

Table 1: Analysis of main volatile components in the Yinqiaosan decoction samples with different time by gas chromatography-mass spectrometer

Retention time (min)	Compound name	Molecular formula	Relative molecular mass	Relative percentage				
				Later-decocting for 3 min	Later-decocting for 5 min	Later-decocting for 8 min	Later-decocting for 10 min	Later-decocting for 0 min
8.793	3-methylcyclohexanone	C ₇ H ₁₂ O	112.16	-	-	4.03	-	1.86
8.83	(R)-(+)-3-methylcyclohexanone	C ₇ H ₁₂ O	112.17	2.29	3.27	-	-	-
15.281	Phenylethyl alcohol	C ₈ H ₁₀ O	122.16	0.74	-	-	-	-
17.105	Cyclohexanone, 5-methyl-2-(1-methylethyl)-, (2S-trans)-	C ₁₀ H ₁₈ O	154.25	-	-	0.96	-	-
17.121	Menthone	C ₁₀ H ₁₈ O	154.25	-	4.41	-	-	-
17.126	Cyclohexanone, 5-methyl-2-(1-methylethyl)-, trans-	C ₁₀ H ₁₈ O	154.24	4.59	-	-	-	-
17.597	(+)-isomenthone	C ₁₀ H ₁₈ O	154.24	0.68	-	-	-	-
18.185	4-terpineol	C ₁₀ H ₁₈ O	154.25	0.57	-	-	-	-
18.907	2-methyl-5-(1-methylethenyl)-cyclohexanol	C ₁₀ H ₁₈ O	154.25	4.26	-	-	-	-
19.052	2-methyl-5-(1-methylethenyl)-cyclohexanone	C ₁₀ H ₁₆ O	152.23	19.05	-	-	-	-
19.816	4-methyl-1-(1-methylethenyl)-cyclohexanol	C ₁₀ H ₁₆ O	136.00	0.4	4.46	3.43	3.26	-
20.95	Pulegone	C ₁₀ H ₁₆ O	152.23	-	19.34	-	-	-
20.956	5-methyl-2-(1-methylethylidene)-cyclohexanone	C ₁₀ H ₁₆ O	152.23	17.93	-	7.92	-	1.24
21.116	2-Cyclohexen-1-one, 2-methyl-5-(1-methylethenyl)-	C ₁₀ H ₁₄ O	150.22	-	-	-	-	2.06
21.132	2-Cyclohexen-1-one, 2-methyl-5-(1-methylethenyl)-, (S)-	C ₁₀ H ₁₄ O	150.22	11.98	14.88	12.84	12.93	-
22.571	Sulfurous acid, butyl nonyl ester	C ₁₃ H ₂₈ O ₃ S	264.17	-	-	-	-	0.66
23.806	2,4 (1H,3H)-Pyrimidinedione, 5-(1,1-dimethylethyl)-	C ₈ H ₁₂ N ₂ O ₂	168.08	1.70	-	-	-	-
23.111	2-octynal diethyl acetal	C ₁₂ H ₂₂ O ₂	198.30	-	11.20	-	-	-
24.582	1-chlorooctadecane	C ₁₈ H ₃₇ Cl	288.94	-	-	-	-	0.97
25.267	1,2-cyclohexanediol, 1-methyl-4-(1-methylethenyl)-	C ₁₀ H ₁₈ O ₂	170.24	1.14	1.31	2.09	2.48	-
25.432	2-Methylene Bornane	C ₁₀ H ₁₈	150.00	-	-	3.93	-	-
25.433	3-methyl-6-(1-methylethylidene)-2-cyclohexen-1-one	C ₁₀ H ₁₄ O	150.21	-	-	-	4.46	1.03
25.443	2,4-Cycloheptadien-1-one, 2,6,6-trimethyl-	C ₁₀ H ₁₄ O	150.22	2.98	3.5	-	-	1.35
26.197	Thichloroacetic acid nonyl ester	C ₁₁ H ₁₈ Cl ₃ O ₂	289.62	1.03	-	-	-	-
27.855	Vanillin	C ₈ H ₈ O ₃	152.14	0.75	-	-	-	-
31.744	Mint furanone	C ₁₀ H ₁₄ O ₂	166.00	5.57	6.73	9.08	12.34	4.31
31.99	2,4-Bis (1,1-dimethylethyl)-phenol	C ₁₄ H ₂₂ O	206.33	-	-	-	-	0.93
31.968	Phenol, 2,5-bis (1,1-dimethylethyl)	C ₁₄ H ₂₂ O	206.32	1.06	1.55	-	-	-
32.648	3-Homoadamantanol	C ₁₁ H ₁₈ O	166.26	1.64	-	-	-	-
33.199	Octahydro-1H-pyrido (1,2-c) pyrimidine	C ₈ H ₁₆ N ₂	140.20	2.49	-	-	-	-
33.477	2,4 (1H,3H)-Pyrimidinedione, 5-amino-	C ₄ H ₅ N ₃ O ₂	127.10	0.54	-	-	-	-
33.477	4-Amino-2,6-dihydroxypyrimidine	C ₄ H ₅ N ₃ O ₂	127.10	-	-	0.90	-	-
34.049	Hexadecane	C ₁₆ H ₃₄	226.44	-	-	-	-	1.00
35.333	(6R,7E,9R)-9-Hydroxy-4,7-megastigmadien-3-one	C ₁₄ H ₁₇ NO ₂	231.29	0.47	-	-	-	-
36.317	2-fluorobenzoic acid, undec-2-enylester			0.22	-	-	-	-
36.408	10-methylnonadecane	C ₂₀ H ₄₂	282.55	-	-	-	-	0.56
36.707	Tetratetracontane	C ₄₄ H ₉₀	619.19	-	-	-	-	0.80
38.868	Octadecane	C ₁₈ H ₃₈	254.49	-	-	-	-	1.88
38.89	2-cyclohexen-1-one, 4-hydroxy-3,5,6-trimethyl-4-(3-oxo-1-butenyl)-	C ₁₃ H ₁₈ O ₃	222.30	0.86	-	1.52	-	-
38.89	2-cyclohexen-1-one, 4-hydroxy-3,5,5-trimethyl-4-(3-oxo-1-butenyl)-	C ₁₃ H ₁₈ O ₃	222.28	-	1.15	-	-	-
43.003	n-Hexadecanoic acid	C ₁₆ H ₃₃ O ₂	256.42	0.80	1.48	-	-	-
44.062	1-chlorohexadecane	C ₁₆ H ₃₃ Cl	260.89	-	-	-	-	1.02
44.452	Tricyclo[4.2.2.2 (2,5)]dodecan-3-one	C ₁₂ H ₁₈ O	178.30	-	-	-	-	1.21
46.736	Tetrapentacontane, 1,54-dibromo-	C ₅₄ H ₁₀₈ Br ₂	914.68	-	-	-	-	1.34
47.143	Bicyclo[3.1.1]heptan-3-one, 2-(but-3-enyl)-6,6-dimethyl-	C ₁₀ H ₁₄ O	150.21	-	-	-	-	1.02
47.383	E, E, Z-1,3,12-nonadecatriene-5,14-diol	C ₁₉ H ₃₄ O ₂	294.47	-	-	-	-	0.80
47.742	Beta-iso-methyl ionone	C ₁₄ H ₂₂ O	206.33	-	-	-	-	3.88
49.705	Bromoacetic acid, octadecyl ester	C ₂₀ H ₃₉ BrO ₂	390.21	-	-	-	-	3.09
50.352	Pregnane	C ₂₁ H ₃₆	288.51	-	-	-	-	1.39
52.074	Sulfurous acid, octadecyl 2-propyl ester	C ₂₁ H ₄₄ O ₃ S	376.64	-	-	-	-	1.62
53.454	1H-Indene, 5-butyl-6-hexyloctahydro-	C ₁₉ H ₃₆	264.28	-	-	-	-	0.87
54.679	Sulfurous acid, pentadecyl 2-propyl ester	C ₁₈ H ₃₆ O ₃ S	334.50	-	-	-	-	1.11
55.422	Phenol, 2,2'-methylenebis[6-(1,1-dimethylethyl)-4-methyl-	C ₂₃ H ₃₂ O ₂	340.50	2.7	6.27	4.2	4.65	24.12
57.257	Eicosane	C ₂₀ H ₄₂	282.55	-	-	-	-	2.32

were not later-decocted with other 7 medicines, chemical compositions of these medicines interacted with each other under high heat decoction, triggering chemical changes, and yielding new compounds; and the longer decocting time is responsible for the heavy loss of volatile components in mint and herba schizonepetae.

CONCLUSIONS

The experiment found that different time patterns of later-decoction of mint and herba schizonepetae had a significant influence on their volatile components. The sample in which mint and herba

schizonepetae were later-decocted for 3 min contained more volatile components with high concentration, which are also the important pharmaceutical basis of the Yinqiaosan. Therefore, when decocting Yinqiaosan, the best length of later-decoction time for mint and herba schizonepetae should be 3 min.

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Conflicts of interest

There are no conflicts of interest.

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