0.29	0.31	0.28	0.28	0.15	0.58	1.11
C ₃₅ H ₆₈ O ₅	761-35-3	Hexadecanoic acid, 1-(hydroxyl methyl)-1,2-ethanediyl ester	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C ₃₅ H ₆₈ O ₅	761-35-3	Hexadecanoic acid, 1-(hydroxyl methyl)-1,2-ethanediyl	0.00	0.00	0.00	0.00	0.00	0.37	0.11	0.00

		ester								
C ₇ H ₆ O	100-52-7	Benzaldehyd	0.00	0.00	0.00	0.00	2.94	1.56	1.21	1.31
C ₈ H ₈ O	122-78-1	Benzeneacetaldehyd	0.00	0.00	0.31	0.59	1.14	0.37	0.00	0.21
C ₉ H ₁₀ O	5973-71-7	Benzaldehyde, 3,4-dimethyl	0.00	0.00	0.00	0.00		0.27	0.20	0.00
C ₆ H ₆ O ₃	67-47-0	5-Hydroxymethylfurfural	0.00	0.00	0.00	0.00	7.94	0.87	0.00	0.00
C ₆ H ₈ O ₄	28564-83-2	4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy-6-methyl	0.00	0.00	0.00	0.00	2.55	0.00	0.00	0.00
C ₂₀ H ₄₀ O	930-02-9	Octadecyl vinyl ether	0.00	0.00	0.09	0.00	0.00	0.00	0.05	0.00
C ₁₄ H ₂₂ O	1138-52-9	Phenol, 3,5-bis(1,1-dimethylethyl)-	0.08	0.79	0.16	0.39	0.13	0.00	0.00	0.00
C ₇ H ₁₄ O	53897-30-6	Oxirane, 2-(1,1-dimethylethyl)-3-methyl	7.41	14.70	13.47	5.34	0.00	0.00	0.89	2.23
C ₂₄ H ₂₄	28336-57-4	Cyclohexane, 1,3,5-triphenyl	45.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C ₁₀ H ₁₆	5989-27-5	D-Limonene	5.48	6.19	4.05	1.57	1.26	0.38	0.14	1.03
C ₂₅ H ₄₄ N ₂ O ₅ S	1000111-63-6	2-Myristynoyl pantetheine	0.00	0.00	0.00	0.00	1.64	0.51	0.22	0.00
C ₃ H ₇ N O ₂	2043-43-8	Propanamide, 2-hydroxy	1.91	0.74	0.82	3.57	3.29	0.39	0.00	5.05
C ₆ H ₉ N ₃ O	1000132-95-8	2-Formylhistamine	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00
C ₁₄ H ₁₇ N O ₉	1000130-04-4	Tetraacetyl-d-xylonic nitrile	0.00	0.00	0.00	0.00	0.12	0.00	0.02	0.00
C ₈ H ₉ N O ₂	1000222-86-6	Oxime-, methoxy phenyl-_	0.11	5.26	3.78	3.19	1.84	1.75	1.11	0.00
C ₇ H ₁₄ O ₇	1000130-14-3	d-Glycero-d-ido heptose	0.00	0.00	0.00	0.00	0.34	0.00	0.00	0.00
C ₁₄ H ₁₇ N O ₉	1000130-04-4	Tetraacetyl-d-xylonic nitrile	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00
C ₁₀ H ₁₄ N ₂ O ₇	35542-01-9	Uridine, 5-methoxy-	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00
C ₁₄ H ₁₇ N O ₉	1000130-04-4	Tetraacetyl-d-xylonic nitrile	0.00	0.00	0.00	0.00	0.56	0.00	0.00	0.00
C ₁₁ H ₁₈ N ₂ O ₂	130403-61-1	Acetamide, N-methyl N-[4-(3-hydroxypyrrolidinyl)-2-butynyl]-	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00
C ₁₄ H ₁₇ N O ₉	1000130-04-4	Tetraacetyl-d-xylonic nitrile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
C ₂₉ H ₃₈ O ₁₃	62561-89-1	(+)-1-Abscisyl-.beta.-d glucopyranoside tetraacetate	0.00	0.00	0.00	0.00	0.61	0.00	0.00	0.00
C ₇ H ₁₄ O ₇	77770-51-5	d-Glycero-d-galacto heptose	0.00	0.00	0.00	0.00	0.84	0.00	0.00	0.00

1 **Table S3.** Qualitative analysis of volatile flavor compounds in Jiangxi rice wine

Count	Compound	CAS#	Formula	MW	RI	Rt [sec]	Dt [a.u.]	Content
1	Decanoic acid ethyl ester	C110383	C ₁₂ H ₂₄ O ₂	200.3	1608.3	2164.309	1.61502	1.13
2	Benzaldehyde	C100527	C ₇ H ₆ O	106.1	1476.1	1309.42	1.15345	0.94
3	Acetic acid(M)	C64197	C ₂ H ₄ O ₂	60.1	1450.5	1187.826	1.04951	7.51
4	Acetic acid(D)	C64197	C ₂ H ₄ O ₂	60.1	1449.9	1185.063	1.15035	1.26
5	Ethyl octanoate	C106321	C ₁₀ H ₂₀ O ₂	172.3	1427.8	1089.308	1.48074	1.23
6	3-Methylbutan-1-ol	C123513	C ₅ H ₁₂ O	88.1	1212.9	676.663	1.48992	16.88
7	Ethyl hexanoate(M)	C123660	C ₈ H ₁₆ O ₂	144.2	1242.9	716.974	1.34239	0.78
8	Ethyl hexanoate(D)	C123660	C ₈ H ₁₆ O ₂	144.2	1240.3	713.356	1.80485	0.67
9	2-Methyl-1-propanol	C78831	C ₄ H ₁₀ O	74.1	1099.7	483.618	1.36325	13.86
10	1-Propanol(M)	C71238	C ₃ H ₈ O	60.1	1048.4	420.83	1.25534	3.03
11	1-Propanol(D)	C71238	C ₃ H ₈ O	60.1	1048.4	420.83	1.38323	1.28
12	Butanoic acid ethyl ester	C105544	C ₆ H ₁₂ O ₂	116.2	1048.8	421.348	1.55863	2.10
13	2-Methyl-1-propyl acetate	C110190	C ₆ H ₁₂ O ₂	116.2	1026.4	396.754	1.61435	1.49
14	Acetic acid propyl ester	C109604	C ₅ H ₁₀ O ₂	102.1	991.5	362.323	1.48372	0.87
15	Ethyl 2-methyl propionate	C97621	C ₆ H ₁₂ O ₂	116.2	980.0	353.78	1.56411	0.06
16	Ethyl propanoate	C105373	C ₅ H ₁₀ O ₂	102.1	973.6	349.121	1.45266	1.87
17	3-Methyl butanal	C590863	C ₅ H ₁₀ O	86.1	931.7	320.126	1.40698	0.28
18	Acetic acid ethyl ester	C141786	C ₄ H ₈ O ₂	88.1	901.5	300.71	1.34304	12.83
19	Butanal	C123728	C ₄ H ₈ O	72.1	919.8	312.36	1.29188	1.24
20	2-Butanone	C78933	C ₄ H ₈ O	72.1	919.3	312.053	1.24435	0.17
21	Dimethyl sulfide	C75183	C ₂ H ₆ S	62.1	793.1	240.292	0.95702	0.69
22	Acetaldehyde	C75070	C ₂ H ₄ O	44.1	763.1	225.816	0.95741	0.04
23	Acetone	C67641	C ₃ H ₆ O	58.1	850.2	270.449	1.11433	2.63
24	Propanal(M)	C123386	C ₃ H ₆ O	58.1	835.1	262.119	1.07018	0.73
25	Propanal(D)	C123386	C ₃ H ₆ O	58.1	835.9	262.525	1.14622	0.56
26	2-Methyl propanal	C78842	C ₄ H ₈ O	72.1	845.9	268.011	1.28603	0.48
27	1-Pentanal	C110623	C ₅ H ₁₀ O	86.1	997.2	366.849	1.42725	0.10
28	Ethanol	C64175	C ₂ H ₆ O	46.1	942.1	327.119	1.13817	11.93
29	Tetrahydrofuran(M)	C109999	C ₄ H ₈ O	72.1	857.3	274.441	1.06025	0.09
30	Tetrahydrofuran(D)	C109999	C ₄ H ₈ O	72.1	856.7	274.066	1.22702	0.05
31	Ethyl 2-hydroxypropanoate	C97643	C ₅ H ₁₀ O ₃	118.1	1353.9	891.122	1.14348	0.30
32	3-Methyl-3-buten-1-ol	C763326	C ₅ H ₁₀ O	86.1	1258.3	738.632	1.17154	0.08
33	3-Hydroxy-2-butanone(M)	C513860	C ₄ H ₈ O ₂	88.1	1292.4	788.831	1.06302	0.49
34	3-Hydroxy-2-butanone(D)	C513860	C ₄ H ₈ O ₂	88.1	1292.1	788.357	1.33058	0.41
35	1-Butanol(M)	C71363	C ₄ H ₁₀ O	74.1	1155.5	578.163	1.1771	0.26
36	1-Butanol(D)	C71363	C ₄ H ₁₀ O	74.1	1153.9	575.172	1.37809	0.17
37	Isoamyl acetate(M)	C123922	C ₇ H ₁₄ O ₂	130.2	1137.2	545.259	1.30722	1.09
38	Isoamyl acetate(D)	C123922	C ₇ H ₁₄ O ₂	130.2	1135.4	542.111	1.75485	7.75
39	1-Octanal	C124130	C ₈ H ₁₆ O	128.2	1291.4	787.287	1.39897	0.33

2

Table S4. ROAV of volatile components in Jiangxi rice wine

No.	Aroma active compound	Formula	Odor threshold ($\mu\text{g/L}$)	Odor description	ROAV values
1	Ethyl propionate	$\text{C}_5\text{H}_{10}\text{O}_2$	19019.33	Sweet, floral	0.1
2	1-Butanol	$\text{C}_4\text{H}_{10}\text{O}$	2730	Fruity	0.16
3	1-Pentanal	$\text{C}_5\text{H}_{10}\text{O}$	500	Malt, grass	0.22
4	Benzaldehyde	$\text{C}_7\text{H}_6\text{O}$	4203	Nutty, woody	0.25
5	Propyl acetate	$\text{C}_5\text{H}_{10}\text{O}_2$	2700	Sweet ,fruity	0.34
6	Isobutanol	$\text{C}_4\text{H}_{10}\text{O}$	40000	Malt, fruity	0.36
7	Ethyl acetate	$\text{C}_4\text{H}_8\text{O}_2$	32600	Grass, floral	0.41
8	Butyraldehyde	$\text{C}_4\text{H}_8\text{O}$	2900	Sweet	0.45
9	Ethyl decanoate	$\text{C}_{12}\text{H}_{24}\text{O}_2$	1122.3	Grape	0.99
10	Ethyl isobutyrate	$\text{C}_6\text{H}_{12}\text{O}_2$	57.47	Sweet, fruity	1.23
11	Isobutyl acetate	$\text{C}_6\text{H}_{12}\text{O}_2$	922	Sweet, apple	1.71
12	3-Hydroxy-2-butanone	$\text{C}_4\text{H}_8\text{O}_2$	259	Floral, fruity	3.76
13	Propanal	$\text{C}_3\text{H}_6\text{O}$	200	Grass, fruity	6.68
14	Ethyl butyrate	$\text{C}_6\text{H}_{12}\text{O}_2$	206	Fruity, floral	10.71
15	3-Methyl butanal	$\text{C}_5\text{H}_{10}\text{O}$	16.51	Grass	17.17
16	Ethyl caproate	$\text{C}_8\text{H}_{16}\text{O}_2$	55	Banana, fruity	27.79
17	Isopentyl acetate	$\text{C}_7\text{H}_{14}\text{O}_2$	93.93	Banana, fruity	99.07
18	Ethyl caprylate	$\text{C}_{10}\text{H}_{20}\text{O}_2$	13	Pineapple	100

3

4