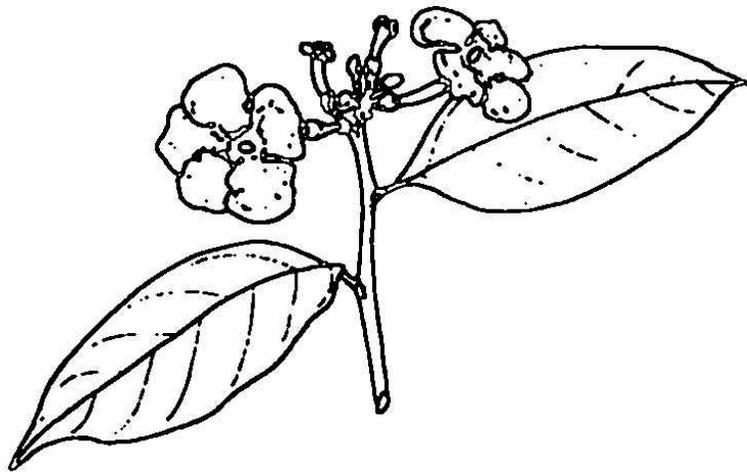


Technical Data Report

for

MANACÁ

Brunfelsia uniflora
Brunfelsia hopeana



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Manacá

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Family: Solanaceae

Genus: Brunfelsia

Species: uniflora

Synonyms: *Brunfelsia hopeana*, *Franciscea hopeana*, *Franciscea uniflora*

Common Names: Manacá, manacán, chiric sanango, chuchuwasha, manaka, vegetable mercury, managá caa, gambá, jeratacaca, bloom of the lent, camgaba, Christmas bloom, chuchuwasha, gerataca, geratacaca, good night, jerataca, moka pari, Paraguay jasmine, santa maria, umburapuama, white tree

Parts Used: Root, bark, leaf

Manacá is a medium-sized, shrubby tree that grows to 8 m high and is indigenous to the Amazon rainforest. Often it is cultivated as an ornamental; it produces pretty, yellowish-white and purple, highly-fragrant flowers, from which a perfume is extracted. It can be found in the Amazon regions of Brazil, Bolivia, Peru, Ecuador, Colombia, and Venezuela. In Brazil manacá is known by several botanical names, including *Brunfelsia uniflora*, *B. hopeana*, and *Franciscea uniflora*. In Europe the plant is known and sold in herbal commerce as *Brunfelsia hopeana*. Other plant relatives from Colombia and Ecuador include *Brunfelsia chiricaspi* (from its local name, chiricaspi, which means “tree of chills”), and *Brunfelsia grandiflora* which are used by rainforest Indians as hallucinogens; however, due to the toxicity and unpleasant side effects, use of these plants appears to be on the wane. They are different plants from manacá—but sometimes are confused with manacá for their similar look, growth, and habit.

Manacá has a long history of indigenous use for both medicine and magic. Its Brazilian common name, *manacá*, originated with the Tupi Indians in Brazil; they named it after the most beautiful girl in their tribe, Manacán, for its lovely flowers. It is a sacred and spiritual plant used by shamans and *curanderos* in the potion *ayahuasca* (a sacred hallucinogen), in special initiation ceremonies, and for bad luck (the *chiricaspi* and *grandiflora* species are preferred for *ayahuasca* brews). In the Amazon, manacá root is infused with *aguardiente* (rum) for rheumatism and venereal disease. In Peru (where the common name of the plant is *chiricsanango*), indigenous peoples apply a decoction of leaves externally for arthritis and rheumatism; they also employ a root decoction for chills. One Amazonian *curandero* (near Pucallpa, Peru) uses a root tea for adult fevers, arthritis and rheumatism, back pain, common colds, bronchitis, lung disease and tuberculosis, snakebite, and as an enema for kidney disorders and ulcers. Indigenous tribes in the northwest Amazon consider manacá to be a diaphoretic and diuretic. They use it for fever, rheumatism, snakebite, syphilis, and yellow fever. *Curanderos* and herbal healers along the Amazon River (and, generally, in Ecuador) use a root decoction to treat arthritis, rheumatism, colds and flu, uterine pain and cramps, venereal diseases, and to clean the blood—while using a poultice of the leaves as a topical analgesic.

The root of manacá is said to stimulate the lymphatic system. It has long been used for syphilis, earning the name *vegetable mercury*. In South American herbal medicine, manacá is considered to be an abortifacient, alterative, anesthetic, diaphoretic, diuretic, emmenagogue, hypothermal, laxative, and narcotic. It is employed for arthritis, rheumatism, scrofula, and syphilis. In Brazil herbalists use the root as a purgative, emetic, abortifacient, and diuretic for syphilis, rheumatism, scrofula, dermatosis, and to promote menstrual flow. Practitioners and herbalists in the United States use manacá as a diuretic, purgative, and anti-inflammatory to treat arthritis and rheumatism, sexually-transmitted diseases, and to stimulate the lymphatic system and disperse uric acid. In Europe the plant is used for arthritis, rheumatism, bronchitis, fevers, and snakebite.

A 1996 phytochemical study on the aerial parts of manacá revealed it contained such active compounds as benzenoids, terpenes, alkaloids, lactones, and lipids.¹ It is the root, though, that has been used primarily by indigenous peoples throughout the Amazon and by herbalists throughout the world. The root of manacá contains coumarins, alkaloids, lignans and sapogenins.²⁻⁴ Active constituents include two alkaloids, manaceine and manacine, as well as scopoletin and aesculetin (phytochemical coumarins). Manaceine and manacine are thought to be responsible for stimulating the lymphatic system, while aesculetin has demonstrated analgesic, antihepatotoxic, antimutagenic, and anti-inflammatory activities in laboratory tests.⁵ Scopoletin is a well-known phytochemical that has demonstrated analgesic, anti-inflammatory, antibacterial, antitumor, cancer-preventive, antifungal, myorelaxant, and spasmolytic activity in many different laboratory experiments.⁶⁻¹⁰ It occurs in significant amounts in manacá.⁸ A U.S. patent was awarded in 2002 for scopoletin's ability to inhibit nitric oxide production.¹¹ Nitric oxide is a reactive radical produced in the body and involved in biological processes such as vascular homeostasis, inflammation, and diseases such as asthma and erectile dysfunction.¹² A 1997 study on the phytochemical beta-eudesmol (found in the aerial parts of manacá) demonstrated significant anti-epileptic activity and was found to enhance the effect of the anticonvulsant medication phenytoin.¹³ These chemicals and their reported biological activities could help to explain many of manacá's uses in traditional herbal medicine systems.

In a 1991 clinical study with mice, manacá (at oral dosages of 1 g/kg) demonstrated analgesic and anti-inflammatory activities.¹⁴ An earlier (1977) study reported that manacá root extracts evidenced marked anti-inflammatory actions in rats (in oral doses of 100 mg/kg)—as well as central nervous system depressant and antipyretic (fever-reducing) actions when injected intraperitoneally.¹⁵ Other root extracts administered orally to rats (at 100 mg/kg) showed anti-inflammatory actions.¹⁶ Leaf and root extracts of manacá also showed insecticidal actions (which may be attributed to naturally-occurring insecticidal chemicals nerolidol and farnesol).¹⁷ Extracts of the twigs also have been documented with antimutagenic actions.¹⁸

In South America manacá is respected as an important sacred and medicinal plant—mainly employed by shamans, healers, *curanderos*, herbal practitioners, and professionals. Inexperienced non-professionals should refrain from self-treating or freely consuming this plant as a natural remedy; there are some contraindications and drug interactions which should be considered. This plant is best left in the hands of trained professionals, taken only in very small amounts and/or in combination with other plants.

Documented Properties and Actions: Abortifacient, alterative, analgesic, anesthetic, anti-inflammatory, antimutagenic, antipyretic, antirheumatic, CNS-depressant, cytotoxic, diaphoretic, diuretic, emmenagogue, hypothermal, insecticide, laxative, purgative, sedative, soporific

Main Phytochemicals: Aesculetin, alpha-ionone, alpha-terpineol, benzaldehyde, benzylbenzoate, benzylsalicylate, beta-bisabolene, beta-cyclocitralbrunfelsene, beta-damascenone, beta-eudesmol, beta-safranal, brunfelsene, brunfelsamidine, elemol, 2-ethylfuran, farnesol, farnesyl, geraniol, geranyl hopeanine, ionones, isobutylsalicylate, lavandulal, limonene, linalool, linoleic acid, linolenic acid, manaceine, manacine, mandragorine, methylfurans, methylanisoles, myrcene, myristic acid, n-decane, n-heneicosane, n-heptadecane, n-heptane, n-hexadecane, nerolidol, n-nonadecane, nonanes, n-octane, n-pentacosane, n-pentadecane, neophytadiene, n-tricosane, ocimene, pentadecanoic acid, palmitic acid, pinoselinols, salicylic acid esters, scopoletin, scopolin, terpinolene, tolualdehyde, toluene, xylene

Traditional Remedy: One-half cup root or leaf decoction 1–2 times daily, or 1–2 ml of a 4:1 tincture twice daily.

Contraindications:

- Manacá has a traditional use as an abortive. No clinical studies have been performed to indicate its safety during pregnancy; therefore, it is contraindicated for pregnant women.
- Manacá root is reported to have toxicity in large doses—causing excessive salivation, vertigo, general anesthesia, partial paralysis of the face, swollen tongue, and disturbed vision.⁵ Avoid dosages higher than the traditional remedy indicates.
- Those allergic to aspirin (acetylsalicylic acid) should avoid using manacá. Manacá contains salicylate and several of its derivatives.
- Salicylate occurs naturally in such foods as fruit, vegetables, and herbs; for some people, too much salicylate causes problems (known as “salicylate sensitivity” or “salicylate intolerance”) without being allergic to aspirin. Do not use manacá if sensitive to salicylate.
- Manacá root contains coumarins—phytochemicals known to thin the blood. Those taking blood-thinning medications such as warfarin should use manacá only under the direction and supervision of a qualified healthcare practitioner to monitor these effects.
- The phytochemical scopoletin has been documented to inhibit monoamine oxidase.¹⁹ Those taking monoamine oxidase (MAO) inhibitors should consult their healthcare practitioner before taking manacá.

Drug Interactions: None reported; however, manacá may potentiate blood-thinning medications such as warfarin and heparin. It may potentiate monoamine oxidase inhibitor drugs also.

WORLDWIDE ETHNOBOTANICAL USES

Region	Uses
Amazonia	Arthritis, colds, diaphoretic, diuretic, fever, flu, lymph, rheumatism, snakebite, syphilis, uterine cramps, uterine disorders, venereal disease, yellow fever
Brazil	Abortive, blennorrhagia, depurative, dermatosis, diaphoretic, diuretic, emetic, emmenagogue, fever, purgative, rheumatism, scrofula, snakebite, syphilis, venereal disease, yellow fever
Ecuador	Abortive, analgesic, arthritis, cold, flu, lymph, malaria, rheumatism, snakebite, uterine, venereal disease, yellow fever
Europe	Alterative, arthritis, bronchitis, diuretic, fever, rheumatism, scrofula, snakebite
Peru	Analgesic, anti-inflammatory, aphrodisiac, arthritis, back pain, bronchitis, chills, colds, diaphoretic, diuretic, fever, hallucinogen, kidney, lung disease, malaria, narcotic, rheumatism, snakebite, syphilis, tuberculosis, ulcers, uterine, venereal disease, yellow fever
South America	Abortive, aphrodisiac, colds, fever, malaria, rheumatism, snakebite, yellow fever
U.S.	Diaphoretic, emmenagogue, rheumatism, syphilis
Elsewhere	Abortive, alterative, anesthetic, arthritis, back pain, bronchitis, cold, diaphoretic, diuretic, eczema, emetic, emmenagogue, fever, gout, hypertensive, hypothermal, inflammation, kidney, laxative, lung, lymphatic, narcotic, purgative, rheumatism, scrofula, skin, snakebite, syphilis, tuberculosis, ulcer, yellow fever

References

1. Castioni, P., et al. "Volatile constituents from *Brunfelsia grandiflora* sp.: Qualitative analysis by GM-MS." *Sci. Pharm.* 1996; 64(1): 83–91.
2. de Costa, A. O. "A pharmacologic study of manacá (*Brunfelsia hopeana*)." *Bol. Assoc. Bras. Pharm.* 1933; 14: 295–99.
3. Ichiki, H., et al. "Studies on the constituents of *Brunfelsia hopeana* Benth." *Natural Med.* 1994; 48(4): 314–16.
4. Gellert, E., et al. "The alkaloids of *Brunfelsia hopeana* Benth." *Chem. Nat. Prod.* 1978; 2: 5–8.
5. Duke, J. A. *CRC Handbook of Medicinal Herbs*. CRC Press: Boca Raton, FL. 1985.
6. Oliveira, E. J., et al. "Intracellular calcium mobilization as a target for the spasmolytic action of scopoletin." *Planta Med.* 2001; 67: 605–8.
7. Muschiatti, L., et al. "Phenolic compounds with anti-inflammatory activity from *Eupatorium buniifolium*." *Planta Med.* 2001; 67(8): 743–44.
8. Kang, S. Y., et al. "Hepatoprotective activity of scopoletin, a constituent of *Solanum lyratum*." *Arch. Pharm. Res.* 1998; 21(6): 718–22.
9. Liu, X. L., et al. "Effect of scopoletin on PC(3) cell proliferation and apoptosis." *Acta. Pharmacol. Sin.* 2001; 22(10): 929–33.
10. Kayser, O., et al. "Antibacterial activity of extracts and constituents of *Pelargonium sidoides* and *Pelargonium reniforme*." *Planta Med.* 1997; 63(6): 508–10.
11. Jain, D. C., et al. "Process for the isolation of compound scopoletin useful as nitric oxide synthesis inhibitor." U.S. patent no. 6,337,095; 2002.
12. Gentiloni, S. N., et al. "Nitric oxide. A general review about the different roles of this innocent radical." *Minerva Med.* 2001; 92(3): 167–71.
13. Chiou, L. C., et al. "Chinese herb constituent beta-eudesmol alleviated the electroshock seizures in mice and electrographic seizures in rat hippocampal slices." *Neurosci. Lett.* 1997; 231(3): 171–74.
14. Ruppelt, B. M., et al. "Pharmacological screening of plants recommended by folk medicine as anti-snake venom—I. Analgesic and anti-inflammatory activities." *Mem. Inst. Oswaldo Cruz* 1991; 86: 203–5.
15. Iyer, R. P., et al. "*Brunfelsia hopeana* I: Hippocratic screening and antiinflammatory evaluation." *Lloydia*. 1977; 40(4): 356–60.
16. Iyer, R. P., et al. "*Brunfelsia hopeana*—Pharmacologic screening: isolation and characterization of hopeanine." *Diss. Abstr. Int. B.* 1978; 39: 761.
17. Heal, R. E., et al. "A survey of plants for insecticidal activity." *Lloydia* 1950; 13 1: 89–162.
18. Wall, M. E., et al. "Plant antimutagenic agents, 1. General bioassay and isolation procedures." *J. Nat. Prod.* 1988; 51(5): 866–73.
19. Yun, B. S., et al. "Coumarins with monoamine oxidase inhibitory activity and antioxidative coumarino-lignans from *Hibiscus syriacus*." *J. Nat. Prod.* 2001; 64 9: 1238–40.

information contained herein is intended for education, research, and informational purposes only. This information is not intended to be used to diagnose, prescribe or replace proper medical care. The statements contained herein have not been evaluated by the Food and Drug Administration. The plant described herein is not intended to diagnose, treat, cure, mitigate, or prevent any disease.

Ethnomedical Information on Manacá (*Brunfelsia grandiflora*)

Plant Part / Location	Documented Ethnomedical Use	Type Extract / Route	Used for	Ref #
Root Africa	Used to induce abortion.	Hot H2O Ext Oral	Pregnant Human	L01999
Entire Plant Amazonia	Used as a diaphoretic and diuretic for fever, rheumatism, snakebite, syphilis and yellow fever.	Not stated	Human Adult	ZZ1005
Root Amazonia	Used for arthritis, rheumatism, scrofula and syphilis; stimulates the lymphatic system and has anti-inflammatory activity.	Various Oral	Human Adult	ZZ1015
Root Amazonia	Used for yellow fever, snakebite and fevers.	Not stated	Human Adult	AY1003
Root Argentina	Used to treat colds.	Infusion Oral	Human Adult	L04223
Not Stated Argentina	Used as an abortifacient by the rural populace.	Not Stated	Pregnant Human	J01423
Root Bolivia	Used for snakebite, malaria, yellow fever, and as an antirheumatic.	Plant Oral	Human Adult	L01999
Bark Brazil	Large doses are said to produce abortion. Used as an emmenagogue.	Hot H2O Ext Oral Hot H2O Ext Oral	Pregnant Human Human Female	L00137 L00137
Bark Brazil	Used as a purgative.	H2O Ext Oral	Human Adult	ZZ1049
Leaf Brazil	Used as an arrow poison.	Not stated	Not stated	L01999
Leaf Brazil	Used for snakebite.	Infusion External	Human Adult	J12450
Root = Bark Brazil	Used as a purgative, diuretic, emmenagogue, antivenereal, antisyphilitic and antirheumatic.	Not stated	Human Adult	ZZ1079
Root Brazil	Used as an emetic and purgative.	Not stated	Human Adult	AY1031
Root Brazil	Used to stimulate the lymphatic system; used for syphilis, arthritis, rheumatism and scrofula. Regarded as abortifacient, alterative, anesthetic, diaphoretic, diuretic, emmenagogue, hypertensive, hypothermal, laxative, narcotic and poison. Called vegetable mercury.	Various oral	Human Adult	ZZ1049
Root Brazil	Used to treat syphilis and rheumatism.	Hot H2O Ext Oral	Human Adult	L00137
Root Brazil	Used as an abortive.	Hot H2O Ext Oral	Pregnant Human	W02290
Root Brazil	Used as a diaphoretic, emetic, and purgative.	Plant Oral	Human Adult	L01999
Root Brazil	Used for snakebite and yellow fever, and as a febrifuge, antisyphilitic, antirheumatic, and diuretic.	Hot H2O Ext Oral	Human Adult	L01999

Plant Part / Location	Documented Ethnomedical Use	Type Extract / Route	Used for	Ref #
Root Brazil	Used as an emetic and purgative.	Hot H2O Ext Oral	Human Adult	W02290
Root Brazil	Used to treat syphilis. Used as a diuretic.	Hot H2O Ext Oral Infusion Oral	Human Adult Human Adult	W02597 W02597
Root Brazil	Used to treat syphilis and as a diuretic.	Infusion Oral	Human Adult	H14972
Root Brazil	Used as a purgative, emetic, abortifacient, antirheumatic and antibleorrhagic. In high doses it causes delirium, mental confusion, tremor and sleep.	Not stated	Human Adult	ZZ1099
Root Brazil	Used as a diuretic and purgative. Used for syphilis, rheumatism and to promote menstrual flow.	Not stated	Human Adult	ZZ1013
Root Brazil	Used for syphilis and as a bitter purgative emetic. In large doses it is poisonous.	Not stated	Human Adult	ZZ1052
Root Brazil	Used for arrow poisons and for magical purposes.	Not stated	Not stated	L00137
Root Brazil	Used as a depurgative and diuretic. Used for scrofula, dermatosis, syphilis and rheumatism. Strong doses relax respiratory function.	Infusion Oral Infusion Oral	Human Adult	ZZ1007
Not Stated Brazil	Used as an emmenagogue by the rural populace.	Not stated	Human Female	J01423
Root Chile	Used as an aphrodisiac.	Hot H2O Ext Oral	Human Male	L02535
Branches Colombia	Used as an abortive.	Hot H2O Ext Oral	Pregnant Human	T15375
Entire Plant Colombia	Used as a febrifuge.	Decoction Oral	Human Adult	K16262
Root Colombia	Used for snakebite, malaria, yellow fever, and as an antirheumatic.	Plant Oral	Human Adult	L01999
Root Colombia	Used to produce abortion in large doses.	Hot H2O Ext Oral	Pregnant Human	A00709
Root Ecuador	Used for snakebite, malaria, yellow fever, and as an antirheumatic.	Plant Oral	Human Adult	L01999
Not Stated Ecuador	Used as an abortifacient.	Not stated	Human Female	AY1003
Not Stated Ecuador	Used as an abortive.	Hot H2O Ext Oral	Pregnant Human	T15375
Root Germany	Used as a diuretic and antirheumatic.	Hot H2O Ext Oral	Human Adult	AY1002
Not Stated Paraguay	Used as an abortifacient by the rural populace.	Not Stated	Pregnant Human	J01423
Root Peru	Used for rheumatism and venereal diseases. Used for chills.	ETOH Ext Oral Decoction Oral	Human Adult	ZZ1045

Plant Part / Location	Documented Ethnomedical Use	Type Extract / Route	Used for	Ref #
Root Peru	Used as a narcotic. Used as an aphrodisiac.	Hot H2O Ext Oral Not Stated Oral	Human Adult Human Male	L00137 L00137
Root Peru	Used for snakebite, malaria, yellow fever, and as an antirheumatic.	Plant Oral	Human Adult	L01999
Bark + Root Peru	Used as a narcotic, fish poison, for rheumatism and arthritis, fevers, and snakebite.	H2O Ext Oral	Human Adult	H00026
Bark + Root Peru	Used as a hallucinogen alone, or with <i>Banisteriopsis caapi</i> .	H2O Ext Oral	Human Adult	H00026
Root + Leaf Peru	Used for adult fevers, arthritis, rheumatism, back pain, common colds and bronchitis, lung disease and tuberculosis, snakebite. Used for kidney disorders and ulcers.	Infusion Oral Enema	Human Adult	ZZ1001
Entire Plant Peru	Used for rheumatism and venereal diseases.	Infusion Oral	Human Adult	L04137
Entire Plant Peru	Used for fever.	Decoction Oral	Human Adult	L04137
Leaf Peru	Used for arthritis and rheumatism.	Decoction Oral	Human Adult	L04137
Leaf Peru	Used for fever, rheumatism, and yellow fever.	Not Stated Oral	Human Adult	L04137
Leaf Peru	Used to prepare hallucinogenic beverages.	Infusion Oral	Human Adult	L04137
Not Stated Peru	Used for hallucinogenic effect during shamanic training. A diet of cooked plantain and smoked fish is followed during use. May be taken with ayahuasca beverage (<i>Banisteriopsis caapi</i> plus <i>Psychotria viridis</i> decoction).	Decoction Oral	Human Adult	T08133
Leaf South America	Used for eczema, skin disorders and syphilitic ulcers.	Poultice External	Human Adult	ZZ1049
Aerial parts Switzerland	Used against rheumatism and arthritis, bronchitis, fevers, and snakebite.	Hot H2O Ext Oral	Human Adult	K28911
Root USA	Useful for subacute and chronic rheumatism, and as a diaphoretic, diuretic, and antisyphilitic.	Fluid Extract Oral	Human Adult	A05638
Root USA	Used as an emmenagogue.	Fluid Extract Oral	Human Female	A05638
Root U.S.	Used as an antirheumatic, diuretic and purgative. Used for syphilis, snakebites and yellow fever.	Tincture Oral	Human Adult	ZZ1014
Root U.S.	Used to treat conditions associated with sexually transmitted infections. Disperses uric acid.	Tincture Oral	Human Adult	ZZ1016

Presence of Compounds in Manacá (*Brunfelsia grandiflora*)

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Acetone	Alkanone to C4	Aerial Parts	Switzerland	00.40%	K28911
Aesculetin	Coumarin	Root	Brazil	Not stated	W02597
Anisole, 4-methyl-	Benzenoid	Aerial Parts	Switzerland	00.03%	K28911
Benzaldehyde	Benzenoid	Aerial Parts	Switzerland	00.05%	K28911
Benzyl benzoate	Benzenoid	Aerial Parts	Switzerland	Traces	K28911
Benzyl salicylate	Benzenoid	Aerial Parts	Switzerland	Traces	K28911
Bisabolene, beta-	Sesquiterpene	Aerial Parts	Switzerland	00.04%	K28911
Brunfelsene		Plant	Not stated	Not stated	ZZ1095
Brunfelsamidine	Alkaloid	Rootbark	Peru	00.08889%	H00026
But-3-en-1-ol, 3-methyl-	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
But-3-en-2-one	Alkanone to C4	Aerial Parts	Switzerland	00.03%	K28911
But-3-en-2-one, 3-methyl-	Alkanone to C4	Aerial Parts	Switzerland	00.03%	K28911
Butan-1-al	Alkanal to C4	Aerial Parts	Switzerland	00.03%	K28911
Butan-1-al, 2-methyl-	Alkanal to C4	Aerial Parts	Switzerland	00.03%	K28911
Butan-1-al, 3-methyl-	Alkanal to C4	Aerial Parts	Switzerland	00.14%	K28911
Chromane, rel-4(a)-7-8-8-(a)-tetrahydro-1-1-3-6-tetramethyl-3-vinyl-iso-	Sesquiterpene	Aerial Parts	Switzerland	00.09%	K28911
Cyclocitral, beta-	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
Cyclohex-1-3-diene, 2-6-6-trimethyl-	Alicyclic	Aerial Parts	Switzerland	00.03%	K28911
Cyclohex-2-en-1-one, 4-(2-butenylide)-3-5-5-trimethyl-	Alicyclic	Aerial Parts	Switzerland	00.06%	K28911
Cyclohexan-1-one, 2-2-6-trimethyl-	Alicyclic	Aerial Parts	Switzerland	00.03%	K28911
Damascenone, beta-	Sesquiterpene	Aerial Parts	Switzerland	00.06%	K28911
Decane, n-	Alkane C5 or More	Aerial Parts	Switzerland	Traces	K28911
Elemol	Sesquiterpene	Aerial Parts	Switzerland	00.04%	K28911

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Esculetin		Bark	Not stated	Not stated	ZZ1095
Eudesmol, beta-	Sesquiterpene	Aerial Parts	Switzerland	00.03%	K28911
Farnesol	Sesquiterpene	Aerial Parts	Switzerland	00.03%	K28911
Farnesol, 6-7-dihydro-	Sesquiterpene	Aerial Parts	Switzerland	Traces	K28911
Farnesyl-acetone	Sesquiterpene	Aerial Parts	Switzerland	00.10%	K28911
Furan, 2-ethyl-	Oxygen Heterocycle	Aerial Parts	Switzerland	00.05%	K28911
Furan, 2-pentyl-	Oxygen Heterocycle	Aerial Parts	Switzerland	00.03%	K28911
Furan, methyl-	Oxygen Heterocycle	Aerial Parts	Switzerland	00.03%	K28911
Furane, 5-(1-5-dimethyl-1-4-hexadienyl)-tetrahydro-2-methyl-2-vinyl-	Oxygen Heterocycle	Aerial Parts	Switzerland	Traces	K28911
Furosta-2-alpha-3-beta-22-26-tetraol,(5-alpha-25r)-26-o-beta-d-glucopyranoside	Sapogenin	Root	Brazil	00.00107%	H14972
Furosta-3-beta-22-26-triol, (5-alpha-25r)-26-o-beta-d-glucopyranosyl-22-o-methyl-hopamidine	Sapogenin	Root Leaf	Brazil South America	00.00064% 00.015%	H14972 K10192
Geraniol	Monoterpene	Aerial Parts	Switzerland	00.44%	K28911
Geranyl acetone	Sesquiterpene	Aerial Parts	Switzerland	00.18%	K28911
Heneicosane, n-	Alkane C5 or More	Aerial Parts	Switzerland	Traces	K28911
Hept-5-en-2-ol, 6-methyl-	Alkenol C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Hept-5-en-2-one, 6-methyl-	Alkenone C5 or More	Aerial Parts	Switzerland	00.08%	K28911
Hept-cis-4-en-1-al	Alkenal C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Hept-trans-2-en-1-al	Alkenal C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Hepta-1-5-diene, trimethyl-	Alkene C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Hepta-2-4-dien-1-ol	Alkenol C5 or More	Aerial Parts	Switzerland	00.08%	K28911
Heptadecane, n-	Alkane C5 or More	Aerial Parts	Switzerland	traces	K28911
Heptan-1-al	Alkanal C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Heptan-2-one	Alkanone C5 or More	Aerial Parts	Switzerland	00.03%	K28911

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Heptane, n-	Alkane C5 or More	Aerial Parts	Switzerland	Traces	K28911
Hex-1-en-3-one	Alkenone C5 or More	Aerial Parts	Switzerland	Traces	K28911
Hex-cis-3-en-1-ol	Alkenol C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Hex-cis-3-en-1-ol salicylate	Alkenol C5 or More	Aerial Parts	Switzerland	00.26%	K28911
Hex-trans-2-en-1-al	Alkenal C5 or More	Aerial Parts	Switzerland	00.93%	K28911
Hex-trans-3-en-1-ol	Alkenol C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Hexadeca-7-10-13-trienoic acid methyl ester	Lipid	Aerial Parts	Switzerland	00.03%	K28911
Hexadecane, n-	Alkane C5 or More	Aerial Parts	Switzerland	Traces	K28911
Hexan-1-al	Alkanal C5 or More	Aerial Parts	Switzerland	00.04%	K28911
Hexan-1-ol	Alkanol C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Hexan-1-ol, 2-ethyl-	Alkanol C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Hopeanine	Quinolizidine Alkaloid	Root Root Bark	Brazil Brazil Not stated	Not stated Not stated 4 ppm	T01443 T01415 ZZ1095
Ionol, alpha- trans-2-3-dehydro-	Sesquiterpene	Aerial Parts	Switzerland	00.04%	K28911
Ionone, alpha-	Sesquiterpene	Aerial Parts	Switzerland	00.09%	K28911
Ionone, beta-	Sesquiterpene	Aerial Parts	Switzerland	00.16%	K28911
Ionone, beta- trans-5-6-epoxy-	Sesquiterpene	Aerial Parts	Switzerland	00.06%	K28911
Kaempferol-3-o-(6-glc-o-feruloyl)-beta-d-glucopyranosyl(1-2)-o-[alpha-l-rhamnopyranosyl(1-6)]-beta-d-galactopyranoside	Flavonol	Aerial Parts	Switzerland	00.0101%	H25351
Lavandulal	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
Limonene	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
Linalool	Monoterpene	Aerial Parts	Switzerland	02.19%	K28911
Linalool oxide(furanoid)	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
Linoleic acid methyl ester	Lipid	Aerial Parts	Switzerland	00.12%	K28911
Linolenic acid methyl ester	Lipid	Aerial Parts	Switzerland	00.09%	K28911

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Manaceine		Bark	Not stated	800 ppm	ZZ1095
Manacine	Alkaloid	Root Bark	Brazil Not stated	Not stated 800 ppm	W02597 ZZ1095
Mandragorine		Plant	Not stated	Not stated	ZZ1095
Mentha-28-dien-1-ol, para-	Monoterpene	Aerial Parts	Switzerland	00.05%	K28911
Myrcene	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
Myristic acid	Lipid	Aerial Parts	Switzerland	Traces	K28911
Naphthalene, 1-2-3-4-tetrahydro- 1-1-6-trimethyl-	Polycyclic	Aerial Parts	Switzerland	Traces	K28911
Naphthalene, dimethyl-	Polycyclic	Aerial Parts	Switzerland	00.03%	K28911
Nerolidol	Sesquiterpene	Aerial Parts	Switzerland	00.14%	K28911
Non-2-en-4-olide, 2-3-dimethyl-	Lactone	Aerial Parts	Switzerland	Traces	K28911
Nona-2-4-dien-4-olide, 2-3-dimethyl-	Lactone	Aerial Parts	Switzerland	00.10%	K28911
Nona-trans-2-trans-4-tran-6-trien-1-al	Alkenal C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Nonadecane, n-	Alkane C5 or More	Aerial Parts	Switzerland	Traces	K28911
Nonan-1-al	Alkanal C5 or More	Aerial Parts	Switzerland	00.06%	K28911
Nonane, n-	Alkane C5 or More	Aerial Parts	Switzerland	Traces	K28911
Ocimene, cis-	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
Ocimene, trans-	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
Oct-2-trans-en-al	Alkenal C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Octa-1-cis-5-dien-3-ol	alkenol C5 or More	Aerial Parts	Switzerland	00.05%	K28911
Octa-1-trans-5-7-trien-3-ol, 3-7-dimethyl-	Monoterpene	Aerial Parts	Switzerland	00.04%	K28911
Octa-3-trans-5-cis-dien-2-one	Alkenone C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Octa-trans-3-trans-5-dien-2-one	Alkenone C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Octan-1-al	Alkanal C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Octan-3-one	Alkanone C5 or More	Aerial Parts	Switzerland	00.03%	K28911

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Octane, n-	Alkane C5 or More	Aerial Parts	Switzerland	Traces	K28911
Palmitic acid	Lipid	Aerial Parts	Switzerland	Traces	K28911
Palmitic acid methyl ester	Lipid	Aerial Parts	Switzerland	00.08%	K28911
Pent-1-en-3-one	Alkenone C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Pent-3-en-2-one, 4-methyl-	Alkenone C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Pent-4-en-1-al	Alkenal C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Pentacosane, n-	Alkane C5 or More	Aerial Parts	Switzerland	Traces	K28911
Pentadecan-2-one	Alkanone C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Pentadecan-2-one, 6-10-14-trimethyl-	Alkanone C5 or More	Aerial Parts	Switzerland	00.57%	K28911
Pentadecane, n-	Alkane C5 or More	Aerial Parts	Switzerland	Traces	K28911
Pentadecanoic acid	Lipid	Aerial Parts	Switzerland	Traces	K28911
Pentan-1-al	Alkanal C5 or More	Aerial Parts	Switzerland	00.06%	K28911
Pentan-1-al, 3-methyl-	Alkanal to C4	Aerial Parts	Switzerland	00.07%	K28911
Pentan-2-ol	Alkanol C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Pentan-2-one, 3-methyl-	alkanone C5 or More	Aerial Parts	Switzerland	00.03%	K28911
Phenanthrene	Polycyclic	Aerial Parts	Switzerland	Traces	K28911
Phytadiene, neo-	Diterpene	Aerial Parts	Switzerland	00.03%	K28911
Phytol	Diterpene	Aerial Parts	Switzerland	Traces	K28911
Pinoresinol diglucoside	Lignan	Root	Brazil	00.00129%	H14972
Prop-2-en-1-al, 2-methyl-	Alkanal to C4	Aerial Parts	Switzerland	00.03%	K28911
Pyrrole, 1-(3-methyl-butyl)-	Alkaloid	Aerial Parts	Switzerland	00.03%	K28911
Pyrrole, 1-methyl-	Alkaloid	Aerial Parts	Switzerland	00.03%	K28911
Pyrrole-3-carbaldehyde, 1-(3-methyl-butyl)-	Alkaloid	Aerial Parts	Switzerland	00.09%	K28911
Safranal, beta-	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
Salicylate, isobutyl-	Benzenoid	Aerial Parts	Switzerland	00.07%	K28911

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Salicylic acid 2-phenyl-ethyl ester	Benzenoid	Aerial Parts	Switzerland	Traces	K28911
Salicylic acid ethyl ester	Benzenoid	Aerial Parts	Switzerland	00.09%	K28911
Salicylic acid hexyl ester	Benzenoid	Aerial Parts	Switzerland	00.03%	K28911
Salicylic acid methyl ester	Benzenoid	Aerial Parts	Switzerland	61.49%	K28911
Salicylic acid pentyl ester	Benzenoid	Aerial Parts	Switzerland	00.07%	K28911
Scopoletin	Coumarin	Root Entire Plant Root Root Seed Rootbark Leaf + Stem	Brazil Brazil Brazil Brazil Brazil Peru Not Stated	00.0125% 00.10% 00.0033% Not stated Not stated Not stated Not stated	AY1031 A07286 L01999 T01415 A07306 H00026 M17895
Scopoletin-beta-d-xylopyranosyl(1-6)-beta-d-glucopyranoside	Coumarin	Root	Brazil	00.00258%	H14972
Scopolin	Coumarin	Leaf + Stem	Not Stated	Not stated	M17895
Sistosterol	Sterol	Root	Brazil	0.04%	AY1031
Spirosta-2-alpha-3-beta-26-triol,(5-alpha-25r)3-o-alpha-l-arabinopyranosyl(1-4)-beta-d-glucopyranosyl(1-2)-(beta-d-xylopyranosyl(1-3))-galactopyranoside	Sapogenin	Root	Brazil	00.00451%	H14972
Spirosta-3-beta-26-diol,(5-alpha-25r)-3-o-alpha-l-arabinopyranosyl(1-4)-beta-d-glucopyranosyl(1-2)-(beta-d-xylopyranosyl(1-3))-beta-d-glucopyranosyl(1-4)-beta-d-galactopyranoside	Sapogenin	Root	Brazil	00.00107%	H14972
Stigmasterol	Sterol	Root	Brazil	0.04%	AY1031
Succinimide, 1-methyl-	Non-alkaloid Nitrogen Heterocycle	Aerial Parts	Switzerland	00.03%	K28911
Terpineol, alpha-	Monoterpene	Aerial Parts	Switzerland	00.36%	K28911
Terpineol acetate, alpha-	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
Terpinolene	Monoterpene	Aerial Parts	Switzerland	00.03%	K28911
Thiophene-2-carbaldehyde, 3-propyl-	Sulfur Compound	Aerial Parts	Switzerland	00.04%	K28911

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Tigonin, degalacto-	Sapogenin	Root	Brazil	00.00043%	H14972
Tolualdehyde	Benzenoid	Aerial Parts	Switzerland	00.07%	K28911
Toluene	Benzenoid	Aerial Parts	Switzerland	00.03%	K28911
Tricosane, n-	Alkane C5 or More	Aerial Parts	Switzerland	Traces	K28911
Xylene	Benzenoid	Aerial Parts	Switzerland	Traces	K28911

Biological Activities for Extracts of Manacá (*Brunfelsia grandiflora*)

Plant Part – Origin	Activity Tested for	Type Extract	Test Model	Dosage	Result	Notes/Organism Tested	Ref #
Root Not stated	Toxicity(general)	Not stated	Not stated	Not stated	Active	Large doses can cause excessive salivation, vertigo, general anesthesia, partial paralysis of the face, swollen tongue and turbid vision.	ZZ1049
Twig Peru	Antimutagenic Activity	MeCl2 Ext	Agar Plate	600.0 mcg	Active	<i>Salmonella typhimurium</i> TA98 vs. 2-amino-anthracene-induced mutation. Metabolic activation was required for activity.	T15281
Root Brazil	CNS Depressant Activity	MeOH Ext CHCl3 Ext	IP Male Rat IP Rat	100.0 mg/kg 100.0 mg/kg	Active Strong Activity		L01999
Rootbark Peru	Convulsant Activity	H2O Ext	Not Stated Mouse	Not Stated	Active		H00026
Leaf Brazil	Analgesic Activity	Infusion	IG Mouse	1.0 g/kg	Active	vs. acetic acid-induced writhing.	J12450
Leaf Brazil	Anti-inflammatory Activity	Infusion	IG Mouse	1.0 g/kg	Active	Dye diffusion assay.	J12450
Root Brazil	Anti-inflammatory Activity	CHCl3 Ext	Oral Rat	100.0 mg/kg	Active		T01415
Root Brazil	Anti-inflammatory Activity	CHCl3 Ext	Oral Male Rat	100.0 mg/kg	Active	vs.carrageenin-induced pedal edema.	L01999
Not Stated	Anti-inflammatory Activity	Not stated	Not stated	Not stated	Active		AY1001
Root Brazil	Antipyretic Activity	MeOH Ext	IP Rat	100.0 mg/kg	Active		L01999
Rootbark Peru	Antipyretic Activity	CHCl3 Ext	Not Stated Mouse	Not Stated	Active		H00026
Root Brazil	Cytotoxic Activity	CHCl3 Ext	Cell Culture	2.0 mg/ml	Active	SV-3-T-S cells.	T01415
Leaf + Root Not Stated	Insecticide Activity	H2O Ext	Not Stated	Variable	Inactive	<i>Blattella germanica</i> .	W03405
Leaf + Root Not Stated	Insecticide Activity	H2O Ext	IV Not Stated	40.0 ml/kg	Weak Activity	<i>Periplaneta americana</i> .	W03405

Biological Activities for Compounds of Manacá (*Brunfelsia grandiflora*)

Compound	Activity Tested for	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Manacine	Toxicity(general)	Animals	Not stated	Active	Induces strong muscular tremors, cramps, lowered temperature and death due to respiratory paralysis.	ZZ1049
Scopoletin	Monoamine oxidase Inhibitor	in vitro	Not stated	Active		AY1023
Scopoletin	Blood Thinning Effect	Oral Chick	60 mcg/kg	Active	Increased bleeding time.	AY1028
Beta-eudesmol	Antiepileptic Activity	Cell Culture	Not stated	Active	Antagonized organophosphate-induced lethal toxicity by reversing neuromuscular failure and reducing the occurrence of convulsion.	AY1007
Beta-eudesmol	Antiepileptic Activity	Mice	Not stated	Active Inactive Active	Prevented convulsions and lethality induced by maximal electroshock. Did not prevent convulsions induced by pentylenetetrazol or picrotoxin. In combination with phenytoin it showed an additive effect in preventing electroshock seizures.	AY1007
Beta-eudesmol	Anticonvulsant Activity	IP Mice	300 mg/kg	Active	Alleviated diisopropylfluorophosphate-induced muscle fasciculation, tremor and convulsion and prolonged the time to death.	AY1008
Total Alkaloids	CNS Depressant Activity	IP Rat	Not stated	Active		T01415
Beta-eudesmol	Nerve growth Factor Activity	Cell Culture	100 microM 150 microM	Active Active	Induced neurite extension in rat pheochromocytoma cells,	AY1005
Beta-eudesmol	Muscle Contraction Inhibition	Mouse	100-200 microM	Active	Blockage of nerve-evoked contraction due to blockade of nicotinic Ach receptor channels at the neuromuscular junction.	AY1010
Linalool	Antispasmodic Activity	Mice	100 mg/kg	Active	Inhibited spontaneous locomotor activity.	AY1018
Scopoletin	Antispasmodic Activity	Cell Culture (rat aortic rings)	26-250 microM	Active	Inhibited contractions induced by phenylephrine, potassium chloride, serotonin and PGF2a. Spasmolytic ability in part due to its ability to inhibit intracellular calcium mobilization from the noradrenalin-sensitive stores.	AY1031
Scopoletin	Antispasmodic Activity	Cell Culture (guinea-pig ileum)	Not stated	Active	Inhibited several agonists.	AY1031
Beta-eudesmol	Intracellular calcium Production	Cell Culture	100 microM 150 microM	Active Active	Increased intracellular calcium in rat pheochromocytoma cells.	AY1005

Compound	Activity Tested for	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Beta-eudesmol	Nicotinic Acetylcholine Receptor Inhibition	Cell Culture	20 microM	Active	Effective in both open and closed conformations.	AY1009
Linalool	Analgesic Activity	Mice	Not stated	Active	Hot plate method.	AY1018
Linalool	Antinociceptive Activity	Mice	Not stated	Active	Effect through activation of opioidergic and cholinergic systems.	AY1018
Linalool	Anti-inflammatory Activity	Mice	25 mg/kg 75 mg/kg	Active Active	Vs. acid-induced writhing.	AY1018
Scopoletin	Anti-inflammatory Activity	Mice	1 mg	Active	TPA-mouse ear model. 59.8% inhibition.	AY1022
Scopolin	Anti-inflammatory Activity	Cell Culture	Not stated	Active	Inhibited eicosanoid-release from ionophore-stimulated mouse peritoneal macrophages.	AY1027
Beta-eudesmol	Nitric oxide Inhibition	Cell Culture	Not stated	Active	Inhibited nitric oxide production in LPS-activated macrophages.	AY1006
Scopoletin	Nitric oxide Inhibition	Cell Culture	Not stated	Active	Inhibited nitric oxide synthase induced by interferon-gamma and LPS.	AY1024
Scopoletin	Nitric oxide Inhibition	Cell Culture	Not stated	Active	Inhibited nitric oxide synthesis.	AY1032
Elemol	Anti-ulcer Activity	Not stated	Not stated	Active	Vs. Ulcer-induced by HCl/ethanol, HCl/aspirin, water-immersion stress and pylorus-ligation.	AY1004
Beta-eudesmol	Antihepatotoxic Activity	Cell Culture	Not stated	Active	Demonstrated liver-protective effects against carbon tetrachloride- and galactosamine-induced cytotoxicity.	AY1011
Scopoletin	Hepatoprotective Activity	Cell Culture	1-50 microM	Active	Reduced carbon tetrachloride-induced release of glutamic pyruvic transaminase and sorbitol dehydrogenase and preserved glutathione content by 50%; increased activity of superoxide dismutase by 36%.	AY1025
Farnesol	Cytochrome P450 Enzyme Inhibition	Cell Culture	Not stated	Active	Reversible inhibition.	AY1016
Farnesol	Chemopreventative Activity	Oral Rat	1.5%	Active	Inhibited colonic aberrant crypt foci by 34% and reduced crypt multiplicity by about 44%.	AY1013
Geraniol	Antiproliferative Activity	Cell Culture	400 microM	Active	Sensitizes colonic cancer cells to 5-FU treatment by increasing the cytotoxicity of the drug.	AY1017
Scopoletin	Antiproliferative Activity	Cell Culture	IC50=157 mg/L IC50=154 mg/L IC50=294 mg/L	Active Active Active	PC3 cells. PAA cells Hela Cells.	AY1021

Compound	Activity Tested for	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Farnesol	Cytotoxic Activity	Cell Culture	Not stated	Active	Human BxPC3 Pancreatic Cancer Cells. Apoptosis increased and greater Bak expression.	AY1012
Geraniol	Cytotoxic Activity	Cell Culture	Not stated	Active	Human BxPC3 Pancreatic Cancer Cells. Apoptosis increased and greater Bak expression.	AY1012
Farnesol	Cytotoxic Activity	Oral Hamster	1 %(w/w)	Active	Pancreatic carcinoma incidence was reduced.	AY1012
Scopoletin	Cytotoxic Activity	Cell Culture	Not stated	Active	PC3 cell proliferation.	AY1019
Scopoletin	Cytotoxic Activity	Cell Culture	100 mg/L 200 mg/L 400 mg/L	Weak Activity Active Active	Apoptosis rate at 0.3%. Apoptosis rate at 2.1%. Apoptosis rate at 35%.	AY1021
Esculetin	Cytotoxic Activity	Cell Culture	100 microM	Active	Leukemia HL-60 cells; cell growth and cell cycle inhibited.	AY1030
Farnesol	HMG-CoA Reductase Inhibitor	Cell Culture	Not stated	Active		AY1013
Farnesol	Hypocholesterolemic Activity	Oral Rat	1.5%	Inactive	No significant effect on serum HDL or total cholesterol levels.	AY1013
Scopoletin	Hypocholesterolemic Activity	Oral Chick	0.5-38.2%	Inactive Active	Increased serum total and free cholesterol and serum phospholipid levels. Decreased serum esterified cholesterol fraction.	AY1028
Farnesol	Antifungal Activity	Cell Culture	3 microM 30 microM 300 microM	Active Active Active	Inhibited filamentation of <i>Candida albicans</i> . Inhibited filamentation of <i>Candida albicans</i> . Completely inhibited biofilm formation of <i>Candida albicans</i> .	AY1014
Farnesol	Antibacterial Activity	Cell Culture	MIC=100 mcg/ml	Active	Production of superantigenic exotoxins by <i>S. aureus</i> was about 10 times lower than control.	AY1015
Scopoletin	Antibacterial Activity	Agar Plate	Not stated	Active Active Active Inactive	<i>Bacillus subtilis</i> <i>Aspergillus niger</i> <i>Cladosporium cladosporioides</i> <i>Escherichia coli</i>	AY1020
Scopoletin	Antibacterial Activity	Agar Plate	MIC=200-1000 mcg/ml	Active	<i>Staphylococcus aureus</i> <i>Streptococcus pneumoniae</i> <i>beta-hemolytic Streptococcus 1451</i> <i>Escherichia coli</i> <i>Klebsiella pneumoniae</i> <i>Proteus mirabilis</i> <i>Pseudomonas aeruginosa</i> <i>Haemophilus influenzae</i>	AY1026

Literature Cited for Manacá (*Brunfelsia grandiflora*)

A00709	FLORA MEDICINAL DE COLOMBIA. VOL.2/3 UNIVERSIDAD NACIONAL, BOGOTA. GARCIA-BARRIGA, H. BOOK. - (1975) (SEC BOTANICA INST DE CIENC NAT UNIV NA CL COLOMBIA BOGOTA COLOMBIA)
A05638	LILLY'S HAND BOOK OF PHARMACY AND THERAPEUTICS.5TH REV, ELI LILLY AND CO, INDIANAPOLIS. ANON. BOOK. - (1898) (ELI LILLY CO INDIANAPOLIS IN 46206 USA)
A07286	OCCURRENCE OF SCOPOLETIN IN THE GENUS BRUNFELSIA. MORS, WB; RIBEIRO, O. J ORG CHEM 22: 978-979 (1957) (INST QUIM AGR MINIST AGR RIO DE JANEIRO BRAZIL)
A07306	SCOPOLETIN IN BRUNFELSIA SEEDS. MACHADO DE CAMPOS, S. AN ACAD BRASIL CIENC 36: 511-513 (1964) (INST BOTANY SAO PAULO BRAZIL)
H00026	BRUNFELSAMIDINE: A NOVEL CONVULSANT FROM THE MEDICINAL PLANT BRUNFELSIA GRANDIFLORA. LLOYD, HA; FALES, HM; GOLDMAN, ME; JERINA, DM; PLOWMAN, T; SCHULTES, RE. TETRAHEDRON LETT 26 22: 2623-2624 (1985) (LAB CHEM NATL HEART LUNG BLOOD INST NIH BETHESDA MD 20205 USA)
H14972	STUDIES ON THE CONSTITUENTS OF BRUNFELSIA HOPEANA BENTH. ICHIKI, H; YAHARA, S; NOHARA, T; NAKASUMI, T; IRINO, N; TAKAOKA, T. NATURAL MED 48 4: 314-316 (1994) (FAC PHARM SCI KUMAMOTO UNIV KUMAMOTO 862 JAPAN)
H25351	A NOVEL ACYLATED FLAVONOL GLYCOSIDE ISOLATED FROM BRUNFELSIA GRANDIFLORA SSP. GRANDIFLORA. STRUCTURE ELUCIDATION BY GRADIENT ACCELERATED NMR SPECTROSCOPY AT 14T. BRUNNER, G; BURGER, U; CASTIONI, P; KAPETANIDIS, I; CHRISTEN, P. PHYTOCHEM ANAL 11 1: 29-33 (2000) (DEPT CHIM ORG UNIV GENEVA GENEVA CH-1211 SWITZERLAND)
J01423	TWO HUNDRED SIXTY-EIGHT MEDICINAL PLANTS USED TO REGULATE FERTILITY IN SOME COUNTRIES OF SOUTH AMERICA. UNPUBLISHED (STENCILED) REVIEW IN SPANISH. MORENO AR. BOOK. - (1975) (PARAGUAY)
J12450	PHARMACOLOGICAL SCREENING OF PLANTS RECOMMENDED BY FOLK MEDICINE AS ANTI-SNAKE VENOM-1. ANALGESIC AND ANTI-INFLAMMATORY ACTIVITIES. RUPPELT, BM; PEREIRA, EFR; GONCALVES, LC; PEREIRA, NA. MEM INST OSWALDO CRUZ RIO DE JANEIRO 86: 203-205 (1991) (DEPT FARMACOL CCS-ICB RIO DE JANEIRO BRAZIL)
K10192	EXTRACTION OF HOPAMIDINE. BIRKNER, C; STAPEL, G; LEYCK, S; FISCHER, H; CHRIST, B; KESSELRING, K. PATENT-GER OFFEN-3,506,643; 12PP-. (1986) (NATTERMAN A CIE GMBH GERMANY)
K16262	DE PLANTIS TOXICARIIS E MUNDO NOVO TROPICALE COMMENTATIONES XXXIX. FEBRIFUGES OF NORTHWEST AMAZONIA. SCHULTES, RE; RAFFAUF, RF. HARVARD PAP IN BOT 1994 5: 50-68 (1994) (BOTANICAL MUSEUM HARVARD UNIV CAMBRIDGE MA 02138 USA)
K28911	VOLATILE CONSTITUENTS FROM BRUNFELSIA GRANDIFLOR SSP. GRANDIFLORA: QUALITATIVE ANALYSIS BY GM-MS. CASTIONI, P; KAPETANIDIS, I. SCI PHARM 64 1: 83-91 (1996) (LAB PHARMACOG UNIV GENEVA GENEVA CH-1211 SWITZERLAND)
L00137	BRUNFELSIA IN ETHNOMEDICINE. PLOWMAN, T. BOT MUS LEAFL HARV UNIV 25 10: 289-320 (1977) (BOTANICAL MUSEUM HARVARD UNIV CAMBRIDGE MA 02138 USA)

L01999	BRUNFELSIA HOPEANA I. HIPPOCRATIC SCREENING AND ANTIINFLAMMATORY EVALUATION. IYER, RP; BROWN, JK; CHAUBAL, MG; MALONE, MH. LLOYDIA 40 4: 356-360 (1977) (SCH PHARM UNIV PACIFIC STOCKTON CA 95211 USA)
L02535	MEDICAL BOTANY.WILEY-INTERSCIENCE, NEW YORK(1977). LEWIS, WH; ELVIN-LEWIS, MPF. BOOK. - (1977) (BOTANY DEPT WASHINGTON UNIV ST LOUIS MO USA)
L04137	AMAZONIAN ETHNOBOTANICAL DICTIONARY. DUKE, JA. BOOK. 181- (1994) (USA) L04223 RITUAL AND MEDICINAL PLANTS OF THE ESE'EJAS OF THE AMAZONIAN RAINFOREST (MADRE DE DIOS, PERU). DESMARCHELIER, C; GURNI, A; CICCIA, G; GIULIETTI, AM. J ETHNOPHARMACOL 52 1: 45-51 (1996) (CATEDRA BIOTECNOL MICROBIOL IN UNIV BUENOS AIRES BUENOS AIRES ARGENTINA)
M17895	OCCURRENCE AND DISTRIBUTION OF SYRINGOSIDE, SKIMMIN AND SIMILAR COUMARIN GLYCOSIDES AND LOGANIN IN SEVERAL BOTANICAL GROUPS. PLOUVIER, V. C R ACAD SCI SER III 305 6: 183-186 (1987) (LAB CHIM APPL MUSEUM HISTOIRE NATURELLE PARIS 75005 FRANCE)
T01415	BRUNFELSIA HOPEANA-PHARMACOLOGIC SCREENING: ISOLATION AND CHARACTERIZATION OF HOPPEANINE. IYER, RP; CHAUBAL, MG. DISS ABSTR INT B 39: 761- (1978) (SCH PHARM UNIV PACIFIC STOCKTON CA USA)
T01443	THE ALKALOIDS OF BRUNFELSIA HOPEANA (HOCK)BENTH. GELLERT, E; CHAUBAL, MG; IYER, RP. PROC IUPAC 11TH INTERNATIONAL SYMP CHEM NAT PROD 1978 2: 5-8 (1978) (DEPT CHEM UNIV WOLLONGONG WOLLONGONG NEW SOTHUTH 2500 AUSTRALIA)
T08133	THE CONCEPT OF PLANTS AS TEACHERS AMONG FOUR MESTIZO SHAMANS OF IQUITOS, NORTHEASTERN PERU. LUNA, LE. J ETHNOPHARMACOL 11 2: 135-156 (1984) (PERHONKATU HELSINKI 00100 FINLAND)
T15281	PLANT ANTIMUTAGENIC AGENTS, 1. GENERAL BIOASSAY AND ISOLATION PROCEDURES. WALL, ME; WANI, MC; HUGHES, TJ; TAYLOR, H. J NAT PROD 51 5: 866-873 (1988) (RES TRI INST RES TRI PARK NC 27709 USA)
T15375	A SURVEY OF PLANTS WITH ANTIFERTILITY PROPERTIES DESCRIBED IN THE SOUTH AMERICAN FOLK MEDICINE. GONZALEZ, F; SILVA, M. ABSTR PRINCESS CONGRESS I BANGKOK THAILAND 10-13 DECEMBER 1987. 20PP-. (1987) (LAB QUIM PROD NAT UNIV CONCEPCION CONCEPCION CHILE)
W02290	DIE HEILPFLANZEN DER VERSCHIEDENEN VOLKER UND ZEITEN, F.ENKE, STUTTGART. DRAGENDORFF, G. BOOK 1898: 885PP- (1898) (NO ADDRESS GIVEN)
W02597	A PHARMACOLOGIC STUDY OF MANACA (BRUNFELSIA HOPEANA). DE A COSTA, O. BOL ASSOC BRAS PHARM 14: 295-299 (1933) (BRAZIL)
W03405	A SURVEY OF PLANTS FOR INSECTICIDAL ACTIVITY. HEAL, RE; ROGERS, EF; WALLACE, RT; STARNES, O. LLOYDIA 13 1: 89-162 (1950) (RE1014S LABS MERCK & CO. RAHWAY NJ USA)
ZZ1001	AMAZON HEALER: THE LIFE AND TIMES OF AN URBAN SHAMAN. RIOS, DE, MARLENE DUBKIN: GARDEN CITY PARK, NY: AVERY PUBLISHING GROUP. 1992.
ZZ1005	THE HEALING FOREST: MEDICINAL AND TOXIC PLANTS OF THE NORTHWEST AMAZONIA. SCHULTES, R.E: RAFFAUF. PORTLAND: R. F. DIOSCORIDES PRESS. 1990.
ZZ1007	MANUAL DE FITOTERAPIA, 2 ND ED. COIMBRA, RAUL. SAO PAULO, BRAZIL: DADOS INTERNACIONAIS DE CATALOGACAO NA PULICACAO 1994.

ZZ1013	DICIONARIO DAS PLANTAS UTEIS DO BRAZIL, 5 TH ED. CRUZ, GL: RIO DE JANEIRO: BERTRAND. 1995.
ZZ1014	HERBS OF THE AMAZON: TRADITIONAL AND COMMON USES. SCHWONTKOWSKI, DONNA. UTAH: SCIENCE STUDENT BRAINTRUST PUBLISHING. 1993.
ZZ1015	WORLD PRESERVATION SOCIETY. POWERFUL AND UNUSUAL HERBS FROM THE AMAZON AND CHINA. GAINESVILLE, FL: THE WORLD PRESERVATION SOCIETY, INC. 1993.
ZZ1045	USEFUL PLANTS OF AMAZONIAN PERU. VASQUEZ, MR: SECOND DRAFT. FILED WITH USDA'S NATIONAL AGRICULTURAL LIBRARY. 1990.
ZZ1049	CRC HANDBOOK OF MEDICINAL HERBS. DUKE, JA: BOCA RATON, FL: CRC PRESS. 1985.
ZZ1052	A MODERN HERBAL. GRIEVE, MM: NEW YORK: DOVER PUBLICATIONS. 1971.
ZZ1079	PLANTAS DE CURAM: CUDIE DA SUA SAUDE ATRAVES DE NATUREZA, 5 TH ED. MOREIRA, FREDERICO. SAO PAULO, BRAZIL: HEMUS EDITORA LTDA. 1996.
ZZ1095	HANDBOOK OF PHYTOCHEMICAL CONSTITUENTS OF GRAS HERBS AND OTHER ECONOMIC PLANTS. DUKE, JAMES A. BOCA RATON, FL: CRC PRESS. 1992.
ZZ1099	MEDICINAL PLANTS OF BRAZIL. MORS, WB: RIZZINI, CT: PEREIRA, NA: ALGONAC, MICHIGAN, REFERENCE PUBLICATIONS, INC 2000.
L00137	BRUNFELSIA IN ETHNOMEDICINE. PLOWMAN, T: BOT. MUS. LEAFL. HARVARD. U. 25 10: 289 (1977).
AY1001	ANON. CHEM. MARK. REP. DEC 12, 1977.
AY1002	HERBAL REMEDIES. BRUNFELSIA HOPEANA. CD-ROM. HEILPFLANZEN. 1996.
AY1003	VINE OF THE SOUL. SCHULTEES, RE: RAFFAUF, RF: SYNERGISTIC PRESS. 1992.
AY1004	ISOLATION OF THE ANTIULCER COMPOUND IN ESSENTIAL OIL FROM THE LEAVES OF CRYPTOMERIA JAPONICA. MATSUNAGA, T: HASEGAWA, C: KAWASUJI, T: SUZUKI, H: SAITO, H: SAGIOKA, T: TAKAHASHI, R: TSUKAMOTO, H: MORIKAWA, T: AKIYAMA, T: BIOL PHARM BULL 23 5: 595-8 (2000) (TOYAMA PREFECTURAL INSTITUTE FOR PHARMACEUTICAL RESEARCH, IMIZU, JAPAN)
AY1005	BETA-EUDESOL INDUCES NEURITE OUTGROWTH IN RAT PHEOCHROMOCYTOMA CELLS ACCOMPANIED BY AN ACTIVATION OF MITOGEN-ACTIVATED PROTEIN KINASE. OBARA, Y: AOKI, T: KUSANO, M: OHIZUMI, Y: J PHARMACOL EXP THER 301 3: 803-11 (2002) DEPT OF PHARMACEUTICAL MOLECULAR BIOLOGY, GRADUATE SCHOOL OF PHARMACEUTICAL SCIENCES, TOHOKU UNIVERSITY, Aoba, Aramaki, Sendai, Japan)
AY1006	EFFECTS OF CONSTITUENTS FROM THE BARK OF MAGNOLIA OBOVATA ON NITRIC OXIDE PRODUCTION IN LIPOPOLYSACCHARIDE-ACTIVATED MACROPHAGES. MATSUDA, H: KAGEURA, T: ODA, M: MORIKAWA, T: SAKAMOTO, Y: YOSHIKAWA, M: CHEM PHARM BULL (TOKYO) 49 6: 716-20 (2001) (KYOTO PHARMACEUTICAL UNIVERSITY, MISASAGI, JAPAN)
AY1007	CHINESE HERB CONSTITUENT BETA-EUDESOL ALLEVIATED THE ELECTROSHOCK SEIZURES IN MICE AND ELECTROGRAPHIC SEIZURES IN RAT HIPPOCAMPAL SLICES. CHIOU, LC: LING, JY: CHANG, CC: NEUROSCI LETT 1997: 231 3: 171-4 (1997) (DEPT OF PHARMACOLOGY, COLLEGE OF MEDICINE, NATIONAL TAIWAN UNIVERSITY, TAIPEI)

AY1008	BETA-EUDESOL AS AN ANTIDOTE FOR INTOXICATION FROM ORGANOPHOSPHORUS ANTICHOLINESTERASE AGENTS. CHIOU, LC: LING, JY: CHANG, CC: EUR J PHARMACOL 292 2: 151-6 (1995) (DEPT OF PHARMACOLOGY, COLLEGE OF MEDICINE, NATIONAL TAIWAN UNIVERSITY, TAIPEI)
AY1009	BLOCKING ACTION OF SUCCINYLCHOLINE WITH BETA-EUDESOL ON ACETYLCHOLINE-ACTIVATED CHANNEL ACTIVITY AT ENPLATES OF SINGLE MUSCLE CELLS OF ADULT MICE. NOJIMA, H: KIMURA, I: KIMURA, M: BRAIN RES 575 2: 337-40 (1992) (DEPT OF CHEMICAL PHARMACOLOGY, FACULTY OF PHARMACEUTICAL SCIENCES, TOYAMA MEDICAL AND PHARMACEUTICAL UNIVERSITY, JAPAN)
AY1010	MECHANISM OF THE BLOCKING ACTION OF BETA-EUDESOL ON THE NICOTINIC ACETYLCHOLINE RECEPTOR CHANNEL IN MOUSE SKELETAL MUSCLES. KIMURA, M: NOJIMA, H: MUROI, M: KIMURA I: NEUROPHARMACOLOGY 30 8: 835-41 (1991) (DEPT OF CHEMICAL PHARMACOLOGY, FACULTY OF PHARMACEUTICAL SCIENCES, TOYAMA MEDICAL AND PHARMACEUTICAL UNIVERSITY, JAPAN)
AY1011	ANTIHEPATOTOXIC PRINCIPLES OF ATRACTYLODES RHIZOMES. KISO, Y: TOHKIN, M: HIKINO, H: J NAT PROD 46 5: 651-4 (1983)
AY1012	EFFECTS OF THE ISOPRENOIDS PERILLYL ALCOHOL AND FARNESOL ON APOPTOSIS BIOMARKERS IN PANCREATIC CANCER CHEMOPREVENTION. BURKE, YD: AYOUBI, AS: WERNER, SR: MCFARLAND, BC: HEILMAN, DK: RUGGERI, BA: CROWELL, PL: ANTICANCER RES 22 6A: 3127-34 (2002) (DEPT OF BIOLOGY, INDIANA UNIVERSITY-PURDUE UNIVERSITY INDIANAPOLIS, IN, USA)
AY1013	CHEMOPREVENTATIVE EFFECT OF FARNESOL AND LANOSTEROL ON COLON CARCINOGENESIS. RAO, CV: NEWMARK, HL: REDDY, BS: CANCER DETECT PREV 26 6: 419-25 (2002) (DIVISION OF NUTRITIONAL CARCINOGENESIS, AMERICAN HEALTH FOUNDATION, ONE DANA ROAD, VALHALLA, NY, USA)
AY1014	INHIBITION OF CANDIDA ALBICANS BIOFILM FORMATION BY FARNESOL, A QUORUM-SENSING MOLECULE. RAMAGE, G: SAVILLE, SP: WICKES, BL: LOPEZ-RIBOT, JL: APPL ENVIRON MICROBIOL 68 11: 5459-63 (2002) (DEPT OF MICROBIOLOGY, DEPT OF MEDICINE, DIVISION OF INFECTIOUS DISEASES, THE UNIVERSITY OF TEXAS HEALTH SCIENCE CENTER AT SAN ANTONIO, SAN ANTONIO, TEXAS, USA)
AY1015	ACTIONS OF FARNESOL AND XYLITOL AGAINST STAPHYLOCOCCUS AUREUS. AKIYAMA, H: OONO, T: HUH, WK: YAMASAKI, O: OGAWA, S: KATSUYAMA, M: ICHIKAWA, H: IWATSUKI, K: CHEMOTHERAPY 48 3: 122-8 (2002) (DEPT OF DERMATOLOGY, OKAYAMA UNIVERSITY GRADUATE SCHOOL OF MEDICINE AND DENTISTRY, OKAYAMA, JAPAN)
AY1016	FARNESOL AS AN INHIBITOR AND SUBSTRATE FOR RABBIT LIVER MICROSOMAL P450 ENZYMES. RANER, GM: MUIR, AQ: LOWRY, CW: DAVIS, BA: BIOCHEM BIOPHYS RES COMMUN 293 1: 1-6 (2002) (DEPT OF CHEMISTRY AND BIOCHEMISTRY. THE UNIVERSITY OF NORTH CAROLINA, GREENSBORO, USA)
AY1017	GERANIOL, A COMPONENT OF PLANT ESSENTIAL OILS, SENSITIZES HUMAN COLONIC CANCER CELLS TO 5-FLUOROURACIL TREATMENT. CARNESECCHI, S: LANGLEY, K: EXINGER, F: GOSSE, F: RAUL, F: J PHARMACOL EXP THER 301 2: 625-30 (2002) (LABORATORY OF CANCER NUTRITIONAL PREVENTION, INSTITUT DE RECHERCHE CONTRE LES CANCERS DE L'APPAREIL DIGESTIF, STRASBOURG, FRANCE)
AY1018	(-)-LINALOOL PRODUCES ANTINOCICEPTION IN TWO EXPERIEMENTAL MODELS OF PAIN. PEANA, AT: D'AQUILA, PS: CHESSA, ML: MORETTI, MD: SERRA, G: PIPPIA, P: EUR J PHARMACOL 460 1: 37-41 (2003) (DIPARTIMENTO DI SCIENZE DEL FARMACO, UNIVERSITA DEGLI STUDI DI SASSARI, VIA VURONI, SASSARI, ITALY)

AY1019	EXTRACTION AND ISOLATION OF ACTIVE COMPONENT FOR INHIBITING PC3 CELL PROLIFERATION IN VITRO FROM THE FRUIT OF LYCIUM BARBARUM L. LIU, XL: SUN, JY: LI, HY: ZHANG, L: QIAN, BC: ZHONGGUO ZHONG YAO ZA ZHI 25 8: 481-3 (2000) (INSTITUTE OF MATERIA MEDICA, ZHEJIANG ACADEMY OF MEDICAL SCIENCES, HANGZHOU, ZHEJIANG, CHINA)
AY1020	ANTIMICROBIAL CONSTITUENTS OF FOENICULUM VULGARE. KWON, YS: CHOI, WG: KIM, WJ: KIM, WK: KIM, MJ: KANG, WH: KIM, CM: ARCH PHARM RES 25 2: 154-7 (2002) (COLLEGE OF PHARMACY, KANGWON NATIONAL UNIVERSITY, CHUNCHEON, KOREA)
AY1021	EFFECT OF SCOPOLETIN ON PC(3) CELL PROLIFERATION AND APOPTOSIS. LIU, XL: ZHANG, L: FU, XL: CHEN, K: QIAN, BC: ACTA PHARMACOL SIN 22 10: 929-33 (2001) (INSTITUTE OF MATERIA MEDICA, ZHEJIANG ACADEMY OF MEDICAL SCIENCES, HANGZHOU, CHINA)
AY1022	PHENOLIC COMPOUNDS WITH ANTI-INFLAMMATORY ACTIVITY FROM EUPATORIUM BUNIFOLIUM. MUSCHIETTI, L: GORZALCZANY, S: FERRARO, G: ACEVEDO, C: MARTINO, V: PLANTA MED 67 8: 743-4 (2001) (CATEDRA DE FARMACOGNOSIA, IQUIMEFA, FACULTAD DE FARMACIA Y BIOQUIMICA, UNIVERSIDAD DE BUENOS AIRES, ARGENTINA)
AY1023	COUMARINS WITH MONOAMINE OXIDASE INHIBITORY ACTIVITY AND ANTIOXIDATIVE COUMARINO-LIGNANS FROM HIBISCUS SYRIACUS. YUN, BS: LEE, IK: RYOO, IJ: YOO, ID: J NAT PROD 64 9: 1238-40 (2001) (KOREA RESEARCH INSTITUTE OF BIOSCIENCE AND BIOTECHNOLOGY, YUSONG, TAEJON, KOREA)
AY1024	SCOPOLETIN: AN INDUCIBLE NITRIC OXIDE SYNTHESIS INHIBITORY ACTIVE CONSTITUENT FROM ARTEMISIA FEDDEI. KANG, TH: PAE, HO: JEONG, SJ: YOO, JC: CHOI, BM: JUN, CD: CHUNG, HT: MIYAMOTO, T: HIGUCHI, R: KIM, YC: PLANTA MED 65 5: 400-3 (1999) (COLLEGE OF PHARMACY, WONKWANG UNIVERSITY, IKSAN, KOREA)
AY1025	HEPATOPROTECTIVE ACTIVITY OF SCOPOLETIN, A CONSTITUENT OF SOLANUM LYRATUM. KANG, SY: SUNG, SH: PARK, JH: KIM, YC: ARCH PHARM RES 21 6: 718-22 (1998) (COLLEGE OF PHARMACY, SEOUL NATIONAL UNIVERSITY, SEOUL, KOREA)
AY1026	ANTIBACTERIAL ACTIVITY OF EXTRACTS AND CONSTITUENTS OF PELARGONIUM SIDOIDES AND PELARGONIUM RENIFORME. KAYSER, O: KOLODZIEJ, H: PLANTA MED 63 6: 508-10 (1997) (INSTITUT FUR PHARMAZIE II, PHARMAZEUTISCHE BIOLOGIE, FREIE UNIVERSITAT BERLIN, GERMANY)
AY1027	ANTIINFLAMMATORY ACTIVITY OF COUMARINS FORM SANTOLINA OBLONGIFOLIA. SILVAN, AM: ABAD, MJ: BERMEJO, P: SOLLHUBER, M: VILLAR, A: J NAT PRODU 59 12: 1183-5 (1996) (DEPT OF PHARMACOLOGY, FACULTY OF PHARMACY, UNIVERSITY COMPLUTENSE, MADRID, SPAIN)
AY1028	EFFECTS OF SINGLE ORAL DOSES OF SCOPOLETIN AND AFLATOXIN B1 ON THE CLOTTING TIME, SERUM CHOLESTEROL AND PHOSPHOLIPID LEVELS OF CHICKS. OBASI, SC: NJOKU, OU: OBIDAO, O: INDIAN J PHYSIOL PHARMACOL 38 2: 89-94 (1994) (SCHOOL OF BIOLOGICAL SCIENCES, ABIA STATE UNIVERSITY, UTURA, NIGERIA)
AY1029	PROTECTION OF COUMARINS AGAINST LINOLEIC ACID HYDROPEROXIDE-INDUCED CYTOTOXICITY. KANEKO, T: BABA, N: MATSUI, M: CHEM BIOL INTERACT 142 3: 239-54 (2003) (REDOX REGULATION RESEARCH GROUP, TOKYO METROPOLITAN INSTITUTE OF GERONTOLOGY, ITABASHI-KU, TOKYO, JAPAN)
AY1030	INHIBITION OF CELL CYCLE PROGRESSION IN HUMAN LEUKEMIA HL-60 CELLS BY ESCULETIN. WANG, CJ: HSIEH, YJ: CHU, CY: LIN, YL: TSENG, TH: CANCER LETT 183 2: 163-8 (2002) (INSTITUTE OF BIOCHEMISTRY, CHUNG SHAN MEDICAL UNIVERSITY, TAICHUNG, TAIWAN)

AY1031	INTRACELLULAR CALCIUM MOBILIZATION AS A TARGET FOR THE SPASMOLYTIC ACTION OF SCOPOLETIN. OLIVEIRA, EJ: ROMERO, MA: SILVA, MS: SILVA, BA: MEDEIROS, IA: PLANTA MED 67: 605-608 (2001)
AY1032	PROCESS FOR THE ISOLATION OF COMPOUND SCOPOLETIN USEFUL AS NITRIC OXIDE SYNTHESIS INHIBITOR. JAIN, DC: ET AL. COUNCIL OF SCIENTIFIC AND INDUSTRIAL RESEARCH. US PATENT #6,337,095 (2002)