

**Dr. Duke's Phytochemical and Ethnobotanical Database**

**Chemicals Found in Glycyrrhiza glabra**

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
1	2,3-DIHYDROBENZOFURAN	Root	1	1		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
1	2,3-DIHYDROBENZOFURAN	Root Essent. Oil	--	--		
1	9,12,13-TRIHYDROXY-10,11-EPOXY-OCTADECANOIC-ACID	Root	--	--		
1	9,12,13-TRIHYDROXY-10,11-EPOXY-OCTADECANOIC-ACID	Stem	--	--		
16	ACETIC-ACID	Root	2	2		
6	ACETOPHENONE	Root	--	--		
23	ALPHA-TERPINEOL	Rhizome Essent. Oil	75000	--		
23	ALPHA-TERPINEOL	Root	--	--		
23	ALPHA-TERPINEOL	Root Essent. Oil	--	--		
5	ALUMINUM	Root	29	182	-0.21482686343318208	
36	ANETHOLE	Root	1	1		
101	APIGENIN	Root	--	--		
1	APIOGLYCYRRHIZIN	Root	157	157	1	
1	ARABOGLYCYRRHIZIN	Root	75	75	-1	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
112	ASCORBIC-ACID	Root	98	626	-0.2881241332595798	
2	ASPARAGINE	Root	20000	40000	1.2247448713915892	=ICMR(Indian Council of Medical Research).1976.Medicinal Plants of India.Vol.1.Indian Council of Med. Res.Cambridge Printing Works, New Delhi.487 pp;ICMR.1987.Medicinal Plants of India.Vol.2.Indian Council of Med. Res.Cambr. Printing Works,New Delhi.600pp
7	ASTRAGALIN	Shoot	--	--		
24	BENZALDEHYDE	Rhizome Essent. Oil	--	--		
24	BENZALDEHYDE	Root	75000	--		Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989.
24	BENZALDEHYDE	Root Essent. Oil	--	--		
20	BENZOIC-ACID	Root	--	--		
20	BENZOIC-ACID	Root Essent. Oil	--	--		
9	BENZYL-ALCOHOL	Root	--	--		
9	BENZYL-ALCOHOL	Rhizome Essent. Oil	--	--		
26	BERGAPTEN	Shoot	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
9	BETA-AMYRIN	Root	--	--		
9	BETA-AMYRIN	Tissue Culture	--	--		
53	BETA-CAROTENE	Root	--	--		
53	BETA-CAROTENE	Seed	5	5	-0.11676226294423345	
47	BETA-SITOSTEROL	Root	500	500	-0.26375908041164936	
47	BETA-SITOSTEROL	Plant	--	--		
47	BETA-SITOSTEROL	Shoot	--	--		
14	BETAINE	Plant	--	--		
14	BETAINE	Root	--	--		Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
22	BETULINIC-ACID	Tissue Culture	--	--		
28	CALCIUM	Root	1379	8780	0.15082777410199327	
41	CAMPHOR	Root	--	--		
1	CAPROIC-ACID	Root	--	--		
1	CAPROIC-ACID	Root Essent. Oil	--	--		
37	CARVACROL	Root	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
37	CARVACROL	Root Essent. Oil	--	--		
1	CELLULOSE	Plant	--	300000	-0.03979603129559332	
1	CELLULOSE	Root	300000	300000	1	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
20	CHOLINE	Root	--	--		Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
24	CHROMIUM	Root	0.3	1.7	-0.2211082365074478	
2	COBALT	Root	2	10.1	-0.3259875959839659	
5	CRESOL	Root	--	--		
3	DECANOIC-ACID	Root	1	1		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
1	DODECANOIC-ACID	Root	--	--		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
1	ECHINATIN	Plant	--	--		J.S. Glasby Dict.Plis Containing 2ndary Metabolite. 1991.
12	ESTRAGOLE	Root	1	1		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
6	ESTRIOL	Root	--	--		
1	ETHYL-PALMITATE	Root	--	--		
1	ETHYL-PHENYLACETATE	Root	--	--		
1	ETHYL-PHENYLACETATE	Root Essent. Oil	--	--		
76	EUGENOL	Root	1	1		
6	FENCHONE	Root	--	--		
61	FERULIC-ACID	Plant	--	--		
15	FIBER	Root	84000	84000	-0.09131862751650978	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
3	FLUORIDE	Root	--	4.2	-0.6333282398540948	
16	FORMONONETIN	Root	33	1920	1.414022441541796	
8	FRUCTOSE	Root	--	--		
6	FURFURAL	Root	2	2	-1	Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
6	FURFURAL	Root Essent. Oil	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
1	FURFURYL-ALCOHOL	Root	--	--		Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989.
1	FURFURYL-ALCOHOL	Root Essent. Oil	--	--		
13	GALANGIN	Shoot	--	--		
1	GAMMA-HEXALACTONE	Root	--	--		
2	GAMMA-NONALACTONE	Root	6	6		
2	GAMMA-NONALACTONE	Root Essent. Oil	--	--		
81	GENISTEIN	Shoot	--	--		
35	GERANIOL	Root	--	--		
35	GERANIOL	Rhizome Essent. Oil	--	--		
4	GLABRANIN	Shoot	3100	3100		
4	GLABRANIN	Plant	--	--		
4	GLABRANIN	Root	--	--		
5	GLABRENE	Rhizome	129	600		
5	GLABRENE	Root	80	800		
37	GLABRIDIN	Rhizome	1433	5700		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
37	GLABRIDIN	Root	400	4000		
6	GLABROL	Root	129	440		
7	GLUCOSE	Root	30000	42300	1.471886334456661	
4	GLUCURONIC-ACID	Root	--	--		
5	GLYCYCOUMARIN	Root	110	710	-1	
29	GLYCYRRHETIC-ACID	Plant	--	--		
32	GLYCYRRHETINIC-ACID	Root	6000	22400		
32	GLYCYRRHETINIC-ACID	Rhizome	--	--		
1	GLYCYRRHISOFLAVANONE	Root	--	--		
8	GLYCYRRHISOFLAVONE	Root	--	--		
17	GLYCYRRHIZIC-ACID	Plant	100000	240000		
57	GLYCYRRHIZIN	Root	360	152000	1.4022164518368727	
57	GLYCYRRHIZIN	Stem	--	--		
57	GLYCYRRHIZIN	Leaf	--	--		
57	GLYCYRRHIZIN	Tissue Culture	--	--		
57	GLYCYRRHIZIN	Rhizome	24000	27560	-0.34086713770350074	
18	GUAIACOL	Root	--	--		
4	HEDERASAPONIN-C	Root	--	--		
12	HERNIARIN	Root	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
2	HEXANOIC-ACID	Root	148	148		
3	HEXANOL	Root	8	8	-1	Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
1	HEXYL-FORMATE	Root	4	4		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
3	HISPAGLABRIDIN-A	Root	--	--		
3	HISPAGLABRIDIN-A	Rhizome	126	127		
3	HISPAGLABRIDIN-B	Root	--	--		
3	HISPAGLABRIDIN-B	Rhizome	--	119		
15	INDOLE	Root	2	2		
6	IRON	Root	14	88	-0.313807642199598	
2	ISOLICOFLAVONOL	Rhizome	--	--		
28	ISOLIQUIRITIGENIN	Rhizome	160	160	-1	
28	ISOLIQUIRITIGENIN	Root	1000	9610	1	
6	ISOLIQUIRITIN	Rhizome	--	4250	-1	
6	ISOLIQUIRITIN	Root	920	920	-1	
3	ISOMUCRONULATOL	Leaf	--	--		



Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
3	ISOMUCRONULATOL	Root	--	--		
22	ISOQUERCITRIN	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
75	KAEMPFEROL	Shoot	--	--		
75	KAEMPFEROL	Root	--	--		
28	LICOCHALCONE-A	Root	250	250		
2	LICOCHALCONE-B	Root	--	--		
4	LICOCOUMARONE	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
4	LICOCOUMARONE	Root	--	--		
1	LICOFLAVANONE	Leaf	4900	4900		
4	LICOISOFLAVONE-A	Root	--	--		
2	LICOISOFLAVONE-B	Root	--	--		
7	LICOPYRANOCOUMARIN	Rhizome	--	--		
1	LICORICIDIN	Root	--	--		
1	LICURASIDE	Root	--	--		Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989.

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
13	LIGNIN	Root	100000	180000		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
3	LIGUSTRAZINE	Rhizome	--	--		Duke, J. A. Writeups or information summaries on approximately 2,000 economic plants, USDA, ARS, Beltsville, MD 20705.
3	LIGUSTRAZINE	Rhizome Essent. Oil	--	--		
53	LINALOOL	Root	--	2	-1.2001299669671104	
1	LIQUIRITIC-ACID	Root	--	--		
12	LIQUIRITIGENIN	Root	140	140	-1	
3	LIQUIRITIN	Root	--	2300	-1	
3	LIQUIRITIN	Rhizome	100	470	-1	
21	LUPEOL	Tissue Culture	--	--		
65	MAGNESIUM	Root	1515	9650	3.771799621373545	
15	MALIC-ACID	Root	--	--		=ICMR(Indian Council of Medical Research).1976.Medicinal Plants of India.Vol.1.Indian Council of Med. Res.Cambridge Printing Works, New Delhi.487 pp;ICMR.1987.Medicinal Plants of India.Vol.2.Indian Council of Med. Res.Cambr. Printing Works,New Delhi.600pp

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11	MALTOL	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
11	MALTOL	Root Essent. Oil	--	--		
2	MALTOSE	Root	--	--		
14	MANGANESE	Root	0.7	4.7	-0.48975099372786696	
18	MANNITOL	Plant	--	--		
18	MANNITOL	Root	--	--		
1	METHYL-ETHYL-KETONE	Root	--	--		
1	METHYL-ETHYL-KETONE	Root Essent. Oil	--	--		
21	METHYL-SALICYLATE	Plant	--	--		
5	MYRTENAL	Root	--	--		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
1	N-NONACOSANE	Root	--	--		
56	NARINGENIN	Shoot	--	--		
1	NEOISOLIQIRITIN	Root	--	--		Williamson, E. M. and Evans, F. J., Potter's New Cyclopaedia of Botanical Drugs and Preparations, Revised Ed., Saffron Walden, the C. W. Daniel Co., Ltd., Essex UK, 362 pp, 1988, reprint 1989.

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
1	NEOLIQUIRITIN	Root	--	--		
39	NIACIN	Root	11	70	0.5727223514607939	
11	NICOTINIC-ACID	Leaf	100	1000	0.4235889253321141	
2	NONANOIC-ACID	Root	2	2		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
2	NONANOIC-ACID	Root Essent. Oil	--	--		
6	O-CRESOL	Root	--	--		
5	OCTANOIC-ACID	Rhizome Essent. Oil	114000	114000		
5	OCTANOIC-ACID	Root	7	7		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
5	OCTANOIC-ACID	Root Essent. Oil	--	--		
2	ONONIN	Root	320	320	-0.657145526853552	
9	OXALIC-ACID	Plant	--	--		
16	P-CYMENE	Root	--	--		
13	P-HYDROXY-BENZOIC-ACID	Plant	--	--		Stitt, Paul. Why George should eat broccoli.

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
1	P-METHOXY-PHENOL	Root	--	--		
1	P-METHOXY-PHENOL	Root Essent. Oil	--	--		
20	PAEONOL	Rhizome Essent. Oil	89000	89000		
13	PALMITIC-ACID	Root	--	--		Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
1	PALMITIC-ACID-ETHYL-ESTER	Root	--	--		
1	PALMITIC-ACID-ETHYL-ESTER	Root Essent. Oil	--	--		
24	PECTIN	Shoot	58000	58000	1	
24	PECTIN	Root	14130	90000	-0.41908391872501777	
1	PENTADECANOIC-ACID	Root	--	--		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
6	PHENETHYL-ALCOHOL	Root	1	1		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
6	PHENETHYL-ALCOHOL	Rhizome Essent. Oil	--	--		
26	PHENOL	Root	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
26	PHENOL	Root Essent. Oil	--	--		
2	PHENYL-ACETALDEHYDE	Root	--	--		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
1	PHENYL-PROPIONIC-ACID	Root	--	--		
1	PHENYL-PROPIONIC-ACID	Root Essent. Oil	--	--		
4	PHOSPHORUS	Root	124	790	-0.47928982526561387	
9	PINOCEMBRIN	Shoot	9500	9700	1.4141550732358925	
9	PINOCEMBRIN	Plant	--	--		
14	POTASSIUM	Plant	11400	11400	-0.7250936985389107	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
14	POTASSIUM	Root	1790	11400	-0.3206295233680915	
6	PROPIONIC-ACID	Root	--	--		
6	PROPIONIC-ACID	Root Essent. Oil	--	--		
2	PRUNETIN	Leaf	--	--		
2	PRUNETIN	Plant	--	--		
176	QUERCETIN	Plant	--	--		Stitt, Paul. Why George should eat broccoli.

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
176	QUERCETIN	Shoot	--	--		
176	QUERCETIN	Root	--	--		
15	RIBOFLAVIN	Root	0.3	1.6	-0.5415349954750799	
34	SALICYLIC-ACID	Root	--	567	0.9999999999999998	
34	SALICYLIC-ACID	Rhizome	567	567		
5	SAPONINS	Root	20000	150000	1.936393086666112	
1	SCHAFTOSIDE	Root	--	--		
60	SELENIUM	Root	--	0.1	-0.3553393095282933	
4	SILICON	Root	2.5	15.8	-0.2703244255424574	
9	SINAPIC-ACID	Plant	--	--		
1	SODIUM	Root	1284	8180	3.295958210940695	
4	SOYASAPONIN	Root	1000	7100		
5	STARCH	Root	7850	200000	-0.48414866409480584	
5	STARCH	Shoot	15000	15000		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
12	STIGMASTEROL	Root	--	--		
14	SUCROSE	Root	24000	91700	-0.3296593573923472	
23	TERPINEN-4-OL	Rhizome Essent. Oil	72000	72000		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
22	TETRAMETHYL-PYRAZINE	Root	--	--		
31	THIAMIN	Root	2.1	2.1	-0.40693378797942115	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
17	THUJONE	Root	--	--		
71	THYMOL	Root	--	--		
4	TIN	Root	4	24	0.7637747609302243	
2	TRIDECANOIC-ACID	Root	--	--		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gogeikagaku Kaishi 61(9): 1119-1122.
22	UMBELLIFERONE	Root	--	--		
18	VITEXIN	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
43	XANTHOTOXIN	Shoot	--	--		
77	ZINC	Root	0.1	0.3	-1.0458068487141465	