

Supporting Information

Direct Flavonoid-Focused Chemical Comparison Among Three *Epimedium* Plants by Online Liquid Extraction–High Performance Liquid Chromatography–Tandem Mass Spectrometry

Xia Xu ¹, Ting Li ¹, Ke Zhang ¹, Yan Cao ¹, Li Liu ², Shilin Zhang ², Pengfei Tu ¹, Yuelin Song ¹, Yunfang Zhao ^{1,*} and Jun Li ^{1,*}

¹ Modern Research Center for Traditional Chinese Medicine, School of Chinese Materia Medica, Beijing University of Chinese Medicine, Beijing 100029, China; Xkilly1119@163.com (X.X.); 18201353145@163.com (T.L.); zk_5353@163.com (K.Z.); cyan199409@163.com (Y.C.); pengfeitu@163.com (P.T.); syltvc2005@163.com (Y.S.)

² Guizhou Hanfang Pharmaceutical Co. Ltd., Guiyang 550014, China; dcxliuli@163.com (L.L.); zhang_shi_lin2021@163.com (S.Z.)

* Correspondence: yunfang.zhao@163.com (Y.Z.); drlij666@163.com (J.L.); Tel./Fax.: +86-010-6428-6350 (Y.Z.)

Table S1. The in-house data library for the chemical components identified from *Epimedium* genus.

No.	Molecular formula	Exact Mass	Integer/Da	Mass defect/ mDa	Identity	Reference
1	C ₁₃ H ₈ O ₆	260.0321	260	32.10	1,3,5,8-tetrahydroxy xanthone	1
2	C ₁₅ H ₁₂ O ₄	256.0736	256	73.60	liquiritigenin	2
3	C ₁₅ H ₁₂ O ₄	256.0736	256	73.60	isoliquiritigenin	3
4	C ₁₅ H ₁₀ O ₅	270.0528	270	52.80	apigenin	4
5	C ₁₅ H ₁₀ O ₆	286.0477	286	47.70	kaempferol	5
6	C ₁₅ H ₁₀ O ₆	286.0477	286	47.70	luteolin	5
7	C ₁₆ H ₁₂ O ₆	300.0634	300	63.40	6-demethoxy-7-methylcapillarisin	6
8	C ₁₆ H ₁₂ O ₆	300.0634	300	63.40	chrysoeriol	7
9	C ₁₅ H ₁₀ O ₇	302.0427	302	42.70	quercetin	5
10	C ₁₆ H ₁₄ O ₆	302.0790	302	79.00	1-hydroxy-3,5,8-trimethoxy xanthone	1
11	C ₁₆ H ₁₂ O ₇	316.0583	316	58.30	tricetin-3'-methyl ether	2
12	C ₁₇ H ₁₄ O ₇	330.0740	330	74.00	tricin	8
13	C ₁₈ H ₁₄ O ₇	330.0740	330	74.00	5-hydroxy-6,7-methylene-dioxyflavone	9
14	C ₂₀ H ₁₆ O ₅	336.0998	336	99.80	yinyanghuo C	10
15	C ₂₀ H ₁₆ O ₅	336.0998	336	99.80	yinyanghuo E	10
16	C ₂₀ H ₁₈ O ₅	338.1154	338	115.40	yinyanghuo D	10
17	C ₂₀ H ₁₆ O ₆	352.0947	352	94.70	epimedonin B	10
18	C ₂₁ H ₂₀ O ₅	352.1311	352	131.10	8-(3,3-dimethylallyl)-5,7-dihydroxy-4'-methoxyflavonol 3-[O-3,5-di-deoxy-2-C-(ethoxycarbonyl)-β-D-erythropentofuranosyl-(1→2)-α-L-rha] 7-(β-D-glc)	2
19	C ₂₀ H ₁₈ O ₆	354.1103	354	110.30	demethylanhydroicaritin	4
20	C ₂₀ H ₁₈ O ₆	354.1103	354	110.30	2-(p-hydroxyphenoxy)-5, 7-dihydroxy-6-isopentenyl chromone	11
21	C ₂₀ H ₁₈ O ₆	354.1103	354	110.30	epimedokoreanin D	12
22	C ₂₀ H ₁₈ O ₆	354.1103	354	110.30	8-prenylkaempferol	13
23	C ₂₀ H ₁₈ O ₆	354.1103	354	110.30	6-demthoxy-7-isopentenylcapillarisin	6
24	C ₂₀ H ₁₈ O ₆	354.1103	354	110.30	aglycone A	14
25	C ₂₁ H ₂₀ O ₆	368.1260	368	126.00	epimedokoreanin D	2
26	C ₂₁ H ₂₀ O ₆	368.1260	368	126.00	anhydroicaritin	2
27	C ₂₁ H ₂₀ O ₆	368.1260	368	126.00	epimedonin A	15
28	C ₂₁ H ₂₂ O ₆	370.1416	370	141.60	6-demethoxy-4'-methyl-8-isopentenylcapillarisin	6
29	C ₂₁ H ₂₀ O ₇	384.1209	384	120.90	aglycone C	14
30	C ₂₁ H ₂₀ O ₇	384.1209	384	120.90	2''-hydroxy-β-anhydroicaritin	2
31	C ₂₁ H ₂₂ O ₇	384.1209	384	120.90	wushanicaritin	16

32	C ₂₁ H ₂₂ O ₇	384.1209	384	120.90	5,7-dihydroxy-2-(p-hydroxyphenoxy)-6-prenyichromone	17
33	C ₂₂ H ₂₂ O ₇	398.1366	398	136.60	baohuosu	18
34	C ₂₂ H ₂₄ O ₇	400.1522	400	152.20	brevicommin	19
35	C ₂₂ H ₃₀ O ₇	406.1992	406	199.20	3''-ethoxylicartin	20
36	C ₂₅ H ₂₆ O ₅	406.1780	406	178.00	5,7,4-trihydroxy-8,3-diprenylflavone	21
37	C ₂₅ H ₂₆ O ₅	406.1780	406	178.00	4'5,7-trihydroxy-5',8-di isopentenyl-flavone	3
38	C ₂₅ H ₂₂ O ₆	418.1416	418	141.60	epimedonin E	22
39	C ₂₅ H ₂₄ O ₆	420.1573	420	157.30	yinyanghuo A	10
40	C ₂₅ H ₂₄ O ₆	420.1573	420	157.30	epimedonin C	22
41	C ₂₅ H ₂₄ O ₆	420.1573	420	157.30	epimedonin F	22
42	C ₂₅ H ₂₆ O ₆	422.1729	422	172.90	yinyanghuo B	10
43	C ₂₅ H ₂₆ O ₆	422.1729	422	172.90	epimedokoreanin B	3
44	C ₂₅ H ₂₆ O ₆	422.1729	422	172.90	broussoflavonol F	3
45	C ₂₁ H ₂₀ O ₁₀	432.1056	432	105.60	kaempferol-3-O- α -rha	18
46	C ₂₆ H ₂₈ O ₆	436.1886	436	188.60	epimedonin D	15
47	C ₂₅ H ₂₆ O ₇	438.1679	438	167.90	breviflavone A	23
48	C ₂₅ H ₂₆ O ₇	438.1679	438	167.90	breviflavone B	23
49	C ₂₅ H ₂₆ O ₇	438.1679	438	167.90	desmethylicartin	20
50	C ₂₁ H ₂₀ O ₁₁	448.1006	448	100.60	quercetin -3-O- rha	24
51	C ₂₁ H ₂₀ O ₁₁	448.1006	448	100.60	astragalin	25
52	C ₂₁ H ₂₀ O ₁₁	448.1006	448	100.60	trifolin	18
53	C ₂₁ H ₂₀ O ₁₁	448.1006	448	100.60	kaempferol-3-O-gal	3
54	C ₂₁ H ₂₀ O ₁₁	448.1006	448	100.60	kaempferol-7-O-glc	3
55	C ₂₁ H ₂₀ O ₁₁	448.1006	448	100.60	quercetin-3-O-rha	3
56	C ₂₅ H ₂₄ O ₈	452.1471	452	147.10	epimedokoreanin A	2
57	C ₂₅ H ₂₆ O ₈	454.1628	454	162.80	epimedokoreanin C	26
58	C ₂₁ H ₂₀ O ₁₂	464.0955	464	95.50	hyperoside	24
59	C ₂₁ H ₂₂ O ₁₂	464.0955	464	95.50	dihydroquercetin-7-O-glc	24
60	C ₂₁ H ₂₀ O ₁₂	464.0955	464	95.50	hyperoside	3
61	C ₂₁ H ₂₀ O ₁₂	464.0955	464	95.50	quercetin-3-O-gal	3
62	C ₂₁ H ₂₀ O ₁₂	464.0955	464	95.50	quercetin-7-O-glc	3
63	C ₂₁ H ₂₀ O ₁₃	480.0904	480	90.40	isoarbayonin	18
64	C ₂₁ H ₂₀ O ₁₃	480.0904	480	90.40	myricetin-3-O-glc	3
65	C ₂₆ H ₂₆ O ₁₀	498.1526	498	152.60	icarisoside E	27
66	C ₂₆ H ₂₈ O ₁₀	500.1682	500	168.20	baohuoside II	25
67	C ₂₆ H ₂₈ O ₁₀	500.1682	500	168.20	ikarisoside A	18
68	C ₂₆ H ₂₈ O ₁₀	500.1682	500	168.20	demethylanhydroicaritin-3-O-rha	3
69	C ₂₇ H ₂₈ O ₁₀	512.1682	512	168.20	acuminatoside	2
70	C ₂₇ H ₃₀ O ₁₀	514.1839	514	183.90	baohuoside I	3
71	C ₂₇ H ₃₀ O ₁₀	514.1839	514	183.90	icariside II	3
72	C ₂₇ H ₃₀ O ₁₀	514.1839	514	183.90	anhydroicaritin-3-O-rha	3
73	C ₂₆ H ₂₈ O ₁₁	516.1632	516	163.20	epimedeside C	18
74	C ₂₆ H ₂₈ O ₁₁	516.1632	516	163.20	demethylanhydroicaritin-7-O-glc	3
75	C ₂₆ H ₃₀ O ₁₁	518.1788	518	178.80	dihydrodemethylicartin-7-O-glc	3
76	C ₂₇ H ₂₈ O ₁₁	528.1632	528	163.20		28
77	C ₂₇ H ₃₀ O ₁₁	530.1788	530	178.80	caohuoside C	18
78	C ₂₇ H ₃₀ O ₁₁	530.1788	530	178.80	icariside I	24
79	C ₂₇ H ₃₀ O ₁₁	530.1788	530	178.80	wushan icariin	2
80	C ₂₇ H ₃₀ O ₁₁	530.1788	530	178.80	caohuoside D	29
81	C ₂₇ H ₃₀ O ₁₁	530.1788	530	178.80	koreanoside E	30
82	C ₂₇ H ₃₀ O ₁₁	530.1788	530	178.80	anhydroicaritin-7-O-glc or isomer	3
83	C ₂₇ H ₃₀ O ₁₁	530.1788	530	178.80	3'-hydroxyicariine-7-O-rha or isomer	3
84	C ₂₇ H ₃₀ O ₁₁	530.1788	530	178.80	icariin I	25
85	C ₂₆ H ₂₈ O ₁₂	532.1581	532	158.10		31
86	C ₂₇ H ₃₂ O ₁₁	532.1945	532	194.50	icaritin-3-O-rha or isomer	24
87	C ₂₈ H ₃₀ O ₁₁	542.1788	542	178.80	ikarisoside D	27
88	C ₂₇ H ₃₀ O ₁₂	546.1737	546	173.70	3'-hydroxyicariine-3-O-glc	3
89	C ₂₇ H ₃₂ O ₁₂	548.1894	548	189.40	maohuoside A	2
90	C ₂₇ H ₃₄ O ₁₂	550.2050	550	205.00	acumination	32
91	C ₃₁ H ₂₀ O ₁₀	552.1056	552	105.60	bilobetin	17
92	C ₂₉ H ₃₂ O ₁₁	556.1945	556	194.50	anhydroicaritin-3-O-rha(OAc)	3

93	C ₂₉ H ₃₂ O ₁₁	556.1945	556	194.50	anhydroicaritin-3-O-rha(OAc) isomer	3
94	C ₂₈ H ₃₄ O ₁₂	562.2050	562	205.00	caohuoside D	2
95	C ₂₈ H ₃₄ O ₁₂	562.2050	562	205.00	caohuoside F	2
96	C ₂₆ H ₂₈ O ₁₄	564.1479	564	147.90	kaempferol-7-O-rha-xyl	3
97	C ₃₂ H ₂₂ O ₁₀	566.1213	566	121.30	ginkgetin	17
98	C ₃₂ H ₂₂ O ₁₀	566.1213	566	121.30	isoginkgetin	17
99	C ₂₇ H ₃₀ O ₁₄	578.1636	578	163.60	kaempferol -3-O-di-rha	24
100	C ₂₇ H ₃₀ O ₁₄	578.1636	578	163.60	kaempferitrin	18
101	C ₂₇ H ₃₀ O ₁₄	578.1636	578	163.60	sempervirenside B	33
102	C ₂₇ H ₃₀ O ₁₄	578.1636	578	163.60	kaempferol-3-O-rha-7-O-rha	3
103	C ₂₇ H ₃₀ O ₁₄	578.1636	578	163.60	kaempferol-3-O-rha-rha	3
104	C ₂₆ H ₂₈ O ₁₅	580.1428	580	142.80	quercetin-3-O-rha-xyl	3
105	C ₂₈ H ₃₆ O ₁₃	580.2156	580	215.60	icariside E7	4
106	C ₃₁ H ₃₆ O ₁₁	584.2258	584	225.80	3',4',5,7-tetrahydroxy-5',8-diisopentenyl-flavone-7-O-glc or brousoflavonol F	3
107	C ₂₇ H ₃₀ O ₁₅	594.1585	594	158.50	quercetin-3,7-O-di-rha	24
108	C ₂₇ H ₃₀ O ₁₅	594.1585	594	158.50	quercetin-3-O-glc-7-O-rha	3
109	C ₂₉ H ₃₂ O ₁₅	620.1741	620	174.10	sutchuenoside A	34
110	C ₂₉ H ₃₂ O ₁₅	620.1741	620	174.10	kaempferol-3-O-rha-7-O-rha(OAc)	3
111	C ₂₉ H ₃₄ O ₁₅	622.1898	622	189.80	wushanicariin	35
112	C ₃₁ H ₃₆ O ₁₄	632.2105	632	210.50	icarisoside F	25
113	C ₃₁ H ₃₆ O ₁₄	632.2105	632	210.50	demethylanhydroicaritin-3-O-rhamnopyranosyl-xylopyranoside	24
114	C ₃₃ H ₃₆ O ₁₃	640.2156	640	215.60		28
115	C ₃₂ H ₃₄ O ₁₄	642.1949	642	194.90	demethylanhydroicaritin-3-O-rha-dideoxyfuranose	3
116	C ₃₂ H ₃₈ O ₁₄	646.2262	646	226.20	2''-O-rhamnopyranosylkariside A	2
117	C ₃₂ H ₃₈ O ₁₄	646.2262	646	226.20	baohuoside III	36
118	C ₃₂ H ₃₈ O ₁₄	646.2262	646	226.20	baohuoside IV	36
119	C ₃₂ H ₃₈ O ₁₄	646.2262	646	226.20	sagittatoside B	3
120	C ₃₂ H ₃₈ O ₁₄	646.2262	646	226.20	anhydroicaritin-3-O-rha-(1-2)-xyl	3
121	C ₃₂ H ₃₈ O ₁₄	646.2262	646	226.20	demethylanhydroicaritin-3-O-rha-(1-2)rha	3
122	C ₃₁ H ₃₆ O ₁₅	648.2054	648	205.40	demethylanhydroicaritin-3-O-glc(1-2)xyl	3
123	C ₃₃ H ₃₆ O ₁₄	656.2105	656	210.50	sutchuenmedin B	34
124	C ₃₃ H ₃₈ O ₁₄	658.2262	658	226.20	anhydroicaritin-3-O-rhamnopyranosyl-furan acid or isomer	24
125	C ₃₃ H ₃₈ O ₁₄	658.2262	658	226.20	sutchuenmedin A	37
126	C ₃₃ H ₃₈ O ₁₄	658.2262	658	226.20		28
127	C ₃₃ H ₃₈ O ₁₄	658.2262	658	226.20		31
128	C ₃₃ H ₄₀ O ₁₄	660.2418	660	241.80	2''-O-rhamnosyl icariside II	24
129	C ₃₃ H ₄₀ O ₁₄	660.2418	660	241.80	2''-O-rhamnosyl icarisideII isomer	24
130	C ₃₃ H ₄₀ O ₁₄	660.2418	660	241.80	anhydroicaritin-3-O-rha-(1-2)-rha	3
131	C ₃₃ H ₄₀ O ₁₄	660.2418	660	241.80	anhydroicaritin-3-O-rha-7-O-rha	3
132	C ₃₂ H ₃₈ O ₁₅	662.2211	662	221.10	epimedeside A	24
133	C ₃₂ H ₃₈ O ₁₅	662.2211	662	221.10	icarisoside B or isomer	25
134	C ₃₂ H ₃₈ O ₁₅	662.2211	662	221.10	ikarisoside B	25
135	C ₃₂ H ₃₈ O ₁₅	662.2211	662	221.10	epimedeside A	18
136	C ₃₂ H ₃₈ O ₁₅	662.2211	662	221.10	demethylanhydroicaritin-3-O-rha-(1-2)glc or isomer	3
137	C ₃₂ H ₃₈ O ₁₅	662.2211	662	221.10	demethylanhydroicaritin-3-O-rha-7-O-glc or isomer	3
138	C ₃₂ H ₃₈ O ₁₅	662.2211	662	221.10	3'-hydroxycariine-3-O-rha-xyl	3
139	C ₃₂ H ₃₈ O ₁₅	662.2211	662	221.10	3'-hydroxycariine-7-O-rha-xyl or isomer	3
140	C ₃₃ H ₃₈ O ₁₅	674.2211	674	221.10	4, 5, 7-trihydroxyl-8-(3, 3-dimethylallyl)-flavonol 3-O-xyl (1→3)-4-Oacetyl-rha	2
141	C ₃₃ H ₃₈ O ₁₅	674.2211	674	221.10	anhydroicaritin-3-o-rha-(1-4)-dideoxyfuranose-7-O-glc	3
142	C ₃₃ H ₃₈ O ₁₅	674.2211	674	221.10	anhydroicaritin-3-O-rha-(1-2)-dideoxyfuranose-7-O-glc	3
143	C ₃₃ H ₄₀ O ₁₅	676.2367	676	236.70	icariin	2
144	C ₃₃ H ₄₀ O ₁₅	676.2367	676	236.70	3'-hydroxycariine-3-di-O-rha	24
145	C ₃₃ H ₄₀ O ₁₅	676.2367	676	236.70	baohuoside VII	24

146	C ₃₃ H ₄₀ O ₁₅	676.2367	676	236.70	sagittatocide A	24
147	C ₃₃ H ₄₀ O ₁₅	676.2367	676	236.70	baohuoside VII	24
148	C ₃₃ H ₄₀ O ₁₅	676.2367	676	236.70	4-methoxyl-3, 5, 7-trihydroxyl-8-(3, 3- dimethylallyl)-flavonol 3-O-rha (1→2)-rha	2
149	C ₃₃ H ₄₀ O ₁₅	676.2367	676	236.70	sagittasine C	38
150	C ₃₃ H ₄₀ O ₁₅	676.2367	676	236.70	anhydroicaritin-3-O-rha-glc	3
151	C ₃₃ H ₄₀ O ₁₅	676.2367	676	236.70	3'-hydroxyicariine-3-O-rha-rha	3
152	C ₃₃ H ₄₀ O ₁₅	676.2367	676	236.70	3''-hydroxyicariine-3-O-rha-7-O-rha or isomer	3
153	C ₃₂ H ₃₈ O ₁₆	678.2160	678	216.00	dihydroanhydroicaritin-3-O-rha-7-O-glc	24
154	C ₃₂ H ₃₈ O ₁₆	678.2160	678	216.00	hexandraside E or isomer	24
155	C ₃₂ H ₃₈ O ₁₆	678.2160	678	216.00	hexandraside E	18
156	C ₃₂ H ₃₈ O ₁₆	678.2160	678	216.00	4, 5-dihydroxyl-8-(3, 3-dimethylallyl)-flavonol 3-O-[xyl (1→3)-rha]-7-O-glc	2
157	C ₃₂ H ₃₈ O ₁₆	678.2160	678	216.00	8-(3, 3-dimethylallyl)-4', 5, 7-trihydroxyflavonol 7-[O-β-D-glc-(1→2)-β-D-glc]	2
158	C ₃₂ H ₃₈ O ₁₆	678.2160	678	216.00	demethylanhydroicaritin-3-O-glc-7-O-glc	3
159	C ₃₂ H ₃₈ O ₁₆	678.2160	678	216.00	dihydrodemethylanhydroicaritin-7-O-sophoroside	3
160	C ₃₃ H ₄₂ O ₁₅	678.2524	678	252.40	wanepimedeside A	2
161	C ₃₂ H ₄₀ O ₁₆	680.2316	680	231.60	dihydrodemethylicaritin-7-O-glc-glc	3
162	C ₃₄ H ₄₀ O ₁₅	688.2367	688	236.70		28
163	C ₃₃ H ₃₈ O ₁₆	690.2160	690	216.00		31
164	C ₃₃ H ₄₀ O ₁₆	692.2316	692	231.60	sagittasine C	24
165	C ₃₃ H ₄₀ O ₁₆	692.2316	692	231.60	anhydroicaritin-3,7-di-O-glc	18
166	C ₃₃ H ₄₀ O ₁₆	692.2316	692	231.60	kaempferin-3-O-α-rha	4
167	C ₃₃ H ₄₀ O ₁₆	692.2316	692	231.60	cuhuoside	2
168	C ₃₃ H ₄₀ O ₁₆	692.2316	692	231.60	3'-hydroxyicariine-3-O-rha-glc	3
169	C ₃₂ H ₃₈ O ₁₇	694.2109	694	210.90		31
170	C ₃₂ H ₃₈ O ₁₇	694.2109	694	210.90		31
171	C ₃₅ H ₄₂ O ₁₅	702.2524	702	252.40	acetylicariin	2
172	C ₃₄ H ₄₀ O ₁₆	704.2316	704	231.60	demethylanhydroicaritin-3-O-rha(OAc)-glc	3
173	C ₃₂ H ₃₈ O ₁₈	710.2058	710	205.80	kaempferol-3-O-rha-xyl-7-O-glc	3
174	C ₃₅ H ₄₂ O ₁₆	718.2473	718	247.30	sagittatocide C	3
175	C ₃₅ H ₄₂ O ₁₆	718.2473	718	247.30	anhydroicaritin-3-O-glc(OAc)-7-O-rha	3
176	C ₃₅ H ₄₂ O ₁₆	718.2473	718	247.30	anhydroicaritin-3-O-rha(OAc)-7-O-glc	3
177	C ₃₄ H ₄₀ O ₁₇	720.2266	720	226.60		31
178	C ₃₅ H ₄₂ O ₁₇	734.2422	734	242.20		28
179	C ₃₅ H ₄₂ O ₁₇	734.2422	734	242.20		31
180	C ₃₄ H ₄₂ O ₁₈	738.2371	738	237.10		14
181	C ₃₃ H ₄₀ O ₁₉	740.2164	740	216.40	kaempferol-3-O-rha-glc-7-O-rha	24
182	C ₃₃ H ₄₀ O ₁₉	740.2164	740	216.40	kaempferol-3-O-rha-glc-7-O-glc	3
183	C ₃₆ H ₄₂ O ₁₇	746.2422	746	242.20	anhydroicaritin-3-O-xyl(2OAc)-7-O-glc	3
184	C ₃₆ H ₄₂ O ₁₇	746.2422	746	242.20	demethylanhydroicaritin-3-O-rha(OAc)-glc(OAc)	3
185	C ₃₇ H ₄₄ O ₁₇	760.2579	760	257.90	epimedeside	2
186	C ₃₇ H ₄₄ O ₁₇	760.2579	760	257.90	anhydroicaritin-3-o-rha(1-4OAc)-glc(1-4OAc)	3
187	C ₃₇ H ₄₄ O ₁₇	760.2579	760	257.90	korepimedeside A isomer	39
188	C ₃₆ H ₄₂ O ₁₈	762.2371	762	237.10		28
189	C ₃₈ H ₄₄ O ₁₈	788.2528	788	252.80		31
190	C ₃₇ H ₄₆ O ₁₉	794.2633	794	263.30	epimedeside D	40
191	C ₃₇ H ₄₆ O ₁₉	794.2633	794	263.30	epimedeside E	24
192	C ₃₇ H ₄₆ O ₁₉	794.2633	794	263.30		31
193	C ₃₉ H ₄₆ O ₁₈	802.2684	802	268.40	korepimeoside A	39
194	C ₃₉ H ₄₆ O ₁₈	802.2684	802	268.40	korepimeoside B	39
195	C ₃₉ H ₄₆ O ₁₈	802.2684	802	268.40	anhydroicaritin-3-O-rha(OAc)-glc(2OAc)	3
196	C ₃₉ H ₄₆ O ₁₈	802.2684	802	268.40	anhydroicaritin-3-O-rha(OAc)-glc(2OAc) isomer	3
197	C ₃₈ H ₄₆ O ₁₉	806.2633	806	263.30		28
198	C ₃₈ H ₄₈ O ₁₉	808.2790	808	279.00	diphyllside B	24
199	C ₃₈ H ₄₈ O ₁₉	808.2790	808	279.00	diphyllside A	18

200	C ₃₈ H ₄₈ O ₁₉	808.2790	808	279.00	epimedin B	4
201	C ₃₈ H ₄₈ O ₁₉	808.2790	808	279.00	baohuoside V	36
202	C ₃₈ H ₄₈ O ₁₉	808.2790	808	279.00	anhydroicaritin-3-O-rha-(1-4)-xyl-7-O-glc	3
203	C ₃₈ H ₄₈ O ₁₉	808.2790	808	279.00	demethylanhydroicaritin-3-O-rha-rha-7-O-glc	3
204	C ₃₈ H ₄₈ O ₁₉	808.2790	808	279.00	epimedin B isomer	28
205	C ₃₇ H ₄₆ O ₂₀	810.2582	810	258.20		31
206	C ₃₇ H ₄₆ O ₂₀	810.2582	810	258.20		31
207	C ₃₉ H ₄₉ NO ₁₈	819.2950	819	295.00	3-acetyl-3,5,12-trihydroxy-10-methoxy-6,11-dioxo-1,2,3,4,6,11-hexahydro-1-tetracenyloxy-3,6-trideoxy-3-[[4-ethoxy-4-(β-D-glucopyranuronosyloxy)butyl]amino]-L-xyl-hexopyranoside	18
208	C ₃₉ H ₄₉ NO ₁₈	819.2950	819	295.00		14
209	C ₃₉ H ₄₈ O ₁₉	820.2790	820	279.00	anhydroicaritin-3-O-rha (1-2)-furan acid-7-O-glc	18
210	C ₃₉ H ₄₈ O ₁₉	820.2790	820	279.00	anhydroicaritin-3-O-rha-(1-3)-furan acid-7-O-glc	4
211	C ₃₉ H ₄₈ O ₁₉	820.2790	820	279.00	anhydroicaritin-3-O-rha (1-4) -furan acid-7-O-glc	24
212	C ₃₉ H ₄₈ O ₁₉	820.2790	820	279.00	anhydroicaritin-3-O-glc (1-2) -furan acid-7-O-rha	24
213	C ₃₉ H ₄₈ O ₂₀	820.2790	820	279.00	4, 5-dihydroxyl-8-(3,3-dimethylallyl)-flavonol-3-O-[xyl (1→3)-4-O-acetyl-rha]-7-O-glc	2
214	C ₃₉ H ₄₈ O ₂₀	820.2790	820	279.00	demethylanhydroicaritin-3-O-rha-xyl-7-O-glc(OAc)	3
215	C ₃₉ H ₅₀ O ₁₉	822.2946	822	294.60	baohuoside VI	25
216	C ₃₈ H ₄₆ O ₂₀	822.2582	822	258.20		14
217	C ₃₉ H ₅₀ O ₁₉	822.2946	822	294.60	baohuoside VI	18
218	C ₃₉ H ₅₀ O ₁₉	822.2946	822	294.60	epimedin C	4
219	C ₃₉ H ₅₀ O ₁₉	822.2946	822	294.60	hexandraside D	24
220	C ₃₉ H ₅₀ O ₁₉	822.2946	822	294.60	anhydroicaritin-3-O-rha-(1-4)-rha-7-O-glc	3
221	C ₃₉ H ₅₀ O ₁₉	822.2946	822	294.60	anhydroicaritin-3-O-rha-glc-7-O-rha	3
222	C ₃₉ H ₅₀ O ₁₉	822.2946	822	294.60	epimedin C isomer	14
223	C ₃₈ H ₄₈ O ₂₀	824.2739	824	273.90	rouhuoside	24
224	C ₃₈ H ₄₈ O ₂₀	824.2739	824	273.90	diphyllaside B	18
225	C ₃₈ H ₄₈ O ₂₀	824.2739	824	273.90	ikarisoside C	12
226	C ₄₀ H ₄₆ NO ₁₈	828.2715	828	271.50		14
227	C ₃₉ H ₄₈ O ₂₀	836.2739	836	273.90	demethylanhydroicaritin-7-O-glc-3-O-acetylated rha-xyl	24
228	C ₃₉ H ₄₈ O ₂₁	836.2739	836	273.90		14
229	C ₃₉ H ₄₈ O ₂₁	836.2739	836	273.90		31
230	C ₃₉ H ₄₈ O ₂₁	836.2739	836	273.90		31
231	C ₃₉ H ₄₈ O ₂₁	836.2739	836	273.90	anhydroicaritin-3-O-rha-glcucronic acid-7-O-glc	24
232	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	hexandraside F	3
233	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	3'-hydroxycariine-3-di-O-rha-7-O-glc	24
234	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	hexandraside F isomer	24
235	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	sagittasine B	3
236	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	epimedin A	25
237	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	hexandraside F	18
238	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	epimedin A isomer	2
239	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	morphoside B	2
240	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	sagittasine A	2
241	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	3'-hydroxycariine-3-O-rha-rha-7-O-glc	3
242	C ₃₉ H ₅₀ O ₂₀	838.2895	838	289.50	epimedin A isomer	28
243	C ₃₈ H ₅₀ O ₂₁	842.2845	842	284.50	dihydrodemethylcaritin-7-O-glc-3-O-glc-glc	3
244	C ₄₀ H ₅₀ O ₂₀	850.2895	850	289.50	anhydroicaritin-3-O-rha(OAc)-xyl-7-O-glc	3
245	C ₄₀ H ₅₀ O ₂₀	850.2895	850	289.50	anhydroicaritin-3-O-rha-7-O-glc-xyl(OAc)	3
246	C ₄₀ H ₅₀ O ₂₀	850.2895	850	289.50	anhydroicaritin-3-O-rha(OAc)-xyl-7-O-glc isomer	3

247	C ₄₀ H ₅₀ O ₂₀	850.2895	850	289.50	demethylanhydroicaritin-3-O-rha-rha-7-O-glc(OAc)	3
248	C ₃₉ H ₅₀ O ₂₁	854.2845	854	284.50		28
249	C ₄₁ H ₅₂ O ₂₀	864.3052	864	305.20	anhydroicaritin-3-O-rha-rha-7-O-glc(OAc)	3
250	C ₄₀ H ₅₀ O ₂₁	866.2845	866	284.50	demethylanhydroicaritin-3-O-rha-glc(OAc)-7-O-glc	3
251	C ₄₁ H ₅₂ O ₂₁	880.3001	880	300.10	korepimidoside C	11
252	C ₄₁ H ₅₂ O ₂₁	880.3001	880	300.10	epimedin I	2
253	C ₄₁ H ₅₂ O ₂₁	880.3001	880	300.10	anhydroicaritin-3-O-rha(1-4OAc)-7-O-(1-3)glc	3
254	C ₄₂ H ₅₂ O ₂₁	892.3001	892	300.10	sempervirenoside A	41
255	C ₄₂ H ₅₂ O ₂₁	892.3001	892	300.10	demethylcaritin-3-O- (6''-O-acetyl)-glc -(1-3) -O- (4''-O-acetyl)-rha-7-O-glc	4
256	C ₄₂ H ₅₂ O ₂₁	892.3001	892	300.10	epimedokoreanoside III	42
257	C ₄₂ H ₅₂ O ₂₂	908.2950	908	295.00	demethylcaritin-3-O-(6''-O-acetyl)-glc-(1-3)- O-(4''-O-acetyl) -rha-7-O-glc	18
258	C ₄₂ H ₅₂ O ₂₂	908.2950	908	295.00	8-(3, 3-dimethylallyl)-4', 5, 7-trihydroxyflavonol 3-[O-6-O-acetyl-β-D-glc-(1→3)-4-O-acetyl-α-L-rha] 7-(β-D-glc)	2
259	C ₄₂ H ₅₂ O ₂₂	908.2950	908	295.00	demethylanhydroicaritin-3-O-rha(OAc)-glc(OAc)-7-O-glc	3
260	C ₄₃ H ₅₄ O ₂₂	922.3107	922	310.70	caohuoside E	2
261	C ₄₃ H ₅₄ O ₂₂	922.3107	922	310.70	epimedokoreanoside I	2
262	C ₄₃ H ₅₄ O ₂₂	922.3107	922	310.70	epimedokoreanoside I isomer	3
263	C ₄₃ H ₅₄ O ₂₂	922.3107	922	310.70	epimedokoreanoside I isomer	3
264	C ₄₄ H ₅₄ O ₂₃	950.3056	950	305.60	demethylanhydroicaritin-3-O-rha(2OAc)-glc(OAc)-7-O-glc	3
265	C ₄₄ H ₅₄ O ₂₃	950.3056	950	305.60	demethylanhydroicaritin-3-O-rha(2OAc)-glc(OAc)-7-O-glc isomer	3
266	C ₄₄ H ₅₈ O ₂₃	954.3369	954	336.90		28
267	C ₄₄ H ₅₈ O ₂₅	954.3369	954	336.90	demethylanhydroicaritin-3-O-rha-glc-7-O-sophoroside	3
268	C ₄₅ H ₅₆ O ₂₃	964.3212	964	321.20	korepimidoside B	43
269	C ₄₅ H ₅₆ O ₂₃	964.3212	964	321.20	epimedin K	2
270	C ₄₅ H ₅₆ O ₂₃	964.3212	964	321.20	epimedin L	2
271	C ₄₅ H ₅₆ O ₂₃	964.3212	964	321.20	caohuoside A	3
272	C ₄₅ H ₅₆ O ₂₃	964.3212	964	321.20	caohuosideB	3
273	C ₄₅ H ₅₆ O ₂₃	964.3212	964	321.20	korepimidoside C or isomer	3
274	C ₄₅ H ₅₆ O ₂₃	964.3212	964	321.20	epemedin L isomer	14
275	C ₄₅ H ₆₀ O ₂₃	968.3525	968	352.50	anhydroicaritin-3-O-rha-rha-7-O-rha-glc	3
276	C ₄₅ H ₆₀ O ₂₄	984.3475	984	347.50	acuminatin	2
277	C ₄₅ H ₆₀ O ₂₄	984.3475	984	347.50	acuminatoside	24

References

1. Wang, M.Q.; Peng, X.; Gan, Q.F. Studies on chemical constituents of *Epimedium brevicornum* Maxim. *Res. Pract. Chin. Med.* **2005**, (02), 39-42.
2. Yuan, H.; Cao, S.P.; Chen, S.Y.; Guo, L.N.; Zheng, J.; Lin, R.C. Research progress on chemical constituents and quality control of *Epimedium Folium*. *Chin. Tradit. Herb. Drugs.* **2014**, 45(24), 3630-3640.
3. Zhao, H.Y.; Sun, J.H.; Fan, M.X.; Fan, L.; Zhou, L.; Li, Z.; Han, J.; Wang, B.R.; Guo, D.A. Analysis of phenolic compounds in *Epimedium* plants using liquid chromatography coupled with electrospray ionization mass spectrometry. *J.Chromatogr.A.* **2008**, 1190,157-181.
4. Lv, L.; Zhang, H.; Zhao, L.; Jia, J.; Li, Y.Y.; Zhang, G.Q. RRLC-TOF/MS in rapid identification of 43 chemical constituents of *epimedium*. *Acad. J. Second Mil. Med. Univ.* **2011**, 32(03), 306-310.
5. Seelinger, G.; Merefot, I.; Schempp, C.M. Anti-oxidant, anti-inflammatory and anti-allergic activities of luteolin. *Planta. Med.* **2008**, 74(14), 1667-1677.
6. Huang, Y.L.; Ou, J.C.; Chen, C.F.; Chen, C.C. Three new 2-phenoxychromones from the leaves of *Epimedium Sagittatum*. *J. Nat. Prod.* **1993**, 56(2), 275-278.
7. Hartwig, U.A.; Maxwell, C.A.; Joseph, C.M.; Phillips, D.A. Chrysoeriol and luteolin released from alfalfa seeds induce nod genes in rhizobium meliloti. *Plant Physiol.* **1990**, 92, 116-122.

8. Jiao, J.J.; Zhang, Y.; Liu, C.M.; Liu, J.E.; Wu, X.Q.; Zhang, Y. Separation and purification of triclin from an antioxidant product derived from bamboo leaves. *J. Agric. Food. Chem.* **2007**, *55*, 10086-10092.
9. Horio, T.; Kawabata, Y.; Takayama, T.; Tahara, S.; Kawabata, J.; Fukushi, I.Y.; Nishimura, H.; Mizutanil, J. A potent attractant of zoospores of aphanomyces cochlioides isolated from its host, *Spinacia oleracea*. *Experientia.* **1992**, *48*, 410-414.
10. Chen, C.C.; Huang, Y.L.; Sun, C.M.; Shen, C.C. New prenylflavones from the leaves of *Epimedium sagittatum*. *J. Nat. Prod.* **1996**, *59*, 412-414.
11. Sun, P.Y.; Wen, Y.; Xu, Y.; Pei, Y.P.; Chen, Y.J.; Shimizu, N.; Takeda, T. The chemical constituents of *Epimedium Koreanum* Nakai. *Acta Pharm. Sin. B.* **1998**, *33(12)*, 919-922.
12. Li, W.K.; Pan, J.Q.; Lv, M.J.; Zhang, R.Y.; Liao, M.C.; Xiao, P.G. Separation and structure of epimedokoreanin D. *Acta Pharm. Sin. B.* **1996**, *31(1)*, 29-32.
13. Chen, C.C.; Tsai, P.C.; Wei, B.L.; Chiob, W.F. 8-Prenylkaempferol suppresses inducible nitric oxide synthase expression through interfering with JNK-mediated AP-I pathway in murine macrophages. *Eur. J. Pharmacol.* **2008**, *590(1-3)*, 430-436.
14. Wang, Y.Q.; Guo, Z.M.; Jin, Y.; Zhang, X.L.; Wang, L.; Xue, X.Y.; Liang, X.M. Identification of prenyl flavonoid glycosides and phenolic acids in *Epimedium koreanum* Nakai by Q-TOF-MS combined with selective enrichment on "click oligo (ethylene glycol)" column. *J. Pharm. Biomed. Anal.* **2010**, *51(3)*, 606-616.
15. Jin, Q.H.; Lee, C.; Lee, J.W.; Yeon, E.T.; Lee, D.; Han, S.B.; Hong, J.T.; Kim, Y.; Lee, M.K.; Hwang, B.Y. 2-Phenoxychromones and prenylflavonoids from *Epimedium koreanum* and their inhibitory effects on LPS-induced nitric oxide and interleukin-1 β production. *J. Nat. Prod.* **2014**, *77(7)*, 1724-1728.
16. Li, H.F.; Guan, X.Y.; Yang, W.Z.; Liu, K.D.; Ye, M.; Sun, C.; Lu, S.; Guo, D.A. Antioxidant flavonoids from *Epimedium wushanense*. *Fitoterapia.* **2012**, *83(1)*, 44-48.
17. Sun, P.Y.; Chen, Y.; Shimizu, N.; Takeda, T. Studies on the constituents of *epimedium koreanum* III. *Chem. Pharm. Bull.* **1998**, *46(2)*, 355-358.
18. Gan, J.S.; Ma, Y.; Wang, Z.Y.; Liu, X.S.; Liu, Y. Analysis on chemical constituents of *Epimedium Herba* by UPLC-Q-TOF-MS. *Drugs & Clinic.* **2014**, *29(04)*, 349-352.
19. Guo, B.L.; Li, W.K.; Yu, J.G.; Xiao, P.G. A flavonol from *Epimedium Brevicornum*. *Phytochemistry.* **1996**, *41(3)*, 991-992.
20. Wang, G.; Wang, C.Y.; Zhang, B.J.; Tian, Y. Tan, S.G.; Liu, T.X.; Sa, D.; Hou, J.; Peng, J.Y.; Yao, J.H.; Ma, X.C. Rapid separation of flavonoids from hydrolysis products of *Epimedium koreanum*. *J. Liq. Chromatogr. Relat. Technol.* **2013**, *36*, 1163-1176.
21. Cui, X.L.; Deng, L.L.; Huang, S.Y. Studies on chemical constituents in chloroform extraction of *Epimedium sagittatum*. *Chin. J. Exp. Tradit. Med. Formulae.* **2010**, *16(13)*, 101-103.
22. Nakashima, K.; Miyashita, H.; Yoshimitsu, H.; Fujiwara, Y.; Nagai, R.; Ikeda, T. Two new prenylflavonoids from *Epimedium Herba* and their inhibitory effects on advanced glycation end-products. *J. Nat. Med.* **2010**, *70(2)*, 290-295.
23. Hong, X.; Wang, X.C.; Yong, E.L.; Gong, Y.H. Determination of breviflavone A and B in *Epimedium* herbs with liquid chromatography-tandem mass spectrometry. *J Pharm Biomed Anal.* **2009**, *49(3)*, 853-857.
24. Yu, X.E.; Qin, J.P.; Li, J.C.; Huang, W.Z.; Wang, Z.Z.; Xiao, W. Rapid analysis on chemical constituents in Yinyanghuo Zong-huangtong capsule by UPLC/Q-TOF-MS/MS. *China J. Chin. Mater. Med.* **2008**, *590(1-3)*, 430-436.
25. Wang, Y.; Yuan, L.; Li, Y.B.; Zhang, Y.J. Analysis on chemical constituents of *Epimedium Folium* by UPLC-Q-TOF-MS. *Chin. Tradit. Herb. Drugs.* **2017**, *48(13)*, 2625-2631.
26. Li, W.K.; Zhang, R.Y.; Xiao, P.G. The structure of epimedokoreanin B and epimedokoreanin C. *Acta Pharm. Sin. B.* **1994**, *29(11)*, 835-839.
27. Toshio, F.; Taro, N. Seven prenylated flavonol glycosides from two *Epimedium* species. *Phytochemistry.* **1988**, *27(1)*, 259-266.
28. Wu, C.S.; Zhang, J.L.; Zhou, T.H.; Guo, B.L.; Wang, Y.L.; Hou, J.F. Simultaneous determination of seven flavonoids in dog plasma by ultra-performance liquid chromatography-tandem mass spectrometry and its application to a bioequivalence study of bioactive components in *Herba Epimedium* and *Er-Xian* Decoction. *J. Pharm. Biomed. Anal.* **2011**, *54(1)*, 186-191.
29. Li, W.K.; Xiao, P.G.; Liao, M.C.; Zhang, R.Y. The structure of a new flavonoid glycoside from *Epimedium Koreanum* Nakai. *Chem. J. Chin. Univ.* **1995**, *16(10)*, 1575-1576.
30. Li, H. M.; Zhou, C.; Chen, C.H.; Li, R.T.; Lee, K.H. Flavonoids isolated from heat-processed *Epimedium Koreanum* and their anti-HIV-1 activities. *Helv. Chim. Acta.* **2015**, *98*, 1177-1187.
31. Pilepić, K.H.; Yang, Z.L.; Chen, J.; Chen, X.Q.; Wang, Y.; Zhao, J.; Mihajević, S.; Li, S. P. Flavonoids in natural and tissue cultured materials of *Epimedium alpinum* identified by using UHPLC-Q-TOF-MS/MS. *Int. J. Mass Spectrom.* **2018**, *434*, 222-232.
32. Li, W.K.; Xiao, P.G.; Zhang, R.Y. A difuranoflavone from *Epimedium Koreanum*. *Phytochemistry.* **1995**, *38(3)*, 807-808.
33. Mizuo, M.; Munekazu, I.; Toshiyuki, T.; Norio, S. New flavonol glycoside from the leaves of *Epimedium sempervirens*. *J. Nat. Prod.* **1990**, *53(3)*, 744-746.
34. Yu, C.Y.; Song, L.N.; Chen, G. Two new prenylflavonoids from *Epimedium sutchuenense*. *Chin. Chem. Lett.* **2009**, *20(7)*, 842-844.
35. Yan, W.M.; Fu, Y.; Ma, Y.; Li, Y.W.; Zhang, X.Z.; Xin, F. Studies on flavones of *Epimedium bevicorum* Maxim. *China J. Chin. Mater. Med.* **1998**, *23(12)*, 31-32+59.

36. Li, F.; Liu, A.F. Studies on the isolation and structures of baohuoside II, III, IV and V. *Acta Pharm. Sin. B.* **1988**, *23*(29), 672-681.
37. Mizuo, M.; Munekazu, I.; Toshiyuki, T.; Norio, S.; Hirobumi, Y. Sutchuenoside A: a new kaempferol glycoside from the aerial parts of *Epimedium sutchuenense*. *J. Nat. Prod.* **1991**, *54*(5), 1427-1429.
38. Wang, G.J.; Tsai, T.H.; Lin, L.C. Prenylflavonol, acylated flavonol glycosides and related compounds from *Epimedium sagittatum*. *Phytochemistry.* **2007**, *68*, 2455-2464.
39. Sun, P.Y.; Chen, Y.J.; Wen, Y.; Pei, Y.P.; Liu, Z.H.; Yao, X.S.; Takeda, T.; Ogihara, Y. Structure determination of korepimedoside A and korepimedoside B from *Epimedium koreanum* Nakai. *Acta Pharm. Sin. B.* **1996**, *31*(8), 602-606.
40. Yang, W.Z.; Qiao, X.; Bo, T.; Wang, Q.; Guo, D.A.; Ye, M. Low energy induced homolytic fragmentation of flavonol 3-O-glycosides by negative electrospray ionization tandem mass spectrometry. *Rapid. Commun. Mass Spectrom.* **2014**, *28*(4), 385-395.
41. Mizuo, M.; Munekazu, I.; Toshiyuki, T.; Norio, S.; Tsutomu, N.; Akakira, I.M. A novel flavonol glycoside in the leaves of *Epimedium sempervirens*. *Chem. Pharm. Bull.* **1989**, *37*(8), 2241-2242.
42. Xiang, D.S.; Li, W.; Ji, E.K.; Seo, Y.Y.; Jlin, Y.M.; Young, H.K. Prenyl-flavonoids from *Epimedium koreanum* Nakai and their soluble epoxide hydrolase and tyrosinase inhibitory activities. *Med. Chem. Res.* **2017**, *26*(11), 2761-2767.
43. Li, J.Y.; Li, H.M.; Liu, D.; Chen, X.Q.; Chen, C.H.; Li, R.T. Three new acylated prenylflavonol glycosides from *Epimedium koreanum*. *Phytochem. Lett.* **2016**, *17*, 206-212.