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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Research Service

BIBLIOGRAPHY
OF ORGANIC ACIDS
IN HIGHER PLANTS

October 1957

100-1000

UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF PLANT INDUSTRY

REPORT

ON THE

PLANT INDUSTRY

1900-1901

BIBLIOGRAPHY OF ORGANIC ACIDS IN HIGHER PLANTS

by
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Scientific interest in the organic acids of higher plants has prompted a search of the literature and tabulation of these acids and their occurrence, with available literature references.

Non-volatile, non-nitrogen-containing, carboxylic acids whose structure is generally accepted (144) (272) are included. Fatty acids and long chain polymers such as pectins are excluded, as are compounds which contain a sugar group as part of the molecule. Thus carboxylic sapogenins are included but saponins are not. The acids reported are those which are found in the free state or as salts, not as esters.

Plants are listed by family, genus and species. The family name follows the system given by Willis (799), as do genus and species when possible. Only spermatophyta are included.

Journal abbreviations and listings are, so far as possible, those used by Chemical Abstracts. All titles are in English.

This review covers all available publications through 1954. Only a limited number of references have been included from more recent literature.

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Naturally Occurring Organic Acids Listed in Alphabetical Order

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TABLE II.

Occurrence of Organic Acids in Higher Plants

Abietic Acid

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Pinaceae		Colophony	37, 117, 166, 173
	<i>Pinus abies</i>	Resin	48, 422
	<i>P. larix</i>		422
	<i>P. palustris</i>	Resin	35a, 265a, 344a

Aconitic Acid

Chenopodiaceae	<i>Beta vulgaris</i>	Juice	396, 399
	" "	Unripe beet	713
Compositae	<i>Achillea millefolium</i>		291
	<i>Helianthus annuus</i>		58
Gramineae	<i>Avena sativa</i>		483
	<i>Hordeum vulgare</i>	Etiolated shoot	172
	" "	Seedling	320, 483
	<i>Saccharum officinarum</i>	Juice	10, 36, 50, 415, 609, 610, 611, 702, 707, 711, 794, 821, 827.
	<i>Secale cereale</i>		483

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Secale cereale</i>	Seedling	676
	<i>Sorghum vulgare</i>		419, 754
	" "	Scale from evap. pans	513
	" "	Juice	755, 796, 797
	<i>Triticum sp.</i>		481
	" "	Temporary in sprout	675
	<i>T. sativum</i>	Seedling	676
	<i>Zea mays</i>	Sprouting seed	676
Leguminosae	<i>Phaseolus coccineus</i>		58
Ranunculaceae	<i>Aconitum spp.</i>		58, 112, 504
	<i>A. columbianum</i>		49
	<i>A. heterophyllum</i>		328
	" "	Root	779
	<i>A. napellus</i>		50
	<i>A. septentrionale</i>	Tuber & root	321
	<i>A. vernalis</i>		504
	" "	Leaf	392
	<i>Delphinium barbeyi</i>		49
	<i>D. bicolor</i>		49
	<i>D. consolida</i>	Leaf sap	791
	<i>D. culculatum</i>		49
	<i>D. geyeri</i>		49
	<i>D. glaucescens</i>		49
	<i>D. nelsonii</i>		49
Solanaceae	<i>Solanum lycopersicum</i>	Fruit	113
	" "	Root, leaf, ripe fruit	120

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Umbelliferae	<i>Angelica archangelica</i>	Root	698

Adipic Acid

Chenopodiaceae	<i>Beta vulgaris</i>		400, 752
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Ascorbic Acid

Since its structure was elucidated by Svirbely and Szent-Györgyi in 1932 (699) (700), ascorbic acid has been reported in almost every plant in which its presence has been investigated.

Bassic Acid

Sapotaceae	<i>Achras sapota</i>	Seed	282
	<i>Bassia butyracea</i>	Seed	282, 283
	<i>B. latifolia</i>	Seed	282, 283
	<i>B. longifolia</i>	Seed	282
	<i>B. parkii</i>	Seed	282, 283
	<i>Dumoria heckelii</i>	Seed	282
	<i>Mimusops djave</i>	Seed	282
	<i>M. elengi</i>	Seed	282
	<i>M. hexandra</i>	Seed	282

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Payena lucida</i>	Seed	
	<u>Benzoic Acid</u>

Compositae	<i>Dahlia</i> sp.		517
Droseraceae	<i>Drosera rotundifolia</i>		806
Empetraceae	<i>Empetrum nigrum</i>	Leaf	312
Ericaceae	<i>Vaccinium macrocarpum</i>	Berry	247, 436, 475
	<i>V. oxycoccus</i>	Berry	247, 418, 485, 605
	<i>V. vitis-idaea</i>	Berry	51, 247, 334, 385, 407, 485
Gramineae	<i>Bambusa arundinaceae</i>	Young shoot	226
Leguminosae	<i>Daviesia latifolia</i>	Leaf & stem	562
	<i>Myroxylon pereirae</i>	Balsam	364
	<i>M. toluiferum</i>	Balsam	114, 150
Lentibulariaceae	<i>Pinguicula vulgaris</i>	Leaf	409
Liliaceae	<i>Dracena draco</i>	Resin	725
	<i>Gloriosa superba</i>	Tuber	127
Magnoliaceae	<i>Illicium anisatum</i>	Fruit & Seed	505
Myrtaceae	<i>Psidium</i> spp.		521
Papaveraceae	<i>Papaver somniferum</i>		641
Pinaceae	<i>Agathis australis</i>		464
Rosaceae	<i>Prunus serotina</i>	Bark	557
	" "	Leaf	558
Rubiaceae	<i>Coffea</i> sp.		414, 522
Rutaceae	<i>Casimiroa edulis</i>	Seed	556

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Scrophulariaceae	Digitalis purpurea		337
Styracaceae	Styrax sp.		375, 535
	Styrax benzoin	Resin	725

Betulinic Acid

Apocynaceae	Alyxia buxifolia	Bark	22
Cornaceae	Cornus florida		612
Gentianaceae	Menyanthes trifoliata	Rhizome	679
Loranthaceae	Nuytsia floribunda	Leaves, stems, bark	22
Myrtaceae	Melaleuca-6 species	Bark	22
	Syncarpia laurifolia	Bark	586
Platanaceae	Platanus acerifolia	Bark	104
Punicaceae	Punica granatum	Leaves and bark	102
Rhamnaceae	Ziziphus vulgaris	Seeds & bark	339

Caffeic Acid

Aquifoliaceae	Ilex aquifolium	Leaf	686
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<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>I. paraguayensis</i>	Leaf	686
Compositae	<i>Anthemis nobilis</i>	Flower	554
	<i>Taraxacum officinale</i>	Root	553
Labiatae	<i>Melissa</i> sp.	Leaf	279
Pinaceae	<i>Larix europaea</i>	Resin	37
Ranunculaceae	<i>Aconitum septentrionale</i>		321
	<i>Clematis vitalba</i>	Flowering branch	740
Rosaceae	<i>Crataegus oxyacantha</i>	Leaf, fruit, flower	194
Rubiaceae	<i>Cinchona cuprea</i>	Bark	352
	<i>Coffea</i> sp.	Bean	194
	<i>Coffea</i> sp.	Leaf	686
Scrophulariaceae	<i>Digitalis purpurea</i>		89, 337
	<i>Scrophularia nodosa</i>	Root	323
Solanaceae	<i>Solanum tuberosum</i>		329
Umbelliferae	<i>Angelica archangelica</i>		698
	<i>Conium maculatum</i>		294

Chelidonic Acid

Amarylidaceae			692
	<i>Agave</i> sp.	Leaf	588
	<i>Agave falcata</i>	Anther, perigone	589
	<i>Amaryllis crispa</i>	Leaf, perigone, anther	589
	<i>Androstemma junceum</i>	Leaf, perigone, anther	589

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Anigozanthos humilis</i>	Leaf	589
	<i>A. preissii</i>	Anther	589
	<i>Anoiganthus breviflorus</i>	Pericarp	589
	<i>Blancoa canescens</i>	Leaf, perigone	589
	<i>Brunsvigia angustifolia</i>	Leaf, Flower	589
	<i>B. josephinae</i>	Pericarp, leaf, perigone, anther	589
	<i>B. uitenhagensis</i>	Flower	589
	<i>Buphane ciliaris</i>	Leaf, perigone, anther	589
	<i>Carpolyza spiralis</i>	Leaf, perigone, bulb	582
	<i>Conostylis</i> 12 spp		589
	<i>Crinum capese</i>	Leaf, perigone, pedicel	589
	<i>C. kirkii</i>	Leaf, perigone, pedicel	589
	<i>C. purpurascens</i>	Leaf, perigone, anther	589
	<i>Cummingia tenella</i>	Perigone	589
	<i>Galanthus nivalis</i>	Leaf, pedicel, anther, perigone	589
	<i>G. plicatus</i>	Leaf, perigone, pedicel, bulb	589
	<i>Hessea maximiliani</i>	Flower	589
	<i>Hippeastrum mandoni</i>	Leaf, perigone anther, pedicel	589
	<i>Hypoxis juncea</i>	Flower	589
	<i>H. minuta</i>	Flower, leaf	589
	<i>H. probata</i>	Perigone	589
	<i>H. serrata</i>	Perigone, leaf, anther	589

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>H. villosa</i>	Leaf, perigone	589
	<i>Ixiolirion montanum</i>	Perigone, leaf, flower	589
	<i>Lanaria plumosa</i>	Leaf, perigone	589
	<i>Leucojum</i> 5 spp.		589
	<i>Lophiola americana</i>	Leaf, flower	589
	<i>Lycoris aurea</i>	Perigone, anther, pedicel, pericarp	589
	<i>Narcissus</i> 14 spp.		589
	<i>Pancratium canariense</i>	Leaf, anther	589
	<i>Sternbergia colchici</i> - flora	Leaf, perigone, anther, seed	589
	<i>S. lutea</i>	Leaf, perigone, anther	589
	<i>Tribonanthus uniflora</i>	Perigone	589
	<i>Zephyranthes rosea</i>	Perigone, leaf, anther	589
Berberidaceae	<i>Berberis vulgaris</i>		373
Campanulaceae	<i>Centropogon</i> 6 spp.		589
	<i>Downingia pulchella</i>		589
	<i>Isotoma</i> 5 spp.		589
	<i>Laurentia</i> 4 spp.		589
	<i>Lobelia</i> 25 spp.		589
	<i>Lobelia cardinalis</i>		373
	<i>L. inflata</i>		373
	<i>L. inflata</i>	Fruit	588
	<i>L. syphilitica</i>		373
	<i>Siphocampylus</i> 9 spp.		589
Cannaceae	<i>Canna</i> spp.	Root	588

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Dioscoreaceae	Discorea balcanica	Leaves, flower, pericarp	589
	D. deltoidea	Leaves, flower	589
	D. humifusa	Seed, pericarp	589
Haemodoraceae	Dilatris corymbosa	Flowers, leaves	589
	Lachenalia tinctoria	Flowers, leaves	589
	Wachendorfia paniculata	Flowers, leaves, pericarp	589
	W. thyrsiflora	Anther	589
Hippocastanaceae	Aesculus flava	Perigone, leaf	589
	A. hippocastanum		588
Liliaceae	Acanthocarpus Preissii	Pericarp, leaf	589
	Allium cirrhosum	Leaf	589
	A. flavescens	Leaf	589
	A. obliquum	Leaf	589
	A. tenuissimum	Leaf, flower	589
	Aloe minima	Leaf	589
	Androcymbium 3 spp.		589
	Anguillaria dioica	Leaf	589
	A. tenella	Leaf	589
	Anticlea sibirica	Leaf, bulb, filament	589
	Asparagus 11 spp.		589
	Asparagus officinalis		587
	Asphodelus clavatus		589
	A. damascena		589
	Bellevalia dubia	Flower	589
	Boemetra columellaris	Filament, leaf, perigone	589

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Borya septentrionalis</i>	Leaf	589
	<i>Brodiaea</i> 3 spp.		589
	<i>Bulbine alooides</i>	Flower	589
	<i>Bulbocodium ruthenicum</i>	Leaf	589
	<i>B. versicolor</i>	Leaf	589
	<i>Chlorophytum Bowkeri</i>	Flower	589
	<i>C. parviflorum</i>	Pedicel	589
	<i>Colchicum</i> 12 spp.		589
	<i>C. autumnale</i>		373
	<i>Convallaria majalis</i>		373
	" "	Leaf, anther, perigone	589
	<i>Cordyline Banksii</i>	Flower	589
	<i>C. Pumilio</i>	Leaf	589
	<i>Dasyllirion graminifolium</i>	Flower	589
	<i>Dasypogon bromeliifolius</i>	Flower	589
	<i>Dichopogon humilis</i>	Flower	589
	<i>Dracena angustifolia</i>	Leaf	589
	<i>D. elliptica</i>	Flower	589
	<i>Eremurus himalaicus</i>	Leaf	589
	<i>Gloriosa superba</i>		373
	<i>Hookera hyacintha</i>	Flower	589
	<i>H. minor</i>	Flower	589
	<i>Hyacinthys leucophaeus</i>	Flower	589
	<i>Iphigenia diuterik</i>	Leaf	589
	<i>I. indica</i>	Leaf	589
	<i>Johnsonia lupulina</i>	Leaf	589

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	Kniphofia 4 spp.		589
	Lachenalia montigena	Leaf	589
	L. picta	Leaf, flower	589
	Liriope graminifolia	Leaf	589
	Melanthium tenue	Leaf, perigone, seed	589
	M. virginicum	Leaf, flower	589
	Merendera 5 spp.		589
	Muscari botryoides	Flower	589
	M. calandrinianum	Flower, leaf	589
	Nartheccium scardicum	Flower	589
	Ophiopogon bockianus	Leaf	589
	O. japonicus	Leaf	589
	Ornithogalum arabicum	Anther	589
	O. fimbriatum	Leaf, perigone	589
	O. narbonense	Flower	589
	O. oligophyllum	Pedicel	589
	Ornithoglossum glaucum	Leaf, flower	589
	Paradisea liliastrum	Leaf	589
	Paris bockiana	Leaf, perigone	589
	Polygonatum 4 spp.	Leaf, perigone	589
	Reineckea carnea	Leaf, pedicel	589
	Rhipogonum album	Pedicel	589
	R. scandens	Leaf, pedicel	589
	Ruscus hypoglossum	Flower	589
	Sabadilla officinarum		692
	Sandersonia aurantiaca	Leaf, perigone	589

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Schoenocaulon officinale</i>		373
	<i>Scilla obtusifolia</i>	Leaf, flower	589
	<i>S. pratensis</i>	Flower	589
	<i>S. verna</i>	Leaf	589
	<i>Smilax</i> 6 spp.		589
	<i>Sugerokia orientalis</i>	Leaf, flower, anther	589
	<i>Tofieldia</i> 4 spp.		589
	<i>Trichopetalum stellatum</i>	Flower	589
	<i>Trillium</i> 9 spp.		589
	<i>Tupistra viridiflora</i>	Leaf	589
	<i>Urginea maritima</i>		373
	<i>Uvularia sessilifolia</i>	Leaf, flower	589
	<i>Veratrum</i> 7 spp.		589
	<i>V. album</i>		373, 642, 692
	<i>V. viride</i>		373
	<i>Wurmbea</i> 4 spp.		589
	<i>Xerotes elongata</i>	Flower	589
	<i>X. pauciflora</i>	Flower	589
	<i>X. suaveolens</i>	Flower	589
	<i>Yucca brevifolia</i>	Perigone, pedicel	589
	<i>Zygadenus</i> 5 spp.		589
Papaveraceae	<i>Chelidonium majus</i>		262, 306, 373, 386, 391, 643, 692, 830
	" "	Leaf	567
	" "	Leaf, perigone, pedicel	589
	<i>Stylophrum diphyllum</i>	Leaf, perigone, anther	589, 638

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Rhamnaceae	Paliurus aculeatus	Pedicel	589
	Rhamnella franguloides	Leaf	589
	Rhamnus 21 spp.		589
	Rhamnus cathartica	Fruit	588
	Sageretia minutifolia	Leaf	589
	Zizyphus lotus	Leaf	589
Rubiaceae	Uragoga ipecacuanha		373
Thymelaeaceae	Daphne 9 spp.		589
	D. gnidium	Fruit	588
	Gnidia 9 spp.		589
	Passerina 5 spp.		589
	Pimelea flava	Leaf	589
	Stellera chamaejasme	Leaf, flower	589
	Thymelaea 4 spp.		589
	Wikstroemia 3 spp.		589

Chlorogenic Acid

Acanthaceae	Barleria cristata		236
	Eranthemum macrophyllum		236
	Graptobilanthes hortense		236
	Strobilanthes lupinus		236
	Thunbergia laurifolia		236

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Apocynaceae	Allamanda Hendersonii		236
	Alstonia scholaris		236
	Kopsia flavida		236, 238
Aquifoliaceae	Ilex aquifolium	Leaf, stem, root	122
	I. salicifolia		236
Araliaceae	Aralia maculata		236
	Hedera helix		257
	Heptapleurum sp.		236
	Paratropia sp.		236
	Trevesia sundaica		236
Asclepiadaceae	Hoya bandanensis		236
Bignoniaceae	Crescentia cuneifloia		236
	Kigelia pinnata		236
	Spathodea campanulata		236
Boraginaceae	Cordia suaveolens		236
	Ehretia buxifolia		236
Canaceae	Canna indica		236
Caprifoliaceae	Lonicera sp.		236
	Sambucus javanica		236
	S. nigra	Flower	122
Chenopodiaceae	Suaeda dodoneifloia		236
Compositae	95 genera		547
	Achillea millefolium	Flower	122
	Anacyclus pyrethrum	Flower	122
	Arnica montana	Flower	122
	Centaurea jacea	Leaf	122

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Cichorium intybus</i>	Leaf	122
	<i>Clibadium asperum</i>		236
	<i>C. surinamense</i>		236
	<i>Dahlia variabilis</i>		544
	<i>Eupatorium javanicum</i>		236
	<i>E. pallescens</i>		236
	<i>Gymnanthemum grande</i>		236
	<i>Helianthus</i> sp.	Seed	240
	<i>H. annuus</i>	Seed	232, 237, 367, 502
	<i>H. doronicoides</i>	Leaf	122
	<i>H. tuberosus</i>		543, 544, 545
	<i>Lactuca sativa</i>		545
	<i>Lappa major</i>	Leaf	122
	<i>Pluchea indica</i>		236
	<i>P. odorata</i>		236
	<i>Silybum marianum</i>		543
	<i>Stiffitia chrysantha</i>		236
	<i>Tagetes erecta</i>		236
	<i>Taraxacum gymnanthum</i>		544
	<i>Tithonia diversifolia</i>		236
	<i>Vernonia</i> sp.		236
<u>Convolvulaceae</u>	<i>Argyreia kurzei</i>		236
	<i>Erycibe tomentosa</i>		236
	<i>Ipomoea batatas</i>		236, 545
	" "	Root	616
	<i>Lepistemon flavescens</i>		236
	<i>Merremia dissecta</i>		236

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Porana paniculata</i>		236
Cornaceae	<i>Mastixia cuspidata</i>		236
Cucurbitaceae	<i>Coccinia cordifolia</i>		236
	<i>Trichosanthes</i> sp.		236
Dipsacaceae	<i>Dipsacus silvestris</i>		122
Ericaceae	<i>Vaccinium lucidum</i>		236
Erythroxylaceae	<i>Erythroxylum coca</i>		236
	<i>E. novogranatense</i>		236
Eucommiaceae	<i>Eucommia</i> sp.	Leaf	255
Gesneriaceae	<i>Aeschynanthus longi- flora</i>		236
	<i>Agalmyla staminea</i>		236
	<i>Cyrtandra bicolor</i>		236
	<i>Episcia pulchella</i>		236
	<i>Gloxinia caulescens</i>		236
	<i>Sinningia</i> sp.		236
Gnetaceae	<i>Gnetum ovalifolium</i>		236
Goodeniaceae	<i>Scaevola sericea</i>		236
Gramineae		Mixed herbage	305
	<i>Bambusa</i> sp.		236
	<i>Oryza sativa</i>		236
	<i>Paspalum vaginatum</i>		236
	<i>Phragmites</i> sp.		236
	<i>Saccharum officinarum</i>		236
Labiatae	<i>Ballota foetida</i>	Leaf	122
	<i>Calamintha officinalis</i>		122

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Mentha javanica</i>		236
	<i>M. rotundifolia</i>		122
	<i>Salvia coccinea</i>		236
	<i>S. pratensis</i>		122
	<i>Stachys lanata</i>		122
Liliaceae	<i>Convallaria maialis</i>	Leaf	122
Loganiaceae	<i>Crateriphytum moluc-</i> <i>canum</i>		236
	<i>Strychnos</i> sp.	Seed	240
	<i>S. nux vomica</i>		236
	" " "	Seed	735
Magnoliaceae	<i>Michelia fuscata</i>		236
Malvaceae	<i>Gossypium</i> sp.		502a
Martyniaceae	<i>Martynia diandra</i>		236
Moraceae	<i>Castilloa elastica</i>	Latex	239
	<i>Ficus elastica</i>	Latex	239
Oleaceae	<i>Jasminum nudiflorum</i>	Leaf, flower	122
Orbanchaceae	<i>Orobanche epithymum</i>	Stem	122
	<i>O. rapum</i>	Stem, flower, underground parts	122
	<i>Phelipaea lutea</i>		122
Pandanaceae	<i>Freycinetia strobilacea</i>		236
Pedaliaceae	<i>Sesamum orientale</i>		236
Ranunculaceae	<i>Aconitum septentrionale</i>		321
	<i>Clematis paniculata</i>		236
	<i>C. vitalba</i>	Leaf	122
	<i>Ranunculus bulbosus</i>	Leaf	122
Rosaceae	<i>Crataegus oxyacantha</i>	Fruit, leaf, flower	194

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Prunus domestica</i>	Fruit	151
	<i>Pyrus communis</i>	Fruit	95, 789
	" "	Leaf	798
	<i>P. Malus</i>	Fruit	95, 302, 467, 789
	" "	Juice	537, 538
	" "	Leaf	798
Rubiaceae	<i>Adina cordifolia</i>		236
	<i>Coelospermum corymbosum</i>		236
	<i>Coffea</i> sp.	Bean	194, 240, 248, 292
	<i>C. arabica</i>		236, 599
	<i>C. bengalensis</i>		236
	<i>C. liberica</i>		235, 236, 238
	<i>Exostemma longiflorum</i>		236
	<i>Hymenodictyon</i> sp.		236
	<i>Mussaenda officinalis</i>		236
	<i>Nauclea fagifolia</i>		236
	<i>Oxyanthus hirsutus</i>		236
	<i>Palicourea gardenioides</i>		236
	<i>Timonius compressicaule</i>		236
Saxifragaceae	<i>Hydrangea mutabilis</i>		236
Scrophulariaceae	<i>Capraria biflora</i>		236
	<i>Torenia</i> sp.		236
	<i>Veronica alpina</i>	Whole plant	122
	<i>V. chamoedrys</i>	" "	122
	<i>V. officinalis</i>	" "	122
	<i>V. traversii</i>	Root, stem, leaf	122

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Solanaceae	<i>Atropa belladonna</i>	Leaf	546
	<i>Brunfelsia americana</i>	Leaf	546
	<i>Capsicum annuum</i>	Leaf	546
	<i>C. grossum</i>	Leaf	546
	<i>C. violaceum</i>	Leaf	546
	<i>Cestrum aurantiacum</i>	Leaf	546
	<i>C. elegans</i>	Leaf	546
	<i>Datura arborea</i>	Leaf	546
	<i>D. stramonium</i>	Leaf	546
	<i>Hyoscyamus albus</i>	Leaf	546
	<i>H. aureus</i>	Leaf	546
	<i>H. pusillus</i>	Leaf	546
	<i>H. reticulatus</i>	Leaf	546
	<i>Mandragora officinarum</i>	Leaf	546
	<i>Nicotiana</i> sp.		351
	<i>Petunia nyctaginiflora</i>	Leaf	546
	<i>Physalis alkekengi</i>	Leaf	122
	<i>P. angulata</i>	Leaf	546
	<i>P. peruviana</i>	Leaf	546
	<i>Physochlaena orientalis</i>	Leaf	546
	<i>Scopolia carnifolica</i>	Leaf	546
	<i>Solanum</i> 16 spp.	Leaf	546
	<i>S. lycopersicum</i>		122
	<i>S. tuberosum</i>		327, 329, 544
	<i>Vithania frutescens</i> Sw.		546
	<i>V. somnifera</i>		546

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Theaceae	Thea sinensis	Leaf	608
Tiliaceae	Corchorus olitorius		236
Umbelliferae	Angelica archangelica	Root	698
	Apium graveolens		544
	Eryngium pandanifolium		236
	Hydrocotyle sp.		236
	Thapsia garganica		544
Urticaceae	Boehmeria nivea		236
Verbenaceae	Verbena officinalis	Leaf	122
<u>Cinnamic Acid</u>			
$\text{CH}=\text{CHCOOH}$
Compositae	Parthenium argentatum	Aq. extract of root, rubber, resin, leaf	79, 776
Ericaceae	Enkianthus japonicus	Leaf	169
Globulariaceae	Globularia spp.		268
	G. alypum	Stalk, leaf	269
	G. vulgaris	Stalk, leaf	269, 753
Hamamelidaceae	Liquidambar sp.	Resin	299, 310
	L. orientalis	Resin	727
	L. styraciflua	Resin	311, 728
Lauraceae	Cinnamomum sp.	Leaf	368
Leguminosae	Myroxylon peregrinum	Balsam	219, 273, 359, 364
	M. toluiferum	Balsam	114, 121, 150, 219
Myrtaceae	Eugenia jambolana	Seed	552
Scrophulariaceae	Scrophularianodosa	Root	323
Styracaceae	Styrax liquidus	Resin	666

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
<u>Citremalic Acid</u>			
$ \begin{array}{c} \text{COOH} \\ \\ \text{H}_3\text{C}-\text{C}-\text{OH} \\ \\ \text{CH}_2 \\ \\ \text{COOH} \end{array} $			
Rosaceae	Pyrus malus	Peel	303, 304

Citric Acid

Citric acid was first found by Scheele (631) (632) in lemons and appears to be ubiquitous in higher plants. Franzen & Helwert (207) have made a critical review of the literature on occurrence of citric acid.

Coumaric Acid

Bignoniaceae	Catalpa bignonioides	Leaf	469
	C. ovata	Leaf, bark	288
Leguminosae	Daviesia latifolia	Leaf, stem	562
	Melilotus alba	Vegetative part	103
	" "	Root	622
	M. officinalis	Vegetative part	103
	Trifolium pratense	Flower	560
Papaveraceae	Papaver somniferum		641
Pinaceae	Pinus sp.	Resin	37
Rosaceae	Prunus serotina	Bark	557

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
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Digallic Acid

Theaceae	Thea sinensis	Leaf	607, 608
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Dihydroxymaleic Acid

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Papaveraceae	Glaucium luteum	Pressed juice	640
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3,4-Dimethoxycinnamic Acid

Scrophylariaceae	Veronica virginica	Rhizome, root (leptandra)	559
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Ethylmalic Acid

Euphorbiaceae	Euphorbia biglandulosa	Latex	347
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Ferulic Acid

Bignoniaceae	Catalpa ovata	Bark	288
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<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Pinaceae	Larix europaea	Resin	37
Umbelliferae	Ferula assafoetida	Resin of roots and rhizomes	644

Isoferulic Acid

Bignoniaceae	Catalpa ovata	Root bark	288
Ranunculaceae	Cimicifuga racemosa	Rhizome	195

Fluoracetic Acid

Dichapetalaceae	Dichapetalum cymosum		428
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Fumaric Acid

Aceraceae	Acer saccharum	Sirup	476
	" "	"sugar sand"	477
	" "	Sap, sirup	549
Asclepiadaceae	Asclepias syriaca	Root	430
Chenopodiaceae	Beta vulgaris	Beet diffusion juice	508, 681
Compositae	Helianthus annuus		58
Cruciferae	Bunias orientalis	Stem, leaf, flowering top	322
Eucommiaceae	Eucommia ulmoides	Leaf	254
Euphorbiaceae	Cluytia similis	Leaf, stem	739
	Ricinus communis	Germinating bean	149

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Gramineae	Hordeum vulgare	Leaf	118
	" "	Etiolated shoot	172
	" "	Seedling	320
	Oryza sativa	Grain	264
	" "	Leaf	819
	Saccharum officinarum	Juice	609, 610, 611
	Sorghum sp.	Sirup	419
Labiatae	Salvia officinalis	Leaf	100
Leguminosae	Daviesia latifolia	Leaf, stem	562
	Phaseolus coccineus		58
	P. mungo		133
Papaveraceae	Corydalis bulbosa		790
	Fumaria officinalis	Sap	142, 144, 722, 800
	Glaucium flavum	Leaf	494
	G. luteum		567, 568, 640
	Papaver somniferum		641
Solanaceae	Nicotiana sp.		661, 758, 759
Umbelliferae	Daucus carota	Root tissue	109, 110, 413
	Myrrhis odorata	Leaf	494, 314

Gelacturonic Acid

Rosaceae	Fragaria vesca	Juice	450, 451, 452
	Prunus persica	Juice	19
	" "	Fruit	20
	Pyrus comunis	Fruit	20
	P. malus	Juice	537

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
<u>Gallic Acid</u>

Anacardiaceae	<i>Rhus coriaria</i>	Stalks	389, 685
	<i>R. glabra</i>	Fruit	624
	<i>R. semialata</i>	Fruit	744
Celastraceae	<i>Celastrus scandens</i>	Fruit	786
Commelinaceae	<i>Commelina agraria</i>		600
Cornaceae	<i>Cornus sericea</i>	Fruit pulp	687
	<i>C. florida</i>	Flowers and bracts	624a
Ericaceae	<i>Arctostaphylos uva</i>		613
	<i>ursi</i>		
	<i>Epigaea repens</i>		509
Euphorbiaceae	<i>Phyllanthus distichus</i>	Root bark	140
Fagaceae	<i>Quercus aegilops</i>	Acorn	685
	<i>Q. pedunculata</i>	Wood	445
Geraniaceae	<i>Geranium onoli</i>		307
	<i>G. pratense</i>		92
	<i>G. zonale</i>		94
Lauraceae	<i>Persea gratissima</i>	Fruit kernel	520, 521
Leguminosae	<i>Pithecolobium saman</i>	Bark	313
Loganiaceae	<i>Gelsemium sempervirens</i>	Root	295
Musaceae	<i>Musa paradisiaca</i>	Sap	267
Myrtaceae	<i>Psidium spp.</i>		521
Nymphaeaceae	<i>Brasenia schreberi</i>		468
Oleaceae	<i>Olea europea</i>	Leaves	119
Polygonaceae	<i>Rheum austriacum</i>	Root	280
	<i>R. rhaponticum</i>	Root	280

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Punicaceae	Punica granatum	Root bark	454
Rubiaceae	Coffea sp.		536
Sapotaceae	Mimusops sp.		521
Scrophulariaceae	Digitalis sp.		470
	D. purpurea		274
Simarubaceae	Quassia simaruba	Root bark	457
Solanaceae	Nicotiana tabacum	Leaf	360
Theaceae	Thea sinensis		372, 607, 608

Ginkgolic Acid

Ginkgoaceae	Ginkgo biloba	Fruit	340
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Gluconic Acid

Chenopodiaceae	Beta vulgaris	Crust on juice preheater	406
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Glucuronic Acid

Compositae	Taraxacum officinale	Young leaf	510
Cucurbitaceae	Cucurbita pepo	Seed	510
Gramineae	Hordeum vulgare	Germinating Seed	510
	Musa sp.	Shoot	626

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Leguminosae	Phaseolus or vicia	Germinating seed, etiolated leaf	510
<u>Glutaric Acid</u>			
$\text{HOOC}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{COOH}$			
Chenopodiaceae	Beta vulgaris	Beet	398, 400, 752
<u>Glyceric Acid</u>			
$\text{CH}_2\text{OH}-\text{CH}(\text{OH})-\text{COOH}$			
Chenopodiaceae	Beta vulgaris	Diffusion juice	681
Gramineae	Hordeum vulgare		56
	" "	Leaf	57, 118
Leguminosae	Glycine sp.	Leaf	25
Solanaceae	Nicotiana tabacum		695
<u>Glycolic Acid</u>			
$\text{HO}-\text{CH}_2-\text{COOH}$			
Caprifoliaceae	Sambucus niger	Leaf	35
Caryophyllaceae	Herniaria glabra	Leaf	35
Chenopodiaceae	Beta vulgaris	Beet juice	400, 508, 600, 681
Combretaceae	Combretum micranthum	Leaf	35
Compositae	Cynara scolymus	Leaf	35
	Solidago virgaurea	Flowering twig	35
Dichapetalaceae	Dichapetalum cymosum		428
Ericaceae	Arbutus unedo	Leaf	35
	Erica multiflora	Flowering twig	35
Euphorbiaceae	Ricinus communis		65, 149

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Gramineae	Agropyron repens	Root and/or rhizome	35
	Avena sativa	Seedling	297
	Hordeum vulgare		56, 57
	" "	Leaf	118, 695
	" "	Etiolated shoot	172
	" "	Seedling	297
	Saccharum officinarum	Juice	566, 609, 610, 611, 652, 794
	Zea mays	Stigmata	35
Labiatae	Lavandula vera	Flowering twig	35
	Orthosiphon stamineus	Leaf	35
	Rosmarinus spp.	Flowering twig	35
Leguminosae	Lupinus albus	Seedling	297
	Medicago sativa	Sap	191
	Pisum sativum	Seedling	297
Liliaceae	Asparagus spp.	Root and/or rhizome	35
	Ruscus aculeatus	Root and/or rhizome	35
Pinaceae	Juniperus communis	Berry	35
Rosaceae	Prunus cerasus	Peduncle	35
	Pyrus communis	Juice	598
	P. malus	Juice	708
Solanaceae	Nicotiana tabacum		694
	" "	Leaf	695
	Physalis akekengi	Berry	35
	Solanum lycopersicum	Leaf	694, 695
Umbelliferae	Apium graveolens	Root and/or rhizome	35

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	Eryngium campestre	Root and/or rhizome	35
	Foeniculum vulgare	Root and/or rhizome	35
	Petroselinum sativum	Root and/or rhizome	35
Urticaceae	Parietaria spp.	Leaf	35
Vitaceae	Ampelopsis nederacea	Leaf	243
	Vitis vinifera	Unripe fruit	105, 187, 188
	" "	Fruit	286

Glyoxalic Acid

Chenopodiaceae	Beta vulgaris		400
Cornaceae	Cornus mas	Fruit	637
Ericaceae	Vaccinium oxycoccus		690
Gramineae	Saccharum officinarum	Juice	794
Labiatae	Mentha piperita	Leaf	717, 719
Leguminosae	Arachis hypogaea	Seedling	202, 203
Liliaceae	Tulipa gesneriana		717, 718
Polygonaceae	Rheum officinale		106
Rosaceae	Prunus domestica	Unripe fruit	106
	Pyrus malus	Unripe fruit	106
	" "	Fruit	303
Saxifragaceae	Ribes sp.	Unripe fruit	106
	R. grossularia	Unripe fruit	106
Solanaceae	Solanum tuberosum	Tuber	719
Umbelliferae	Daucus carota	Leaf, root	717
	" "	Root	719

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Vitaceae	Vitis vinifera		106, 107, 256, 286
	" "	Juice	653

Hamipinic Acid

Papaveraceae	Papaver somniferum		641
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Hydrocaffeic Acid

Chenopodiaceae	Beta vulgaris	Leaf	401
Solanaceae	Solanum tuberosum	Tuber	593
Vitaceae	Ampelopsis hederacea		593

Hydrocoumaric Acid

Leguminosae	Melilotus officinalis		832
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p-Hydroxybenzoic Acid

Bignoniaceae	Bignonia catalpa	Unripe fruit	541
	Catalpa ovata	Leaf	469
Papaveraceae	Papaver somniferum		641

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
<u>Hydroxycitric Acid</u>			
$ \begin{array}{c} \text{CH}_2\text{-COOH} \\ \\ \text{HO-C-COOH} \\ \\ \text{HO-C-COOH} \\ \\ \text{H} \end{array} $			
Chenopodiaceae	Beta vulgaris	Juice	399
<u>α-Hydroxyglutaric Acid</u>			
$\text{HOOC-CH}_2\text{CH}_2\text{CHOH-COOH}$			
Chenopodiaceae	Beta vulgaris	Sap	398
<u>2-Hydroxy-6-Methoxy Benzoic Acid</u>

Liliaceae	Gloriosa superba	Tubers	127
<u>p-Hydroxyphenylacetic Acid</u>

Compositae	Taraxacum officinale	Root	553
<u>Isochlorogenic Acid</u>

Rosaceae	Pyrus communis	Leaf and shoot	95
	" "	Leaf	798
Rubiaceae	Coffea sp.		41

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
<u>Isocitric Acid</u>			
CH(OH)-COOH			
CH-COOH			
CH ₂ -COOH			
Anonaceae	Anona muricata		479
Crassulaceae	Bryophyllum sp.	Leaf	511, 579, 81
	B. calycinum	Leaf	113, 365, 570, 571, 574, 575, 694, 695
	" "	Leaf and stem	748, 757 573
	Escheveria sp.	Leaf	365
	E. secunda		492, 493
	Sedum acre		493
	S. maximum		493
	S. praealtum		813
	Sempervivum tectorum		493
Gramineae	Hordeum vulgare		56
	" "	Leaf	57, 695
Lecythidaceae	Couroupita guianensis	Fruit	484
Leguminosae	Pisum sativum	Ungerminated seeds	427
Rosaceae	Pyrus malus	Fruit	109, 110
	Rubus fruticosus	Fruit	131, 473, 478
Scrophulariaceae	Digitalis purpurea		337
	" "	Leaf	365
Solanaceae	Nicotiana tabacum		694
	" "	Leaf	695
	Solanum lycopersicum	Leaf	694, 695
	S. tuberosum	Juice of tuber	130

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Umbelliferae	Daucus carota		109, 110
<u>Isophthalic Acid</u>

Iridaceae	Iris versicolor	Rhizome	561
<u>α-Ketoadipic Acid</u>			
HOOC-CH ₂ -CH ₂ -CH ₂ -CO-COOH			
Leguminosae	Pisum sativum	Germinating seed	763
<u>Ketoglutaric Acid</u>			
HOOC-CH ₂ -CH ₂ -CO-COOH			
Euphorbiaceae	Ricinis communis	Germinating seed	149
Gramineae	Hordeum vulgare	Etiolated Shoot	172
Labiatae	Mentha piperita	Leaf	717, 719
Leguminosae	Arachis hypogaea	Seedling	202, 203
	Pisum sativum	Young plant	767, 769
	Trifolium pratense		766, 767
Liliaceae	Tulipa gesneriana		717, 718
Rosaceae	Pyrus malus	Fruit	303
Solanaceae	Solanum tuberosum	Tuber	38, 719
Umbelliferae	Daucus carota	Root and leaf	717
	" "	Root	719

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
<u>Lactic Acid</u>			
$\text{CH}_3\text{-CHOH-COOH}$			
Amaryllidaceae	Agave sisalana	Leaf	417, 646, 647
Bromeliaceae	Ananas sativas		521
Chenopodiaceae	Beta vulgaris		440
	" "	Juice	680, 681
	" "	Beet	688, 689
	" "	Beet and leaf	752
Compositae	Helianthus annuus		58
	Lactuca sp.		521
	" "	Leaf	646
	L. sativa	Leaf	647
Crassulaceae	Bryophyllum calycinum		811
Cruciferae	Brassica oleracea	Kale	42
	" "	Cabbage	647
Cucurbitaceae	Cucumis sativus		688
Ericaceae	Vaccinium myrtillus		331
Euphorbiaceae	Ricinis communis		141
	" "	Germinating Seed	149, 300
	" "	Seedling	646
	" "	Seedling, leaf	647
Fagaceae	Castanea vesca	Fruit	152
	Fagus sylvatica	Nut	333
Gentianaceae	Erythrae centaurium		261
Gramineae	Bambusa sp.	Shoot	626
	Hordeum distichum	Germinating Seed	689
	H. sativum		803
	H. vulgare	Etiolated shoot	172

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Oryza</i> spp.	Leaf	819
	<i>Secale cereale</i>	Leaf	676
	<i>Triticum sativum</i>	Leaf	676
	<i>T. Vulgare</i>	Germinating seed	689
	<i>Zea mays</i>	Germinating seed	646, 647, 803
Leguminosae	<i>Glycine</i> sp.		333
	<i>Lupinus</i> sp.	Seed	463
	<i>L. luteus</i>	Germinating seed	689
	<i>Phaseolus coccineus</i>		58
	<i>P. vulgaris</i>	Seedling	647
	<i>Pisum sativum</i>	Germinating seed	646, 647, 689
	<i>Tamarindus indica</i>		3, 331
	<i>Vicia faba</i>	Leaf, sprout	646, 647
	" "	Germinating seed	689
Malvaceae	<i>Gossypium</i> sp.	Seed	333
Myricaceae	<i>Myrica rubra</i>	Fruit	357
Myrsinaceae	<i>Maesa picta</i>	Seed	23
Papaveraceae	<i>Glaucium luteum</i>	Pressed juice	640
	<i>Papaver somniferum</i>	"Poppy straw"	641
Polygonaceae	<i>Rheum</i> sp.	Leaf	646
	<i>R. hybridum</i>	Tuber	647
Rosaceae	<i>Eriobotrya japonica</i>	Milky juice	192
	<i>Fragaria</i> sp.	Juice of Fruit	287
	<i>Prunus avium</i>		204

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Prunus cerasus</i>	Juice of fruit	439
	<i>Pyrus communis</i>	Juice of fruit	439
	" "	Juice, fruit	598
	<i>P. . . malus</i>	Fruit	206, 287
	" "	Juice of fruit	438, 439, 710
	<i>Rubus</i> sp.	Leaf	646
	<i>R. fruticosus</i>	Leaf	210, 211, 647
	<i>R. idaeus</i>	Leaf	217, 218, 648
Rutaceae	<i>Citrus decumana</i>	Juice of fruit	287
Salicaceae	<i>Salix</i> sp.	Bark	155
Scrophulariaceae	<i>Digitalis purpurea</i>		337
	<i>Euphrasia officinalis</i>		176
	<i>Veronica officinalis</i>		175
Solanaceae	<i>Solanum dulcamara</i>	Peduncle	809
	<i>S. lycopersicum</i>	Fruit	113, 120, 747
	" "	Fruit juice	601
	<i>S. tuberosum</i>	Tuber	39, 40, 646, 647, 688, 689, 788, 803
Sterculiaceae	<i>Theobroma cacao</i>	Seed	459, 460
Umbelliferae	<i>Daucus carota</i>		646
	" "	Root	647, 689
Vitaceae	<i>Vitis vinifera</i>	Juice	439
	" "	Sap	810

Malic Acid

Malic acid was discovered by Scheele (633), who reported its presence in a number of plants. Franzen & Keyssner (212) have made a critical review of the literature on its occurrence but it appears to be ubiquitous in higher plants.

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
<u>Malonic Acid</u>			
$\begin{array}{c} \text{COOH} \\ \\ \text{CH}_2\text{COOH} \end{array}$			
Chenopodiaceae	Beta vulgaris	Incrustation on evaporator	397
	" "	Beet juice	399
	" "	Beet and leaf	752
Compositae	Helianthus annuus		58
	H. tuberosus		234
Cruciferae	Bunias orientalis	Stem, leaf, flowering top	322
Gramineae		Mixed herbage	305
	Avena sativa		297, 483
	Dactylis glomerata		138
	Hordeum vulgare		297, 483
	Triticum sp.		481
Leguminosae	Anthyllis sp.		58
	Astragalus sp.		58
	A. sinicus		822
	Colutea sp.		58
	Lotus sp.		58
	Lupinus sp.		58, 297
	Medicago sp.		58
	M. sativa		737
	Melilotus sp.		58
	Ononis sp.		58
	Phaseolus coccineus		58
	Sophora sp.		58

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	Thermopsis sp.		58
	Trifolium sp.		58
	Trigonella sp.		58
	Vicia sp.		58
Rosaceae	Fragaria sp.	Fruit	691
Umbelliferae	Anthriscus sp.		58
	Apium sp.		58

Meconic Acid

Papaveraceae	Papaver Rhoeas		516
	P. somniferum		66
	" "	Dried capsules	145
	" "	Milky sap	654, 655

Melilotic Acid

Leguminosae	Melilotus alba	Vegetative part	103
	M. officinalis	Vegetative part	103, 832
Solanaceae	Nicotiana tabacum	Leaf	360

Mesaconic Acid

Bignoniaceae	Crescentia sp.	Curare	336
Cruciferae	Brassica oleracea	Leaf	115, 116
Gramineae	Saccharum officinarum	Juice	609, 610, 611

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
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Neobietic Acid

Pinaceae	<i>Pinus palustris</i>	oleoresin	265a
	<i>P. silvestris</i>	oleoresin, wood rosin	265b

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
<u>Oleanolic Acid</u>

Apocynaceae	<i>Alyxia buxifolia</i>	Bark	22
Ericaceae	<i>Vaccinium myrtillus</i>		590
Euphorbiaceae	<i>Petalogstigma sericea</i>		22
Labiatae	<i>Thymus vulgaris</i>		615
	<i>Salvia officinalis</i>		101
Loranthaceae	<i>Viscum album</i>	Leaf	805
Myrtaceae	<i>Psidium guajava</i>	Leaf	26
Oleaceae	<i>Olea europea</i>	Leaf	259
Rosaceae	<i>Crataegus oxyacantha</i>	Leaf	60
	<i>Eriobotrya japonica</i>	Leaf	27
Solanaceae	<i>Anthocercis intricata</i>	Bark	22
	<i>A. littorea</i>	Bark	22
	<i>A. odgersii</i>	Bark	22
Vitaceae	<i>Vitis labrusca</i>	Pomace	434

Oxalacetic Acid

Gramineae	<i>Hordeum vulgare</i>		766
	<i>Phleoma pectense</i>		766
Labiatae	<i>Mentha piperita</i>		717, 719

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Leguminosae	Convallia ensiformis		766
	Pisum sativum		765, 766, 767, 768, 769
	Trifolium pratense	Young leaves	764, 765, 766, 767
Liliaceae	Tulipa gesneriana		717, 718
Rosaceae	Pyrus malus	Fruit	303
Solanaceae	Solanum tuberosum	Tuber	719
Umbelliferae	Daucus carota	Root, leaf	717
	" "	Root	719

Oxalic Acid

Reviews and surveys of the occurrence of oxalic acid include Andrews and Visser Esbach (189) (18), Kohman (354), Meyen (446), Miller, Ross and Lewis (449), Molisch (455), Patschovsky (514), Schimper (636), and Treviranus (721).

Aceraceae	Acer platanoides	Root	362
	A. saccharum	Sap, sugar sand	778
Aizoaceae	Mesembryanthemum sp.		515
	M. acinaciforme		2
	M. crystallinum		17, 63
	" "	Leaf, flower	62
Amarantaceae			515
	Alternanthera sessilis		298
	Amarantus sp.		244
	A. aquatica		627
	A. caudatus	Leaf, flower	63
	" "		62
	A. gangeticus		298
	A. polygonoides		298

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Amaryllidaceae	Agave americana	Leaf	825
Anacardiaceae	Mangifera indica		87
Araceae	Acorus calamus		820
	Arum italicum	Berry	348
Aristolochiaceae	Asarum sp.		515
Balsaminaceae	Impatiens parviflora		462
	I. sultani		462
Begoniaceae	Begonia sp.		228
	B. evansiana		658, 659, 660
	B. rex		770
	B. semperflorens		129, 617, 742
Berberidaceae	Berberis vulgaris	Fruit	348
Betulaceae	Alnus sp.	Leaf	781
	Betula sp.		362
	Ostrya vulgaris		362
Bombacaceae	Adansonia digitata	Fruit	5
Bromeliaceae	Bromelia pinguin	Fruit	29
Cactaceae			515
	Cereus peruvianus		738
	Opuntia sp.		486
	O. vulgaris	Stem	348
Caprifoliaceae	Sambucus nigra	Young leaf	47
	Symphoricarpus sp.	Leaf	781
Caryophyllaceae	Dianthus barbatus		500
	D. carthusianorum	Leaf, stem	13

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
	<i>Lychnis coronaria</i>		75
	<i>L. dioica</i>		13, 75, 92
	<i>L. flos-jovis</i>		75
	<i>L. githago</i>		13
	<i>Saponaria sp.</i>		486
	<i>S. officinalis</i>		13
	<i>Spergula arvensis</i>		75
	<i>Stellaria media</i>		462, 500
	<i>Tunica saxifraga</i>		13
Celastraceae	<i>Celastrus obscurus</i>	Leaf	158
	<i>Euonymus japonicus</i>		2
Chenopodiaceae			449
	<i>Atriplex sp.</i>		515
	<i>Beta vulgaris</i>		500, 515, 540, 627
	" "	Juice	400, 447, 508, 600, 681
	" "	Root, leaf	421, 752
	" "	Leaf	34, 461, 621, 629
	" "	Swiss chard, mangold, beet leaf	630
	" "	Seed	153, 693
	" "	Root	24, 190, 234, 244, 783
	<i>Chenopodium</i>		515
	<i>C. quinoa</i>	Leaf, flower	62, 63
	<i>Halogeton glomeratus</i>		198, 296
	<i>Spinacia oleracea</i>		24, 91, 189, 190; 384, 482, 515, 540.
	" "	Leaf	46, 70, 154, 244, 500, 621, 792, 820.

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Commelinaceae	Callisia repens		462
	Tradescantia		515
	T. fluminensis		53, 787
	T. selloi	Leaf	636
	T. virginica	Leaf	348
Compositae	Cichorium endivia		24, 190
	Helianthus tuberosus		234
	Kleinia articulata		318
	Lactuca spp.		521
	L. setiva		482, 540, 792
Convolvulaceae	Ipomoea aquatica		298
Cornaceae	Cornus sericea	Fruit pulp	687
Crassulaceae	Bryophyllum calycinum	Leaf	113, 570, 574, 580, 694, 695, 748
	" "	Leaf, stem	573
	B. crenatum	Leaf	81, 348
	Echeveria glauca	Leaf	348
	Sedum azureum		17
	S. fabaria	Leaf	348
	Sempervivum glaucum	Leaf	52
	S. tectorum	Leaf	348
Cruciferae			515
	Brassica oleraceae		24, 190, 482
	B. pekinensis		820
	Bunias orientalis	Stem, leaf, flowering top	322
Cucurbitaceae	Cucumis melo		24, 190, 540
	Cucurbita pepo		792
Dipsacaceae	Succisa pratensis		500
Ericaceae	Vaccinium myrtillus		24, 190, 331

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Euphorbiaceae	Aleurites cordata	Leaf	22)
	Euphorbia sp.		515
	Mercurialis annuelle		134
	M. perennis		500
	Phyllanthus emblica		332
	Ricinus communis		65
Fagaceae	Fagus sylvatica		98, 500, 652
	Quercus pedunculata		445
Gesneraceae	Aeschynanthus sp.		515
Globulariaceae	Globularia spp.		268
Gramineae			515
	Avena sativa	Seedling	297, 483, 530
	Bambusa sp.	Shoot	626
	Hordeum vulgare	Leaf	47, 695
	" "	Seedling	297, 320, 483, 694
	Lolium perenne		423
	Oplismenus imbecillis		53
	Oryza spp.	Leaf	819
	Phyllostachys mitis	Sprout	703
	Poa pratensis		540
	Saccharum officinarum	Juice	10, 86, 518, 609, 610, 611, 707, 821
	Secale cereale		483
	Sorghum sp.	Juice	419
	S. vulgare		796, 797
	S. vulgare	Leaf	812
	Triticum sp.		481
	T. aestivum		540
	Zea mays		53, 771

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Hippocastanaceae	Aesculus hippocastanum	Young leaf	47
Hydrocharitaceae	Elodea densa		466
	E. canadensis		466
Juglandaceae	Juglans regia	Bark	356
Labiatae			515
Leguminosae	Acacia spp.	Bark	683
	Acacia cambagei	Bark and wood	682, 683
	Arachis hypogaea	Kernal	591
	Cassia sp.	Leaf	773
	Cicer arietinum	Secretion from hairs	453
	" "	Fruit	828
	Glycine soja		540
	Lupinus albus	Seedling	297
	L. luteus	Seed	606
	Medicago sativa		540
	Mimosa spegazzinii		462
	Phaseolus limensis		540
	Pisum sativum	Seedling	297, 540, 792
	Tamarindus indica		209, 331, 332
	" "	Mature leaf	245
	Vicia sp.		324
	Vicia faba		24, 190
Liliaceae			515
	Agapanthus umbellatus	Leaf	343
	Allium cepa		8, 221, 363, 792
	Asparagus officinalis		24, 190
	Erythronium dens canis	Bulb	157

Family	Genus and Species	Source	Reference
	<i>Hyacintha orientalis</i>	Bulb	76
	<i>Smilacina bifolia</i>	Fruit	167
	<i>S. racemosa</i>	Fruit	167
Loranthaceae	<i>Viscum</i> sp.		515
Malvaceae	<i>Gossypium</i> sp.		184, 185, 186, 415a
Melastomaceae	<i>Memecylon tinctorum</i>		159
Menispermaceae	<i>Jateorhiza columba</i>		734
Moraceae	<i>Cannabis</i> sp.		134
	<i>Ficus carica</i>		244
Musaceae	<i>Musa sapientum</i>	Over-ripe fruit	490
Myricaceae	<i>Myrica rubra</i>	Fruit	357
Myristicaceae	<i>Myristica surinamensis</i>	Seed	724
Myrtaceae	<i>Eucalyptus</i> 12 spp.	Bark	673
	<i>Psidium guajava</i>	Leaf	11
Nyctaginaceae	<i>Mirabilis</i> sp.	Flower, fruit	542
Nymphaeaceae	<i>Nymphaea alba</i>	Rhizome	252
	<i>N. lutea</i>	Rhizome	252
Orchidaceae			515
	<i>Vanilla planifolia</i>		777
Oxalidaceae	<i>Averrhoa carambola</i>		124
	" "	Fruit	388
	" "	Juice	480
	<i>Oxalis</i> sp.		228, 244, 515
	<i>O. acetosella</i>	Leaf	348, 500
	<i>O. corniculata</i>		245
	<i>O. stricta</i>		63

Family	Genus and Species	Source	Reference
Oxalidaceae	Oxalis violacea		521
Papaveraceae			515
	Fumaria officinalis	Seed coat	246
Pedaliaceae	Essenium indicum	Seed	266a
Phytolaccaceae	Phytolacca sp.		515
	P. dioica	Shoot, bark, pith	2
Pinaceae			614
	Pinus abies	Sap	330, 652
	P. cembra	Seedling	650
	P. excelsa	Needle	500, 823
Piperaceae	Peperomia sp.		515
Polygonaceae	Emex sp.		515
	Fagopyrum esculentum		53, 540
	" "	Leaf, stem	584
	Oxyria sp.		515
	Polygonum sp.		515
	Rheum sp.		24, 108, 190, 244, 384, 515, 760, 792
	" "	Leaf	684
	R. crispum	Stem	506
	R. hybridum	Leaf, rhizome	9
	" "	Leaf	572, 583, 695, 770
	" "	Stem, rhizome	618, 619
	R. leucorhizum	Stem	506
	R. nepalense	Stem	506
	R. nutans	Stem	506
	R. officinale	Leaf	106, 770
	R. palmatum	Stem	506
	R. paragon	Stem	506

Family	Genus and Species	Source	Reference
Polygonaceae	<i>R. rhaponticum</i>	Stem	378
	<i>R. undulatum</i>	Petiole	348
	<i>Rumex</i> sp.		228, 244, 515
	<i>R. acetosa</i>	Leaf	45
	" "	Seed, root	63
	" "		61, 190, 521
	<i>R. obtusifolius</i>	Root	362
Polypodiaceae	<i>Lonchitis</i> sp.		515
Portulacaceae	<i>Portulaca</i> sp.		244, 515
	<i>Talinum speciosa</i>		298
Primulaceae			515
	<i>Primula elatior</i>		500
Punicaceae	<i>Punica granatum</i>		332
	" "	Bark	486
Pyrolaceae	<i>Monotropa</i> sp.		515
Ranunculaceae	<i>Anemone</i> sp.		515
	<i>A. nemorosa</i>		742
Rhamnaceae	<i>Rhamnus lycioides</i>	Leaf	221
	<i>Zizyphus jujuba</i>		332
Rosaceae	<i>Crataegus</i> sp.	Leaf	781
	<i>C. oxyacantha</i>	Leaf	47
	<i>Fragaria</i> sp.	Fruit	24, 190, 792
	" "		6
	<i>Mespilus germanica</i>	Over-ripe fruit	490
	<i>Prunus armenica</i>	Dried fruit	472
	<i>P. avium</i>	Fruit	204
	<i>P. cerasus</i>	Fruit	24, 343

Family	Genus and Species	Source	Reference
Rosaceae	<i>Prunus domestica</i>	Fruit	24, 108
	<i>P. persica</i>	Fruit	24, 190
	<i>Pyrus communis</i>	Fruit	24
	" "	Over-ripe fruit	490
	<i>P. malus</i>	Fruit	24, 206, 303, 736
	<i>Quillaja</i>		486
	<i>Rubus</i> sp.	Fruit	24, 792
	<i>R. fruticosus</i>	Leaf	211
	" "	Fruit	473
	<i>R. idaeus</i>		742
Rubiaceae	<i>Cinchona</i> spp.	Bark	592
	<i>Coffea</i> sp.	Seed	46
	<i>C. arabica</i>	Fruit capsule	277
	<i>Dentella asiatica</i>		298
	<i>Galium lucidum</i>	Leaf	348
Rutaceae	<i>Citrus aurantium</i>	Fruit	24, 490, 792
	" "	Leaf	668
	" "	Peel	667
	<i>C. decumana</i>	Fruit	332, 441
	" "	Peel	667
	<i>C. limonum</i>	Fruit	24, 332, 490, 792
	" "	Peel	667
	<i>C. medica</i>	Petiole	221
	" "	Fruit	332
	<i>C. nobilis</i>	Fruit	490
Santalaceae	<i>Santalum album</i>		315

Family	Genus and Species	Source	Reference
Saxifragaceae	Ribes grossularia		24, 108, 792
	R. rubrum		205
Simarubaceae	R. sanguineum		361
	Quassia amara	Root bark	457
Solanaceae			134
	Capsicum annuum		24, 63, 190, 244
	Datura sp.		515
	D. stramonium		462
	Nicotiana sp.	Leaf	31, 501, 511, 576, 581
	" "		582, 670, 758, 759, 81
			33, 694, 715, 716, 761
	Nicotiana tabacum	Leaf	360, 462, 695
	Solanum sp.		515
	S. lycopersicum		4, 63, 126, 540, 694,
	" "	Fruit	820
	" "	Unripe fruit	7, 24, 108, 190, 354,
Sterculiaceae			384, 792
			84, 85
	S. tuberosum	Tuber	130, 190, 309, 429,
			462, 569, 664, 792
Sterculiaceae	Sterculia plantanifolia		8
	Theobroma cacao		24, 244, 458, 459,
Theaceae			460, 792
			244, 298, 795
Umbelliferae			515
	Angelica archangelica	Root	698
	Anethum graveolens	Leaf	792
	Apium graveolens		24, 190
	Pastinaca sativa		792
	Petroselinum sativum		792
Valerianaceae	Valeriana officinalis		92
	Valerianella sp.		515

<u>Family</u>	<u>Genus and Species</u>	<u>Source</u>	<u>Reference</u>
Vitaceae	Ampelopsis sp.		515
	A. quinquefolia	Fruit	564
	Vitis vinifera	Fruit	24, 188, 190, 193, 284
	" "		285, 286
	" "	Vines	489
	" "	Leaf, fruit	348
	" "	Leaf, shoot	487
	" "	Sap	488, 814
Zingiberaceae	Hedychium sp.	Leaf	221
Zygophyllaceae	Guaiacum sp.	Phloem	221

Phthalic Acid

Papaveraceae	Papaver somniferum		641
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Pimaric Acid

d-pimaric

levopimaric

Pinaceae	Picea vulgaris	Resin	67
	P. excelsa	Resin	265c, 349a, 349b
	Pinus 5 spp.	Oleoresin	265c
	P. maritima	Resin	161, 381
	P. palustris	Oleoresin	35a, 265a
	" "	Resin	360a
	" "	Turpentine gum	509a
	P. pinaster		163
	P. silvestris		265b, 280a

Family	Genus and Species	Source	Reference
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Piperonilic Acid

Rubiaceae	<i>Palicourea densiflora</i>	bark	324
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Podocarpic Acid

Pinaceae	<i>Dacrydium cupressinum</i>		165, 657
	<i>Podocarpus cupressina</i>		507, 657
	<i>P. dacrydioides</i>		165, 657

Protocatechuic Acid

Bignoniaceae	<i>Crescentia</i> sp.	Crude curare	336, 793
Globulariaceae	<i>Globularia alypum</i>		753
Liliaceae	<i>Allium cepa</i>	Skin	21, 393, 394, 772
Magnoliaceae	<i>Illicium anisatum</i>	Fruit, seed	505
	<i>I. religiosum</i>	Fruit	125, 168, 170
	<i>I. verum</i>	Capsule	77
Saxifragaceae	<i>Hydrangea Thunbergii</i>	Leaf	706
Vitaceae	<i>Vitis vinifera</i>	Leaf	74

Family	Genus and Species	Source	Reference
<u>Pyruvic Acid</u>			
$ \begin{array}{c} \text{CH}_3 \\ \\ \text{C}=\text{O} \\ \\ \text{COOH} \end{array} $			
Chenopodiaceae	Spinacia oleracea	Leaf	32
Euphorbiaceae	Ricinus communis	Germinating seed	149
Gramineae	Hordeum vulgare		57
	" "	Seedling	320
Labiatae	Mentha piperita	Leaf	717, 719
Leguminosae	Arachis hypogaea	Seedling	202, 203
	Pisum sativum	Leaf	32
	" "	Seedling	769
	" "		767
	Trifolium pratense		767
Liliaceae	Allium cepa		55
	" "	Juice	456
	Tulipa gesneriana		717, 718
Rosaceae	Pyrus malus	Fruit	303
Solanaceae	Solanum tuberosum	Tuber	38, 719
Umbelliferae	Daucus carota	Leaf, root	717
	" "	Root	719

Quinic Acid

Compositae	Taraxacum officinale		408
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Family	Genus and Species	Source	Reference
Ericaceae	Vaccinium arctostaphylos	Leaf	678
	V. myrtillus		331
	" "	Young leaf	346
	" "	Foliage	831
	V. oxycoccus	Fruit	355, 382
	V. vitis idaea	Leaf	334
Gramineae		Hay	407, 408
		Mixed herbage	305
Leguminosae	Tamarindus indica	Fruit	331
Magnoliaceae	Illicium verum	Capsule	77
Pinaceae	Cedrus Libani	Needle	709
	Larix europaea	Needle	709
	Picea excelsa	Young shoot	345
	" "		346
Ranunculaceae	Aconitum septentrionale		321
Rosaceae	Prunus domestica	Ripe fruit	151
	" "	Fruit	355
	P. persica	Fruit	19, 137
	Pyrus communis	Juice	598
	" "	Fruit	743
	P. malus	Fruit	301, 303
	" "	Juice	537, 538, 708
Rubiaceae	Cinchona sp		293, 527, 528, 592, 751
	C. Cordifolia		528
	Coffea sp.	Fruit	833
	Gallium mollugo		498
Solanaceae	Nicotiana tabacum	Leaf	360

Family	Genus and Species	Source	Reference
Umbelliferae	Angelica archangelica	Root	698
Vitaceae	Vitis vinifera	Fruit	355

Quinovic Acid

Rosaceae	Potentilla	Root	595
Rubiaceae	Cinchona spp.		592
	C. sp.		620
Zygophyllaceae	Zygophyllum coccineum		677

Saccharic Acid

Moraceae	Ficus elastica	Latex	239
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Saccharinic Acid

Bromeliaceae	Ananas sativas	Fruit	80
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Salicylic Acid

Compositae	Calendula officinalis		147
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Family	Genus and Species	Source	Reference
Compositae	<i>Matricaria chamomilla</i>	Flower head	555
Euphorbiaceae	<i>Cluytia similis</i>	Stem, leaf	739
Iridaceae	<i>Iris versicolor</i>	Rhizome	561
Leguminosae	<i>Daviesia latifolia</i>	Leaf, stem	562
	<i>Glycyrrhiza glabra</i>	Root	146
	<i>Trifolium pratense</i>	Flower	560
Liliaceae	<i>Alce</i> sp.		741
	<i>Gloriosa superba</i>	Tuber	127
	<i>Hyacinthus</i> sp.		249
	<i>Tulipa</i> sp.		249
	<i>Yucca</i> sp.		249
Moraceae	<i>Morus</i> sp.	Fruit	146
Pittosporaceae	<i>Pittosporum undulatum</i>	Fruit	563
Polygalaceae	<i>Polygala</i> sp.	Root	645
Ranunculaceae	<i>Cimicifuga racemosa</i>	Rhizome	195
Resedaceae	<i>Reseda odorata</i>		424
Rosaceae	<i>Fragaria</i> sp.	Calyx, pedicel	437
	" "	Fruit	550, 551, 720, 745
	" "	Fruit pulp and juice	697
	" "	Juice	601
	<i>Prunus armenica</i>	Fruit	720
	<i>P. avium</i>	Fruit	147
	<i>P. cerasus</i>	Fruit	147, 251, 720
	" "	Juice	317
	<i>P. domestica</i>	Fruit	720
	<i>P. persica</i>	Fruit	720
	<i>Rubus fruticosus</i>	Fruit	720

Family	Genus and Species	Source	Reference
Rosaceae	Rubus idaeus	Fruit	146, 251, 720, 745
	" "	Juice	271, 801
	R. occidentalis	Fruit	720
	Spiraea ulmaria	Flower	424, 425
Rubiaceae	Uragoga ipecacuanha	Root	424
Rutaceae	Barosma sp.		780
	Casimiroa edulis	Seed	556
Saxifragaceae	Ribes sp.	Fruit	720
Solanaceae	Solanum lycopersicum		201, 525
Violaceae	Viola 6 spp.		147
	V. sylvatica	Leaf, stem, rhizome	426
	V. tricolor	Flower, leaf, stem, root	250
	" "	Leaf, stem, rhizome	426
Vitaceae	Vitis labrusca	Fruit	251
	V. vinifera	Fruit	437

Shikimic Acid

Ginkgoaceae	Ginkgo biloba	Leaf	266, 818
Gramineae	Lolium perenne		602
Magnoliaceae	Illicium anisatum		505
	I. religiosum	Fruit	125, 168
	" "		170
	" "	Carpel	663
	I. Verum		77, 220

Family	Genus and Species - 64 -	Source	Reference
Magnoliaceae	Illicium verum	Carpel	663
Pinaceae	25 spp.		266
Taxaceae	4 spp.		266

Succinic Acid

Critical review of literature - Franzen & Ostertag (215)

Aceraceae	Acer saccharum	Sirup	476, 549
	" "	"Sugar sand"	477
Amaryllidaceae	Narcissus poeticus	Leaf, root	762
Begoniaceae	Begonia semperflorens		617, 742
Betulaceae	Corylus sp.	Nut	148
Bignoniaceae	Crescentia sp.		72
	" "	Crude curare	336
Bombacaceae	Adansonia digitata	Fruit	5
Celastraceae	Goupia tomentosa	Wood	160
Compositae	Artemisia absinthium		714
	" "	Leaf	829
	Helianthus annuus		58
	Lactuca sativa		350, 742
	L. virosa		350
	Taraxacum officinale		408
Chenopodiaceae	Beta vulgaris	Juice	400, 508, 680, 681
	" "	Top, root	578
	" "	Leaf, root	752
	Spinacia oleraceae	Leaf	381

Family	Genus and Species	Source	Reference
Compositae	Lactuca spp.		521
Crassulaceae	Bryophyllum sp.	Leaf	577, 578
	B. calycinum	Leaf	113, 570, 695
	" "	Detached leaf	748
	" "		694
	Echeveria secunda		214
	" "	Leaf	492
	Sedum acre	Leaf	492
	Sempervivum glaucum	Leaf	52
Cruciferae	Brassica oleraceae	Leaf, bud	482
	Bunias orientalis	Stem, leaf, flowering top	322
Ericaceae	Vaccinium myrtillus	Fruit	331
	" "	Whole plant	590
Euphorbiaceae	Ricinus communis		65, 149
Fagaceae	Fagus sylvatica	Sap	652
	Quercus sp.	Nut	148
Gramineae			305
	Avena sativa		297
	Bambusa sp.		71
	Dactylis glomerata		138
	Hordeum vulgare	Leaf	118, 695
	" "	Etiolated shoot	172
	" "	Seedling	297, 694
	" "		320, 749
	Lolium perenne		138
	Oryza spp.		819
	O. sativa		264

Family	Genus and Species	Source	Reference
Gramineae	Phleum pratense		130
	Saccharum officinarum	Juice	10,99,609,610,611 804,821
	Triticum sp.		749
	Zea mays	Leaf	43, 570
Juglandaceae	Juglans regia	Nut	148
Lauraceae	Persea gratissima	Kernel	520
Leguminosae	Lupinus albus	Seedling	297
	Phaseolus coccineus		58
	Pisum sativum	Seedling	297
	Tamarindus indica		209, 331
Loganiaceae	Strychnos toxifera		71, 73
Malvaceae	Gossypium sp.		185
Moraceae	Morus sp.		816
	M. alba	Bark exudate	233
	M. indica	Leaf	332
Musaceae	Musa basjoo	Juice	628
	M. sapientum	Fruit	200
Papaveraceae	Chelidonium majus		643
	Eschscholtzia sp.		776
	Glaucium luteum	Juice	640
	Papaver somniferum		776
Pinaceae		Turpentine	383
	Abies pectinata	Turpentine	117
	" "	Resin	733
	Agathis australis	Resin	464
	A. dammara	Resin	729

Family	Genus and Species	Source	Reference
Pinaceae	<i>Larix decidua</i>	Rosin	732
	<i>Picea vulgaris</i>	Resin	730
	<i>Pinus</i> sp.	Sap	652
	<i>P. silvestris</i>	Resin	731
Polygonaceae	<i>Fagopyrum esculentum</i>		148
	" "	Leaf and stem	578
	<i>Rheum hydridum</i>	Rhizome, stem	618
	" "	Leaf	695
	<i>R. officinale</i>	Petiole	106
	<i>R. rhaponticum</i>	Leaf, petiole	578
	<i>R. Undulatum</i>	Petiole	348
Proteaceae	<i>Orites excelsa</i>	Wood	672
Ranunculaceae	<i>Anemone nemorosa</i>	Leaf	404
	" "		742
Rosaceae	<i>Fragaria</i> sp.	Fruit	6
	<i>Prunus avium</i>	Fruit	204
	<i>P. cerasus</i>	Juice	325
	" "	Fruit	343
	<i>P. communis</i>	Fruit pulp	326
	<i>P. persica</i>	Fruit	19
	<i>Pyrus aucuparia</i>	Fruit	213
	" "		405
	<i>P. communis</i>	Juice	598
	" "	Fruit	743
	<i>P. malus</i>	Fruit	43, 109, 110
	" "		206
	" "	Juice	537, 710

Family	Genus and Species	Source	Reference
Rosaceae	Rubus fruticosus	Leaf	211
	" "	Fruit	473
	R. idaeus	Leaf	218, 325, 742
Rutaceae	Citrus limonum	Fruit	332
Santalaceae	Santalum album		315
Sapotaceae	Mimusops sp.		521
Saxifragaceae	Ribes rubrum		205
Scrophulariaceae	Digitalis purpurea		88, 337
Solanaceae	Atropa belladonna		369
	Nicotiana sp.		43, 578, 661, 694
	" "	Leaf	577, 758, 759
	N. tabacum	Leaf	695, 761
	Solanum lycopersicum	Fruit	7, 746, 747
	" "	Over-ripe fruit	83, 84, 85
	" "	Leaf, stalk	578
	" "	Leaf	694, 695
	S. tuberosum	Tuber	824
Umbelliferae	Angelica archangelica	Root	698
	Daucus carota	Root	109, 110, 413
Vitaceae	Vitis vinifera	Leaf	74
	" "	Unripe fruit	105
	" "	Fruit	106, 348

Family	Genus and Species	Source	Reference
Vitaceae	Vitis vinifera	Sap, fruit	286
	" "	Sap	489, 814

Syringic Acid

Gramineae	Saccharum officinarum	Juice	611
	" "	Crude molasses	704

Tartaric Acid

Critical review of literature
Franzen & Helwert (208)

Aceraceae	Acer saccharum	"Sugar sand"	402, 674
	" "	Sirup	477
Amaryllidaceae	Agave americana	Leaf sap	111
Anacardiaceae	Mangifera indica		87
	Rhus coriaria		156
	R. semialata		744
	Spondias purpurea		565
Araliaceae	Aralia hispida	Fruit	230
Asclepiadaceae	Asclepias syriaca	Milky sap	649
Berberidaceae	Berberis integerrima	Fruit	348
	Caulophyllum thalictroides	Fruit pulp	687
Betulaceae	Betula alba	Sap	225
Bombacaceae	Adansonia sp.	Fruit pulp	270

Family	Genus and Species	Source	Reference
Bombacaceae	Adansonia sp.	Fruit	448
	A. digitata	Fruit	5
Bromeliaceae	Ananas sativas	Fruit	80, 521
Caprifoliaceae	Diervilla florida	Fruit	139
	Lonicera xylosteum	Fruit	174
	Sambucus calicarpa	Fruit	128
	S. ebulus	Fruit	178
	" "	Root	179
	S. nigra	Fruit	177
	Symphoricarpus racemosus	Fruit	671
	Viburnum lantana		182
	V. nudum		410
Caricaceae	Carica papaya	Fruit	519
Celastraceae	Celastrus obscurus	Leaf	158
	C. scandens	Fruit	786
	Euonymus atropurpureus	Root bark	471
	E. europaeus	Seed kernel	253
Chenopodiaceae	Beta vulgaris	Root	234, 400
	" "	Root, leaf	752
	Chenopodium ambrosioides		69
Commelinaceae	Tradescantia purpurea	Stem sap	227
	T. zebrina	Stem sap	227
Compositae	Bellis perennis		183
	Helianthus tuberosus	Tuber	93, 234
	Matricaria chamomilla	Flower	276

Family	Genus and Species	Source	Reference
Cornaceae	Cornus paniculatum	Fruit	656
	C. sericea	Fruit	687
Cruciferae	Capella bursa pastoris		135
Elaegnaceae	Hippophae" rhamnoides	Fruit	807
Elaeocarpaceae	Elaeocarpus serratus	Fruit	817
Ericaceae	Vaccinium sp.	Leaf	334
	V. corymbosum	Fruit	265
	V. vitis idaea	Leaf	499
	" " "	Fruit	802
Eucommiaceae	Eucommia ulmoides	Leaf	254
Euphorbiaceae	Euphorbia cyparissias	Milky sap	784
	E. platyphylla	Milky sap	785
	Phyllanthus emblica		332
	Ricinus communis		65
Fagaceae	Quercus pedunculata	Wood	445
Geraniaceae	Geranium zonale		94
Gramineae	Bambusa sp.	Shoot	626
	Saccharum officinarum	Juice	821
	Sorghum vulgare		419, 796, 797
Guttiferae	Garcinia gambogia	Fruit rind	370
Hydnoraceae	Prosopanche burmeisteri		826
Labiales	Glechoma hederaceae		180
	Orthosiphon stamineus		344
Lauraceae	Persea gratissima	Fruit pulp	520, 521

Family	Genus and Species	Source	Reference
Leguminosae	Astragalus sp.	Twig	412
	Bauhinia reticulata	Fruit, leaf	585
	Cassia sp.	Leaf	726, 773
	C. acutifolia	Leaf	379
	Tamarindus indica	Fruit pulp	82, 596, 756
	" "		3, 199, 209, 241
	" "	Leaf	634, 750
	" "		245
	" "	Mesocarp	278
	" "	Green and ripe fruit	316, 565
Liliaceae	" "	Fruit	332, 701
	Clintonia borealis	Fruit	669
	Erythronium dens canis	Bulb	157
	Smilacina bifolia	Fruit	167
	S. racemosa	Fruit	167
Magnoliaceae	Schizandra chinensis	Fruit	531
Moraceae	Morus indica	Leaf	332
Myrtaceae	Eugenia australis		411
	Psidium guajava		625
Musaceae	Musa sapientum	Fruit	200
Orchidaceae	Vanilla planifolia	Fruit	387
Oxalidaceae	Oxalis corniculata	Leaf	245
Pinaceae	Pinus sylvestris	Pollen	366
Piperaceae	Piper nigrum		526
Papaveraceae	Allium cirrhosa	Root	639
	Chelidonium majus	Leaf	567

Family	Genus and Species	Source	Reference
Papaveraceae	Fumaria officinalis	Sap	444
	Papaver somniferum	Capsule	145
Polygonaceae	Polygonum reynoutria	Stem	705
Ranunculaceae	Aconitum napellus		594
Rosaceae	Crataegus sp.	Fruit	435
	Cydonia vulgaris	Fruit	123, 701, 723
	Eriobotrya japonica	Fruit	371
	Fragaria sp.		123, 465, 723
	Prunus armeniaca	Fruit	123, 495, 497, 701
	" "		723
	P. avium		123
	P. cerasus	Fruit	123, 465, 495, 496, 497, 723
	P. domestica	Fruit	495, 496, 497, 723
	P. persica	Fruit	496, 635
	P. spinosa		648
	Pyrus arbutifolia	Fruit	591
	P. aucuparia		390, 405
	P. malus	Fruit	495, 497
	" "	Juice	701
	Rubus sp.		136
	R. idaeus	Fruit	465
	" "	Fruit juice	123, 341
	" "	Sap	338
Rubiaceae	Coffea sp.		522
Rutaceae	Citrus decumana	Fruit	441
	Cusparia trifoliata		97

Family	Genus and Species	Source	Reference
Santalaceae	Leptomeria acida	Fruit	597
Sapindaceae	Sapindus saponaria		241
Sapotaceae	Achras sapota		523
	Bassia latifolia		349
	Sideroxylon crassipedicellatum	Fruit	523
Saxifragaceae	Ribes sp.		465
	R. grossularia		802
	R. nigrum		123
	R. rubrum		216, 802
Scrophulariaceae	Antirrhinum majus		775
	Digitalis grandiflora		775
	Euphrasia officinalis		176
	Linaria cymbalaria		775
	Scrophularia nodosa		775
	Veronica officinalis		175
Solanaceae	Cyphomandra calycina		524
	Physalis peruviana	Fruit	376
	Solanum dulcamara	Fruit	16, 736
	S. lycopersicum		4
	" "	Fruit	7, 181, 348, 701
	S. Tuberosum	Tuber	171
Sterculiaceae	Theobroma cacao	Berry	90

Family	Genus and Species	Source	Reference
Tiliaceae	Tilia vulgaris		275
Urticaceae	Parietaria officinalis		289
Vitaceae			193
	Ampelopsis hederacea		242
	A. "	Leaf	243
	Parthenocissus quinque- folia	Leaf	539
	Vitis sp.		12
	" "	Leaf	511
	V. hederaceae		808
	V. labrusca	Juice	416, 635
	V. "	Fruit	474
	V. sylvestris	Fruit	604
	V. vinifera		14, 64, 224, 286, 308, 488
	" "	Fruit	15, 197, 284, 332, 495, 548, 701
	" "	Leaf	74, 348, 533, 651
	" "	Juice	143, 222, 231, 263, 358, 534, 653
	" "	Sap	377, 810, 814
	" "	Vine	285
	" "	Unripe fruit	420, 503, 532
	" "	Young shoot, leaf	487

Tartronic Acid

Family	Genus and Species	Source	Reference
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Tricarballic Acid

Aceraceae	Acer saccharum	"Sugar sand"	402, 477
Chenopodiaceae	Beta vulgaris	Evaporated juice	395, 406
	" "	Root	396, 713
	" "	Juice	399
	" "	Root, leaf	752
Gramineae	Hordeum vulgare	Whole plant	483

Ursolic Acid

Apocynaceae	Allamanda cathartica	Leaf	27
Aquifoliaceae	Ilex aquifolium		196
	I. latifolia	Cartlele	335
	I. paraguariensis	Leaf	442
Cornaceae	Cornus florida	Flower, bract	621a
Ericaceae	Arctostaphylos uva-ursi	Leaf	623
	Enkianthus quinqueflorus		28
	Erica arborea		196
	E. carnea		196
	E. mediterranea		196

Family	Genus and Species	Source	Reference
Ericaceae	<i>Kalmia angustifolia</i>		319
	<i>Leucothoe keiskei</i>	Leaf	665
	<i>Rhododendron</i> 6 sp.		28
	<i>R. pulchrum</i>	Leaf	27
	<i>R. simsii</i>	Leaf	27
	<i>Vaccinium macrocarpon</i>	Pomace	433
	<i>V. myrtillus</i>		196, 590
	<i>V. oxycoccus</i>	Fruit pulp	374
	<i>V. vitis-idaea</i>		196
Labiatae	<i>Thymus vulgaris</i>		615
	<i>Salvia officinalis</i>		101
Myrtaceae	<i>Psidium guajava</i>	Leaf	26
Punicaceae	<i>Punica granatum</i>	Peel, leaf	102
Pyrolaceae	<i>Pyrola minor</i>		196
	<i>P. umbellata</i>		196
Rosaceae	<i>Crataegus oxyacantha</i>		59
	<i>Eriobotrya japonica</i>		27
	<i>Prunus avium</i>	Cuticle	433a
	<i>P. serotina</i>		258
	" "	Leaf	623
	<i>Pyrus communis</i>	Fruit skin	431
	<i>P. malus</i>	Fruit	260
	" "	Fruit skin	281, 623
	" "	Fruit cuticle	432
Solanaceae	<i>Anthocercis intricata</i>		22
	<i>A. littorea</i>		22
	<i>A. odgersii</i>		22
Verbenaceae	<i>Verbena stricta</i>		512

Family	Genus and Species	Source	Reference
	<u>Veratric Acid</u>		
	<div style="text-align: center;"><chem>COc1ccccc1C(=O)OC</chem> COOH -OCH₃ OCH₃</div>		
Liliaceae	Sabadilla officinalis	Seed.	443

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