

C HISTIDINE

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HISTIDINE

ubiquitous

Yes

*Unless otherwise noted all references are to Duke, James A. 1992. Handbook of phytochemical constituents of GRAS herbs and other economic plants. Boca Raton, FL. CRC Press.

Plant	Part	Low PPM	High PPM	StdDev	Reference
Abelmoschus esculentus	Fruit	310	3100	0.9727269415226906	USDA's Ag Handbook 8 and sequelae)
Acacia farnesiana	Leaf	1840	9870	2.255186144347604	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.
Aesculus hippocastanum	Leaf	--	--		Jim Duke's personal files.
Albizia lebeck	Seed	--	--		Wealth of India.
Allium ampeloprasum	Plant	--	--		--
Allium cepa	Bulb	190	2071	-1	USDA's Ag Handbook 8 and sequelae)
Allium sativum var. sativum	Bulb	2.4	2712	1	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Allium schoenoprasum	Leaf	480	6000	0.3581707187383524	USDA's Ag Handbook 8 and sequelae)
Aloe vera	Leaf	2327	2327	-1.5303131560149847	--
Alpinia galanga	Leaf	--	--		--
Amaranthus sp.	Leaf	520	6256	0.4414788035666947	--
Anacardium occidentale	Seed	3990	4059	-0.5489975487982978	--
Ananas comosus	Fruit	48	667	-0.7330978320953143	--
Anethum graveolens	Fruit	3200	3466	1.229336833484955	--
Anethum graveolens	Seed	3200	3466	-0.7066452608029122	USDA's Ag Handbook 8 and sequelae)
Angelica sinensis	Root	--	--		Jim Duke's personal files.
Apium graveolens	Pt	110	2425		USDA's Ag Handbook 8 and sequelae)
Arachis hypogaea	Seed	6610	8013	0.5021644297282549	--
Arctium lappa	Root	310	1550	-0.235775973025123	USDA's Ag Handbook 8 and sequelae)
Artocarpus altilis	Seed	2070	4735	-0.3692844740679109	USDA's Ag Handbook 8 and sequelae)
Asimina triloba	Fruit	124	1336	-0.2640486033446176	--
Asparagus officinalis	Shoot	470	6065	-1	--
Avena sativa	Seed	1000	6000	-0.03298707830764554	Jim Duke's personal files.*
Averrhoa carambola	Fruit	40	440	-0.8922520547057898	USDA's Ag Handbook 8 and sequelae)
Basella alba	Leaf	390	5650	0.13735410834997389	--
Bertholletia excelsa	Seed	4020	4159	-0.5224127744298973	USDA's Ag Handbook 8 and sequelae)

Plant	Part	Low PPM	High PPM	StdDev	Reference
Beta vulgaris	Root	200	1577	-0.20948317136853128	USDA's Ag Handbook 8 and sequelae)
Bixa orellana	Seed	3620	3930	-0.5832919077335342	--
Brassica chinensis	Leaf	260	5556	0.09017965067609301	--
Brassica napus var. napobrassica	Root	300	2900	1.0788641098044627	USDA's Ag Handbook 8 and sequelae)
Brassica nigra	Leaf	450	6627	0.6276673545987139	USDA's Ag Handbook 8 and sequelae)
Brassica oleracea	Stem	190	2111		--
Brassica oleracea var. botrytis l.	Leaf	500	5370	-0.0031655528062669996	--
Brassica oleracea var. botrytis l.	Flower	400	5165		--
Brassica oleracea var. capitata l.	Leaf	250	3343	-1.0204275283909108	USDA's Ag Handbook 8 and sequelae)
Brassica oleracea var. gemmifera	Leaf	760	5426	0.024938379424981175	USDA's Ag Handbook 8 and sequelae)
Brassica oleracea var. italica	Leaf	500	5370	-0.0031655528062669996	USDA's Ag Handbook 8 and sequelae)
Brassica oleracea var. sabellica l.	Leaf	690	4440	-0.46989157021806705	--
Brassica oleracea var. viridis l.	Leaf	300	4917	-0.2305062903197567	--
Brassica rapa	Root	140	1720	-0.07022870333547145	--
Brassica rapa	Leaf	260	5556	0.09017965067609301	USDA's Ag Handbook 8 and sequelae)
Cajanus cajan	Seed	7090	8655	0.6728386811733856	--
Calathea allouia	Root	1080	1190	-0.5863466617796792	--
Camellia sinensis	Leaf	--	--		--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Cannabis sativa	Seed	--	--		ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Capsicum annuum	Fruit	170	2319	0.4251522813518472	--
Capsicum frutescens	Fruit	410	3346	1.1452024426776553	USDA's Ag Handbook 8 and sequelae)
Carica papaya	Fruit	50	448	-0.8866430953186365	USDA's Ag Handbook 8 and sequelae)
Carum carvi	Seed	5500	6105	-0.005073065220825094	Revised USDA data received 1993.
Castanea dentata	Seed	1230	2158	-1.0543741095415897	--
Castanea mollissima	Seed	1267	2256	-1.0283210306605572	--
Castanea sativa	Seed	554	1218	-1.3042709886045538	--
Ceratonia siliqua	Seed	11750	11750	1.4956374478753787	Duke, J. A. Writeups or information summaries on approximately 2,000 economic plants, USDA, ARS, Beltsville, MD 20705.
Chenopodium album	Leaf	1160	7389	1.0100815753167693	--
Cicer arietinum	Seed	4620	6000	-0.03298707830764554	--
Cichorium endivia	Leaf	230	3704	-0.8392575366859002	--
Cichorium intybus	Leaf	150	3468	-0.9576955368033032	USDA's Ag Handbook 8 and sequelae)
Citrullus lanatus	Fruit	707	707	-0.7050530351595478	Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
Citrullus lanatus	Seed	7018	7018	0.23764592476267077	Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
Citrus paradisi	Fruit	140	140	-1.1025880317240395	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Citrus reticulata	Fruit	440	3546	1.2854264273564884	USDA's Ag Handbook 8 and sequelae)
Citrus sinensis	Fruit	180	1359	-0.24792284510655177	USDA's Ag Handbook 8 and sequelae)
Coccinia grandis	Flower	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Cocos nucifera	Leaf	--	--		Jim Duke's personal files.
Cocos nucifera	Seed	770	1455	-1.2412650733514448	USDA's Ag Handbook 8 and sequelae)
Colocasia esculenta	Leaf	1140	7950	1.291622753561952	--
Colocasia esculenta	Root	340	1160	-0.6155608858425589	--
Corchorus olitorius	Leaf	690	8950	1.7934786862628123	--
Coriandrum sativum	Fruit	--	--		--
Crocus sativus	Bulb	--	--		--
Cryptotaenia japonica	Root	--	--		--
Cucumis sativus	Fruit	80	2025	0.2190230238739625	--
Cucurbita foetidissima	Seed	5835	19000	3.42303358958441	--
Cucurbita pepo	Fruit	140	1905	0.13488863306666263	--
Cucurbita pepo	Seed	6810	7316	0.9280525151100297	--
Cucurbita spp	Fruit	250	3955	1.5721844760247021	--
Daucus carota	Root	160	1310	-0.46948976552816046	--
Dioscorea pentaphylla	Root	300	1615	-0.17247848755555034	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Fagopyrum esculentum	Seed	2750	2750	-0.8969922452806592	Laferriere, J.E., 1988, Nutricomp Program, Nutricomp Database; reviewed in J. Ethnobiology 9(1):27-29.
Ficus carica	Fruit	110	527	-0.8312546213704974	USDA's Ag Handbook 8 and sequelae)
Foeniculum vulgare	Fruit	3310	3631	1.3450216208449925	--
Foeniculum vulgare	Seed	3310	3631	-0.6627803830950515	USDA's Ag Handbook 8 and sequelae)
Fragaria spp	Fruit	120	1423	-0.20305117000932518	USDA's Ag Handbook 8 and sequelae)
Ginkgo biloba	Seed	1020	2275	-0.8876875742517191	USDA's Ag Handbook 8 and sequelae)
Glycine max	Seed	9840	10770	1.2351066590650546	USDA's Ag Handbook 8 and sequelae)
Glycine max	Sprout Seedling	--	--		--
Glycine max	Shoot	--	--		--
Harpagophytum procumbens	Root	--	--		--
Helianthus annuus	Seed	6320	20000	3.688881333268414	--
Helianthus tuberosus	Tuber	1906	1906	-0.9223195022041148	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.
Humulus lupulus	Fruit	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Ipomoea aquatica	Leaf	470	6240	0.43344910864348096	--
Ipomoea batatas	Root	300	1200	-0.5766085870920526	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Juglans cinerea	Seed	8080	8359	0.5941477490429204	--
Juglans nigra	Seed	6800	7110	0.26210391718159914	USDA's Ag Handbook 8 and sequelae)
Juglans regia	Seed	3590	3725	-0.6377906951887551	USDA's Ag Handbook 8 and sequelae)
Lablab purpureus	Seed	1090	8986	0.7608342843327911	--
Lactuca sativa	Leaf	220	3667	-0.857826206195832	--
Lagenaria siceraria	Fruit	40	900	-0.5697368899444738	--
Lens culinaris	Seed	7900	8900	0.7379713783759667	USDA's Ag Handbook 8 and sequelae)
Lens culinaris	Sprout Seedling	2570	8565	-0.42492819593571496	USDA's Ag Handbook 8 and sequelae)
Lentinus edodes	Fruit	--	--		--
Lepidium meyenii	Root	--	4190	2.335075744508289	Taylor, Leslie. 2005. The Healing Power of Rainforest Herbs. SquareOne Publisher, Garden City Park, NY. 519 pp.
Linum usitatissimum	Seed	--	0.108	-1.6280448288553528	--
Lupinus albus	Seed	10300	11500	1.4291755119543776	--
Lycium chinense	Leaf	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Lycopersicon esculentum	Fruit	30	2149	0.30596189437483906	--
Lycopodium clavatum	Pollen Or Spore	--	--		ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Macadamia spp	Seed	1680	1730	-1.1681569438383435	USDA's Ag Handbook 8 and sequelae)

Plant	Part	Low PPM	High PPM	StdDev	Reference
Malus domestica	Fruit	30	187	-1.0696353953245137	--
Mangifera indica	Fruit	120	1200	-0.3594009129262241	--
Manihot esculenta	Root	450	1430	-0.3526328692766417	--
Medicago sativa	Plant	--	--		Newall, C. A., Anderson, L. A. and Phillipson, J. D. 1996. Herbal Medicine - A Guide for Health-care Professionals. The Pharmaceutical Press, London. 296pp.
Mentha spicata	Leaf	660	4565	-0.4071595786304595	USDA's Ag Handbook 8 and sequelae)
Mentha x piperita	Leaf	750	3515	-0.9341083079663628	USDA's Ag Handbook 8 and sequelae)
Momordica charantia	Seed	--	43.6	-1.6164825787870483	Jim Duke's personal files.
Moringa oleifera	Shoot	1960	9185	1	USDA's Ag Handbook 8 and sequelae)
Mucuna pruriens	Seed	3275	6945	0.21823903947373846	--
Murraya sp	Fruit	640	1843	0.09141919781622437	--
Musa x paradisiaca	Fruit	640	1843	0.09141919781622437	USDA's Ag Handbook 8 and sequelae)
Nasturtium officinale	Herb	400	8000	1	USDA's Ag Handbook 8 and sequelae)
Nelumbo nucifera	Rhizome	380	1820	1	--
Nelumbo nucifera	Seed	1150	3485	-0.7015941536729161	--
Ocimum basilicum	Leaf	2870	2870	-1.2578053845584176	USDA's Ag Handbook 8 and sequelae)
Oenothera biennis	Seed	3700	3949	-0.5782408006035382	--
Pachyrhizus erosus	Tuber	370	3410	0.0885520819204898	--
Panax ginseng	Leaf	--	--		--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Panax ginseng	Root	--	20	-1.7257014002319866	--
Panax quinquefolius	Plant	320	1100	-1.2977122612239684	--
Papaver bracteatum	Seed	4350	4650	-0.3918815322810512	--
Papaver somniferum	Seed	5280	5664	-0.12231192018547095	--
Perideridia gairdneri	Root	1080	1080	-0.6934654833435714	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	230	1127	-0.4105826673339982	--
Phaseolus lunatus	Seed	2320	7796	0.44447546934882604	USDA's Ag Handbook 8 and sequelae)
Phaseolus vulgaris	Fruit	340	3494	1.2489681913399917	USDA's Ag Handbook 8 and sequelae)
Phaseolus vulgaris	Seed	6010	6754	0.16746212043009365	USDA's Ag Handbook 8 and sequelae)
Phaseolus vulgaris	Sprout Seedling	1180	12688	1.3806152102919922	USDA's Ag Handbook 8 and sequelae)
Phoenix dactylifera	Fruit	10	390	-0.9273080508754981	--
Phyllanthus emblica	Fruit	133	658	-0.7394079114058618	--
Pinus edulis	Seed	2770	2945	-0.8451519352622784	USDA's Ag Handbook 8 and sequelae)
Pinus pinea	Seed	5750	7475	0.3591383436262607	--
Pistacia vera	Seed	5360	5576	-0.14570652162966333	--
Pisum sativum	Fruit	170	1682	-0.021461109850236294	--
Pisum sativum	Seed	1070	5061	-0.2826181096269255	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Portulaca oleracea	Herb	220	5170	-1	--
Prunus armeniaca	Fruit	270	1980	0.18747262732122505	USDA's Ag Handbook 8 and sequelae)
Prunus domestica	Fruit	130	878	-0.5851615282591455	USDA's Ag Handbook 8 and sequelae)
Prunus dulcis	Seed	5580	5837	-0.07632026052813823	USDA's Ag Handbook 8 and sequelae)
Prunus persica	Fruit	130	1053	-0.46246554166516646	--
Psidium cattleianum	Fruit	50	260	-1.0184536409167395	--
Psidium guajava	Fruit	70	504	-0.8473803796085632	USDA's Ag Handbook 8 and sequelae)
Psophocarpus tetragonolobus	Leaf	7900	8618	1.6268625166061266	--
Psophocarpus tetragonolobus	Tuber	2410	5657	1.598810359532183	--
Psoralea esculenta	Root	1266	1266	-0.5123372941537173	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	40	247	-1.0275681999208637	--
Raphanus sativus	Root	130	2520	0.7088172716746535	--
Rehmannia glutinosa	Root	1000	4000	2.1500523254433843	--
Rosmarinus officinalis	Leaf	660	2050	-1.669327249373123	USDA's Ag Handbook 8 and sequelae)
Sambucus canadensis	Fruit	150	742	-0.6805138378407519	USDA's Ag Handbook 8 and sequelae)
Secale cereale	Seed	3670	4120	-0.5327808364335734	USDA's Ag Handbook 8 and sequelae)
Sechium edule	Fruit	160	2285	0.40131420395644557	--

Plant	Part	Low PPM	High PPM	StdDev	Reference
Sesamum indicum	Seed	3050	7112	0.2626356126689672	--
Sinapis alba	Seed	7620	8153	0.5393831138440155	--
Solanum melongena	Fruit	240	3098	0.9713247016759022	--
Solanum tuberosum	Tuber	450	2140	-0.765042939248558	USDA's Ag Handbook 8 and sequelae)
Spinacia oleracea	Plant	640	7601	1.1356385926026882	USDA's Ag Handbook 8 and sequelae)
Stachys officinalis	Shoot	--	--		--
Theobroma cacao	Seed	800	800	-1.4153953454644674	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Trifolium pratense	Plant	--	--		--
Trigonella foenum-graecum	Seed	4850	7350	0.32590737566576017	--
Triticum aestivum	Seed	1000	6000	-0.03298707830764554	--
Urtica dioica	Leaf	--	--		Jim Duke's personal files.
Vaccinium corymbosum	Fruit	100	715	-0.6994440757723944	--
Valerianella locusta	Plant	360	5000	0.16207366862128014	--
Vicia faba	Seed	1340	7050	0.2461530525605589	USDA's Ag Handbook 8 and sequelae)
Vigna aconitifolia	Seed	7710	8536	0.6412027996749892	--
Vigna angularis	Seed	5240	6054	-0.01863130014870931	--
Vigna radiata	Seed	6950	7642	0.4035349168214894	USDA's Ag Handbook 8 and sequelae)
Vigna radiata	Sprout Seedling	700	7353	-0.9556870143562779	USDA's Ag Handbook 8 and sequelae)

Plant	Part	Low PPM	High PPM	StdDev	Reference
Vigna unguiculata	Fruit	900	7407	3.9924504515813624	USDA's Ag Handbook 8 and sequelae)
Vigna unguiculata	Seed	7550	8245	0.5638411062629439	USDA's Ag Handbook 8 and sequelae)
Vigna unguiculata	Seed	950	8290	0.5758042547287241	USDA's Ag Handbook 8 and sequelae)
Vitis vinifera	Fruit	240	1235	-0.33486171560742833	USDA's Ag Handbook 8 and sequelae)
Zea mays	Seed	890	3702	-0.6439051932934873	USDA's Ag Handbook 8 and sequelae)
Zea mays	Embryo	--	--		--
Zingiber officinale	Rhizome	300	1738	-1	--
Zingiber officinale	Root	300	1738	-0.05270016889774364	USDA's Ag Handbook 8 and sequelae)