Technical Data Report

for

GERVÂO

Stachytarpheta jamaicensis
Stachytarpheta cayennensis

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Gervâo

Preprinted from *Herbal Secrets of the Rainforest,* 2nd edition, by Leslie Taylor
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Family: Verbenaceae

Genus: *Stachytarpheta*

Species: *jamaicensis, cayennensis*

Synonyms: *Stachytarpheta urticifolia* Sims, *Verbena cayennensis*, *Verbena jamaicensis*

Common Names: Gervâo, Brazilian tea, verbena cimarrona, bastard vervain, verbena azul, verbena, wild verbena, blue flower, rooster comb, jarbao, rat tail, vervain, verveine, verveine a queue de rat, verveine bleue, verveine violette, porterweed, gewongan, rumput tahi babi, selaseh dandi (spotted basil).

Parts Used: Plant, leaves

Gervâo is a weedy annual (and sometimes perennial) herbaceous plant that grows 60–120 cm tall. It bears small reddish-purple to deep blue flowers that grow along tall bracts that are favored by butterflies. It is indigenous to most parts of tropical America and, although some consider it a semi-invasive weed, it is sometimes cultivated as an ornamental plant for its blue flowers and deeply-serrated, dark green leaves. Gervâo belongs to the large Verbenaceae family, which comprises about 100 genera and 2,600 species (including the common vervain and verbena plants). It is often referred to as "bastard vervain" or "wild verbena." While very similar to verbena and vervain in appearance and growth habits, gervâo is a different species of plant. Two very similar species of *Stachytarpheta* grow in the tropics and are used interchangeably (and share the same common names) in many countries' herbal medicine systems—*S. cayennensis* and *S. jamaicensis*.

Gervâo is widely used by indigenous peoples throughout the Amazon. The Créoles use the leaf tea as a purgative for dysentery, while the Kofans in northwest Amazonia drink a decoction of the plant to relieve stomach pains. Indigenous peoples of Peru use the plant for diabetes and the Wayãpi and Palikur Indians in Guyana use the plant in baths to relieve colds and headaches. Other tribes in the Amazon prepare an infusion or decoction of the plant to take internally for fevers (including yellow fever), allergies, stomach problems, and intestinal parasites.

In Brazilian herbal medicine systems the plant is considered to be stimulant, digestive, tonic, febrifuge, antitussive, diaphoretic, anthelmintic, emetic, cathartic, emmenagogue, antihydropic, and antisyphilitic. The natural remedy there is usually a hot tea is prepared with the leaves or entire aerial parts. It is employed mainly today by Brazilian herbalists and practitioners as a stomach tonic; to stimulate the function of the gastrointestinal tract; for dyspepsia, allergies, asthma, and fevers; and for chronic liver problems. Gervâo is also used in Brazil as a diuretic for various urinary complaints and as a mild purgative for constipation. Externally it is used to clean ulcers, cuts, and wounds. In Cuban herbal medicine (where the plant is named *verbena cimarrona*) the plant is considered abortive, anticatarrhal (reducing mucous), antidiabetic, antispasmodic, a CNS depressant, diuretic, emmenagogue, galactagogue, hypotensive, hypothermic, purgative, and sedative.

In the West Indies, gervâo commonly is employed as an anthelmintic and vermifuge to expel intestinal worms and other parasites; several commercial preparations sold in Jamaica for parasites contain gervâo. One popular preparation combines gervâo with graviola (*Annona muricata*) and epazote (*Chenopodium ambrosioides*) into a natural remedy for this purpose. Besides its long history of use as a vermifuge (which was documented as early as 1898), gervâo also has been used by women in Jamaica and the West Indies as an emmenagogue and for menstrual disorders. In many parts of the West Indies, a leaf tea is drunk after childbirth to restore health and to increase the supply of mother's milk. In Belize, a tea brewed from the aerial parts of the plant is taken for nervousness, heart conditions, stomachache, dyspepsia, neuralgia, cough, colds, fever, flu, and liver complaints. There the mashed leaves are also used in a poultice for boils and infected sores, and the leaf juice is used for intestinal parasites.

Phytochemical screening reveals that gervâo contains flavonoids, terpenes, phenols, and steroids. Several of these phytochemicals have been documented with biological activities that may help explain the plant's ethnobotanical uses (especially for liver ailments and respiratory problems). The first of these is an iridoid glycoside called *verbascoside* (also called *acetoside*), found in several species in the Verbenaceae genus. In clinical research, this powerful antioxidant phytochemical has been documented with neuroprotective,[1] antiviral,[2] antibacterial,[3] antihepatotoxic (liver-protecting),[4,5] cardioactive,[6] and antitumorous[7] effects. A flavonoid in gervâo called *scutellarein* has been documented with cardioprotective,[8] anti-inflammatory[9] and antiviral[10] actions. Another flavonoid found in gervâo called *hispidulin* is also found in verbena and vervain and is considered one of the main "active" chemicals in all three plants. Hispidulin has been reported to have anti-asthmatic, bronchodilator, and spasmolytic properties,[11] antihepatotoxic actions,[12] and platelet aggregation inhibition activity.[13]

The first pharmacological studies were published on gervâo in 1962 by researchers in India who reported that the plant demonstrated antispasmodic and vasodilator activities in several small animal studies.[14] In 1990, two clinical studies reported that leaf extracts evidenced larvicidal effects, which might help explain its long history of use as a vermifuge for parasites.[15,16] In 1998, the anti-inflammatory and pain-relieving properties of gervâo were demonstrated in rats.[17] In this study, researchers pre-treated rats with gervâo (at dosages of 100–200mg/kg) and showed that it inhibited significantly the ability to induce inflammation with chemical agents. At dosages of 100–300 mg/kg they also reported an analgesic effect. They isolated two chemicals in the plant (vebascoside and another iridoid chemical, ipolamiide) and tested them individually for these effects. These chemicals demonstrated a marked anti-inflammatory effect in rats (administered 4 hours after chemically inducing inflammation) of 94% and 70%, respectively. They attributed this effect, in part, to the extract (and its phytochemicals) which inhibited a histamine reaction.

Another area of research has verified gervâo's longstanding use for gastric and intestinal disorders. In a 1995 Brazilian study, a gervâo extract demonstrated anti-diarrhea effects in rats.[18] Another (1997) Brazilian study demonstrated antacid, antiulcer, and laxative effects in mice.[19] In this study, a water extract of the whole plant increased intestinal motility, protected against ulcers from various chemical agents, and inhibited gastric secretion. These researchers noted the same histaminergic (or histamine-blocking) properties in this ulcer model that was observed in the anti-inflammatory model, along with another possible pathway of action. They concluded that "whatever the mechanisms involved, the present data confirm the plant's effectiveness as antacid/antiulcer and laxative."

In the mouse and rat studies noted above, no toxicity was noted when the plant was taken orally (at up to 2 g per kg of body weight). In herbal medicine today, gervâo is regarded as a safe, natural remedy when prepared in decoctions and infusions (taken orally or applied externally). A researcher in Panama, however (who injected mice intraperitoneally with varying dosages of a leaf extract) reported toxic effects and even death at the highest dosages.[20] While gervâo is a well known and popular natural herbal remedy in South America for gastric and liver problems, colds, flu, asthma, and as a natural antihistamine and anti-inflammatory, practitioners in North America are just beginning to learn about its many uses. With its many applications, gervâo is sure to increase in popularity as more practitioners learn about it and begin incorporating it into their natural health practices.

Documented Properties and Actions: Analgesic, antacid, anthelmintic, antihistamine, anti-inflammatory, antispasmodic, antiulcerogenic, diuretic, emmenagogue, febrifuge, gastroprotective, hepatoprotective, hypotensive, lactagogue, larvicidal, laxative, purgative, sedative, spasmogenic, stomachic, sudorific, tonic, vasodilator, vermifuge, vulnerary

Phytochemicals: apigenol-7-glucuronide, alpha-spinasterol, gamma-amino butyric acid, chlorogenic acid, citral, dopamine, friedelin, geraniol, hentriacontane, hispidulin, ipolamiide, luteolol-7-glucuronide, n-dotriacontane, n-nonacosane, n-pentriacontane, n-tetratriancontane, n-triacontane, n-tritriacontane, salicylic-acid, scutellarein, stachytarphine, stigmasterol, tarphetalin, ursolic acid, verbascoside

Traditional Remedy: One-half cup whole herb infusion 1–2 times daily or 1–3 ml of a 4:1 tincture daily. One to 3 g powdered herb in tablets, capsules, or stirred into juice or water daily may be substituted if desired.

Contraindications:

- Gervâo has been used in herbal medicine as an emmenagogue and abortifacient and, therefore, should not be used during pregnancy.
- Gervâo has been documented with vasodilator properties in a animal study and, therefore, may lower blood pressure. Those with low blood pressure or those on antihypertensive medications should consult their doctor before using gervâo.
- Gervâo is a natural source of the phytochemical hispidulin, which has been documented to inhibit platelet aggregation. While gervâo itself has not been studied specifically for this effect, those on blood thinning medications should check with a health care practitioner before using this plant product.
- *Stachytarpheta cayennensis* (but not *S. jamaicensis*) has been reported to contain a small amount of naturally-occurring salicylic acid. This phytochemical is the natural precursor to aspirin. Those allergic to aspirin should probably avoid using this plant product.

Drug Interactions: None reported, however the plant:

- Might potentiate antihypertensive medications.
- Might potentiate blood-thinning medications such as Warfarin®.

WORLDWIDE ETHNOBOTANICAL USES

Region	Uses
Amazonia	Asthma, fever, stomach pain
Bahamas	Abortifacient, asthma, bronchitis, chest cold, emetic, itch, puerperium, skin, sore, vermifuge
Belize	Boils, colds, cough, fever, flu, heart, intestinal parasites, liver, nervousness, neuralgia, sores, stomachache
Brazil	Allergies, amenorrhea, amoebas, antacid, anthelmintic, antidiarrheal, antiemetic, antirheumatic, antitussive, antisyphilitic, arthritis, bronchitis, bronchial catarrh, cathartic, chest pains, cholagogue, colds, constipation, contusions, cough, cuts, debilitation, diaphoretic, digestive, diuretic, dropsy, dysentery, dyspepsia, eczema, emetic, emmenagogue, erysipelas, expectorant, febrifuge, fever, flu, gastritis, gastrointestinal disorders, hemorrhoids, hepatitis, hepatoprotective, high blood pressure, hoarseness, hydropsy, liver, lung, rheumatism, skin, sore, stimulant, stomach, stomachache, sudorific, tea, tonic, tumor, ulcer, urinary complaints, venereal disease, vermifuge, worms, wounds, yellow fever
Cuba	Abortive, anticatarrhal, antidiabetic, CNS depressant, diuretic, emmenagogue, emetic, hypothermic, hypotensive, lactation, purgative, sedative, spasmogenic
Haiti	Cathartic, dropsy, emetic, emmenagogue, erysipelas, nerve, sedative, sore, stomachic, tumor, vermifuge
India	Abortifacient, dysentery, fever, inflammation, rheumatism, ulcers (skin)

Region	Uses
Jamaica	Emmenagogue, intestinal worms
Malaya	Abortive, malaria, rhinosis, sore
Mexico	Amenorrhea, anodyne, gonorrhea, nerve, sudorific, syphilis, yellow fever
Samoa	Boil, nausea, rhinitis, sore
South America	Anthelmintic, antifertility, emmenagogue, vermifuge
Trinidad	Boil, chest colds, collyrium, cough, depurative, dysentery, eczema, fever, flu, heart attack, lactagogue, ophthalmia, purgative, rash, rectitis, stomach, vermifuge, vitiligo, worms
West Indies	Anthelmintic, childbirth, dysmenorrhea, emmenagogue, lactagogue, parasites, vermifuge, worms
Elsewhere	Abortifacient, alopecia, antifertility, boil, bruise, cardiac, cataract, cholagogue, diabetes, diarrhea, dropsy, dysentery, dysmenorrhea, emmenagogue, erysipelas, fever, headache, inflammation, intestinal parasites, liver disease, panacea, poison, purgative, rage, rheumatism, sore, sprain, stomach, tumors, venereal disease, vermifuge

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Ethnomedical Information on Gervâo (Stachytarpheta sp)

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Not Stated Africa	Used for dysmenorrhea.	Not Stated Oral	Human Female	A03324
Leaf Amazonia	Used for fever.	H2O Ext Oral	Human Adult	ZZ1005
Entire Plant Amazonia	Used for asthma, allergies, and stomach pain.	Decoction Oral	Human Adult	ZZ1005
Entire Plant Argentina	Used as an emmenagogue.	Hot H2O Ext Oral	Human Female	T05032
Leaf Bahamas	Used to induce an abortion. Leaf juice taken as a vermifuge (for 10 days)	Hot H2O Ext Oral Juice Oral	Human (pregnant) Human Adult	T00897
Entire Plant Brazil	Used as a febrifuge and vermifuge.	Decoction Oral	Human Adult	ZZ1096
Entire Plant Brazil	Used as a stomach tonic, to stimulate the function of the gastrointestinal tract, for dyspepsia, for fevers and to promote perspiration as well as for chronic liver problems.	Hot H2O Ext Oral	Human Adult	ZZ1007
Leaf Brazil	Used as an antirheumatic, antacid, antidiarrheal, antiemetic, cholagogue, digestive, expectorant, sudorific, hepatoprotector, and vermifuge. Used for coughs, to support the lungs, allergies, for hoarseness, bronchitis, hepatitis, gastrointestinal disturbances, amenorrhea, worms, fever, rheumatic pains, arthritis, amoebas, hemorrhoids, constipation, wounds, contusions, eczema and other skin problems.	Infusion Oral	Human Adult	ZZ1081 AO1003 AO1004
Leaf Brazil	Used as a sudorific, stimulant, febrifuge, diuretic, tonic, digestive, diaphoretic, anthelmintic, emetic, cathartic, emmenagogue, antihydropic and antisyphilitic. Used to soothe chest pains and stomachache and to treat yellow fever and chronic hepatitis. Used to clean ulcers.	Infusion Oral Leaf External	Human Adult	ZZ1099
Leaf Brazil	Used for hepatitis, urinary complaints, constipation and a diuretic.	Infusion Oral	Human Adult	ZZ1013
Leaf Brazil	Used for urinary problems, for debilitated organs, dyspepsia, gastritis, hemorrhoids, hepatitis and fever.	Decoction Oral	Human Adult	ZZ1072

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Leaf Brazil	Used to stimulate the digestive system - the stomach, liver, gallbladder and intestine. Used for wounds, cuts, contusions and affections of the skin such as eczema. Used for fever, colds, flu and bronchial catarrh.	Infusion Oral Paste External Hot H2O Ext Oral	Human Adult Human Adult Human Adult	ZZ1081
Leaf + Root Brazil	Used for contusions, cuts and wounds.	Cataplasm External	Human Adult	ZZ1072
Root Brazil	Used for fevers.	Decoction Oral	Human Adult	ZZ1072
Root Brazil	Used to stimulate the digestive system - the stomach, liver, gallbladder and intestine.	Tincture Oral	Human Adult	ZZ1081
Not Stated Cuba	Used as an emetic, purgative, diuretic, emmenagogue, anticatarrhal, antidiabetic, hypotensive, sedative, abortive and CNS depressant. Reputed to have hypothermic and spasmogenic activity.	Not Stated	Human Adult	AO1005
Leaf Cuba	Used to promote lactation.	Not Stated	Human Adult	AO1007
Not Stated Dominican Republic	Used as a panacea.	Not Stated	Human Adult	ZZ1050
Leaf Guyana	Used as a cholagogue and purgative. Used for dysentery.	Hot H2O Ext Oral	Human Adult	ZZ1033
Entire Plant India	Used as an abortifacient.	Not Stated Oral	Human (pregnant)	A04132
Entire Plant India	Reputed to be abortifacient.	Hot H2O Ext Oral	Human (pregnant)	A05524
Leaf India	Used for purulent ulcers. Used for fevers and dysentery. Used for rheumatic inflammations.	Leaves External Hot H2O Ext Oral Not Stated	Human Adult	W00571
Root Indonesia	Used as an abortive.	Not Stated Oral	Human (pregnant)	A04766
Entire Plant Jamaica	Used for treatment of worms in children. Used as an emmenagogue.	Hot H2O Ext Oral	Human Child Human Adult	W01270
Leaf Malaysia	Used as an abortifacient.	Hot H2O Ext Oral	Human (pregnant)	A06590
Not Stated New Caledonia	Reputed to be an emmenagogue.	Not Stated Oral	Human Female	A04174

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Not Stated Papua-New Guinea	Used as an antifertility agent.	Hot H2O Ext Oral	Human Female	A01948
Stem + Leaf Peru	Used for diabetes.	H2O Ext Oral	Human Adult	AO1002
Root South America	Used as an anthelmintic. Used as an emmenagogue.	Hot H2O Ext Oral	Human Adult Human Female	W02290
Aerial Parts Taiwan	Used for liver disease.	Hot H2O Ext Oral	Human Adult	T14999
Root Taiwan	Used for liver disease.	Hot H2O Ext Oral	Human Adult	T14999
Leaf Trinidad	Used as a lactogogue.	Hot H2O Ext Oral	Human Female	K03665
Leaf Trinidad	Used to increase milk supply of nursing mother.	Hot H2O Ext Oral	Human Female	W01284
Not Stated Trinidad	Used for collyrium and as a depurative in chest colds. Used for dysentery, fever, heart attacks, ophthalmia and worms.	Not Stated	Human Adult	ZZ1050
Not Stated Venezuela	Used for tumors.	Not Stated	Human Adult	ZZ1050
Entire Plant West Indies	Used to prevent intestinal worms in children.	Hot H2O Ext Oral	Human Child	L01534
Entire Plant West Indies	Combined with *Annona muricata* leaves and *Chenopodium ambrosioides* whole plant and used for intestinal worms. Beaten and boiled with *Ambrosia hispida* and used as a vermifuge.	Hot H2O Ext Oral	Human Adult	T00701
Leaf West Indies	Leaves boiled with *Dendropemon emarginatum* for after delivery.	Hot H2O Ext Oral	Human (pregnant0	T00701
Leaf West Indies	Used as a lactagogue and as an emmenagogue.	Hot H2O Ext Oral	Human Female	T00701
Leaf Juice West Indies	Used for worms. Used for dysmenorrhea.	Juice Oral Juice Oral	Human Adult Human Female	T00701
Root West Indies	Used as an anthelmintic. Used as an emmenagogue.	Hot H2O Ext Oral	Human Adult Human Female	W02290
Not Stated West Indies	Used as an anthelmintic and vermifuge to expel worms and other parasites.	Not Stated	Human Adult	AO1001
Leaf Not Stated	Used for intestinal parasites and for rage.	Decoction Oral	Human Adult	T13846

Presence of Compounds in Gervâo (Stachytarpheta jamaicensis)

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Apigenol, 7: glucuronide	Flavonol	Not stated	Not Stated	Not stated	ZZ1095
Butyric acid, gamma-amino:	Proteid	Entire Plant	Jamaica	Not stated	A00262
Chlorogenic acid	Phenylpropanoid	Entire Plant	Brazil	Not stated	W00577
Dopamine	Isoquinoline Alkaloid	Entire Plant	Jamaica	Not stated	A00262
Dotriacontane, n:	Alkane	Aerial Parts	Taiwan	Not stated	L00193
Friedelin	Triterpene	Leaf Leaf	India Not Stated	Not stated Not stated	W00571 T00246
Hentriacontane	Alkane	Aerial Parts	Taiwan	Not stated	L00193
Hispidulin	Flavonoid	Leaf	India	Not stated	W00571
Ipolamiide	Monoterpene	Aerial Parts Entire Plant Leaf Leaf Leaf	Thailand Denmark Netherlands(cult) Brazil Brazil	Not stated 00.51626% Not stated Not stated Not stated	J02191 T07810 T00022 A01010 A01008
Luteolol, 7:glucuronide	Flavonol	Not stated	Not Stated	Not stated	ZZ1095
Luteolol, 7- 6-hydroxy: glucuronide	Flavonol	Not stated	Not Stated	Not stated	ZZ1095
Nonacosane, n:	Alkane	Aerial Parts	Taiwan	Not stated	L00193
Pentriacontane, n:	Alkane	Aerial Parts	Taiwan	Not stated	L00193
Scutellarein	Flavonoid	Leaf	India	Not stated	W00571
Spinasterol, alpha:	Steroid	Aerial Parts	Taiwan	Not stated	L00193
Stachytarphine	Monoterpene	Not stated	Not Stated	Not stated	ZZ1095

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Stigmasterol	Steroid	Leaf	India	Not stated	W00571
Tarphetalin	Monoterpene	Leaf + Stem	Not Stated	Not stated	T02638
Tetratriacontane, n:	Alkane	Aerial Parts	Taiwan	Not stated	L00193
Triacontane, n:	Alkane	Aerial Parts	Taiwan	Not stated	L00193
Tritriacontane, n:	Alkane	Aerial Parts	Taiwan	Not stated	L00193
Ursolic acid	Triterpene	Leaf	India	Not stated	W00571
Verbascoside (also called acetoside)	Glycoside	Leaf Leaf	Brazil Brazil	Not stated Not stated	A01010 A01008

Biological Activities for Extracts of Gervâo (Stachytarpheta sp)

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf + Stem Jamaica	Toxicity Assessment (quantitative)	H2O Ext	IP Mouse	0.1 ml			A03360
Entire Plant Brazil	Toxic Effect (general)	H2O Ext	Oral Rat	2 g/kg	Inactive	No signs of toxicity noted.	AO1009
Leaf Panama	Toxic Effect (general)	H2O Ext	IP Rat	Not stated	Active	A reduction of motor activity, alarm reaction, ataxia, sedation, analgesia, anesthesia, ptosis, piloerection, head tremors and a reduction of body temperature seen. C. Robichaud's sign present due to muscular relaxation.	AO1010
Leaf + Stem Jamaica	Spasmogenic Activity	ETOH(95%) Ext H2O Ext	Guinea Pig IP Guinea Pig	3.3 ml/l 0.33 ml/l	Active	ileum	A03360
Leaf Brazil	Anti-inflammatory Activity	ETOH Ext n-Butenol Ext	IP Rat	100 mg/kg 200 mg/kg	Active Strong Activity	Inhibited carrageenin-induced edema.	AO1008
Leaf Brazil	Anti-inflammatory Activity	ETOH Ext n-Butenol Ext	IG Rat	100 mg/kg 200 mg/kg	Active Strong Activity	vs. phlogistic agents.	AO1008
Leaf Brazil	Antinociceptive Activity	ETOH Ext n-Butenol Ext	IP Rat PO Rat	100-300 mg/kg	Active	vs. hot-plate test.	AO1008
Leaf + Stem Jamaica	Vasodilator Activity	ETOH(95%) Ext	Rat	0.033 ml/l	Active		A03360
Entire Plant Brazil	Laxative Activity	H2O Ext	Oral Rat	0.5-2g/kg	Active	Increased intestinal motility.	AO1009
Leaf Brazil	Anti-diarrheal Activity	H2O Ext	Mice	Not stated	Active	Reduced gastrointestinal propulsion. No effect on the absorption of water in intestines.	AO1011
Entire Plant Brazil	Antiulcer Activity	H2O Ext	Oral Mice	0.5-2g /kg	Active	vs. restraintin-cold-, ethanol- and indomethacin-induced ulceration.	AO1009

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant Brazil	Antiulcer Activity	H2O Ext	Oral Mice	0.5-2g /kg	Active	Inhibited gastric acid secretion. Reduced cholinergic and histaminergic stimulation of acid secretion.	AO1009
Entire Plant Brazil	Antacid Activity	H2O Ext	IG Mice	0.5-2g /kg	Active		AO1009
Entire Plant Brazil	Antisecretory Effect	H2O Ext	IP Mice	Not stated	Active	Inhibited basal acid secretion and secretions induced by histamine and bethanecol in pylorus-ligated mice.	AO1009
Leaf Cuba	Antifungal Activity	Acetone Ext ETOH(95%) Ext H2O Ext	Agar Plate	50%	Inactive	*Neurospora crassa*	T08589
Stem Cuba	Antifungal Activity	Acetone Ext ETOH(95%) Ext H2O Ext	Agar Plate	50%	Inactive	*Neurospora crassa*	T08589
Not stated Jamaica	Anthelmintic Activity	Not stated	Larvae	IT50=81.5 hrs	Weak Activity	*Strongyloides stercoralis*	AO1001
Entire Plant India	Larvicidal Activity	H2O Ext	Not stated	0.03 gm/ml	Active	*Culex quinquefasciatus*	M19731
Aerial Parts Taiwan	Glutamate-pyruvate-transaminase Inhibition	ETOH-H2O Ext	Cell Culture	1 mg/ml	Inactive	rat liver cells vs. CCL4- and PgE-1 induced inflammation.	T14999
Root Taiwan	Glutamate-pyruvate-transaminase Inhibition	ETOH-H2O Ext	Cell Culture	1 mg/ml	Inactive	rat liver cells vs. CCL4- and PgE-1 induced inflammation.	T14999

Biological Activities for Compounds of Gervâo (Stachytarpheta sp)

Compound	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Ipolamiide + Verbascoside	Antispasmodic Activity	Guinea pig (ileum)	Not stated	Active	vs. histamine and bradykinin induced contractions	AO1008
Ipolamiide + Verbascoside	Antinociceptive Activity	IP Rat Oral Rat	100 mg/kg 300 mg/kg	Active	vs. hot-plate test.	AO1008
Ipolamiide	Anti-inflammatory Activity	Oral Rat	Not stated	Active	70.22% inhibition when administering chemical 4 hours after a phlogistic agent.	AO1008
Verbascoside (Acetoside)	Antioxidant Activity	Cell Culture	0.1 mmol/l	Active	vs. oxidized OH adducts of dAMP and dGMP.	AO1036
Verbascoside (Acetoside)	Antioxidant Activity	Cell Culture	ED50: 1.0 mcmol	Strong Activity	vs. LDL peroxidation. vs. Cu(2+)-induced LDL oxidation	AO1044
Verbascoside (Acetoside)	Anti-inflammatory Activity	Oral Rat	Not stated	Active	93.99% inhibition when administering chemical 4 hours after a phlogistic agent.	AO1008
Verbascoside (Acetoside)	Antihepatotoxic Activity	Cell Culture In vivo Rat	Not stated Not stated	Active Strong Activity	vs. NADH/CCL4 induced lipid peroxidation in rat liver cells vs. CCL4 induced hepatoxicity	AO1049
Verbascoside (Acetoside)	Antihepatotoxic Activity	SC Mouse	10-50 mg/kg	Strong Activity	vs. D-Glactosamine- lipopolysaccharide- and TNF-alpha-dependent induced hepatic apoptosis and liver failure.	AO1046
Verbascoside (Acetoside)	Immunomodulatory Activity	Cell Culture	Not stated	Active	vs. neutrophil function; chemotasis and intracellular killing activity.	AO1014
Verbascoside (Acetoside)	Anti-neurotoxic Activity	Cell Culture	Not stated	Strong Activity	vs 1-methyl-4-phenylpyridium-induced apoptosis and oxidative stress in PC12 neuronal cells. Results suggest possible application for Parkinson's Disease.	AO1022
Verbascoside (Acetoside)	Antinephritic Activity	Cell Culture In vivo rat	Not stated	Strong Activity	Strong antinephritic action noted in vivo and in vitro by inhibition of intraglomerular accumulation of leukocytes through prevention of the up-regulation of ICAM-1.	AO1051

Compound	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Verbascoside (Acetoside)	Antimetastatic Activity	IP Mouse	50 mg/kg	Active	vs. B16 melanoma. Increase survival rate from 52 weeks to 63 weeks and suppressed lung metastasis.	AO1026
Verbascoside (Acetoside)	Antileukemic Activity	Cell Culture	IC50: 26.7 mcg	Active	vs. promyelocytic leukemia HL-60 cells	AO1050
Verbascoside (Acetoside)	Antiviral Activity	Cell Culture	500 mcg/ml Not stated	Active Active	vs. vesicular stomatitis virus. 53.6% inhibition vs. respiratory syncytial virus	AO1035 AO1048
Verbascoside (Acetoside)	Antimicrobial Activity	Cell Culture	Not stated	Active	vs. *Proteus mirabilis*, *Staphylcoccus aureus* and mithicillin-resistant *S. aureus*.	AO1045
Verbascoside (Acetoside)	Cardioactive Activity	Rat (heart)	Not stated	Active	142% increase in prostacyclin following adminsitration of verbascoside simulated formation of cAMP.	AO1047
Scutellarein	Cardioprotective Activity	IP Rat (hypertensive)	10 mg/kg	Active	Reversed ventricular remodeling, reduced hypertrophy of the cardiac muscle and collagen volume fraction, improved myocardial stiffness and protected heart cardiac muscle.	AO1037
Scutellarein	Vasoprotective Activity	Rat (aorta)	0.5%	Active	Scutellarein treatment in 1-week diabetes induction prevented endothelial dysfunction but potentiated the contractile response to phenylepherine.	AO1038
Scutellarein	Anti-inflammatory Activity	Oral Mice	150 mg/kg	Active	vs. carrageenan-induced mouse paw edema.	AO1030
Scutellarein	Anti-inflammatory Activity	Cell Culture	IC50=12.2 mmol	Active	Inhibited human recombinant synovial phospholipase A2.	AO1030
Scutellarein	Anti-inflammatory Activity	External Mice	Not stated	Active	vs. 12-O-tetradecanoylphorbol-13-acetate-induced ear edema.	AO1030
Scutellarein	Protein Kinase C Inhibitor	Not stated	Not stated	Active		AO1037
Scutellarein	Antilipid Peroxidation Activity	Cell Culture	Not stated	Active		AO1029
Scutellarein	Xanthine oxidase Inhibitory Activity	Cell Culture	Not stated	Active		AO1029
Scutellarein	Glutamate-pyruvate transaminase Inhibitory Activity	Mice	Not stated	Active	After bromobenzene intoxication scutellarein decreased serum glutamate-pyruvate transaminase activity.	AO1029

Compound	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Scutellarein	Cyclic AMP phosphodiesterase Inhibition	Not stated	EC50: 30-50 mcmol	Active		AO1039
Scutellarein	Reverse Transcriptase Inhibition	Cell Culture	Not stated	Active Active Active	Avian myeloblastosis RT. Rous-associated virus-2 RT. Maloney murine leukemia virus RT.	AO1040
Hispidulin	Antihepatotoxic Activity	IP Mouse	50 mg/kg 150 mg/kg	Active Active	Protected against bromobenzene-induced hepatotoxicity. At 150 mg glutathione depletion was checked.	AO1031
Hispidulin	Platelet aggregation Inhibition	Cell Culture	100 mcmol	Active	Inhibited adenosine-5'-monophosphate, arachidonic acid, paf-acether and collagen induced platelet aggregation through increasing cAMP in platelets 4-fold.	AO1034
Hispidulin	Glutamate-pyruvate transaminase Inhibitory Activity	Mice	Not stated	Active	After bromobenzene intoxication hispidulin decreased serum glutamate-pyruvate transaminase activity.	AO1029
Hispidulin	Cytotoxic Activity	Cell Culture	Not stated	Active	Hormone-dependent human prostate (LNCaP) cancer cell line.	AO1028
Hispidulin	Cytotoxic Activity	Agar Plate	100 mcg	Inactive	S. typhimurium TA98 & TA100.	AO1032
Hispidulin	Antiproliferative Activity	Cell Culture	12 mcg/ml 5 mcg/ml 5 mcg/ml	Active Active Active	Human gastric adenocarcinoma (MK-1). Human uterus carcinoma(HeLa). Murine melanoma(B16F10).	AO1027
Hispidulin	Antimutagenic Activity	Agar Plate	Not stated	Active Inactive	Inhibited mutagens 2-aminoanthracene, aflatoxin B1 (in TA98) and dimethylnitrosamine (in TA100). No effect on mutagens 2-(2-furyl)-3-(5-nitro-2-furyl) acrylamide or sodium azide (in TA98 & TA100).	AO1032
Hispidulin	Anti-inflammatory Activity	Not stated	Not stated	Active	Reduced human recombinant synovial phospholipase A2.	AO1030
Hispidulin	Antioxidant Activity	Mouse (liver)	IC50=10(-5) M	Weak Activity		AO1033
Hispidulin	Antioxidant Activity	in vitro	Not stated	Active	vs. lipid peroxidation	AO1029
Friedelin	Antiproliferative Activity	Cell Culture	Not stated	Inactive	Human leukocyte elastase.	AO1021

Compound	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Friedelin	Antifungal Activity	Agar Plate	Not stated	Inactive		AO1023
Friedelin	Antibacterial Activity	Agar Plate	Not stated	Active Inactive	Gram-negative bacteria *Vibrio parahaemolyticus*	AO1023
Friedelin	Antibacterial Activity	Agar Plate	Not stated	Active	Broad and concentration dependent activity.	AO1024
Chlorogenic acid	Antibacterial Activity	Agar Plate	Not stated	Active	*L. pneumophilia*	AO1016
Chlorogenic acid	Antiviral Activity	Cell Culture	EC50=13.3 mcg/ml SI=301	Active	*Adenovirus ADV*-11	AO1017
Chlorogenic acid	Antioxidant Activity	Not stated	Not stated	Active		AO1012
Chlorogenic acid	Anti-inflammatory Activity	Not stated	Not stated	Active		AO1018
Chlorogenic acid	Oxidative Activity	Cell Culture	Not stated	Active	Oxidation seen in human oral squamous cell carcinoma and salivary gland tumors.	AO1019
Chlorogenic acid	Chemopreventative Activity	Cell Culture	Not stated	Active	vs. human colorectal cancer. Apoptosis- and cell proliferation-independent.	AO1013
Chlorogenic acid	Cytotoxic Activity	Cell Culture	Not stated	Active Active	Human oral squamous cell carcinoma (HSC-2). Salivary gland tumor (HSG).	AO1019
Chlorogenic acid	Immunomodulatory Activity	Cell Culture (human PBMC)	Not stated	Active	Inhibited staphylococcal exotoxin-induced T-cell proliferation by 98%. Inhibited the production of interleukin 1 beta, TNF, interleukin 6, interferon gamma, monocyte chemotactic protein I, and macrophage inflammatory protein 1alpha and 1beta by human peripheral blood mononuclear cells (PBMC).	AO1018
Chlorogenic acid	Immunomodulatory Activity	Cell Culture	10-50 mcmol/l	Active Inactive	Enhanced antigen specific proliferation of lymphocytes. No effect on the production of influenza virus specific antibodies by human PBMC.	AO1020
Chlorogenic acid	Liver Enzyme Modulation Activity	Rat (liver)	0.1 mmol 0.25 mmol	Inactive Active	No effect on liver enzymes. Inhibited the O-deethylation of compound EFC in microsomes.	AO1015

Compound	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Spinasterol, alpha	Antispasmodic Activity	Rat (ileum)	Not stated	Active	Inhibition of spontaneous contractions of the rat ileum.	AO1042
Spinasterol	Antitumor Activity	Mouse	15 mcg	Active	Decreased the incidence of skin tumors (induced by croton oil) by 55.6% and decreased the number of tumors by 65% when applied immediately after croton oil.	AO1041
Spinasterol	Anticholesterol Effect	Mice	1% In ration	Active	Increased fecal cholesterol excretion, inhibited cholesterol absorption, decreased plasma and liver cholesterol levels, the bile acid pool size and the fecal bile acid excretion.	AO1043

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AO1020	IN VITRO EFFECT OF BIOACTIVE COMPOUNDS ON INFLUENZA VIRUS SPECIFIC B- AND T-CELL RESPONSES. BOON,AC: VOS,AP: GRAUS,YM: RIMMELZWAAN,GF: OSTERHAUS,AD: SCAND J IMMUNOL 55 1: 24-32 (2002) (ERASMUS UNIVERSITY ROTTERDAM, INSTITUTE OF VIROLOGY, DR MOLEWATERPLEIN 50, 3015 GE, ROTTERDAM, THE NETHERLANDS)
AO1021	TRITERPENES AND PHTYOSTEROLS AS HUMAN LEUCOCYTE ELASTASE INHIBITORS. MITAINE-OFFER,AC: HORNEBECK,W: SAUVAIN,M: ZECHES-HANROT,M: PLANTA MED 68 10: 930-2 (2002) (LABORATOIRE DE PHARMACOGNOSIE, FACULTE DE PHARMACIE, UNIVERSITE DE REIMS CHAMPAGNE-ARDENNE, REIMS, FRANCE)
AO1022	PROTECTIVE EFFECT OF VERBASCOSIDE ON 1-METHYL-4-PHENYLPYRIDINIUM ION-INDUCED NEUROTOXICITY IN PC12 CELLS. SHENG GQ, ZHANG JR, PU XP, MA J, LI CL. EUR J PHARMACOL 2002 SEP 13;451(2):119-24 (DEPARTMENT OF MOLECULAR AND CELLULAR PHARMACOLOGY, SCHOOL OF PHARMACEUTICAL SCIENCES, PEKING UNIVERSITY, 38 XUEYUAN ROAD, BEIJING, 100083, PR CHINA.)
AO1023	PHYTOCHEMICAL AND ANTIMICROBIAL STUDIES OF BEGONIA MALABARICA. RAMESH,N: VISWANATHAN,MB: SARASWATHY,A: BALAKRISHNA,K: BRINDHA,P: LAKSHMANAPERUMALSAMY,P: J ETHNOPHARMACOL 79 1: 129-32 (2002) (SRI PARAMAKALYANI CENTRE FOR ENVIRONMENTAL SCIENCES, MANONMANIAM SUNDARANAR UNIVERSITY 627 412 TAMIL NADU, ALWARKURICHI, INDIA)
AO1024	PHYTOCHEMICAL AND ANTIMICROBIAL STUDIES ON DRYNARIA QUERCIFOLIA. RAMESH,N: VISWANATHAN,MB: SARASWATHY,A: BALAKRISHNA,K: BRINDHA,P LAKSHMANAPERUMALSAMY,P: FITOTERAPIA 72 8: 934-6 (2001) (SRI PARAMAKALYANI CENTRE FOR ENVIRONMENTAL SCIENCES, MANONMANIAM SUNDARANAR UNIVERSITY, ALWARKURICHI 627 412, TAMIL NADU, INDIA)
AO1025	EVALUATION OF THE ANTIULCEROGENIC ACTIVITY OF FRIEDELAN-3BETA-OL AND FRIEDELIN ISOLATED FROM MAYTENUS ILICIFOLIA (CELASTRACEAE). QUEIROGA,CL: SILVA,GF: DIAS,PC; POSSENTI,A: DE CARVALHO,JE: J ETHNOPHARMACOL 72 3: 465-8 (2000) (DIVISAO DE FITOQUIMICA, CENTRO PLURIDISCIPLINAR DE PESQUISAS QUIMICAS, BIOLOGICAS E AGRICOLAS-CPQBA, UNIVERSIDADE ESTADUAL DE CAMPINAS-UNICAMP, SAO PAULO, BRAZIL)

AO1026	ANTIMETASTATIC ACTIVITY OF ACTEOSIDE, A PHENYLETHANOID GLYCOSIDE. OHNO T, INOUE M, OGIHARA Y, SARACOGLU I. BIOL PHARM BULL 2002 MAY;25(5):666-8 (LABORATORY OF PHARMACOGNOSY, GRADUATE SCHOOL OF PHARMACEUTICAL SCIENCES, NAGOYA CITY UNIVERSITY, JAPAN.)
AO1027	ANTIPROLIFERATIVE CONSTITUENTS IN PLANTS 10. FLAVONES FROM THE LEAVES OF LANTANA MONTEVIDENSIS BRIQ. AND CONSIDERATION OF STRUCTURE-ACTIVITY RELATIONSHIP. NAGAO,T: ABE,F: KINJO,J: OKABE,H: BIOL PHARM BULL 25 7: 875-9 (2002) (FACULTY OF PHARMACEUTICAL SCIENCES, FUKUOKA UNIVERSITY, JAPAN)
AO1028	CYTOTOXIC SESQUITERPENOIDS FROM RATIBIDA COLUMNIFERA. CUI,B: LEE,YH: CHAI,H: TUCKER,JC: FAIRCHILD,CR: RAVENTOS-SUAREZ,C: LONG,B: LANE,KE: MENENDEZ,AT: BEECHER,CW: CORDELL,GA: PEZZUTO,JM: KINGHORN,AD: J NAT PROD 62 11: 1545-50 (1999) (PROGRAM FOR COLLABORATIVE RESEARCH IN THE PHARMACEUTICAL SCIENCES AND DEPARTMENT OF MEDICINAL CHEMISTRY AND PHARMACOGNOSY, COLLEGE OF PHARMACY, UNIVERSITY OF ILLINOIS AT CHICAGO, CHICAGO, ILLINOIS, USA)
AO1029	INFLUENCE OF A SERIES OF NATURAL FLAVONOIDS ON FREE RADICAL GENERATING SYSTEMS AND OXIDATIVE STRESS. SNAZ,MJ: FERRANDIZ,ML: CEJUDO,M: TERENCIO,MC: GIL,B: BUSTOS,G: UBEDA,A: GUNASEGARAN,R: ALCARAZ,MJ: XENOBIOTICA 24 7: 689-99 (1994) (DEPATAMENTO DE FARMACOLOGIA, FACULTAD DE FARMACIA, VALENCIA, SPAIN)
AO1030	EFFECTS OF FLAVONOIDS ON NAJA NAJA AND HUMAN RECOMBINANT SYNOVIAL PHOSPHOLIPASES A2 AND INFLAMMATORY RESPONSES IN MICE. GIL,B: SANZ,MJ: TERENCIO,MC: FERRANDIZ,ML: BUSTOS,G: PAYA,M: GUNASEGARAN,R: ALCARAZ,MJ: LIFE SCI 54 20: PL338-8 (1994) (DEPT OF PHARMACOLOGY, UNIVERSITY OF VALENCIA, SPAIN)
AO1031	HISPIDULIN PROTECTION AGAINST HEPATOTOXICITY INDUCED BY BROMOBENZENE IN MICE. FERRANDIZ,ML: BUSTOS,G: PAYA,M: GUNASEGARAN,R: ALCARAZ,MJ: LIFE SCI 55 8: PL145-50 (1994) (DEPT OF PHARMACOLOGY, UNIVERSITY OF VALENCIA, SPAIN)
AO1032	MUTAGENICITY AND ANTIMUTAGENICITY OF HISPIDULIN AND HORTENSIN, THE FLAVONOIDS FROM MILLINGTONIA HORTENSIS L. CHULASIRI,M: BUNYAPRAPHATSARA,N: MOONGKARNDI,P: ENVIRON MOL MUTAGEN 20 4: 307-12 (1992) (DEPT OF MICROBIOLOGY, FACULTY OF PHARMACY, MAHIDOL UNIVERSITY, BANGKOK, THAILAND)
AO1033	FLAVONOIDS AS SUPEROXIDE SCAVENGERS AND ANTIOXIDANTS. CHEN,YT: ZHENG,RL: JIA,ZJ: JU,Y: FREE RADIC BIOL MED 9 1: 19-21 (1990) (DEPT OF BIOLOGY, LANZHOU UNIVERSITY, GANSU PROVINCE, CHINA)
AO1034	HISPIDULIN, A NATURAL FLAVONE, INHIBITS HUMAN PLATELET AGGREGATION BY INCREASING CAMP LEVELS. BOURDILLAT,B: DELAUTIER,D: LABAT,C: BENVENISTE,J: POTIER,P: BRINK,C: EUR J PHARMACOL 147 1: 1-6 (1988) (INSERM U.200, UNIVERSITE PARIS XI, CLAMART, FRANCE)
AO1035	ANTIVIRAL ACTIVITY OF SEVEN IRIDOIDS, THREE SAIKOSAPONINS AND ONE PHENYLPROPANOID GLYCOSIDE EXTRACTED FROM BUPLEURUM RIGIDUM AND SCROPHULARIA SCORODONIA. BERMEJO P, ABAD MJ, DIAZ AM, FERNANDEZ L, SANTOS JD, SANCHEZ S, VILLAESCUSA L, CARRASCO L, IRURZUN A. PLANTA MED 2002 FEB;68(2):106-10 (DEPARTMENT OF PHARMACOLOGY, FACULTY OF PHARMACY, UNIVERSITY COMPLUTENSE, MADRID, SPAIN.)

AO1036	FAST REPAIRING OF OXIDIZED OH RADICAL ADDUCTS OF DAMP AND DGMP BY PHENYLPROPANOID GLYCOSIDES FROM SCROPHULARIA NINGPOENSIS HEMSL. LI YM, HAN ZH, JIANG SH, JIANG Y, YAO SD, ZHU DY. ACTA PHARMACOL SIN 2000 DEC;21(12):1125-8 (STATE KEY LABORATRY OF DRUG RESEARCH, SHANGHAI INSTITUTE OF MATERIA MEDICA, SHANGHAI INSTITUTES FOR BIOLOGICAL SCIENCES, CHINESE ACADEMY OF SCIENCES, SHANGHAI 200031, CHINA.)
AO1037	VENTRICULAR REMODELING BY SCUTELLAREIN TREATMENT IN SPONTANEOUSLY HYPERTENSIVE RATS. ZHOU,J: LEI,H: CHEN,Y: LI,F: MA,C: CHIN MED J (ENGL) 115 3: 375-7 (2002) (DEPT OF INTERNAL MEDICINE, THE FIRST AFFILIATED HOSPITAL, CHONGQUING UNIVERSITY OF MEDICAL SCIENCES, CHONGQUING, CHINA)
AO1038	EFFECTS OF SCUTELLAREIN ON DIABETIC RAT AORTA. ZHU,BH: GUAN,YY: HE,H: LIN,MJ: ACTA PHARMACOL SIN 21 4: 353-6 (2000) (DEPT OF PHARMACOLOGY, SUN YAT-SEN UNIVERSITY OF MEDICAL SCIENCES, GUANGZHOU, CHINA)
AO1039	EFFECTS OF FLAVONOIDS ON CYCLIC AMP PHOSPHODIESTERASE AND LIPID MOBILIZATION IN RAT ADIPOCYTES. KUPPUSAMY,UR: DAS,NP: 44 7: 1307-15 (1992) (DEPT OF BIOCHEMISTRY, FACULTY OF MEDICINE, NATIONAL UNIVERSITY OF SINGAPORE)
AO1040	INHIBITION OF REVERSE TRANSCRIPTASES BY FLAVONOIDS. SPEDDING,G: RATTY,A: MIDDLETON,E JR: ANTIVIRAL RES 12 2: 99-110 (1989) (DEPT OF MEDICINE, STATE UNIVERSITY OF NEW YORK, BUFFALO GENERAL HOSPITAL)
AO1041	ANTICARCINOGENICITY POTENTIAL OF SPINASTEROL ISOLATED FROM SQUASH FLOWERS. VILLASENOR,IM: DOMINGO,AP: TERATOG CARCINOG MUTAGEN 20 3: 99-105 (2000) (INSTITUTE OF CHEMISTRY, UNIVERSITY OF THE PHILIPPINES, DILIMAN, QUEZON CITY, PHILIPPINES)
AO1042	SMOOTH MUSCLE RELAXING FLAVONOIDS AND TERPENOIDS FROM CONYZA FILAGINOIDES. MATA,R: ROJAS,A: ACEVEDO,L: ESTRADA,S: CALZADA,F: ROJAS,I: BYE,R: LINARES,E: PLANTA MED 63 1: 31-5 (1997) (DEPARTAMENTO DE FARMACIA, FACULTAD DE QUIMICA AND UNIDAD DE INVESTIGACION EN PLANTAS MEDICINALES, INSTITUTO DE QUIMICA, MEXICO)
AO1043	EFFECTS OF SPINASTEROL AND SITOSTEROL ON PLASMA AND LIVER CHOLESTEROL LEVELS AND BILIARY AND FECAL STEROL AND BILE ACID EXCRETIONS IN MICE. UCHIDA,K: MIZUNO,H: HIROTA,K: TAKEDA,K: TAKEUCHI,N: ISHIKAWA,Y: JPN J PHARMACOL 33 1: 103-12 (1983)
AO1044	PHENYLPROPANOIDS FROM BALLOTA NIGRA L. INHIBIT IN VITRO LDL PEROXIDATION. SEIDEL V, VERHOLLE M, MALARD Y, TILLEQUIN F, FRUCHART JC, DURIEZ P, BAILLEUL F, TEISSIER E. PHYTOTHER RES 2000 MAR;14(2):93-8 LABORATOIRE DE PHARMACOGNOSIE, FACULTE DE PHARMACIE, UNIVERSITE DE LILLE 2, 3 RUE DU PROFESSEUR LAGUESSE, BP 83, 59006 LILLE,) FRANCE.)
AO1045	ISOLATION AND ANTIBACTERIAL ACTIVITY OF PHENYLPROPANOID DERIVATIVES FROM BALLOTA NIGRA. DIDRY N, SEIDEL V, DUBREUIL L, TILLEQUIN F, BAILLEUL F. J ETHNOPHARMACOL 1999 NOV 1;67(2):197-202 (LABORATOIRE DE PHARMACOGNOSIE, FACULTE DES SCIENCES PHARMACEUTIQUES ET BIOLOGIQUES, LILLE, FRANCE.)
AO1046	ACTEOSIDE INHIBITS APOPTOSIS IN D-GALACTOSAMINE AND LIPOPOLYSACCHARIDE-INDUCED LIVER INJURY. XIONG Q, HASE K, TEZUKA Y, NAMBA T, KADOTA S. LIFE SCI 1999;65(4):421-30 (RESEARCH INSTITUTE FOR WAKAN-YAKU (TRADITIONAL SINO-JAPANESE MEDICINES), TOYAMA MEDICAL & PHARMACEUTICAL UNIVERSITY, JAPAN.)

AO1047	MECHANISM OF ACTION OF VERBASCOSIDE ON THE ISOLATED RAT HEART: INCREASES IN LEVEL OF PROSTACYCLIN. PENNACCHIO M, SYAH YM, ALEXANDER E, GHISALBERTI EL. PHYTOTHER RES 1999 MAY;13(3):254-5 (SCHOOL OF ENVIRONMENTAL BIOLOGY, CURTIN UNIVERSITY OF TECHNOLOGY, PERTH, WESTERN AUSTRALIA, AUSTRALIA.)
AO1048	ANTIVIRAL PHENYLPROPANOID GLYCOSIDES FROM THE MEDICINAL PLANT MARKHAMIA LUTEA. KERNAN MR, AMARQUAYE A, CHEN JL, CHAN J, SESIN DF, PARKINSON N, YE Z, BARRETT M, BALES C, STODDART CA, SLOAN B, BLANC P, LIMBACH C, MRISHO S, ROZHON EJ. J NAT PROD 1998 MAY;61(5):564-70 (SHAMAN PHARMACEUTICALS, 213 EAST GRAND AVENUE, SOUTH SAN FRANCISCO, CALIFORNIA, 94080-4812, USA.)
AO1049	HEPATOPROTECTIVE ACTIVITY OF PHENYLETHANOIDS FROM CISTANCHE DESERTICOLA. XIONG Q, HASE K, TEZUKA Y, TANI T, NAMBA T, KADOTA S. PLANTA MED 1998 MAR;64(2):120-5 (RESEARCH INSTITUTE FOR WAKAN-YAKU (TRADITIONAL SINO-JAPANESE MEDICINES), TOYAMA MEDICAL AND PHARMACEUTICAL UNIVERSITY, JAPAN.)
AO1050	INDUCTION OF APOPTOTIC CELL DEATH IN HL-60 CELLS BY ACTEOSIDE, A PHENYLPROPANOID GLYCOSIDE. INOUE M, SAKUMA Z, OGIHARA Y, SARACOGLU I. BIOL PHARM BULL 1998 JAN;21(1):81-3 (DEPARTMENT OF PHARMACOGNOSY, FACULTY OF PHARMACEUTICAL SCIENCES, NAGOYA CITY UNIVERSITY, JAPAN.)
AO1051	ACTEOSIDE, A COMPONENT OF STACHYS SIEBOLDII MIQ, MAY BE A PROMISING ANTINEPHRITIC AGENT (3): EFFECT OF ACETEOSIDE ON EXPRESSION OF INTERCELLULAR ADHESION MOLECULE-1 IN EXPERIMENTAL NEPHRITIC GLOMERULI IN RATS AND CULTURED ENDOTHELIAL CELLS. HAYASHI K, NAGAMATSU T, ITO M, YAGITA H, SUZUKI Y. JPN J PHARMACOL 1996 FEB;70(2):157-68 (DEPARTMENT OF PHARMACOLOGY, MEIJO UNIVERSITY, NAGOYA, JAPAN.)