

Dr. Duke's Phytochemical and Ethnobotanical Databases

List of Plants for GLUTAMIC-ACID

Plant	Part	Low PPM	High PPM	StdDev	Reference
Abelmoschus esculentus	Fruit	2710.0	27100.0	1.0787835766302012	USDA's Ag Handbook 8 and sequelae)
Acacia farnesiana	Leaf	10080.0	54070.0	0.8730215200517875	CRC Handbook of Medicinal Herbs and/or CRC Handbook of Proximate Analyses
Achillea millefolium	Plant				Tunon, H., Thorsell, W., and Bohlin, L. 1993. Mosquito Repelling Activity of Compounds Occurring in Achillea millefolium L. (Asteraceae). Economic Botany 48(2): 111-120, 1994.
Allium sativum var. sativum	Leaf				--
Allium cepa	Bulb				Thomas, D. J., Parkin, K. L. 1994. Quantification of Alk(en)yl-L-Cysteine Sulfoxides and Related Amino Acids in Alliums by High-Performance Liquid Chromatography. J. Agr. Food Chem., 42(8): 1632-1638.
Allium sativum var. sativum	Bulb	5.0	19320.0		--
Allium ampeloprasum	Plant				--
Allium schoenoprasum	Leaf	5790.0	72400.0	1.864122232129579	USDA's Ag Handbook 8 and sequelae)
Aloe vera	Leaf		43256.0	0.28830994883469857	--
Alpinia galanga	Leaf				--
Amaranthus sp.	Leaf	2920.0	35128.0	-0.15116995229832328	--
Anabasis aphylla	Plant				--
Anacardium occidentale	Seed	36240.0	36867.0	-0.20446602453379503	--
Ananas comosus	Fruit	90.0	3333.0	-0.7707955020140207	--
Angelica sinensis	Root				Jim Duke's personal files.
Apium graveolens	Pt	860.0	18285.0		USDA's Ag Handbook 8 and sequelae)
Apium graveolens	Shoot				--
Arachis hypogaea	Seed	54650.0	65281.0	0.994345783515463	--
Arctium lappa	Root	1570.0	7850.0	-0.6250548944791179	USDA's Ag Handbook 8 and sequelae)
Artemisia dracunculus	Leaf				--
Artemisia dracunculus	Root				--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Artemisia dracunculus	Shoot				--
Artocarpus altilis	Seed	10360.0	23690.0	-0.7604153169482764	USDA's Ag Handbook 8 and sequelae)
Asimina triloba	Fruit	622.0	7332.0	-0.4595880826721499	--
Asparagus officinalis	Shoot	5010.0	64645.0	0.9806017011914672	--
Astragalus membranaceus	Root				Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
Avena sativa	Seed	29000.0	31000.0	-0.4519999471714031	Jim Duke's personal files.*
Avena sativa	Plant		19000.0	-0.17653409934818678	Jim Duke's personal files.*
Averrhoa carambola	Fruit	770.0	8480.0	-0.3702492186050162	USDA's Ag Handbook 8 and sequelae)
Bacopa monnieri	Plant				Wealth of India.
Basella alba	Leaf	2830.0	41015.0	0.1671393707787067	--
Bertholletia excelsa	Seed	31510.0	32600.0	-0.3844945310779699	--
Beta vulgaris	Root	3930.0	30994.0	1.3370135300475792	USDA's Ag Handbook 8 and sequelae)
Brassica oleracea var. sabellica l.	Leaf	3740.0	24065.0	-0.749344921077189	--
Brassica oleracea var. botrytis l.	Leaf	3750.0	40275.0	0.12712766718145815	--
Brassica rapa	Leaf	3600.0	76932.0	2.1091668817278633	USDA's Ag Handbook 8 and sequelae)
Brassica oleracea var. botrytis l.	Flower	2650.0	34240.0		--
Brassica oleracea var. viridis l.	Leaf	1310.0	21471.0	-0.8896021631464629	--
Brassica napus var. napobrassica	Root	1420.0	13730.0	-0.12656879284513156	USDA's Ag Handbook 8 and sequelae)
Brassica rapa	Root	1300.0	15990.0	0.06502620540194483	--
Brassica oleracea var. capitata l.	Leaf	2700.0	36099.0	-0.09866810879436606	USDA's Ag Handbook 8 and sequelae)
Brassica chinensis	Leaf	3600.0	76932.0	2.1091668817278633	--
Brassica oleracea var. italica	Leaf	3750.0	40275.0	0.12712766718145815	USDA's Ag Handbook 8 and sequelae)
Cajanus cajan	Seed	40790.0	56270.0	0.6141637182542585	--
Calathea allouia	Root	8825.0	9710.0	-0.4673705153908161	--
Capsella bursa-pastoris	Plant				--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Capsicum frutescens	Fruit	2640.0	21542.0	0.6462527347442002	USDA's Ag Handbook 8 and sequelae)
Capsicum annuum	Fruit	1120.0	15277.0	0.15870222657295222	USDA's Ag Handbook 8 and sequelae)
Carica papaya	Fruit				USDA's Ag Handbook 8 and sequelae)
Carum carvi	Seed	31690.0	35175.0	-0.2758530020526007	Revised USDA data received 1993.
Castanea sativa	Seed	2558.0	5628.0	-1.5224670828730211	--
Castanea mollissima	Seed	5393.0	9600.0	-1.354884887421073	--
Castanea dentata	Seed	6204.0	11043.0	-1.294003440281808	--
Centella asiatica	Plant				=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
Ceratonia siliqua	Seed		131600.0	3.7924030897032144	Duke, J. A. Writeups or information summaries on approximately 2,000 economic plants, USDA, ARS, Beltsville, MD 20705.
Chenopodium album	Leaf	5210.0	33188.0	-0.25606549956678565	--
Chondrus crispus	Thallus				Jim Duke's personal files.
Cicer arietinum	Seed	33600.0	38150.0	-0.15033511900387322	--
Cichorium endivia	Leaf	1660.0	26731.0	-0.6051946483876423	--
Citrullus lanatus	Fruit		7420.0	-0.45273980737780517	Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
Citrullus lanatus	Seed		53000.0	0.4761995241133043	Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
Citrus reticulata	Fruit	160.0	5158.0	-0.6287716109665302	Lawrence, B.M., Essential Oils 1976-1977, Essential Oils 1978, Essential Oils 1979-1980.
Citrus paradisi	Fruit	220.0	2800.0	-0.8122742603309042	--
Citrus limon	Plant				--
Citrus sinensis	Fruit	60.0	7097.0	-0.4778760905604569	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
<i>Cnidioscolus chayamansa</i>	Leaf	11780.0	58900.0	1.1341789908284232	--
<i>Coccinia grandis</i>	Flower				List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
<i>Cocos nucifera</i>	Endosperm				Jim Duke's personal files.
<i>Cocos nucifera</i>	Seed	7610.0	14355.0	-1.154267228968401	USDA's Ag Handbook 8 and sequelae)
<i>Cocos nucifera</i>	Leaf				Jim Duke's personal files.
<i>Coffea arabica</i>	Seed				Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
<i>Colocasia esculenta</i>	Root	1740.0	5925.0	-0.7882497491807205	--
<i>Corchorus olitorius</i>	Leaf	4930.0	40130.0	0.11928753607118647	--
<i>Coriandrum sativum</i>	Fruit				--
<i>Crocus sativus</i>	Bulb				--
<i>Cryptotaenia japonica</i>	Shoot				--
<i>Cucumis sativus</i>	Fruit	1540.0	38987.0	2.0038454905378824	--
<i>Cucurbita</i> spp	Fruit	1260.0	19935.0	0.5211938893122456	--
<i>Cucurbita pepo</i>	Seed	43150.0	101820.0	2.535958532664187	--
<i>Cucurbita foetidissima</i>	Seed	52800.0	73530.0	1.3423783943621699	--
<i>Cucurbita pepo</i>	Fruit	1840.0	35000.0	1.6935719269179679	--
<i>Daucus carota</i>	Root	2020.0	16545.0	0.11207718948474456	--
<i>Dioscorea pentaphylla</i>	Root	1590.0	8565.0	-0.5644396627328083	--
<i>Dryopteris marginalis</i>	Plant				List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
<i>Elaeagnus angustifolia</i>	Root		0.48	-1.2905101027270787	Wheller, C. T., Bond, G. 1970. The Amino Acids of Non-Legume Root Nodules. Phytochemistry 9: 705-708. Dept. Botany Univ. Glasgow Glasgow, Scotland.

Plant	Part	Low PPM	High PPM	StdDev	Reference
Fagopyrum esculentum	Seed		23300.0	-0.7768697621210507	Laferriere, J.E., 1988, Nutricomp Program, Nutricomp Database; reviewed in J. Ethnobiology 9(1):27-29.
Ficus carica	Fruit	720.0	3447.0	-0.7619238726554377	USDA's Ag Handbook 8 and sequelae)
Foeniculum vulgare	Seed	29560.0	32427.0	-0.3917935541930723	USDA's Ag Handbook 8 and sequelae)
Foeniculum vulgare	Fruit	29560.0	32427.0	1.4933376958685471	--
Fragaria spp	Fruit	900.0	10676.0	-0.19935362148704966	USDA's Ag Handbook 8 and sequelae)
Ginkgo biloba	Seed	8360.0	22840.0	-0.7962775692479128	USDA's Ag Handbook 8 and sequelae)
Glechoma hederacea	Plant				Oriental Materia Medica (three volumes by Dr. Hsu and collaborators)
Glycine max	Seed	70680.0	77280.0	1.500594213331154	USDA's Ag Handbook 8 and sequelae)
Glycine max	Shoot				--
Harpagophytum procumbens	Root				--
Helianthus tuberosus	Tuber		26493.0	0.992368582660606	Izadoost, M. & Robinson, T., Synergism & antagonism in the pharmacology of alkaloidal plants, pp 137-58 in Craker, L. & Simon, J., eds., Herbs, Spices & Medicinal Plants: Recent Advances in Botany, Horticulture & Pharmacology, v. 2, 1987, 255pp.
Hordeum vulgare	Seed	32000.0	38000.0	-0.15666375176263259	Jim Duke's personal files.*
Huperzia spp	Plant				--
Ipomoea batatas	Root	1590.0	6360.0	-0.7513719508455532	--
Ipomoea aquatica	Leaf	2520.0	33465.0	-0.24108814565268047	--
Juglans cinerea	Seed	60840.0	62942.0	0.8956613033638753	--
Juglans regia	Seed	28090.0	29155.0	-0.5298421301041434	USDA's Ag Handbook 8 and sequelae)
Juglans nigra	Seed	52130.0	54505.0	0.53969680612619	USDA's Ag Handbook 8 and sequelae)
Lablab purpureus	Seed	1720.0	42815.0	0.04648535979354315	--
Lactuca sativa	Leaf	1820.0	30333.0	-0.4104349776345486	--
Larrea tridentata	Plant		13600.0	-0.6106343436470067	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Lens culinaris	Sprout Seedling	12580.0	41935.0	0.25078727322053307	USDA's Ag Handbook 8 and sequelae)
Lens culinaris	Seed	43500.0	49000.0	0.30743598387972115	USDA's Ag Handbook 8 and sequelae)
Lentinus edodes	Fruit				--
Lepidium meyenii	Root		15650.0	0.036202179116986435	Taylor, Leslie. 2005. The Healing Power of Rainforest Herbs. SquareOne Publisher, Garden City Park, NY. 519 pp.
Linum usitatissimum	Seed		1.153	-1.7598687378912001	--
Lupinus albus	Seed	21650.0	96985.0	2.3319656034068434	--
Lycium barbarum	Fruit		6300.0	-0.5398996747603746	Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
Lycopersicon esculentum	Fruit	90.0	54053.0	3.1763013494537677	--
Macadamia spp	Seed	17820.0	18330.0	-0.9865584608612779	USDA's Ag Handbook 8 and sequelae)
Malus domestica	Fruit	156.0	1244.0	-0.9333642189445454	--
Mangifera indica	Fruit	600.0	6800.0	-0.5009890196788704	--
Manihot esculenta	Root	4700.0	14925.0	-0.025260818108292494	--
Melia azedarach	Plant				--
Mentha spicata	Leaf	3580.0	24775.0	-0.7109553135717208	USDA's Ag Handbook 8 and sequelae)
Mentha x piperita	Leaf	4090.0	19155.0	-1.0148279814319057	USDA's Ag Handbook 8 and sequelae)
Momordica charantia	Fruit				Jim Duke's personal files.
Momordica charantia	Seed		212.0	-1.7509729163492929	Jim Duke's personal files.
Moringa oleifera	Shoot	10350.0	48500.0	0.39220423591385656	USDA's Ag Handbook 8 and sequelae)
Morus alba	Leaf				--
Mucuna pruriens	Seed	19075.0	40440.0	-0.05371799222014686	--
Murraya sp	Fruit	1160.0	3341.0	-0.7701729315327166	--
Musa x paradisiaca	Fruit	1160.0	3341.0	-0.7701729315327166	USDA's Ag Handbook 8 and sequelae)
Myrica cerifera	Root				--
Nasturtium officinale	Herb	1900.0	38000.0	1.0	USDA's Ag Handbook 8 and sequelae)

Plant	Part	Low PPM	High PPM	StdDev	Reference
Nelumbo nucifera	Seed	9570.0	29000.0	-0.5363817172881947	--
Nelumbo nucifera	Rhizome	1390.0	6650.0	-1.0	--
Nigella sativa	Seed	28085.0	35900.0	-0.24526461038526376	--
Ocimum basilicum	Leaf		15650.0	-1.204342874821576	USDA's Ag Handbook 8 and sequelae)
Oenothera biennis	Seed	26300.0	28068.0	-0.5757036221626196	--
Opuntia ficus-indica	Bud		16000.0		Laferriere, J.E., 1988, Nutricomp Program, Nutricomp Database; reviewed in J. Ethnobiology 9(1):27-29.
Opuntia ficus-indica	Seed		37500.0	-0.17775919429183049	Laferriere, J.E., 1988, Nutricomp Program, Nutricomp Database; reviewed in J. Ethnobiology 9(1):27-29.
Oryza sativa	Hay				--
Pachyrhizus erosus	Tuber	820.0	7560.0	-1.6000445771204561	--
Panax ginseng	Leaf				--
Panax quinquefolius	Plant	396.0	4450.0	-1.3461930909311184	--
Panax ginseng	Root				--
Papaver bracteatum	Seed	37600.0	43200.0	0.06272885054102553	--
Papaver somniferum	Seed	45410.0	48713.0	0.2953271998679615	--
Perideridia gairdneri	Root		12319.0	-0.24618850192770889	Izadoost, M. & Robinson, T., Synergism & antagonism in the pharmacology of alkaloidal plants, pp 137-58 in Craker, L. & Simon, J., eds., Herbs, Spices & Medicinal Plants: Recent Advances in Botany, Horticulture & Pharmacology, v. 2, 1987, 255pp.
Persea americana	Fruit	1660.0	8045.0	-0.40410148852592487	--
Phaseolus vulgaris	Seed	32940.0	37019.0	-0.19805301000491887	USDA's Ag Handbook 8 and sequelae)
Phaseolus vulgaris	Fruit	1870.0	19219.0	0.46547383123553154	USDA's Ag Handbook 8 and sequelae)
Phaseolus vulgaris	Sprout Seedling	5120.0	55054.0	1.0799400548183595	USDA's Ag Handbook 8 and sequelae)
Phaseolus lunatus	Seed	8810.0	33820.0	-0.333021651306727	USDA's Ag Handbook 8 and sequelae)
Phoenix dactylifera	Fruit	400.0	6160.0	-0.5507946581831958	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Phyllanthus emblica	Fruit	1320.0	6535.0	-0.5216116668720676	--
Pinellia ternata	Tuber				--
Pinus edulis	Seed	19690.0	20925.0	-0.8770731141347408	USDA's Ag Handbook 8 and sequelae)
Pinus pinea	Seed	40840.0	59800.0	0.7630975425103956	--
Pistacia vera	Seed	49160.0	51139.0	0.3976822870196297	--
Pisum sativum	Fruit	4480.0	44313.0	2.4183217884660655	--
Pisum sativum	Shoot		70.0	-1.3728059371053247	--
Pisum sativum	Seed	7400.0	35005.0	-0.283025452512528	--
Plantago ovata	Seed				--
Portulaca oleracea	Herb	1500.0	33792.0	-1.0	--
Prunus domestica	Fruit	370.0	2500.0	-0.8356206533798067	USDA's Ag Handbook 8 and sequelae)
Prunus persica	Fruit	1060.0	8586.0	-0.3620001597277373	--
Prunus cerasus	Fruit				--
Prunus dulcis	Seed	59340.0	62070.0	0.8588708515929542	USDA's Ag Handbook 8 and sequelae)
Prunus armeniaca	Fruit	1570.0	11500.0	-0.13522886191273067	USDA's Ag Handbook 8 and sequelae)
Psidium cattleianum	Fruit	760.0	3930.0	-0.7243361798467046	--
Psidium guajava	Fruit	1070.0	7704.0	-0.43063855529151074	USDA's Ag Handbook 8 and sequelae)
Psophocarpus tetragonolobus	Seed	40100.0	43749.0	0.08589164643808482	--
Psophocarpus tetragonolobus	Leaf	3890.0	16803.0	-1.142000315027485	--
Psophocarpus tetragonolobus	Tuber	8000.0	18779.0	-0.06387581149516006	--
Psoralea esculenta	Root	4093.0	12319.0	-0.24618850192770889	Izadoost, M. & Robinson, T., Synergism & antagonism in the pharmacology of alkaloidal plants, pp 137-58 in Craker, L. & Simon, J., eds., Herbs, Spices & Medicinal Plants: Recent Advances in Botany, Horticulture & Pharmacology, v. 2, 1987, 255pp.
Pyrus communis	Fruit	280.0	1729.0	-0.8956208835154862	--
Raphanus sativus	Root	1320.0	25580.0	0.8780332997335651	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Rehmannia glutinosa	Root	2000.0	53000.0	3.202606243067563	--
Ribes nigrum	Fruit Juice		210.0		--
Ricinus communis	Seed				List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Rosmarinus officinalis	Leaf	3610.0	11200.0	-1.4449537951023277	USDA's Ag Handbook 8 and sequelae)
Sambucus canadensis	Fruit	960.0	4752.0	-0.6603670628927117	USDA's Ag Handbook 8 and sequelae)
Scutellaria baicalensis	Root				--
Secale cereale	Seed	36610.0	41110.0	-0.025450099231021674	USDA's Ag Handbook 8 and sequelae)
Sechium edule	Fruit	1370.0	19570.0	0.4927891111027475	--
Sesamum indicum	Seed	24670.0	51927.0	0.4309287044456456	--
Silybum marianum	Seed				--
Sinapis alba	Seed	49790.0	53275.0	0.48780201750436314	--
Solanum melongena	Fruit	2010.0	24907.0	0.9081214434427236	--
Solanum tuberosum	Tuber	3470.0	24150.0	0.6715518059550106	--
Spinacia oleracea	Plant	3430.0	40735.0	1.5707193839545637	USDA's Ag Handbook 8 and sequelae)
Stachys officinalis	Shoot				--
Taraxacum officinale	Leaf				Hansel, R., Keller, K., Rimpler, H., and Schneider, G. eds. 1992. Hager's Handbuch der Pharmazeutischen Praxis, Drogen (A-D), 1209 pp., 1993 (E-O), 970 pp., 1994 (P-Z), 1196 pp. Springer-Verlag, Berlin.
Theobroma cacao	Seed		10200.0	-1.3295703563860357	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Tilia sp.	Fruit				--
Tribulus terrestris	Fruit				--
Trifolium pratense	Plant				--
Trigonella foenum-graecum	Seed	39880.0	43870.0	0.0909967435301507	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Triticum aestivum	Seed	39000.0	63000.0	0.8981083746972622	--
Urtica dioica	Leaf				Jim Duke's personal files.
Vaccinium corymbosum	Fruit	830.0	5393.0	-0.6104836030782232	--
Valeriana officinalis	Root				--
Valerianella locusta	Plant	2030.0	28195.0	0.5626421499717483	--
Vicia faba	Seed	8550.0	45000.0	0.13867244364613796	USDA's Ag Handbook 8 and sequelae)
Vigna unguiculata	Seed		43190.0	0.06230694169044158	--
Vigna angularis	Seed	30990.0	35802.0	-0.24939931712098654	--
Vigna radiata	Sprout Seedling	1610.0	16912.0	-1.3307273280388923	USDA's Ag Handbook 8 and sequelae)
Vigna radiata	Seed	42640.0	46883.0	0.21811788021109724	USDA's Ag Handbook 8 and sequelae)
Vigna unguiculata	Seed		43190.0	0.06230694169044158	--
Vitis vinifera	Fruit	1380.0	7099.0	-0.47772044794013085	USDA's Ag Handbook 8 and sequelae)
Zea mays	Seed	6360.0	26457.0	-0.6436731379916952	USDA's Ag Handbook 8 and sequelae)
Zingiber officinale	Root	1620.0	9328.0	-0.49975515668744586	USDA's Ag Handbook 8 and sequelae)
Zingiber officinale	Rhizome	1620.0	9328.0	1.0	--