

List of Plants

MALIC-ACID

Chemid

MALICACID

Dosage

LDLo=1,600 (ori rat)

*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
Acacia nilotica	Plant	--	--		*
Aconitum napellus	Plant	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Allium cepa	Leaf	--	--		Soldatenkov, S. V., Mazurova, T. A., Ranteleev, A. N. 1960. Organic Acids of Onion and Spinach. Trudy Petergof Biol. Inst., Leningrad Gosudarst Univ Im AA Zhdanova, 18: 55-61.
Allium cepa	Bulb	--	--		Soldatenkov, S. V., Mazurova, T. A., Ranteleev, A. N. 1960. Organic Acids of Onion and Spinach. Trudy Petergof Biol. Inst., Leningrad Gosudarst Univ Im AA Zhdanova, 18: 55-61.
Allium schoenoprasum	Leaf	--	--		*
Alocasia macrorrhiza	Plant	--	--		*
Ananas comosus	Fruit	1000.0	4700.0	-0.65	*
Angelica archangelica	Root	--	--		*
Angelica archangelica	Plant	--	--		*
Annona squamosa	Plant	--	--		*
Annona muricata	Plant	--	--		*
Apium graveolens	Root	--	--		*
Apium graveolens	Pt	--	--		*
Apium graveolens	Shoot	--	--		*
Arctostaphylos uva-ursi	Leaf	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Arnica montana	Flower	--	--		*
Avena sativa	Petiole	--	--		*
Avena sativa	Hull Husk	--	--		*
Averrhoa carambola	Fruit	--	12100.0	-0.16	Morton, J.F., Major Medicinal Plants. 1977. Atlas of Medicinal Plants of Middle America. Bahamas to Yucatan. 1981.
Berberis vulgaris	Plant	--	--		*
Berberis vulgaris	Fruit	--	--		Jim Duke's personal files.
Borago officinalis	Plant	--	--		*

Borago officinalis	Leaf	--	--		Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
Brassica oleracea var. capitata L.	Leaf	--	--		Jim Duke's personal files.
Brassica oleracea var. gemmifera	Leaf	--	--		*
Brassica oleracea	Stem	--	--		*
Brassica oleracea var. botrytis L.	Flower	--	--		*
Brassica oleracea var. botrytis L.	Plant	--	--		*
Brassica oleracea var. sabellica L.	Leaf	--	--		*
Brassica oleracea var. italica	Plant	--	--		Jim Duke's personal files.
Calendula officinalis	Flower	--	6400.0	-1.0	*
Camellia sinensis	Leaf	--	--		*
Capsella bursa-pastoris	Plant	--	--		*
Carica papaya	Fruit	3150.0	23333.0	0.57	*
Carica papaya	Latex Exudate	--	4400.0		ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Cephaelis ipecacuanha	Plant	--	--		*
Chaenomeles lagenaria	Fruit	--	--		*
Chelidonium majus	Plant	--	--		*
Chenopodium ambrosioides	Fruit	--	--		*
Cichorium intybus	Plant	--	--		*
Citrus aurantium	Plant	--	--		*
Citrus mitis	Fruit Juice	--	2000.0		*
Citrus sinensis	Fruit	600.0	2000.0	-0.82	*
Citrus reticulata	Fruit	1800.0	2100.0	-0.82	*
Citrus paradisi	Fruit	400.0	600.0	-0.91	*
Citrus aurantiifolia	Fruit	--	2000.0	-0.82	*
Cocos nucifera	Seed	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Convallaria majalis	Plant	--	--		*
Cornus officinalis	Fruit	--	--		*
Cryptostegia grandifolia	Latex Exudate	--	--		*
Cydonia oblonga	Seed	--	--		*
Daphne mezereum	Bark	--	--		*

<i>Datura stramonium</i>	Plant	--	2120.0	-0.62	*
<i>Daucus carota</i>	Root	--	--		*
<i>Elytrigia repens</i>	Rhizome	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
<i>Equisetum arvense</i>	Plant	--	--		*
<i>Eriobotrya japonica</i>	Leaf	--	--		Chemical Constituents of Oriental Herbs (3 diff. books)
<i>Euonymus atropurpureus</i>	Plant	--	--		*
<i>Euphorbia tirucalli</i>	Plant	--	--		*
<i>Fagopyrum esculentum</i>	Leaf	--	15100.0	0.61	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
<i>Ficus carica</i>	Leaf	--	23400.0	1.66	Rizk, A.F.M. and Al-Nowaihi, A.S., The Phytochemistry of the Horticultural Plants of Qatar, Scientific and Applied Research Centre, University of Qatar.
<i>Ficus carica</i>	Fruit Juice	--	--		Shiraishi, S. C., Kawakami, K., Widodo, S. E., Shiraishi, M., Kitazaki, M. 1996. Organic acid profiles in the juice of fig fruits. Journal of the Faculty of Agriculture Kyushu University, 41(1-2): 29-33.
<i>Ficus carica</i>	Fruit	--	30200.0	1.01	*
<i>Foeniculum vulgare</i>	Fruit	--	--		*
<i>Foeniculum vulgare</i>	Seed	--	--		Rizk, A.F.M., The Phytochemistry of the Flora of Qatar, Scientific and Applied Research Centre, University of Qatar, Kingprint, Richmond, UK, 1986.
<i>Fragaria spp</i>	Fruit	3500.0	8000.0	-0.43	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
<i>Frangula purshiana</i>	Plant	--	--		*
<i>Galium odoratum</i>	Plant	--	--		*
<i>Genipa americana</i>	Fruit	--	6300.0	-0.54	*
<i>Ginkgo biloba</i>	Pollen Or Spore	--	--		Jim Duke's personal files.
<i>Glycine max</i>	Seed	700.0	1000.0		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
<i>Glycyrrhiza glabra</i>	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
<i>Hedera helix</i>	Plant	--	--		*
<i>Helianthus annuus</i>	Leaf	--	--		Rizk, A.F.M. and Al-Nowaihi, A.S., The Phytochemistry of the Horticultural Plants of Qatar, Scientific and Applied Research Centre, University of Qatar.
<i>Hibiscus sabdariffa</i>	Leaf	--	12500.0	0.28	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
<i>Hibiscus sabdariffa</i>	Flower	6233.0	56667.0	1.0	*
<i>Hibiscus sabdariffa</i>	Stem	--	6000.0		ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
<i>Hippophae rhamnoides</i>	Fruit	15000.0	29000.0	0.94	*
<i>Juglans regia</i>	Fruit	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
<i>Kalanchoe daegrifontiana</i>	Plant	--	--		*
<i>Kalanchoe pinnata</i>	Leaf	--	--		*
<i>Lactuca scariola</i>	Latex Exudate	--	--		*
<i>Lactuca sativa</i>	Leaf	--	600.0	-1.22	*
<i>Lactuca virosa</i>	Plant	--	--		*

Ledum palustre	Plant	--	--		*
Leonurus cardiaca	Plant	--	--		*
Lepidium meyenii	Root	--	--		*
Linum usitatissimum	Seed	--	--		ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Lupinus albus	Seed	--	--		*
Lycopersicon esculentum	Fruit	--	--		*
Mangifera indica	Fruit	6700.0	36600.0	1.43	*
Matricaria recutita	Plant	--	--		Kameoka, H. and Nakai, K. 1987. Components of essential oil from the root of Glycyrrhiza-glabra. Nippon Gokeikagaku Kaishi 61(9): 1119-1122.
Medicago sativa	Plant	--	--		Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
Morus alba	Leaf	--	--		*
Musa x paradisiaca	Fruit	530.0	3730.0	-0.71	Rizk, A.F.M. and Al-Nowaihi, A.S., The Phytochemistry of the Horticultural Plants of Qatar, Scientific and Applied Research Centre, University of Qatar.
Myrciaria dubia	Fruit	--	--		Jim Duke's personal files.
Myrtus communis	Fruit	--	--		*
Nicotiana tabacum	Leaf	--	--		ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Opuntia ficus-indica	Leaf	--	950.0	-1.18	*
Opuntia ficus-indica	Fruit	180.0	1700.0	-0.84	*
Opuntia ficus-indica	Plant	--	--		*
Panax ginseng	Root	--	--		*
Panax quinquefolius	Plant	--	--		*
Papaver somniferum	Latex Exudate	--	--		ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Passiflora edulis	Fruit	1200.0	3800.0	-0.7	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Petroselinum crispum	Root	--	--		*
Physalis ixocarpa	Fruit	116.0	1500.0	-0.85	*
Physalis peruviana	Plant	--	--		*
Pimenta dioica	Fruit	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Piscidia piscipula	Plant	--	--		*
Pisum sativum	Seed	--	--		*
Polygonum hydropiperoides	Plant	--	--		*
Polygonum hydropiper	Plant	--	--		*
Polypodium vulgare	Root	--	--		*
Populus nigra	Plant	--	--		*
Portulaca oleracea	Plant	--	5100.0	1.41	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Prunus domestica	Fruit	--	15000.0	0.02	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Prunus cerasus	Fruit Juice	--	--		*

<i>Prunus armeniaca</i>	Fruit	7000.0	22000.0	0.48	*
<i>Punica granatum</i>	Fruit	--	--		*
<i>Punica granatum</i>	Fruit Juice	--	--		*
<i>Pyrus communis</i>	Fruit	--	--		*
<i>Quassia amara</i>	Root	--	--		*
<i>Quisqualis indica</i>	Fruit	--	--		*
<i>Rheum rhabarbarum</i>	Pt	--	--		*
<i>Ribes uva-crispa</i>	Fruit	--	7300.0	-0.48	*
<i>Ribes rubrum</i>	Fruit	--	2600.0	-0.78	*
<i>Rosa laevigata</i>	Fruit	--	--		*
<i>Rosa canina</i>	Fruit	15000.0	62200.0	3.1	*
<i>Rosa gallica</i>	Flower	--	--		*
<i>Rosa centifolia</i>	Flower	--	--		*
<i>Rosa spp</i>	Fruit	--	--		*
<i>Rubus fruticosus</i>	Leaf	--	--		*
<i>Rubus chingii</i>	Fruit	--	--		*
<i>Rubus idaeus</i>	Fruit	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
<i>Ruta graveolens</i>	Leaf	--	--		*
<i>Salvia officinalis</i>	Plant	--	--		*
<i>Sambucus nigra</i>	Fruit	1200.0	19000.0	0.29	*
<i>Sanguinaria canadensis</i>	Plant	--	--		*
<i>Sarcostemma acidum</i>	Plant	--	--		*
<i>Schisandra chinensis</i>	Fruit	5000.0	33333.0	1.22	*
<i>Schisandra chinensis</i>	Plant	--	--		*
<i>Sclerocarya caffra</i>	Fruit	--	--		*
<i>Solanum tuberosum</i>	Tuber	--	1120.0		*
<i>Sophora pachycarpa</i>	Leaf	--	--		*
<i>Sorbus aucubaria</i>	Fruit	19000.0	39000.0	1.59	*
<i>Spinacia oleracea</i>	Leaf	--	4300.0	-0.75	Soldatenkov, S. V., Mazurova, T. A., Ranteleev, A. N. 1960. Organic Acids of Onion and Spinach. Trudy Petergof Biol. Inst., Leningrad Gosudarst Univ Im AA Zhdanova, 18: 55-61.
<i>Stevia rebaudiana</i>	Plant	--	1880.0	-0.79	Kinghorn, A. D. (Ed.) 2002. Medicinal and Aromatic Plants - Industrial Profiles. Stevia. The genus Stevia. Taylor & Francis. New York, NY. 211 pp.
<i>Tamarindus indica</i>	Leaf	--	15000.0	0.6	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
<i>Tamarindus indica</i>	Fruit	--	10000.0	-0.3	ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
<i>Tussilago farfara</i>	Flower	--	--		*
<i>Urtica dioica</i>	Plant	--	--		*
<i>Vaccinium vitis-idaea</i>	Fruit	--	--		*

Vaccinium myrtillus	Leaf	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Vaccinium macrocarpon	Fruit	--	--		Duke, J. A. Writeups or information summaries on approximately 2,000 economic plants, USDA, ARS, Beltsville, MD 20705.
Valeriana jatamansi	Root	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Valeriana officinalis	Root	--	--		*
Vanilla planifolia	Fruit	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Viburnum prunifolium	Root Bark	--	--		Leung, A.Y., Encyclopedia of Common Natural Ingredients Used in Food, Drugs, and Cosmetics, John Wiley & Sons, New York, 1980.
Viburnum opulus	Bark	--	--		List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Vicia faba	Fruit	--	--		ANON. 1948-1976. The Wealth of India raw materials. Publications and Information Directorate, CSIR, New Delhi. 11 volumes.
Viola odorata	Flower	--	--		*
Vitis vinifera	Fruit	1500.0	2000.0	-0.82	List, P.H. and Horhammer, L., Hager's Handbuch der Pharmazeutischen Praxis, Vols. 2-6, Springer-Verlag, Berlin, 1969-1979.
Vitis vinifera	Plant	--	--		*
Zea mays	Silk Stigma Style	--	--		Leung, A. Y. and Foster, S. 1995. Encyclopedia of Common Natural Ingredients 2nd Ed. John Wiley & Sons, New York. 649 pp.
Zea mays	Plant	--	--		*