Technical Data Report

for

CARQUEJA

(Baccharis genistelloides)

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Carqueja

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Family: Asteraceae

Genus: *Baccharis*

Species: *genistelloides*

Synonyms: *Baccharis trimera, B. triptera , B. venosa, Conyza genistelloides, Molina venosa*

Common Names: Carqueja, bacanta, bacárida, cacaia-amarga, cacalia amara, cacália-amarga, cacália-amargosa, cacliadoce, carqueja amara, carqueja-amargosa, carqueja-do-mato, carquejilla, carquejinha, chinchimani, chirca melosa, condamina, cuchi-cuchi, quimsa-kuchu, quina-de-condamiana, quinsu-cucho, tiririca-de-balaio, tres-espigas, vassoura

Parts Used: Entire plant, aerial parts

Carqueja is a perennial green herb that grows nearly vertical to a height of 1–2 m and produces yellowish-white flowers at the top of the plant. The bright green, flat, winged stalks have a fleshy, succulent consistency and the “wings” take the place of leaves. The *Baccharis* genus is composed of more than 400 species native to tropical and subtropical America. Carqueja is known by several botanical names in Brazil, including *Baccharis genistelloides, B. triptera,* and *B. trimera.* It is found throughout the Amazon rainforest in Peru, Brazil, and Colombia, as well as in tropical parts of Argentina, Paraguay, and Uruguay. Other common species called *carqueja* in Brazil include *Baccharis trinervis* and *B. gaudichaudiana* which look similar (smaller in height and smaller wings) and are sometimes used as substitutes for *B. genistelloides*. Another well known species in the family is a small shrub, *B. cordifolia*, which is toxic to grazing animals.

Indigenous peoples of the rainforest have utilized this herb for centuries to cure common ailments. Its uses in herbal medicine were first recorded in Brazil in 1931 by Pio Correa, who wrote about an infusion of carqueja being used for sterility in women and impotency in men. Correa described carqueja as having the therapeutic properties of a tonic, bitter, febrifuge, and stomachic, with cited uses for dyspepsia, gastroenteritis, liver diseases, and diarrhea. Since that time, carqueja has long been used in Brazilian medicine to treat liver diseases, to strengthen stomach and intestinal function, and to help purge obstructions of the liver and gallbladder. Almost every book published in Brazil on herbal medicine includes carqueja, since it has shown to be so effective for liver and digestive disorders as well as a good blood cleanser and fever reducer. Other popular uses for carqueja in Brazilian herbal medicine today are to treat malaria, diabetes, stomach ulcers, sore throat and tonsillitis, angina, anemia, diarrhea, indigestion, hydropsy, urinary inflammation, kidney disorders, intestinal worms, leprosy, and poor blood circulation.

In Peruvian herbal medicine today, carqueja is used for liver ailments, gallstones, diabetes, allergies, gout, intestinal gas and bloating, and venereal diseases. Herbalists and natural health practitioners in the United States are just learning of the many effective uses of carqueja. They document that it helps strengthen digestive, ileocecal valve, stomach, and liver functions; fortifies and cleanses the blood; expels intestinal worms; is helpful for poor digestion, liver disorders, anemia, or loss of blood; and removes obstructions in the gallbladder and liver.

Phytochemically, carqueja is a rich source of flavonoids. Certain flavonoids, such as silymarin in milk thistle, have shown liver-protective properties and are used for many liver conditions in herbal medicine systems. Carqueja is rather like the South American version of milk thistle. It contains up to 20% flavonoids including quercetin, luteolin, nepetin, apigenin and hispidulin. In a German clinical study, a crude flavonoid fraction and a leaf/stem extract (at 50 mg/kg) dose-dependently increased the survival rate to 100% in mice administered toxic dosages of phalloidin—a liver toxin (as compared to a 24% survival rate in the control group).[1] While these scientists

indicated that the single flavonoid hispidulin evidenced the highest hepatoprotective effect of the flavonoids tested (it increased survival to 80%), the crude extract and the whole flavonoid fraction provided a stronger liver detoxifying and protective effect than the single flavonoid. This led them to postulate that other constituents in the crude extract besides the flavonoids had liver protective effects and/or there were interactions between the flavonoids and other phytochemicals which potentiated their effects.

Other traditional uses of carqueja have been studied and validated by western research. Its antacid, anti-ulcer and hypotensive properties were documented in two Brazilian animal studies in 1992.[2–3] Its anti-ulcer and analgesic properties were verified in a 1991 clinical study, which showed that carqueja reduced gastric secretions and had an analgesic effect in rats with *H. pylori* ulcers. The study concluded that carqueja "may relieve gastrointestinal disorders by reducing acid secretion and gastrointestinal hyperactivity."[4] A later (2000) study confirmed its anti-ulcerogenic effect when a water extract of carqueja administered to rats protected against ethanol-induced ulcers.[5] These researchers also reported no toxicity of the extracts given to rats up to 2 g/kg in body weight. Other researchers documented carqueja's analgesic effects, reporting that (at a dosage of 100 mg/kg in mice) the extract reduced abdominal constrictions by 95% (induced by acetic acid).[6] This same research group in Spain also reported a strong anti-inflammatory effect (a 70–90% inhibition) when mice were pre-treated with the carqueja extract prior to inducing inflammation with various chemicals. In summarizing their report, they stated that carqueja "shows strong anti-inflammatory and analgesic properties which seem to be due, at least partly, to the inhibition of prostaglandin biosynthesis."[6]

Carqueja has also long been used as a natural aid for diabetes in South America and several studies confirm its blood sugar-lowering effect in mice, rats, and humans (in both normal and diabetic subjects).[7–9] Several novel phytochemicals called *clerodane diterpenoids* were discovered in carqueja and, in 1994, scientists showed these phytochemicals exhibited maximum antifeedant and repellent activities against worms (*Tenebrio molitor* larvae).[10] This could possibly explain carqueja's long history of use as an anthelmintic (to expel intestinal worms). Finally, carqueja's traditional use for colds, flu and stomach viruses has been verified by research as well; some of the more recent research has focused on its antiviral properties. In a clinical study published in 1999, researchers in Spain reported that a water extract of carqueja showed *in vitro* antiviral actions against *Herpes simplex* I and *Vesicular stomatitis* virus at low dosages (25 mcg/ml).[11] Researchers in Texas had already reported in 1996 that a water extract of carqueja provided an *in vitro* inhibition of HIV virus replication in T-cells.[12] In subsequent research, they've attributed this anti-HIV effect to a single chemical they found in the water extract of carqueja— 3,5-dicaffeoylquinic acid—and reported that this phytochemical is a potent inhibitor of HIV-1 integrase *in vitro* at dosages as low as only 1 mcg/ml.[13]

Carqueja is one of the more widely known and used medicinal plants in Brazil and other parts of South America. It is as popular in Brazil as a natural herbal liver aid and digestive aid as milk thistle is in the United States and Europe. Many of its traditional uses have been verified by research and it appears in the official pharmacopeias of several South American countries as a specific liver and digestive aid.

Documented Properties and Actions: Abortive, analgesic, antacid, anthelmintic, anti-inflammatory, antidiabetic, antihepatotoxic, antirheumatic, antiulcerogenic, antiviral, aperient, bitter, chologogue, depurative, digestive, diuretic, febrifuge, gastrotonic, hepatic, hepatoprotective, hepatotonic, hypoglycemic, laxative, refrigerant, stomachic, sudorific, tonic, vermifuge

Phytochemicals: 3,5-dicaffeoylquinic acid, alpha-phellandrene, alpha-terpinene, alpha-ylangene, beta-caryophyllene, beta-phellandrene, beta-pinene, calacorene, camphene, carquejol, cirsimaritin, clerodane diterpenoids, elemol, eriodictyol, essential oils, eudesmol, eugenol, eupatorin, eupatrin, farnesene, farnesol, flavonoids, genkwanin, germacrene D, glycosides, hispidium, hispidulin, ledol, limonene, linalool, luteolin, muurolene, myrcene, neptin, nerolidol, palustrol, pentadecanol,

quercetin, resins, sabinene, saponins, spatholenol, spathulenol, squalene, terpinolene, viridiflorene, viridiflorol

Traditional Remedy: One to 4 grams daily in capsules or tablets. Alternatively, a standard infusion is prepared with 5 g of dried herb to 100 ml water and infused for 10 minutes. This traditional remedy is usually taken 2–3 times daily. For topical use, 60 g of herb is decocted in 1 liter of water and applied to the affected area.

Contraindications:

- Not to be used during pregnancy as it has demonstrated uterine stimulant and abortive effects in rats.[9]
- The use of this plant is contraindicated in persons with low blood pressure due to its documented hypotensive effects. Persons with any heart condition or taking heart medications should check with their physician prior to using this plant.
- Carqueja has been documented to lower blood glucose levels in human and animal studies. As such, it is contraindicated in persons with hypoglycemia. Diabetics should check with their physicians prior to using this plant, and use with caution while monitoring their blood sugar levels accordingly.

Drug Interactions:

- May potentiate antihypertensive drugs.
- May potentiate insulin and anti-diabetic drugs.
- May speed the clearance of some drugs metabolized in the liver (decrease the half-life), thereby reducing the pharmacological effect (and/or side effects) of drugs required to be metabolized in the liver.

WORLDWIDE ETHNOBOTANICAL USES

Country	Uses
Bolivia	Abortifacient, digestion, gastrointestinal problems, ulcers
Brazil	Abortifacient, anemia, angina, anorexia, antacid, anthelmintic, aperitif, biliary, bitter, blood detoxification, bronchitis, calculus, Chagas disease, chologogue, circulation, colds, constipation, depurative, diabetes, diarrhea, digestive, diuretic, dyspepsia, edema, fevers, flu, gastritis, gastroenteritis, gout, heartburn, hepatic, hepatoprotective, hepatotonic, high cholesterol, hydropsy, hypertension, ileocecal, impotence, indigestion, intestinal disorders, kidney, leprosy, liver disorders and detoxification, malaria, nausea, obesity, rheumatism, sore throat, spleen, sterility, stomach, stomachic, tonic, tonsillitis, ulcers (gastric), ulcers (skin), urinary tract disorders, venereal diseases, vermifuge
Colombia	Emmenagogue, hemostatic, ulcers, wounds
Paraguay	Diabetes, fertility aid, high cholesterol
Peru	Bloating, broncho-pulmonary disorders, diabetes, dislocations, emmenagogue, gallstones, gastritis, gastrointestinal disorders, gout, grippe, intestinal gas, liver diseases, malaria, rheumatic pain, stomachache, urinary, uterine problems, venereal disease

References:

1. Soicke, H., et al. “Characterisation of flavonoids from *Baccharis trimera* and their antihepatotoxic properties.” *Planta Medica* 1987; 53(1): 37–9.
2. Gamberini, M. T., et al. “Açoes antiúlcera e antiácida do extracto aquoso e das fraçoes da *Baccharis trimera*.” Anais XII Simposio de Plantas Medicinais do Brasil. UFP: Curitiba, Paraná, 15–17 September 1992.
3. Sousa, B., et al., “Avaliaçao da atividade antiulcera do extrato bruto e fraçoes de *Baccharis trimera*.” Anais XII Simposio de Plantas Medicinais do Brasil. UFP: Curitiba, Paraná, 15–17 September 1992.
4. Gamberini, M. T., et al. “Inhibition of gastric secretion by a water extract from *Baccharis triptera.* Mart.” *Mem. Inst. Oswaldo Cruz*. 1991; 86(Suppl. 2): 137-9.
5. Gonzales, E., et al. “Gastric cytoprotection of Bolivian medicinal plants.” *J. Ethnopharmacol*. 2000; 70(3): 329–33.
6. Gene, R. M., et al. “Anti-inflammatory and analgesic activity of *Baccharis trimera*: Identification of its active constituents.” *Planta Med*. 1996; 62(3): 232–5.
7. Hossen, S., et al. “Evaluacion *in vivo* de la actividad hipoglucemiante de plantas medicinales de los valles altos y bajos de Cochabamba.” Ed. Universidad Mayor De San Simón Instituto de Investigaciones Bioquímico-Farmacéuticas-Programa 2001; Cochabamba, Bolivia.
8. Xavier, A. A., et al. “Effect of an extract of *Baccharis genistelloides* on the glucose level of the blood.” *C. R. Seances Soc. Biol. Fil*. 1967; 16(4): 972–4.
9. Alonso, P. E., et al. “Uso racional de las plantas medicinales.” Ed. Fin De Siglo Facultad de Química 1992; Montevideo, Uruguay.
10. Sosa, M. E., et al. “Insect antifeedant activity of clerodane diterpenoids.” *J. Nat. Prod.* 1994; 57(9): 1262–65.
11. Abad, M. J., et al. “Antiviral activity of Bolivian plant extracts.” *Gen. Pharmacol*. 1999; 32(4): 499–503.
12. Abdel-Malek, S., et al. “Drug leads from the Kallawaya herbalists of Bolivia. 1. Background, rationale, protocol and anti-HIV activity.” *J. Ethnopharmacol..* 1996; 50(3): 157–66.
13. Robinson, W. E., et al. “Inhibitors of HIV-1 replication that inhibit HIV Integrase.” *Proc. Natl. Acad. Sci*. 1996; 93(13): 6326–31.

Ethnomedical Information on Carqueja (Baccharis genistelloides)

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Dried Leaf Bolivia	An infusion in high doses can cause an abortion.	Infusion / Oral	Human(pregnant)	L12113
Aerial Parts Brazil	Used for diabetes.	Hot H2O Ext / Oral	Human Adult	M29199
Aerial Parts Brazil	Used for stomach, liver and intestinal problems, for diabetes, rheumatism, and heartburn.	Infusion / Oral	Human Adult	ZZ1081
Aerial Parts Brazil	Considered aperient, stomachic, diuretic, vermifuge, abortifacient, hypoglycemic; used to treat rheumatism, diabetes, impotency, liver problems, gastroenteritis, dyspepsia, fevers, and hypertension.	Decoction / Oral	Human Adult	AU1010
Aerial Parts Brazil	Used for general weakness, stomach problems, intestinal worms, diarrhea, liver problems, fever, gastroenteritis, dyspepsia, anorexia, kidney problems, colds and flu, diabetes, and hypertension.	Infusion / Oral	Human Adult	ZZ1013
Aerial Parts Brazil	Stems and branches used to clean the teeth. Used topically for Chagas ulcers on the skin. Considered tonic, stomachic, anti-rheumatic, anthelmintic; used to treat liver obstructions and problems, diabetes, and leprosy.	Plant / External Decoction / External Infusion / Oral	Human Adult Human Adult Human Adult	AU1013
Aerial Parts Brazil	Used for gastric ulcers, and sexual impotency. Used as a depurative, stomachic, and diuretic, to treat rheumatism, diarrhea, liver, kidney and spleen diseases, for anemia, obesity, and hypertension.	Infusion / Oral Infusion / Oral	Human Adult Human Adult	ZZ1079 ZZ1092
Entire Plant Brazil	Used as an aperitif, digestive, diuretic, febrifuge, anti-rheumatic, anthelmintic, aphrodisiac, hypoglycemic, and abortifacient.	Decoction / Oral	Human Adult	AU1006
Entire Plant Brazil	Used for its bitter principles, as a tonic, anthelmintic, anti-rheumatic; for liver obstructions, diabetes, and malaria. Used for chagas ulcers and leprosy.	Tincture / Oral Fluid Extract / External	Human Adult Human Adult	AU1014

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Entire Plant Brazil	Used for rheumatism, diabetes, anorexia, colds and flu, gastroenteritis, liver problems, and as a vermifuge.	Infusion / Oral	Human Adult	ZZ1078
Entire Plant Brazil	Used for anemia, biliary problems, diarrhea, pain in the kidneys, liver, spleen, digestion problems, stomach ulcers, urinary tract inflammation, intestinal parasites, angina, hypertension, and sore throat.	Infusion / Oral	Human Adult	ZZ1002
Entire Plant Brazil	Used as a febrifuge, anti-rheumatic, chologogue, stomachic, and anthelmintic; to treat obesity, biliary calculus, diabetes, and liver obstructions.	Infusion / Oral	Human Adult	ZZ1096
Entire Plant Brazil	Used for asthma, gingivitis, anemia, gastric and intestinal problems, rheumatism, gout, high cholesterol, liver problems, to eliminate toxins from the blood and liver, venereal diseases, diabetes, and urinary tract problems. Used topically for wounds and ulcers.	Infusion / Oral Decoction / External	Human Adult Human Adult	AU1011
Entire Plant Brazil	Used for wounds, ulcers, leprosy, venereal disease. Used for asthma, bronchitis, rheumatism, gastric and intestinal problems, dyspepsia, liver problems, diabetes, urinary problems, fevers, edema, and intestinal worms.	Decoction / External Infusion / Oral	Human Adult Human Adult	ZZ1072
Entire Plant Brazil	Considered stomachic, antibiotic, hepatoprotective, chologogue, hypoglycemic; used for kidney and urinary problems, asthma, dyspepsia, bronchitis, intestinal worms, fevers, and to stimulate the excretion of liver and stomach bile.	Decoction / Oral	Human Adult	ZZ1076
Dried Leaf Brazil	Used for fevers. Used for malaria.	Decoction / Oral Hot H2O Ext / Oral	Human Adult Human Adult	K07977 A04980
Entire Plant Colombia	Used as an emmenagogue and a hemostatic.	Hot H2O Ext / Oral	Human Adult	T05014
Entire Plant Colombia	Used for wounds and ulcers.	Decoction / External	Human Adult	AU1008
Entire Plant Paraguay	Used as fertility promoter by the rural populace.	Not stated / Not stated	Human Female	J01423
Leaf + Stem Paraguay	Used to reduce cholesterol and for diabetes	Infusion / Oral	Human Adult	AU1006

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Aerial Parts Peru	Used as an emmenagogue. Used for uterine ailments, rheumatic pain, malaria, and liver disease.	Hot H2O Ext / Oral Hot H2O Ext / Oral	Human Adult Human Adult	T04785 T15323
Aerial Parts Peru	Used for broncho-pulmonary disorders.	Infusion / Oral	Human Adult	ZZ1093
Leaf + Stem Peru	Used for stomachache. Used for consolidating dislocations.	Decoction / Oral Decoction / External	Human Adult	K27043
Leaf + Stem Peru	Used for gastrointestinal disorders.	Decoction / Oral	Human Adult	AU1007

Biological Activities for Extracts of Carqueja (Baccharis genistelloides)

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Aerial Parts Brazil	Toxic Effects (Acute)	HOT H2O EXT (1 gm/20 ml)	Oral Rat	1.5 ml/kg	Inactive	No toxicity noted	AU1001
Stem Brazil	Toxic Effects (General)	H2O EXT	Oral Rat & Mice	0.1 to 2 g/kg	Inactive	Did not alter spontaneous motor activity, sleeping time induced by barbiturates or tail-flick response.	AU1017
Aerial Parts Uruguay	Abortifacient Activity	HOT H2O EXT	Oral Rat	Not stated	Active	A water extract administered to rats daily for 15 days evidenced abortive effects in rats.	AU1002
Aerial Parts Uruguay	Uterine Stimulant Activity	HOT H2O EXT	Oral Rat	Not stated	Active		AU1002
Aerial Parts Bolivia	Hypoglycemic Activity	ETOH EXT	Oral Rat	500 mg/kg	Active	vs. glucose tolerance test inhibited glucose by 90.33% in normal rats	AU1009
Aerial Parts Bolivia	Hypoglycemic Activity	ETOH EXT	Oral Rat	500 mg/kg	Active	Reduced blood glucose by 23.14% in diabetic rats.	AU1009
Aerial Parts Uruguay	Hypoglycemic Activity	HOT H2O EXT	Oral Human	Not stated	Active	Lowered blood sugar levels in healthy volunteers.	AU1002
Aerial Parts Brazil	Hypoglycemic Activity	HOT H2O EXT	Oral Human	Not stated	Active	Lowered blood sugar levels by 32-40% in diabetic patients.	AU1016
Aerial Parts Brazil	Hypotensive Activity	HOT H2O EXT	Oral Rat	Various	Active	Induced diuresis and lowered arterial blood pressure.	AU1003
Aerial Parts Brazil	Hepatoprotective Activity	HOT H2O EXT ETOH EXT	IV Mouse	10 mg/kg 50 mg/kg	Active	vs. phalliodin induced liver damage. The crude extract at 50mg/kg increased survival rate dose-dependently from 26% in the control group to 100%in the treated group	AU1005

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Aerial Parts Brazil	Hepatoprotective Activity	Crude flavonoid EXT	IV Mouse	10 mg/kg 50 mg/kg	Active	vs. phalliodin induced liver damage. The flavonoid extract at 50mg/kg increased survival rate dose-dependently from 26% in the control group to 100% in the treated group.	AU1005
Stem Brazil	Analgesic Activity	H2O EXT	Oral Rat	0.1 to 2 g/kg	Active	Decreased by 40% the number of writhings induced by acetic acid.	AU1017
Aerial Parts Brazil	Analgesic Activity	Butanolic Fraction	IP Mice	100 mg/kg	Active	Reduced acetic acid-induced abdominal constrictions by 95.1%	AU1018
Aerial Parts Brazil	Analgesic Activity	Butanolic Fraction	IP Mice	50 mg/kg	Active	Reduced acetic acid-induced abdominal constrictions by 67.4%	AU1018
Aerial Parts Brazil	Bitter tasting effect	HOT H2O EXT	Oral Human Adult	Various	Active	Used as a bitter to stimulate bile production.	H01410
Dried Leaf Bolivia	Antiulcer Activity	H2O EXT Hexane EXT	Intragastric rat	1.25 gm/kg	Active	vs. ethanol-induced ulcers	L11050
Stem Brazil	Antiulcer Activity	H2O EXT	IP Rat Intraduodenal Rat	1 g/kg 2 g/kg	Active	Reduced gastric secretion in pylorus ligated rats and raised gastric pH.	AU1017
Dried Leaf Bolivia	Antiulcer Activity	CH2Cl2 EXT ETOH EXT	Intragastric rat	1.25 gm/kg	Inactive	vs. ethanol-induced ulcers.	L11050
Stem Brazil	Antiulcer Activity	H2O EXT	Oral Rat	1 g/kg	Active	Prevented gastric ulcers induced by cold immobilization but not those induced by indomethacin.	AU1017
Stem Brazil	Intestinal Transit Delay Activity	H2O EXT	Oral Mouse	2 g/kg	Active	Delayed intestinal transit of charcoal by 20%	AU1017
Entire Plant Bolivia	Antiviral Activity	H2O EXT	Cell Culture	25.0 mcg/ml	Active	Virus - *Herpes simplex* 1	L06519
Entire Plant Bolivia	Antiviral Activity	H2O EXT	Cell Culture	25.0 mcg/ml	Active	Virus - *Vesicular stomatitis*	L06519
Entire Plant Bolivia	Antiviral Activity	H2O EXT	Cell Culture	25.0 mcg/ml	Inactive	Virus - *Polio virus* I	L06519

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Aerial Parts Bolivia	Antiviral Activity	H20 EXT	Cell Culture	1 to 4 mcg/ml	Active	vs. HIV-1	AU1019
Leaf + Stem Bolivia	Antiviral Activity	H2O EXT	Cell Culture	50.0 mcl	Active	virus - HIV vs. mt-2 t-lymphoblastoid cells infected with HIV	K29837
Entire Plant Bolivia	Cytotoxic Activity	ETOH EXT	Cell Culture	25.0 mcg/ml	Weak Activity	HeLa cells.	L06519
Entire Plant Brazil	Antioxidant Activity	Saline Ext	Agar Plate	5.0 mg/ml	Weak Activity	*Escherichia coli* vs. stannous chloride oxidative damage.	L17930
Aerial Parts Brazil	Anti-inflammatory Activity	Butanolic Fraction	IP Mice	20 to 100 mg/kg	Strong Activity	Pretreatment with extract inhibited carrageenan induced inflammation by 70-90% and inhibited dextran induced inflammation by 25-71%	AU1018
Aerial Parts Brazil	Anti-inflammatory Activity	Butanolic Fraction	IP Mice	20 to 100 mg/kg	Weak Activity	vs. C16-paf- and arachidonic acid induced swelling	AU1018
Aerial Parts Brazil	Anti-inflammatory Activity	Butanolic Fraction	IP Mice	20 to 100 mg/kg	Inactive	vs. zymosan induced edema	AU1018
Stem Brazil	Anti-inflammatory Activity	H2O EXT	Oral Rat	0.1 to 2 g/kg	Inactive	vs. carrageenan and dextran paw edema	AU1017
Dried Leaf Bolivia	Antimalarial Activity	ETOH EXT ETOH EXT	Not stated Intragastric rat	100.0 mcg/ml 966.0 mg/kg	Active Active	*Plasmodium falciparum* *Plasmodium vinckei*	L12113
Entire Plant Brazil	Antimalarial activity	CHCL3 EXT	SC Chicken	425.0 mg/kg	Inactive	*Plasmodium gallinaceum*	A00785
Entire Plant Brazil	Antimalarial activity	H2O EXT	Oral Chicken	9.8 gm/kg	Inactive	*Plasmodium gallinaceum*	A00785
Entire Plant Brazil	Antimalarial Activity	Alkaloid Fraction	Broth Culture	Not stated	Inactive	*Plasmodium cathemerium*	A04980
Aerial Part Bolivia	Insecticide activity	Essential Oil	In vivo	1.0 mg/insect	Inactive	*Triatoma infestans*	L18411
Essential Oil Bolivia	Insecticide Activity	Essential Oil	Not stated	50.0 mg/liter	Inactive	*Aedes aegypti*	L15839
Entire Plant Bolivia	Antileishmaniasis Activity	ETOAC EXT ETOH EXT Pet Ether EXT	Cell Culture	100.0 mcg/ml	Inactive	*Leishmania amazonensis* *Leishmania braziliensis* *Leishmania donovani*	K23096
Entire Plant Bolivia	Antitrypanosomal Activity	ETOAC EXT ETOH EXT Pet Ether EXT	Cell Culture	100.0 mcg/ml	Inactive	*Trypanosoma cruzi* (various strains)	K23096

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant Brazil	Antitrypanosomal Activity	H2O EXT	Broth Culture	Not stated	Active	*Trypanosoma cruzi*	AU1012
Entire Plant Brazil	Antiprotozoan Activity	Alkaloid Fraction	Broth Culture	Not stated	inactive	*Haemoproteus columbae*	A04980

Biological Activities for Compounds in Carqueja (Baccharis genistelloides)

Compound Tested	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Carquejol	Toxic Effects (Acute)	Oral Rat IP Rat	LD50= 1.3 g/kg LD50= 0.41 g/kg	Active		AU1004
Carquejol	Hypocholestolemic Effects	IP Rat	Not Stated	Active	Lowered blood cholesterol levels by 5-10%	ZZ1078
Hispidulin	Hepatoprotective Activity	IV Mouse	10 mg/kg 50 mg/kg	Active	vs. phalliodin induced liver damage. At 50mg/kg hispidulin increased survival rate dose-dependently from 26% in the control group to 80%	AU1005
Flavonoid Fraction which included quercetin, luteolin, nepetin, apigenin and hispidulin	Hepatoprotective Activity	IV Mouse	10 mg/kg 50 mg/kg	Active	vs. phalliodin induced liver damage. At 50mg/kg the flavonoid mixture increased survival rate dose-dependently from 26% in the control group to 70% in the treated group.	AU1005
Clerodane diterpenoids	Insecticidal Activity	In vivo	Various	Active	vs. *Tenebrio molitor* larvae	AU1015
3,5-Dicaffeoylquinic acid	Antiviral Activity	In vitro	1 to 4 mcg/ml IC50= 0.03 mcg /ml ED50=1.0 mcg/ml LD50 > 150 mcg/ml	Strong Activity	vs. HIV-1 shown to be a potent inhibitor of the HIV-1 integrase reaction. Therapeutic index was > 150 (LD50 vs ED50). No toxicity noted.	AU1019

Presence of Compounds in Carqueja (Baccharis genistelloides)

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Apigenin	Flavone	Aerial Parts	Brazil	00.02667%	H01410
Baccharis genistelloides clerodane diterpene 4-a	Sesquiterpene	Aerial Parts	Brazil	00.00360%	H01410
Baccharis trimera diterpene 2-a	Diterpene	Aerial Parts	Brazil	00.10760%	H01410
Baccharis trimera diterpene 1-b	Diterpene	Aerial Parts	Brazil	00.24400%	H01410
Bicyclogermacrene	Sesquiterpene	Aerial Parts Essential Oil	Bolivia Brazil	00.01333% 01.58%	T05901 K12940
Cadinene, delta:	Sesquiterpene	Essential Oil	Brazil	01.78%	K12940
Calacorene	Sesquiterpene	Essential Oil	Brazil	05.74%	K12940
Camphene	Monoterpene	Essential Oil Essential Oil	Brazil Brazil	00.15	K12940 N05594
Carquejol	Monoterpene	Essential Oil Essential Oil	Brazil Brazil	 02.3%	N05594 K12940
Carquejol acetate	Monoterpene	Essential Oil Essential Oil	Brazil Brazil	69.0% 42.82%	N05594 K12940
Caryophyllene, beta:	Sesquiterpene	Essential Oil	Brazil	01.34%	K12940
Chromium	Inorganic	Part Not Specified	Brazil		M29199
Chrysanthenone	Monoterpene	Essential Oil	Brazil	00.28%	K12940
Cineol, 1-8:	Monoterpene	Essential Oil	Brazil	Trace	K12940
Cinnamic acid,3-4-dimethoxy: benzyl ester	Phenylpropanoid	Aerial Parts	Brazil	00.00350%	H01410
Cirsiliol	Flavone	Aerial Parts	Brazil	00.00840%	H01410
Cirsimaritin	Flavone	Aerial Parts Aerial Parts	Bolivia Brazil	00.00992% 00.02120%	H13518 H01410

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Cleroda-3-ene,15-16-diacetoxy-7-alpha-18-dihydroxy: ent:	Diterpene	Aerial Parts	Bolivia	00.02724%	H13518
Cleroda-3-ene,15-16-epoxy-7-alpha-18-dihydroxy-15-methoxy: ent:	Diterpene	Aerial Parts Aerial Parts	Bolivia Bolivia	00.00476% 00.08%	H13518 H13518
Cleroda-3-ene,15-16-epoxy-7-alpha-18-dihydroxy-15-oxo: ent:	Diterpene	Aerial Parts	Bolivia	00.0048%	H13518
Cleroda-3-ene,7-alpha-15-18-trihydroxy: ent:	Diterpene	Aerial Parts	Bolivia	00.01176%	H13518
Clerodan-15-20-dioic acid,lactone,3-4-dehydro: 16-19-dihydroxy-7-oxo:	Diterpene	Aerial Parts	Brazil	00.00560%	H01410
Clerodan-15-20-dioic acid-dilactone,3,4-dehydro: 16-19-dihydroxy-7-oxo:	Diterpene	Aerial Parts	Bolivia	00.02667%	T05901
Copaene, alpha:	Sesquiterpene	Essential Oil	Brazil	Trace	K12940
Cubebene, alpha:	Sesquiterpene	Essential Oil	Brazil	00.18%	K12940
Cubebene, beta:	Sesquiterpene	Essential Oil	Brazil	00.24%	K12940
Cyclohepta-2-4-dien-1-one, 2-6-6-tri methyl:	Monoterpene	Essential Oil	Brazil	00.515	K12940
Cymene, para:	Monoterpene	Essential Oil	Brazil	00.06%	K12940
Cyperene	Sesquiterpene	Essential Oil	Brazil	00.63%	K12940
Dicaffeoylquinic acid; 3,5-	Diterpene	Aerial Parts	Not stated		AU1019
Elemene, beta:	Sesquiterpene	Essential Oil	Brazil	03.49%	K12940
Elemene, delta:	Sesquiterpene	Essential Oil	Brazil	00.07%	K12940
Elemol	Sesquiterpene	Essential Oil	Brazil	00.39%	K12940
Eriodictyol	Flavanone	Aerial Parts	Brazil	00.00500%	H01410
Eudesmol	Sesquiterpene	Essential Oil	Brazil	Trace	K12940
Eudesmol, beta:	Sesquiterpene	Essential Oil	Brazil	01.43%	K12940
Eugenol,iso: cis: methyl ether	Phenylpropanoid	Essential Oil	Brazil	00.08%	K12940

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Eupatorin	Flavone	Aerial Parts	Bolivia	00.384%	H13518
Eupatrin	Flavone	Aerial Parts	Brazil	00.65800%	H01410
Farnesene, beta: cis:	Sesquiterpene	Essential Oil	Brazil	00.68%	K12940
Farnesol	Sesquiterpene	Essential Oil	Brazil		N05594
Flavone, 5-hydroxy-3'-4'-6-7-tetrame thoxy:	Flavone	Aerial Parts	Bolivia	00.00536%	H13518
Genkwanin	Flavone	Aerial Parts	Brazil	00.02311%	H01410
Germacrene D	Sesquiterpene	Aerial Parts Essential Oil	Bolivia Brazil	00.01667% 04.34%	T05901 K12940
Ledol	Sesquiterpene	Essential Oil	Brazil	01.04%	K12940
Limonene	Monoterpene	Essential Oil	Brazil Brazil	 02.65%	N05594 K12940
Linalool	Monoterpene	Essential Oil	Brazil	00.07%	K12940
Muurolene, alpha:	Sesquiterpene	Essential Oil	Brazil	00.52%	K12940
Myrcene	Monoterpene	Essential Oil	Brazil	00.75%	K12940
Nerolidol	Sesquiterpene	Essential Oil	Brazil	30.0%	N05594
Ocimene, beta: cis:	Monoterpene	Essential Oil	Brazil	00.09%	K12940
Ocimene, beta: trans:	Monoterpene	Essential Oil	Brazil	03.47%	K12940
Octa-1-7-dien-3-one,2-methyl-6-methylene:	Monoterpene	Essential Oil	Brazil	00.09%	K12940
Palustrol	Sesquiterpene	Essential Oil	Brazil	00.08%	K12940
Pentadecanol, 6-10-14-trimethyl-2-et hylidene:	Diterpene	Aerial Parts	Bolivia	00.01667%	T05901
Phellandrene, alpha:	Monoterpene	Essential Oil	Brazil	00.06%	K12940
Phellandrene, beta:	Monoterpene	Essential Oil	Brazil	02.3%	K12940
Phytol, trans:	Diterpene	Aerial Parts	Bolivia	00.00944%	H13518

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Pinene, alpha:	Monoterpene	Essential Oil Essential Oil	Brazil Brazil	00.2%	K12940 N05594
Pinene, beta:	Monoterpene	Essential Oil Essential Oil	Brazil Brazil	08.24%	K12940 N05594
Sabinene	Monoterpene	Essential Oil	Brazil	01.29%	K12940
Spatholenol	Sesquiterpene	Aerial Parts	Bolivia	00.00164%	H13518
Spathulenol	Sesquiterpene	Essential Oil	Brazil	00.29%	K12940
Squalene	Triterpene	Root	Bolivia	00.002	T05901
Styrene, alpha-para-dimethyl:	Monoterpene	Essential Oil	Brazil	00.18%	K12940
Terpinene, alpha:	Monoterpene	Essential Oil	Brazil	00.05%	K12940
Terpinene, gamma:	Monoterpene	Essential Oil	Brazil	00.1%	K12940
Terpinolene	Monoterpene	Essential Oil	Brazil	00.16%	K12940
Viridiflorene	Sesquiterpene	Essential Oil	Brazil	00.44%	K12940
Viridiflorol	Sesquiterpene	Essential Oil	Brazil	00.84%	K12940
Ylangene, alpha:	Sesquiterpene	Essential Oil	Brazil	01.41%	K12940

LITERATURE CITED

A00785	SURVEY OF PLANTS FOR ANTIMALARIAL ACTIVITY. SPENCER,CF: KONIUSZY,FR: ROGERS,EF: SHAVEL JR,J: EASTON,NR: KACZKA,EA: KUEHL JR,FA: PHILLIPS,RF: WALTI,A: FOLKERS,K: MALANGA,C: SEELER,AO: LLOYDIA 10 : 145-174 (1947) (RES LAB MERCK + CO,INC RAHWAY NJ USA)
A04980	QUININE AND ALKALOIDS IN BRAZIL. WASICKY,R: UNTI,O: BARBIERI,E: AN FAC FARM ODONTOL UNIV SAO PAULO 3 : 137- (1942) (NO ADDRESS GIVEN)
H01410	STUDIES ON THE CONSTITUENTS OF BACCHARIS GENISTELLOIDES. KUROYANAGI,M: FUJITA,K: KAZAOKA,M: MATSUMOTO,S: UENO,A: FUKUSHIMA,S: KATSUOKA,M: CHEM PHARM BULL 33 11: 5075-5078 (1985) (SHIZUOKA COLL PHARM SHIZUOKA 422 JAPAN)
H13518	NEO-CLERODANE DITERPENOIDS AND OTHER CONSTITUENTS FROM BACCHARIS GENISTELLOIDES. SUTTISRI,R: KINGHORN,AD: WRIGHT,AD: STICHER,O: PHYTOCHEMISTRY 35 2: 443-446 (1994) (PROGRAM COLLAB RES PHARM SCI COLL PHARMACY UNIV ILLINOIS AT CHICAGO CHICAGO IL 60680 USA)
J01423	TWO HUNDRED SIXTY-EIGHT MEDICINAL PLANTS USED TO REGULATE FERTILITY IN SOME COUNTRIES OF SOUTH AMERICA. UNPUBLISHED (STENCILED) REVIEW IN SPANISH. MORENO A,R: BOOK : - (1975) (PARAGUAY)
K07977	ANTIMALARIAL EXPERIMENTAL CHEMOTHERAPY USING NATURAL PRODUCTS. BRANDAO,M: BOTELHO,M: KRETTLI,E: CIENC CULT 37 7: 1152-1163 (1985) (DEPT PARASITOL INST CIEN BIOL BRAZIL)
K12940	ESSENTIAL OIL FROM CARQUEJA. (BACCHARIS GENISTELLOIDES PERS.). CHIALVA,F: DOGLIA,G: J ESSENT OIL RES 2 : 173-177 (1990) (MARTINI & ROSSI SPA TORINO ITALY)
K23096	LEISHMANICIDAL AND TRYPANOCIDAL ACTIVITIES OF BOLIVIAN MEDICINAL PLANTS. FOURNET,A: BARRIOS,AA: MUNOZ,V: J ETHNOPHARMACOL 41 1/2: 19-37 (1994) (DEV COOPER INST FRANCAIS RECH PARIS 75480 FRANCE)
K27043	MEDICINAL PLANTS FROM PAMPALLAKTA: AN ANDEAN COMMUNITY IN CUZCO (PERU). YELASCO-NEGUERUELA,A: PEREZ-ALONSO,MJ: ESENARRO ABARCA,G: FITOTERAPIA 66 5: 447-462 (1995) (DEPT PLANT BIOL FAC BIOL COMPLUTENSE UNIV MADRID SPAIN)
K29837	DRUG LEADS FROM THE KALLAWAYA HERBALISTS OF BOLIVIA. 1. BACKGROUND, RATIONALE, PROTOCOL AND ANTI-HIV ACTIVITY. ABDEL-MALEK,S: BASTIEN,JW: MAHLER,WF: JIA,Q: REINECKE,MG: ROBINSON JR,WE: SHU,YH: ZALLES-ASIN,J: J ETHNOPHARMACOL 50 3: 157-166 (1996) (DEPT CHEM TEXAS CHRISTIAN UNIV TEXAS 76129 USA)
L06519	ANTIVIRAL ACTIVITY OF BOLIVIAN PLANT EXTRACTS. ABAD,MJ: BERMEJO,P: GONZALES,E: IGLESIAS,I: IRURZUN,A: CARRASCO,L: GEN PHARMACOL 32 4: 499-503 (1999) (DEPT FARMCOL FAC FARM UNIV COMPLUTENSE MADRID 28040 SPAIN)
L11050	GASTRIC CYTOPROTECTION OF BOLIVIAN MEDICINAL PLANTS. GONZALES,E: IGLESIAS,I: CARRETERO,E: VILLAR,A: J ETHNOPHARMACOL 70 3: 329-333 (2000) (INST INVEST GARMAC BIOQUIM FAC FARMACIA UNIV MAYOR SAN ANDRES PAX BOLIVIA)

L12113	A SEARCH FOR NATURAL BIOACTIVE COMPOUNDS IN BOLIVIA THROUGH A MULTIDISCIPLINARY APPROACH PART III. EVALUATION OF THE ANTIMALARIAL ACTIVITY OF PLANTS USED BY ALTENOS INDIANS. MUNOZ,V: SAUVAIN,M: BOURDY,G: ARRAZOLA,S: CALLAPA,J: RUIZ,G: CHOQUE,J: DEHARO,E: J ETHNOPHARMACOL 71 1/2: 123-131 (2000) (INST BOLIVIA BIOL ALTURA LA PAZ BOLIVIA)
L15839	INSECTICIDAL ACTIVITY OF ESSENTIAL OILS ON AEDES AEGYPTI LARVAE. CHANTRAINE,JM: LAURENT,D: BALLIVIAN,C: SAAVEDRA,G: IBANEZ,R: VILASECA,LA: PHYTOTHER RES 12 5: 350-354 (1998) (ORSTOM COCHABAMBA BOLIVIA)
L17930	EFFECT OF THE CYMBOPOGON CITRATUS, MAYTENUS ILICIFOLIA AND BACCHARIS GENISTELLOIDES EXTRACTS AGAINST THE STANNOUS CHLORIDE OXIDATIVE DAMAGE IN ESCHERICHIA COLI. DE F MELO,S: SOARES,S: COSTA,RF: DA SILVA,CR: DE OLIVEIRA,BN: BEZERRA,JAC: CALDEIRA DE ARAUJO,A: BERNARDO FILHO,M: MUTAT RES 496 1/2: 33-38 (2001) (DEPT BIOFISICA BIOMETRIA UNIV ESTADO RIO JANEIRO RIO JANEIRO BRAZIL)
L18411	INSECTICIDAL ACTIVITY OF ESSENTIAL OILS ON TRIATOMA INFESTANS. LAURENT,D: VILASEACA,LA: CHANTRAINE,JM: BALLIVIAN,C: SAAVEDRA,G: IBANEZ,R: PHYTOTHER RES 11 4: 285-290 (1997) (ORSTOM COCHABAMBA BOLIVIA)
M29199	CHROMIUM IN PLANTS COMPARISON BETWEEN THE CONCENTRATION OF CHROMIUM IN BRAZILIAN NONHYPO AND HYPOGLYCEMIC PLANTS. FELCMAN,J: BRAGANCA,MLT: BIOL TRACE ELEMENT RES 17 1: 11-16 (1988) (DEPT CHEM PONTIFICIA UNIV CATOL RIO DE JANEIRO RJ BRAZIL)
N05594	ESSENTIAL OILS OF BACCHARIS DRACUNCULIFOLIA DC. AND BACCHARIS GENISTELLOIDES PERS. FROM RIO GRANDE DO SUL (BRAZIL). BAUER,L: BRASIL E SILVA,GADA: DE SIQUEIRA,NCS: BACH,CTM: SANT'ANA,BMS: REV CENT CIENC SAUDE UNIV FED ST MARIA 6 3/4: 7-11 (1978) (DEPT PROD MATER PRIMA UNIV FED RIO GRANDE DO SUL PORT ALEGRE BRAZIL)
T04785	THE USE OF CERTAIN PLANTS FROM THE TRADITIONAL PHARMACOPOEIA OF PERU. HOET,P: PLANT MED PHYTOTHER 14 3: 193-201 (1980) (UNIV CATOLICA PERU LIMA PERU)
T05014	BOTANICAL REMEDIES OF SOUTH AND CENTRAL AMERICA, AND THE CARIBBEAN: AN ARCHIVAL ANALYSIS. PART I. HIRSCHHORN,HH: J ETHNOPHARMACOL 4 2: 129-158 (1981) (SALUS-HAUS NATUR-ARZENIMETTEL BRUCKMUHL/MANGFALL D-8206 GERMANY)
T05901	NATURALLY OCCURRING TERPENE DERIVATIVES. 196. A NEW DITERPENE AND ADDITIONAL CONSTITUENTS FROM BACCHARIS SPECIES. BOHLMANN,F: KNAUF,W: KING,RM: ROBINSON,H: PHYTOCHEMISTRY 18 : 1011-1044 (1979) (ORG CHEM INST TECH UNIV BERLIN BERLIN D-1000 GERMANY)
T15323	VEGETALES EMPLEADOS EN MEDICINA TRADICIONAL NORPERUANA. RAMIREZ,VR: MOSTACERO,LJ: GARCIA,AE: MEJIA,CF: PELAEZ,PF: MEDINA,CD: MIRANDA,CH: BANCO AGRARIO DEL PERU & NACL UNIV TRUJILLO, TRUJILLO, PERU, JUNE, 1988 : 54PP- (1988) (UNIV TRUJILLO TRUJILLO PERU)
AU1001	EVALUACIÓN DE LOS EFECTOS TÓXICOS DE LA ADMINISTRACIÓN ORAL DE BACCHARIS TRIMERA EN RATAS.; PEDRAZZI H. ET AL.: FITOTERAPIA. MARZO DE 1997.
AU1002	USO RACIONAL DE LAS PLANTAS MEDICINALES; ALONSO PAZ E.; BASSAGODA M. Y FERREIRA F.: YUYOS:. EDIT. FIN DE SIGLO FACULTAD DE QUÍMICA, MONTEVIDEO, URUGUAY. 1992.

AU1003	AÇOES ANTIÚLCERA E ANTIÁCIDA DO EXTRACTO AQUOSO E DAS FRAÇOES DA B. TRIMERA.; GAMBERINI M. & LAPA A.: ANAIS XII SIMPOSIO DE PLANTAS MEDICINAIS DO BRASIL. UFP, CURITIBA, PARANÁ. 15-17 SETIEMBRE DE 1992.
AU1004	AVALIAÇAO DA ATIVIDADE ANTIULCERA DO EXTRATO BRUTO E FRAÇOES DE BACCHARIS TRIMERA. SOUSA, BRIT, ET AL.: XIIIº SIMPOSIO DE PLANTAS MEDICINALES DO BRASIL. UNICAMP. 1992.
AU1005	CHARACTERIZATION OF FLAVONOIDS FROM B. TRIMERA AND THEIR ANTI -HEPATOTOTOXIC PROPERTIES. SOICHE H. & LENG PESCHLOW E.: PLANTA MEDICA. VOL. 53, Nº 1, PP. 37-39. (1987).
AU1006	MONOGRAPH: CARQUEJA; DR. JORGE ALONSO; IN PLANTAS MEDICINALES; ED, ASOCIACION ARGENTINA DE FITOMEDICINA. 2000.
AU1007	VELASCO NEGUERUELA A.; PÉREZ ALONSO M. AND ESENARRO ABARCA G.: MEDICINAL PLANTS FROM PAMPALLAKTA: AN ANDEAN COMMUNITY IN CUZCO (PERÚ). FITOTERAPIA. VOL. LXVI, Nº 5, PP. 447-461. (1995).
AU1008	270 PLANTAS MEDICINALES IBEROAMERICANAS. LAPA A. ET AL.: CITED, UNESCO. COLOMBIA. 1996.
AU1009	EVALUACION IN VIVO DE LA ACTIVIDAD HIPOGLUCEMIANTE DE PLANTASMEDICINALES DE LOS VALLES ALTOS Y BAJOS DE COCHABAMBA; HOSSEN S. ALEJANDRA; PERYRA M. VIVIAN Y BUSTAMANTE G. ZULEMA.; UNIVERSIDAD MAYOR DE SAN SIMÓN-INSTITUTO DE INVESTIGACIONES BIOQUÍMICO-FARMACÉUTICAS-PROGRAMA FÁRMACOS, ALIMENTOS Y COSMÉTICOS (PROFAC).CASILLA 992. COCHABAMBA-BOLIVIA
AU1010	MEDICINA POPULAR; CAMARGO, MTL; ALMED EDITORA E LIVARIA (SAO PAULO, BRAZIL) (BOOK 1985) P 61-63.
AU1011	FAMACIA VERDE MONOGRAPH: CARQUEJA; CENTRO UNIVERSITÁRIO DE LAVRAS; (RUA PADRE JOSÉ POGGEL, 506 - CENTENÁRIO - 37200-000 BRAZIL) 2001
AU1012	PLANTAS DA MEDICINA POPULAR NO RIO GRANDE DO SUL; SIMOES, CLAUDIA, ET AL.; PORTO ALEGRE, EDITORA DA UNIVERSIDADE 1986, P. 42-5
AU1013	DICIONARIO DAS PLANTAS UTEIS DO BRASIL E DAS EXOTICAS CULTIVADAS. VOL. II; P. 74-5.; CORREA, M. PIO; RIO DE JANEIRO 1931; MINISTERIO DA AGRICULTURA (BRAZIL)
AU1014	FAMACOGNOSIA VOL.2 2ND ED.; P. 1011-12; COSTA, AF; FUNDACAO CALOUSTE GULBENKIAN; LISBOA 1978
AU1015	INSECT ANTIFEEDANT ACTIVITY OF CLERODANE DITERPENOIDS; SOSA, M. E., ET AL.; J. NAT. PROD. 1994; 57(9): 1262-65.
AU1016	EFFECT OF AN EXTRACT OF *BACCHARIS GENISTELLOIDES* ON THE GLUCOSE LEVEL OF THE BLOOD.; XAVIER, A. A., ET AL. C R SEANCES SOC. BIOL. FIL. 161, 4 (1967): 972-74.
AU1017	INHIBITION OF GASTRIC SECRETION BY A WATER EXTRACT FROM BACCHARIS TRIPTERA, MART.; GAMBERINI MT, SKORUPA LA, SOUCCAR C, LAPA AJ; .MEM INST OSWALDO CRUZ 1991;86 SUPPL 2:137-9 (ESCOLA PAULISTA DE MEDICINA DEPARTAMENTO DE FARMACOLOGIA INFAR, SAO PAULO, BRASIL.)

AU1018	ANTI-INFLAMMATORY AND ANALGESIC ACTIVITY OF BACCHARIS TRIMERA: IDENTIFICATION OF ITS ACTIVE CONSTITUENTS. GENE RM, CARTANA C, ADZET T, MARIN E, PARELLA T, CANIGUERAL S.; PLANTA MED 1996 JUN;62(3):232-5; (UNITAT DE FARMACOLOGIA I FARMACOGNOSIA, FACULTAT DE FARMACIA, UNIVERSITAT DE BARCELONA, SPAIN.)
AU1019	INHIBITORS OF HIV-1 REPLICATION THAT INHIBIT HIV INTEGRASE.; ROBINSON, W.E.; REINECKE, M.G.; ABDEL-MALEK, S.; JIA, Q.; CHOW, S.A.; PROC NATL ACAD SCI USA 93(13):6326-6331 (1996).
ZZ1002	PLANTAS MEDICINAIS BRAZILEIRAS, CONHECIMENTOS POPULARES E CIENTIFICOS. ALMEIDA, DE, E. R. SÃO PAULO: HEMUS EDITORA LTDA., 1993.
ZZ1013	DICIONARIO DAS PLANTAS UTEIS DO BRAZIL, 5TH ED. CRUZ, G. L. RIO DE JANEIRO: BERTRAND, 1995.
ZZ1072	PLANTAS QUE AJUDAM O HOMEM: GUIA PRÁTICO PARA A ÉPOCA ATUAL, 5TH ED. CARIBÉ, DR. JOSÉ, AND DR. JOSÉ MARIÁ CAMPOS. SÃO PAULO, BRAZIL: EDITORA PENSIMENTO, LTDA., 1997.
ZZ1076	AS SENSACIONAIS 50 PLANTAS MEDICINAIS: CAMPEÃ DE PODER CURATIVO, VOL. 1, 4TH ED. FRANCO, LELINGTON L.; BRAZIL: EDITORA NATURISTA, 1999.
ZZ1078	FARMACIAS VIVAS: SISTEMA DE UTILIZACO DE PLANTAS MEDICINAIS PROJETADO PARA PEQUENAS COMUNIDADES. MATOS, F. J. ABREU; FORTALEZA, BRAZIL: EDICOES UFC, 1994.
ZZ1079	PLANTAS DE CURAM: CUDIE DA SUA SAÚDE ATRAVÉS DE NATUREZA, 5TH ED. SÃO PAULO, BRAZIL: MOREIRA, FREDERICO; HEMUS EDITORA LTDA., 1996.
ZZ1081	PLANTAS QUE CURAM:, 11TH ED. PANIZZA, SYLVIO, AND CHERIO DE MATO; SÃO PAULO, BRAZIL: IBRASA, 1997.
ZZ1092	PLANTAS MEDICINAIS (CD-ROM). AGROMÍDIA SOFTWARE; SÃO PAULO, BRAZIL, 2002.
ZZ1093	PERÚ—EL LIBRO DE LAS PLANTAS MÁGICAS, 2ND ED. ZADRA, DE, ADRIANA ALARCO; LIMA: CONCYTEC, 2000.
ZZ1096	ETHNOBOTANICAL SURVEY OF THE MEDICINAL PLANTS IN THE DOMINION OF MEADOWS IN THE REGION OF THE ALTO RIO GRANDE - MINAS GERAIS; RODRIGUES, V. E. G., ET AL; CIENC. AGROTEC., LAVRAS V.25, N.1, 102-123 JAM/FEB 2001 (BRAZIL)

ABSTRACTS

Mutat Res 2001 Sep 20;496(1-2):33-8

Effect of the Cymbopogon citratus, Maytenus ilicifolia and Baccharis genistelloides extracts against the stannous chloride oxidative damage in Escherichia coli.

Melo SF, Soares SF, da Costa RF, da Silva CR, de Oliveira MB, Bezerra RJ, Caldeira-de-Araujo A, Bernardo-Filho M.

Departamento de Biofisica e Biometria, Instituto de Biologia Roberto Alcantara Gomes, Universidade do Estado do Rio de Janeiro, Av 28 de setembro, 87 20551-030, RJ, Rio de Janeiro, Brazil.

Stannous ion has been used in different sectors of human interest, such as in food industry and in health sciences. Much is known about stannous chloride (SnCl(2)) toxicity, although, there is no general agreement regarding its genotoxicity. Cymbopogon citratus, Maytenus ilicifolia and Baccharis genistelloides extracts have been used in popular medicine. We evaluated the influence of these crude extracts on the survival of the Escherichia coli wild type (AB 1157) strain submitted to SnCl(2) treatment. Reactive oxygen species (ROS) can be generated by a Fenton like reaction induced by SnCl(2). E. coli culture was treated simultaneously with SnCl(2) and a specific extract. Our results showed a reduction of the SnCl(2) effect on the survival of the cultures in presence of the crude extracts. The extract of M. ilicifolia showed the highest level of protection action against the SnCl(2) effect in comparison with the other extracts. This protector effect could due to the redox properties of these crude extracts. The compounds in the crude extracts could (i) chelate stannous ions, protecting them against the oxidation and avoiding the generation of ROS, (ii) be a scavenger of the ROS generated by the SnCl(2) oxidation and/or (iii) have oxidant compounds that could oxidise the stannous ions, abolishing or reducing the SnCl(2) effect.

Phytochemistry 2000 Nov;55(6):617-9

Diterpene from Baccharis trimera with a relaxant effect on rat vascular smooth muscle.

Torres LM, Gamberini MT, Roque NF, Lima-Landman MT, Souccar C, Lapa AJ.

Universidade Federal de Sao Paulo, Escola Paulista de Medicina, Department of Pharmacology, SP, Brazil.

A bioassay monitored fractionation of a chloroform extract from the aerial parts of Baccharis trimera yielded a mixture that blocked the Ca2+-induced contractions of KCl- depolarized rat portal vein preparations. Pharmacological tests of two pure compounds isolated from the mixture revealed the dilactonic clerodane diterpene as the active compound.

Gen Pharmacol 1999 Apr;32(4):499-503

Antiviral activity of Bolivian plant extracts.

Abad MJ, Bermejo P, Gonzales E, Iglesias I, Irurzun A, Carrasco L.

Departamento de Farmacologia, Facultad de Farmacia, Universidad Complutense, Madrid, Spain.

Ethanolic and aqueous extracts of seven plant species used in the traditional medicine of Bolivia have been tested for their antiviral activity against herpes simplex type I (HSV-1), vesicular stomatitis virus (VSV), and poliovirus type 1. The aqueous extracts of most of the species investigated showed antiviral activity. Two of these plants-namely, Satureja boliviana and Baccharis genistelloides-were active against two different viruses-HSV-1 and VSV.

J Nat Prod 1994 Sep;57(9):1262-5

Insect antifeedant activity of clerodane diterpenoids.

Sosa ME, Tonn CE, Giordano OS.

Departamento de Bioquimica y Ciencias Biologicas, Facultad de Quimica, Bioquimica y Farmacia, Universidad Nacional de San Luis, Argentina.

Fourteen clerodane-type diterpenoids isolated from plants in the genera Baccharis, Teucrium, and Salvia were assayed for antifeedant activity against Tenebrio molitor larvae in order to establish structure-activity relationships. Among the compounds tested, furanoditerpenes with alpha, beta-unsaturated-gamma-lactone moieties, or C-4-epoxy substitution with C-5-methylacetoxy or C-12-acyloxy functionalities, exhibited maximal antifeedant and repellent activities.

Planta Med 1996 Jun;62(3):232-5

Anti-inflammatory and analgesic activity of Baccharis trimera: identification of its active constituents.

Gene RM, Cartana C, Adzet T, Marin E, Parella T, Canigueral S.

Unitat de Farmacologia i Farmacognosia, Facultat de Farmacia, Universitat de Barcelona, Spain.

The butanolic fraction (BT-II) derived from the aqueous crude extract was prepared from aerial parts of Baccharis trimera and assessed in anti-inflammatory, analgesia, and ulcerogenesis models. Intraperitoneal pretreatment with lyophilized BT-II, at doses ranging from 40 to 100 mg/kg, markedly inhibited carrageenan- and dextran-induced inflammation (70.4-90.8% and 25.7-71.3%, respectively) and weakly decreased C16-paf- and arachidonic acid-induced swelling (24.9-36.7% and 0-30.6%, respectively). No effect was observed, at the same doses, on zymosan-induced edema. The intraperitoneal examination indicates that the anti-phlogistic action of BT-II was not due to an irritating effect at the injection site. Besides, BT-II reduced abdominal constrictions in mice following injection of acetic acid: at 50 mg/kg, it gave 67.4% inhibition and, at 100 mg/kg, 95.1%. The ulcerogenic assay showed that the incidence of ulcers after BT-II i.p. treatment was 2/6 at 50 mg/kg and 6/6 at 100 mg/kg. Ulcerogenic indices were 1.3 +/- 0.5 and 2.7 +/- 0.8, respectively. These results indicate that B.trimera shows strong anti-inflammatory and analgesic properties which seem to be due, at least partly, to the inhibition of prostaglandin biosynthesis. The chromatographic separation of BT-II monitored by bio-assay (carrageenan-induced edema test in mice) was carried out. The active constituents were found to be mainly saponins in which echinocystic acid (or its enantiomer) is the major aglycone, and also rutin.

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Inhibition of gastric secretion by a water extract from Baccharis triptera, Mart.

Gamberini MT, Skorupa LA, Souccar C, Lapa AJ.

Escola Paulista de Medicina Departamento de Farmacologia INFAR, Sao Paulo, Brasil.

Baccharis triptera Mart, is a widespread Compositae used in Brazilian folk medicine to treat gastrointestinal disturbances, rheumatic disease, mild fever, diabetes and as an anti-helminthic. Water extract of small branches of the plant (WE) administered to mice and rats (0.1 to 2 g/kg, p.o.) did not alter spontaneous motor activity, sleeping time induced by barbiturates or the tail-flick response in mice. The extract decreased by 40% the number of writhings induced by 0.8% acetic acid, i.p., but did not influence paw edema induced by carrageenan or dextran in rats. WE (2 g/kg, p.o.) decreased the intestinal transit of charcoal in mice by 20%. Gastric secretion in pylorus ligated rats was reduced after treatment with WE (1 and 2 g/kg, i.p. or intraduodenal) and the gastric pH was raised. The extract (1 g/kg, p.o.) prevented gastric ulcers induced in rats by immobilization at 4 degrees C, but not those induced by indomethacin (10 mg/kg, s.c.). The results indicate that WE may relieve gastrointestinal disorders by reducing acid secretion and gastrointestinal hiperactivity. Neither analgesic nor anti-inflammatory activities were detectable.

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Inhibitors of HIV-1 replication that inhibit HIV integrase.

Robinson WE Jr, Reinecke MG, Abdel-Malek S, Jia Q, Chow SA.

Department of Pathology, University of California, Irvine 92717-4800, USA.

HIV-1 replication depends on the viral enzyme integrase that mediates integration of a DNA copy of the virus into the host cell genome. This enzyme represents a novel target to which antiviral agents might be directed. Three compounds, 3,5-dicaffeoylquinic acid [obtained from a water extract of Baccharis genistelloides], 1-methoxyoxalyl-3,5-dicaffeoylquinic acid, and L-chicoric acid, inhibit HIV-1 integrase in biochemical assays at concentrations ranging from 0.06-0.66 microgram/ml; furthermore, these compounds inhibit HIV-1 replication in tissue culture at 1-4 microgram/ml. The toxic concentrations of these compounds are fully 100-fold greater than their antiviral concentrations. These compounds represent a potentially important new class of antiviral agents that may contribute to our understanding of the molecular mechanisms of viral integration. Thus, the dicaffeoylquinic acids are promising leads to new anti-HIV therapeutics and offer a significant advance in the search for new HIV enzyme targets as they are both specific for HIV-1 integrase and active against HIV-1 in tissue culture.

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Dicaffeoylquinic and dicaffeoyltartaric acids are selective inhibitors of human immunodeficiency virus type 1 integrase.

McDougall B, King PJ, Wu BW, Hostomsky Z, Reinecke MG, Robinson WE Jr. Department of Pathology, University of California, Irvine 92697-4800, USA.

Current pharmacological agents for human immunodeficiency virus (HIV) infection include drugs targeted against HIV reverse transcriptase and HIV protease. An understudied therapeutic target is HIV integrase, an essential enzyme that mediates integration of the HIV genome into the host chromosome. The dicaffeoylquinic acids (DCQAs) and the dicaffeoyltartaric acids (DCTAs) have potent activity against HIV integrase in vitro and prevent HIV replication in tissue culture. However, their specificity against HIV integrase in cell culture has been questioned. Thus, the ability of the DCQAs and DCTAs to inhibit binding of HIV type 1 (HIV-1) gp120 to CD4 and their activities against HIV-1 reverse transcriptase and HIV Rnase H were studied. The DCQAs and DCTAs inhibited HIV-1 integrase at concentrations between 150 and 840 nM. They inhibited HIV replication at concentrations between 2 and 12 microM. Their activity against reverse transcriptase ranged from 7 microM to greater than 100 microM. Concentrations that inhibited gp120 binding to CD4 exceeded 80 microM. None of the compounds blocked HIV-1 RNase H by 50% at concentrations exceeding 80 microM. Furthermore, when the effects of the DCTAs on reverse transcription in acutely infected cells were measured, they were found to have no activity. Therefore, the DCQAs and DCTAs exhibit > 10- to > 100-fold specificity for HIV integrase, and their activity against integrase in biochemical assays is consistent with their observed anti-HIV activity in tissue culture. Thus, the DCQAs and DCTAs are a potentially important class of HIV inhibitors that act at a site distinct from that of current HIV therapeutic agents.

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Dicaffeoylquinic acid inhibitors of human immunodeficiency virus integrase: inhibition of the core catalytic domain of human immunodeficiency virus integrase.

Robinson WE Jr, Cordeiro M, Abdel-Malek S, Jia Q, Chow SA, Reinecke MG, Mitchell WM.
Department of Pathology, University of California, Irvine 92697-4800, USA.

Integration of a cDNA copy of the human immunodeficiency virus (HIV) genome is mediated by an HIV-1-encoded enzyme, integrase (IN), and is required for productive infection of CD4+ lymphocytes. It had been shown that 3,5-dicaffeoylquinic acid and two analogues were potent and selective inhibitors of HIV-1 IN in vitro. To determine whether the inhibition of IN by dicaffeoylquinic acids was limited to the 3,5 substitution, 3,4-, 4,5-, and 1,5-dicaffeoylquinic acids were tested for inhibition of HIV-1 replication in tissue culture and inhibition of HIV-1 IN in vitro. All of the dicaffeoylquinic acids were found to inhibit HIV-1 replication at concentrations ranging from 1 to 6 microM in T cell lines, whereas their toxic concentrations in the same cell lines were > 120 microM. In addition, the compounds inhibited HIV-1 IN in vitro at submicromolar concentrations. Molecular modeling of these ligands with the core catalytic domain of IN indicated an energetically favorable reaction, with the most potent inhibitors filling a groove within the predicted catalytic site of IN. The calculated change in internal free energy of the ligand/IN complex correlated with the ability of the compounds to inhibit HIV-1 IN in vitro. These results indicate that the dicaffeoylquinic acids as a class are potent and selective inhibitors of HIV-1 IN and form important lead compounds for HIV drug discovery.