

Dr. Duke's Phytochemical and Ethnobotanical Database

Chemicals Found in Malus domestica

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
30	(+)-CATECHIN	Leaf	--	--		
30	(+)-CATECHIN	Fruit	--	--		
30	(+)-CATECHIN	Pericarp	--	--		
30	(+)-CATECHIN	Pt	--	--		
30	(+)-CATECHIN	Seed	--	--		
30	(+)-CATECHIN	Bark	--	--		
38	(-)-EPICATECHIN	Leaf	150	900	-0.6820874109972213	
38	(-)-EPICATECHIN	Fruit Juice	--	--		
38	(-)-EPICATECHIN	Fruit	--	--		
38	(-)-EPICATECHIN	Pericarp	--	--		
6	ACETALDEHYDE	Plant	--	--		
6	ACETALDEHYDE	Fruit Juice	--	--		Miyake, T., Shibamoto, T. 1993. Quantitative Analysis of Acetaldehyde in Foods and Beverages. J. Agr. Food Chem, 41(11): 1968-1970.
6	ACETALDEHYDE	Fruit	--	--		
16	ACETIC-ACID	Plant	--	--		
3	ACETONE	Plant	--	--		
11	ADENINE	Root	--	--		
3	ALANINE	Fruit	70	435	-1.2861845168681025	USDA's Ag Handbook 8 and sequelae)

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
15	ALPHA-LINOLENIC-ACID	Fruit	180	1120	-0.6452626880371877	
32	ALPHA-TOCOPHEROL	Fruit	2	37	-0.5521025162177928	
5	ALUMINUM	Fruit	0.4	129	-0.18599251654737567	
8	AMYGDALIN	Seed	6000	13800	-0.8422024808761887	
3	AMYL-BUTYRATE	Plant	--	--		
3	AMYL-BUTYRATE	Fruit	--	--		
1	AMYL-FORMATE	Fruit	--	--		
101	APIGENIN	Heart Wood	--	--		
14	ARGININE	Fruit	60	373	-1.0500818434124615	USDA's Ag Handbook 8 and sequelae)
2	ARSENIC	Fruit	0.001	0.43	0.014133429185321438	
112	ASCORBIC-ACID	Fruit	20	402	-0.2594938543964892	
2	ASPARAGINE	Fruit	171	171	-0.825458790451801	
3	ASPARTIC-ACID	Fruit	210	2115	-1.056731649443471	USDA's Ag Handbook 8 and sequelae)
7	AVICULARIN	Fruit	--	--		
7	AVICULARIN	Leaf	--	1425		
7	AVICULARIN	Fruit Juice	--	--		
7	AVICULARIN	Pericarp	--	--		
20	BENZOIC-ACID	Plant	--	--		
20	BENZOIC-ACID	Leaf	98	710	1.3479809099758226	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
9	BENZYL-ACETATE	Plant	--	--		
2	BETA-ALANINE	Fruit	--	--		
53	BETA-CAROTENE	Fruit	--	76	-0.0038939984397263717	
47	BETA-SITOSTEROL	Fruit	110	660	0.07292039240169416	Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)
47	BETA-SITOSTEROL	Seed	--	--		Fathy, M. M., Abd El Megid, R. M. 1995. A Comparative Study of the Lipid Contents and the Antimicrobial Activity of Certain Rosaceous Seeds. Zagazig J Pharm Sci, 4(2): 121-127.
47	BETA-SITOSTEROL	Heart Wood	--	--		
4	BIOTIN	Plant	--	--		
4	BORON	Fruit	1	110	1.410811087811246	
3	CADMIUM	Fruit	0.002	0.026	-0.5672128851607269	
102	CAFFEIC-ACID	Fruit	85	1270	-0.10378621224302456	
102	CAFFEIC-ACID	Fruit Juice	--	--		
28	CALCIUM	Fruit	43	570	-0.75834467805693	
4	CALCIUM-OXALATE	Plant	--	--		
2	CAMPESTEROL	Fruit	10	60	-0.14986892201478846	Spiller, G. A. 1996 (Spiller, G. A. Ed. 1996. CRC Handbook of Lipids in Human Nutrition. CRC Press. Boca Raton, FL. 233 pp.)
1	CATALASE	Plant	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
77	CHLOROGENIC-ACID	Fruit	5	15	-1.0935971883111022	
77	CHLOROGENIC-ACID	Leaf	100	1200	-1.3240006985895736	
77	CHLOROGENIC-ACID	Pericarp	8	18		
77	CHLOROGENIC-ACID	Fruit Juice	--	--		
77	CHLOROGENIC-ACID	Seed	--	--		
77	CHLOROGENIC-ACID	Pt	--	--		
21	CHLOROPHYLL	Fruit	--	1	-0.9710352631864654	
24	CHROMIUM	Fruit	0.005	0.3	-0.4654957769727276	
60	CINNAMALDEHYDE	Fruit	--	--		
23	CITRIC-ACID	Plant	--	--		
2	COBALT	Fruit	0.005	0.043	-0.5299096696083117	
12	COPPER	Fruit	0.24	4	-0.6863742487163819	
4	COSMOSIIN	Heart Wood	--	--		
7	CYANIDIN	Leaf	--	--		
2	CYSTINE	Plant	30	187	-1.078139109591067	
4	D-CATECHIN	Fruit	--	--		
2	DIETHYL-AMINE	Fruit	3	3		
40	EPICATECHIN	Fruit	4	11		
40	EPICATECHIN	Pericarp	20	80		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
1	EPSILON-CAROTENE	Plant	--	--		Jeffery B. Harborne and H. Baxter, eds. 1983. Phytochemical Dictionary. A Handbook of Bioactive Compounds from Plants. Taylor & Frost, London. 791 pp.
12	ESTRAGOLE	Essential Oil	--	--		
8	ESTRONE	Seed	0.1	0.13	-1.0000000000000002	
24	ETHANOL	Plant	--	--		
6	ETHYL-ACETATE	Plant	--	--		
6	ETHYL-ACETATE	Fruit	--	--		
1	ETHYL-BUTYRATE	Plant	--	--		
1	ETHYL-FORMATE	Fruit	--	--		
2	ETHYL-ISOBUTYRATE	Plant	--	--		
2	ETHYL-ISOBUTYRATE	Fruit	--	--		
1	ETHYL-NONANOATE	Plant	--	--		
1	ETHYL-PROPIONATE	Plant	--	--		
1	ETHYL-PROPIONATE	Fruit	--	--		
1	ETHYL-VALERATE	Fruit	--	--		
2	FARNESENE	Fruit Epidermis	--	--		
2	FARNESENE	Pericarp	--	--		
61	FERULIC-ACID	Fruit	4	95	1.7162326606420661	
15	FIBER	Fruit	5200	49636	-0.8685372806832163	USDA's Ag Handbook 8 and sequelae)

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
15	FOLACIN	Fruit	0.02	0.2	-0.7547576455042277	USDA's Ag Handbook 8 and sequelae)
13	FORMIC-ACID	Plant	--	--		
2	FRIEDELIN	Heart Wood	--	--		
8	FRUCTOSE	Fruit	50100	60800	0.04916971831634761	
7	FUMARIC-ACID	Plant	--	--		
62	GALLIC-ACID	Fruit	--	--		
62	GALLIC-ACID	Pericarp	--	--		
35	GERANIOL	Plant	--	--		
7	GLUCOSE	Fruit	17200	18200	-0.7019443383136035	
8	GLUTAMIC-ACID	Fruit	156	1244	-0.9333642189445454	
5	GLUTAMINE	Plant	20	20		
3	GLYCERIC-ACID	Plant	--	--		
12	GLYCINE	Plant	80	497	-0.8208359653564842	
4	GLYCOLIC-ACID	Plant	--	--		
1	GLYOXYLIC-ACID	Plant	--	--		
6	GUANIDINE	Shoot	--	--		
6	GUANIDINE	Stem	--	--		
5	HEXANAL	Fruit	--	--		
3	HEXANOL	Plant	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
1	HEXYL-ACETATE	Plant	--	--		
1	HEXYL-ACETATE	Fruit	--	--		
1	HEXYL-BUTYRATE	Plant	--	--		
1	HEXYL-BUTYRATE	Fruit	--	--		
1	HEXYL-FORMATE	Plant	--	--		
7	HISTIDINE	Fruit	30	187	-1.0696353953245137	
14	HYPERIN	Plant	--	--		
30	HYPEROSIDE	Fruit	--	--		
30	HYPEROSIDE	Pericarp	--	--		
30	HYPEROSIDE	Fruit Juice	--	--		
30	HYPEROSIDE	Heart Wood	--	--		
7	INDOLE-3-ACETIC-ACID	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
7	INDOLE-3-ACETIC-ACID	Leaf	--	--		
7	INDOLE-3-ACETIC-ACID	Stem Bark	--	--		
8	INOSITOL	Plant	--	--		
12	IODINE	Plant	--	--		
6	IRON	Fruit	1.1	123	-0.039580333705947705	
2	ISOAMYL-ACETATE	Fruit	--	--		
3	ISOBUTYL-ACETATE	Plant	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
4	ISOCHLOROGENIC-ACID	Plant	--	--		Stitt, Paul. Why George should eat broccoli.
3	ISOLEUCINE	Fruit	50	497	-0.9433250929721118	
4	ISOPROPYL-ACETATE	Fruit	--	--		
3	ISOQUERCETIN	Fruit Juice	--	--		
22	ISOQUERCITRIN	Fruit	--	--		
22	ISOQUERCITRIN	Fruit Juice	--	--		
22	ISOQUERCITRIN	Pericarp	--	--		
1	ISOVALERALDEHYDE	Fruit	--	--		
75	KAEMPFEROL	Fruit	--	2	-0.5794291374991353	
1	L-ARGININE	Shoot	--	--		
1	L-ARGININE	Stem	--	--		
8	LACTIC-ACID	Plant	--	--		
7	LAURIC-ACID	Fruit	10	63	-0.44474745342800637	
20	LECITHIN	Plant	--	--		
2	LEUCINE	Fruit	120	746	-0.9258535515942413	
11	LITHIUM	Fruit	0.044	0.172	-0.8448748858580687	
15	LUTEIN	Fruit	0.4	5	-0.4027761600563295	
78	LUTEOLIN	Heart Wood	--	--		
4	LYSINE	Fruit	20	746	-0.8724121045963826	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
65	MAGNESIUM	Fruit	48	478	-0.7648501234386748	
14	MANGANESE	Fruit	--	29	-0.2123152729972876	
3	MANNOSE	Plant	--	--		
23	MELATONIN	Fruit	--	--		Hattori, A., et. al. 1995. Identification of Melatonin in Plants and its Effects on Plasma Melatonin Levels and Binding to Melatonin Receptors in Vertebrates. Biochem. Mol. Biol. Int., 35(3): 627-634.
1	MERCURY	Fruit	--	0.02	0.10095423065636192	
2	METHANOL	Plant	--	--		
15	METHIONINE	Plant	20	124	-0.9578509469925256	
2	METHYL-2-METHYL-BUTYRATE	Plant	--	--		
3	METHYL-ACETATE	Plant	--	--		
1	METHYL-AMINE	Fruit Epidermis	--	4.5		
1	METHYL-AMINE	Pericarp	4.5	4.5		
1	METHYL-AMINE	Fruit	--	5.6		
4	METHYL-BENZOATE	Fruit	--	--		
2	METHYL-BUTYRATE	Plant	--	--		
2	METHYL-BUTYRATE	Fruit	--	--		
2	METHYL-CAPROATE	Plant	--	--		
2	MOLYBDENUM	Fruit	0.077	0.43	-0.3990584824882058	
13	MUFA	Fruit	150	935	-0.24039423421132997	USDA's Ag Handbook 8 and sequelae)

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
34	MYRICETIN	Fruit	--	0.5	-0.7536633445071549	
6	MYRISTIC-ACID	Fruit	20	124	-0.26329389964394695	
1	N-BUTYL-FORMATE	Plant	--	--		
1	N-BUTYL-PROPIONATE	Plant	--	--		
1	N-BUTYL-PROPIONATE	Fruit	--	--		
1	N-HEXYL-PROPIONATE	Plant	--	--		
1	N-HEXYL-PROPIONATE	Fruit	--	--		
2	NEO-CHLOROGENIC-ACID	Plant	--	--		
2	NEOXANTHIN	Fruit Epidermis	--	--		
39	NIACIN	Fruit	1	7	-0.7178505836876389	
3	NICKEL	Fruit	0.004	0.645	-0.5833033975627046	
2	NONACOSANE	Plant	--	--		
6	OCTACOSANOL	Plant	--	--		
18	OLEIC-ACID	Fruit	140	871	-0.4740320725940964	
9	OXALIC-ACID	Plant	--	--		
25	P-COUMARIC-ACID	Fruit	15	460	1.836295249622603	
25	P-COUMARIC-ACID	Leaf	--	--		
13	P-HYDROXY-BENZOIC-ACID	Fruit	--	--		
13	PALMITIC-ACID	Fruit	480	2986	-0.31904990505316816	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
13	PALMITIC-ACID	Seed	--	--		Fathy, M. M., Abd El Megid, R. M. 1995. A Comparative Study of the Lipid Contents and the Antimicrobial Activity of Certain Rosaceous Seeds. Zagazig J Pharm Sci, 4(2): 121-127.
2	PALMITOLEIC-ACID	Fruit	10	62	-0.3340992517515945	
11	PANTOTHENIC-ACID	Fruit	1	4	-0.8996713902808875	USDA's Ag Handbook 8 and sequelae)
24	PECTIN	Fruit	1400	66585	0.16029071562128944	
7	PHENYLALANINE	Fruit	50	311	-1.0455516744717288	
9	PHLORETIN	Leaf	300	11000		
1	PHLORETIN-GLUCOSIDE	Fruit	--	1		
1	PHLORETIN-GLUCOSIDE	Pericarp	10	15		
8	PHLORIDZIN	Leaf	54000	140000	1	
8	PHLORIDZIN	Fruit Juice	--	--		
8	PHLORIZIN	Plant	--	--		
8	PHLORIZIN	Leaf	--	--		
8	PHLORIZIN	Pericarp	--	--		
2	PHOSPHATIDYL-CHOLINE	Fruit	189	214		
4	PHOSPHORUS	Fruit	68	925	-0.6958662309301713	
5	PHYLLOQUINONE	Fruit	--	0.06	-0.22359887323159108	
2	PHYTOSTEROLS	Fruit	120	745	-0.2581394518581099	USDA's Ag Handbook 8 and sequelae)

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
2	POMOLIC-ACID	Plant	--	--		J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991.
14	POTASSIUM	Fruit	1110	12140	-0.5110685274797335	
17	PROCYANIDIN-A-2	Leaf	--	--		
1	PROCYANIDIN-B-1	Fruit	--	--		
1	PROCYANIDIN-B-1	Fruit Juice	--	--		
1	PROCYANIDIN-B-1	Leaf	--	--		
1	PROCYANIDIN-B-1	Pericarp	--	--		
1	PROCYANIDIN-B-2	Leaf	150	900	0.9999999999999998	
1	PROCYANIDIN-B-2	Fruit	2	10		
1	PROCYANIDIN-B-2	Pericarp	15	100		
1	PROCYANIDIN-B-2	Fruit Juice	--	--		
4	PROCYANIDIN-B-4	Leaf	--	--		
27	PROCYANIDINS	Leaf	--	--		
2	PROPIONALDEHYDE	Fruit	--	--		
43	PROTOCATECHUIC-ACID	Fruit	--	--		
4	PUFA	Fruit	1050	6535	-0.3716987814442892	USDA's Ag Handbook 8 and sequelae)
1	PYRROLIDINE	Fruit Epidermis	--	1.5		
1	PYRROLIDINE	Pericarp	1.5	1.5		
1	PYRUVIC-ACID	Plant	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
176	QUERCETIN	Pericarp	58	263	1	Pizzorno, J.E. and Murray, M.T. 1985. A Textbook of Natural Medicine. John Bastyr College Publications, Seattle, Washington (Looseleaf).
176	QUERCETIN	Heart Wood	--	--		
176	QUERCETIN	Fruit	2.5	41	-0.582618968173555	
2	QUERCETIN-3-O-BETA-D-GLUCOSIDE	Plant	--	--		J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991.
1	QUERCETIN-3-O-RHAMNOSIDE	Plant	--	--		J.S. Glasby Dict.Pls Containing 2ndary Metabolite. 1991.
4	QUERCETIN-3-RHAMNOGLUCOSIDE	Plant	--	--		
44	QUERCITRIN	Fruit	--	--		
44	QUERCITRIN	Pericarp	--	--		
44	QUERCITRIN	Leaf	600	9015	1.7298124819748746	
44	QUERCITRIN	Fruit Juice	--	--		
2	REYNOUTRIN	Fruit	--	--		
2	REYNOUTRIN	Fruit Juice	--	--		
2	REYNOUTRIN	Pericarp	--	--		
15	RIBOFLAVIN	Fruit	1	1.3	-0.7944081953947483	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
87	RUTIN	Fruit Epidermis	--	--		
87	RUTIN	Pericarp	--	--		

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
87	RUTIN	Leaf	--	8885	-0.45294433702030634	
87	RUTIN	Fruit Juice	--	--		
87	RUTIN	Fruit	--	--		
7	SALICYLATES	Fruit	0.8	60	-0.16469419114376535	
60	SELENIUM	Fruit	--	--	-0.38618723699673646	
1	SERINE	Fruit	80	497	-1.1107007920496865	USDA's Ag Handbook 8 and sequelae)
14	SHIKIMIC-ACID	Plant	--	--		
4	SILICON	Fruit	1	70	-0.3810148443665756	
3	SILVER	Fruit	0.011	0.086	-0.4995614833070808	
9	SINAPIC-ACID	Fruit	--	--		
1	SODIUM	Fruit	--	133	-0.1713385458263085	
11	SORBITOL	Leaf	--	--		
1	SPERMIDINE	Bud	--	--		Wang, S. Y., Faust, M. 1994. Changes in Polyamine Content During Dormancy in Flower Buds of 'Anna' Apple. J. Amer. Soc. Hort. Sci., 119(1): 70-73.
1	SPERMINE	Bud	--	--		Wang, S. Y., Faust, M. 1994. Changes in Polyamine Content During Dormancy in Flower Buds of 'Anna' Apple. J. Amer. Soc. Hort. Sci., 119(1): 70-73.
8	STEARIC-ACID	Fruit	70	435	-0.25037310927026857	

Activity Count	Chemical	Plant Part	Low PPM	High PPM	StdDev	Reference Citation
8	STEARIC-ACID	Seed	--	--		Fathy, M. M., Abd El Megid, R. M. 1995. A Comparative Study of the Lipid Contents and the Antimicrobial Activity of Certain Rosaceous Seeds. Zagazig J Pharm Sci, 4(2): 121-127.
7	SUCCINIC-ACID	Plant	--	--		
14	SUCROSE	Fruit	24000	36200	-0.49014841841433165	
14	SULFUR	Fruit	1.65	23	-0.9685087927350676	
31	THIAMIN	Fruit	1	2	-0.4266044741562528	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
4	THREONINE	Fruit	30	435	-1.0736073129874002	
4	TIN	Fruit	--	--	-0.3771396188984718	Pedersen, M. 1987. Nutritional Herbology. Pederson Publishing. Bountiful, Utah. 377 pp.
3	TRIACONTANOL	Plant	--	--		
29	TRYPTOPHAN	Fruit	20	124	-1.0195295627538696	
8	TYROSINE	Fruit	40	249	-0.8990776765345502	
89	URSOLIC-ACID	Fruit Epidermis	--	--		
89	URSOLIC-ACID	Pericarp	--	--		
89	URSOLIC-ACID	Wax	--	--		
3	VALINE	Fruit	40	560	-0.8032333881374735	
3	XYLOSE	Plant	--	--		
77	ZINC	Fruit	--	35	0.1413570623516533	