Technical Data Report

for

AMARGO

Quassia amara

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Amargo

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

Genus: *Quassia*

Species: *amara*

Synonyms: *Quassia alatifolia, Q. officinalis, Picranea ailanthoides, P. excelsa, Picrasma excelsa, Simaroube officinale*

Common Names: Amargo, bitter ash, bitterholz, bitterwood, bois amer, bois de quassia, crucete, quassia, cuassia, fliegenholz, guabo, hombre grande, jamaica bark, jamaica quassia, kashshing, maraubá, marupá, palo muneco, pau amarelo, quassia amarga, quassiawood, ruda, simaruba, simarubabaum, quassiaholz, quassia de cayenne, quassie, quina, simaba, surinam wood, wewe gifi

Parts Used: Wood, leaves

Amargo is a small tree, growing only 2–6 m in height. It is indigenous to Brazil, Peru, Venezuela, Suriname, Colombia, Argentina, and Guayana. It has red flowers and fruit that turns red as it matures. Known botanically as *Quassia amara,* it is marketed and used interchangeably with another tree species, *Picrasma excelsa.* Sharing the common name of *quassia* (and many of *Quassia amara*'s constituents and uses), *P. excelsa* is much taller (up to 25 m in height) and occurs in the tropics of Jamaica, the Caribbean, the Lesser Antilles, and northern Venezuela.

In the Amazon rainforest, amargo is used much in the same manner as quinine bark: for malaria and fevers, and as a bitter digestive aid. It grows at lower elevations (where quinine does not) and contains many of the same antimalarial phytochemicals as quinine. In addition, it is used as an insecticide and tonic, and for hepatitis. Brazilian Indians use the leaves in a bath for measles as well as in a mouthwash used after tooth extractions; Indians in Suriname use the bark for fever and parasites. Throughout South America, amargo is a reputed folk remedy for debility, dyspepsia, fever, hepatosis, hyperglycemia, malaria, snakebite, and spasms of the back.

In current Brazilian herbal medicine systems, amargo is considered tonic, stomachic, depurative, insecticidal, anthelmintic, and aperitive; it is recommended for diarrhea, dysentery, dyspepsia, blennorrhagia, intestinal gas, stomachache, anemia, and liver and gastrointestinal disorders. In Peru amargo is employed as a bitter digestive, anthelmintic, stomachic, and febrifuge that traditionally is used for scrofula, hydropsy, and to expel kidney and gallbladder stones. In Mexico the wood is used for liver and gallbladder diseases, and to expel intestinal parasites. In Nicaragua amargo also is used to expel worms and intestinal parasites as well as for malaria and anemia. Throughout South America, the bitter principles of amargo are used to stimulate the appetite and secretion of digestive juices, as well as to expel worms and intestinal parasites.

In herbal medicine in the U.S. and Europe, very little distinction is made between the two species of trees; they are used identically. Amargo is used as a bitter tonic for stomach, gallbladder, and digestive problems (by increasing the flow of bile, digestive juices, and saliva); as a laxative; and as a amebicide, insecticide, and anthelminthic. It often is found as a component in various herbal drugs sold in Europe as specific stomachics and chologogues. In Britain, a water extract of the wood also is used topically against scabies, fleas, lice, and other skin parasites. U.S. herbalist David Hoffman recommends it as an excellent remedy for dyspeptic conditions, to stimulate production of saliva and digestive juices, and to increase the appetite (as well as for lice infestations and threadworms). He also notes, "It may safely be used in all cases of lack of appetite such as anorexia nervosa and digestive sluggishness."

Amargo bark contains many active constituents and phytochemicals, including indole alkaloids, triterpenes, and bitter principles reported to be 50 times more bitter than quinine.[1] While amargo contains many of the same types of quassinoids as quinine bark, it also contains another chemical called *quassin*. The large amount of quassin in the bark and wood gives amargo a bitterness rating of 40,000.[2] The bark

also contains the phytochemicals quassimarin and simalikalactone D. Quassimarin has demonstrated antileukemic and antitumorous properties in various studies,[3–5] while simalikalactone D has been documented to have antimalarial, [6,7] antiviral,[8] antitumor,[7] and cytotoxic activities.[9] Other quassinoids have demonstrated amebicidal actions *in vivo* and *in vitro.*

Several early clinical studies performed on amargo verified its traditional use as a natural insecticide—documenting it to be an effective treatment for head lice infestation in humans.[10–13] One of these studies reported a 99% effectiveness in 454 patients with only two topical treatments (using a wood tincture) one week apart.[11] In a 1991 double-blind placebo trial on 148 children with head lice, those treated with an amargo bark extract reported fewer numbers of new cases—demonstrating a prophylactic activity against lice.[12] In addition, an amargo water extract is reported to work quite well against aphids in the garden,[13] and researchers in India discovered its larvicidal activity against several types of insects including mosquitoes.[14] Since amargo has long been used for malaria in South America, researchers studied this pharmacological effect as well. One study (in which a leaf extract was employed) showed strong *in vivo* antimalarial activity in mice.[15]

Amargo was reported to have antiviral activity when scientists at Texas Christian University demonstrated in 1996 that a water extract was active against lymphoblastoid cells infected with HIV.[16] A 1978 *in vivo* study reported that amargo wood and/or sap extracts (as well as the isolated chemical quassimarin) inhibited the growth of leukemia in mice.[4] Most recently (in 2002), amargo clearly demonstrated antiulcerogenic actions in mice—inhibiting the formation of gastric ulcers (induced by stress and various chemical means) when the mice were treated with 100 mg/kg of an ethanol and/or hexane extract of the wood.[17] Prior to this study, a U.S. patent was awarded on the quassinoid phytochemicals in amargo, finding them to have "remarkable anti-ulcer effects with low toxicities."[18] In another *in vivo* study, amargo was reported to have antinociceptive (pain-relieving), muscle-relaxant, and sedative effects in rats and mice.[19]

Toxicity studies performed on rats and mice reported no toxicity in oral dosages up to 5 g per kg of body weight (and even 1 g/kg administered intraperitoneally).[17] Two studies, however, reported that bark extracts (chloroform extracts injected intramuscularly) had an antifertility effect in male rats—lowering sperm count and motility—as well as inhibiting testosterone production and release.[20,21] Quassia wood is on the FDA's GRAS (generally regarded as safe) list. Tthe wood and its main bitter chemical, quassin, also are approved as food additives—and are employed in beverages and baked goods for their bitter taste.

Documented Properties and Actions: Anthelmintic, antifertility, anti-inflammatory, antileukemic, antimalarial, antineoplastic, antinociceptive, antitumorus, antiulcerogenic, aperitif, astringent, depurative, digestive, febrifuge, insecticidal, larvicidal, laxative, pediculicide, sedative, sialagogue, stomachic, tonic, vermifuge

Main Phytochemicals: Beta-carbolines, beta-sitostenone, beta-sitosterol, dehydroquassins, gallic acid, gentisic acid, hydroxyquassins, isoparain, isoparaines, isoquassins, malic acid, methylcanthins, methoxycanthins, methoxycantins, nigakilactone A, neoquassins, nor-neoquassin, parain, paraines, quassialactol, quassimarin, quassins, quassinol, quassol, simalikalactone D

Traditional Remedy: The traditional remedy as a digestive aid is 1/2 teaspoon of wood powder infused in one cup of boiling water; this is taken 10–15 minutes before meals. Another remedy calls for 1 teaspoon of wood powder or chips to be soaked in 1 cup of cold water overnight. This is drunk for the same purpose, or used topically for skin/hair parasites or as a garden insecticidal spray for plants. Two to three ml of an alcohol tincture can be substituted if desired.

Contraindications: Amargo should not be used during pregnancy.

Amargo has been documented to have an antifertility and antiandrogenic effects in three studies with male rats. Men undergoing fertility treatment, those with lowered sperm count, low testosterone levels, or those wishing to have children probably should not use amargo.

Large amounts of amargo can irritate the mucous membrane of the stomach and can lead to nausea and vomiting.

Drug Interactions: None reported; however, amargo may potentiate antiandrogenic medications.

WORLDWIDE ETHNOBOTANICAL USES

Country	Uses
Brazil	Anemia, anorexia, aperitif, blennorrhagia, bitter, colic, debility, dentistry, diarrhea, digestive, diuretic, dysentery, dyspepsia, fever, flatulence, gallbladder, gallstones, gastrointestinal disorders, gonorrhea, hepatic colic, insecticide, kidney stones, liver, malaria, measles, stomachic, tonic
Costa Rica	Diabetes, diarrhea, fever, worms
Europe	Bitter, choleretic, chologogue, fleas, gallbladder, lice, liver, parasites, scabies, stomachic, threadworms
Guatemala	Constipation, diabetes, high blood pressure, nervousness
Mexico	Dyspepsia, gallbladder, intestinal parasites, liver, stomachic, tonic, vermicide
Nicaragua	Anemia, astringent, bites, intestinal parasites, malaria, stings, tonic, worms
Panama	Hepatosis, hyperglycemia, fever, liver, malaria, snakebite
Peru	Anthelmintic, digestive, depurative, febrifuge, gallstones, hepatitis, hydropsy, insecticide, kidney stones, scrofula, stomachic, tonic, vermifuge
South America	Anorexia, anthelmintic, aperitif, aphidicide, bitter, debility, depurative, digestive, dyspepsia, carcinoma, cirrhosis, fever, fleas, hepatosis, hyperglycemia, indigestion, insecticide, laxative, leukemia, lice, malaria, parasites, pediculicide, scabies, snakebite, spasms, stomachic, tonic, vermifuge, worms
Turkey	Astringent, diarrhea, digestive, diuretic, dysentery, fever, malaria, tonic
U.S.A.	Alcoholism, anorexia, anthelmintic, antispasmodic, ascarides, atonic dyspepsia, bitter, choleretic, convalescence, debility, digestive, fever, gallbladder, lice, narcotic, purgative, sialagogue, stomachic, tonic, vermicide, worms
Venezuela	Diuretic, dysentery, fever, laxative, tonic, vermifuge
Elsewhere	Amoeba, antibiotic, antipyretic, aperitif, bitter, cancer, carcinoma, digestive, epithelioma, fever, insecticide, liver, malaria, narcotic, piscicide, snakebite, stomachic, stimulant, tonic, vermifuge

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Ethnomedical Information on Amargo(Quassia amara)

Plant Part / Location	Documented Ethnomedical Use	Type Extract / Route	Used For	Ref #
Wood Brazil	Bitter properties. Used for flatulence, diarrhea, anemia, dyspepsia, fever and gallbladder ailments.	Not stated	Human Adult	ZZ1099
Wood Brazil	Used as an insecticide, aperitive, stomachic and tonic for a lack of appetite, dyspepsia, diarrhea, liver congestion and colic, anemia, debility and to increase digestive and saliva secretions.	Decoction Oral	Human Adult	ZZ1007
Wood Brazil	Used as a eupeptic and diuretic for blenorrhagia.	Not stated	Human Adult	ZZ1079
Bark Brazil	Used for diarrhea, dysentery, dyspepsia, stomach weakness, intestinal gas and blenorrhagia.	Not stated Oral	Human Adult	ZZ1013
Leaf Brazil	Used for measles. Used to wash the mouth after a tooth extraction.	Infusion External Infusion Mouth Wash	Human Child Human Adult	ZZ1024
Leaf Brazil	Used for malaria. Used to combat malaria and to rinse the mouth after tooth extraction.	Infusion Oral Infusion External	Human Adult	ZZ1099
Entire Plant Brazil	Used as an insecticide.	H2O Ext	Garden	ZZ1099
Wood Brazil	Used for diarrhea, dysentery, dyspepsia, flatulence and gonorrhea.	Not stated	Human Adult	ZZ1049
Bark Costa Rica	Used as an enema to expel worms.	Hot H2O Ext Rectal	Human Adult	T01287
Root Costa Rica	Used for diabetes, diarrhea and fever.	Decoction Oral	Human Adult	ZZ1049
Wood Germany	Used as a homeopathic for liver and gallbladder complaints; for its bitter properties. May have a choleretic effect.	Homeopathic Oral	Human Adult	AC1002
Leaf + Root Guatemala	Used for constipation, nervousness, diabetes and high blood pressure.	Decoction Oral	Human Adult	K26154
Not Stated Guyana	Used as a tonic.	ETOH Ext Oral	Human Adult	ZZ1049
Wood Jamaica	Used for epithelioma and fever and as a bitter and aperitive.	Not stated	Human Adult	ZZ1049
Wood Mexico	Used for liver disease.	Hot H2O Ext Oral	Human Adult	T13488
Wood Mexico	Used for gall bladder diseases.	Hot H2O Ext Oral	Human Adult	T13488
Wood Mexico	Used for intestinal parasites.	Hot H2O Ext Oral	Human Adult	T13488

Plant Part / Location	Documented Ethnomedical Use	Type Extract / Route	Used For	Ref #
Bark Mexico	Used for intestinal parasites.	Infusion Enema	Human Adult	ZZ1049
Stem Nicaragua	Used for bites and stings.	Decoction External	Human Adult	K27070
Stem Nicaragua	Used as an astringent and tonic; used to treat malaria, worms, intestinal parasites, and anemia	Decoction Oral	Human Adult	K27070
Stemwood Nigeria	Used as a stomachic, antiamebic and antibiotic. Used to treat malaria.	Infusion Oral	Human Adult	K20214
Bark Panama	Used to treat liver disorders, fevers, snakebite and as a hypoglycemic agent.	Decoction Oral	Human Adult	T01287
Not Stated Panama	Used for fever, hepatosis and snakebite.	Not stated	Human Adult	ZZ1049
Bark Peru	Used as a stomachic, anthelmintic, digestive, depurgative, vermifuge and febrifuge; used for scrofula and hydropsy and to expel calculi in the gallbladder and kidney. Not recommended during menstruation as it may produce colic.	H2O Ext Oral	Human Adult	ZZ1093
Wood Peru	Used as an insecticide and tonic for fever and hepatitis.	Not stated	Human Adult	ZZ1041
Wood South America	Used as a bitter and digestive to stimulate the appetite. Used as an anthelmintic and insecticide.	Hot H2O Ext Oral	Human Adult	AC1001
Wood South America	Used as an anthelmintic, tonic bitter, orexigenic and insecticide. Used to increase the flow of gastric juice and saliva, for a lack of appetite, indigestion, cirrhosis (temporary relief of symptoms) and worms. Said to have antileukemic properties.	H2O Ext Oral	Human Adult	ZZ1011
Wood South America	Used to eliminate nematodes. Used for scabies, fleas and other parasites.	Infusion Enema H2O Ext External	Human Adult	ZZ1011
Wood South America	Used as a bitter and to treat fevers. Used as an anthelmintic.	Not stated Not stated Enema	Human Adult	ZZ1068
Bark South America	Used as a febrifuge and insecticide. Said to be an aperitif, depurative, insecticidal, laxative, pediculicide, stomachic, tonic and vermifuge. Used for carcinoma, debility, dyspepsia, fever, hepatosis, hyperglycemia, malaria, snakebite and spasms.	Various Oral	Human Adult	ZZ1049
Bark Suriname	Used to prevent fever.	ETOH Ext Oral	Human Adult	ZZ1049
Bark Suriname	Used for fever and parasites. A potent aphidicide.	Not stated	Human Adult	ZZ1039

Plant Part / Location	Documented Ethnomedical Use	Type Extract / Route	Used For	Ref #
Wood Suriname	Used as a bitter and aperitive.	Not stated	Human Adult	ZZ1048
Root Thailand	Used as an antipyretic.	Hot H2O Ext Oral	Human Adult	W03804
Wood USA	Used as a bitter tonic, stomachic, vermicide, antispasmodic and for its slight narcotic properties. Used for convalescence, debility, fever, atonic dyspepsia, to increase appetite and prevent the formation of acid substances during digestion.	H2O Ext Oral	Human Adult	ZZ1052
Wood USA	Used for ascarides.	Decoction Injection or Enema	Human Adult	ZZ1052
Wood USA	Used with sulphuric acid to cure drunkenness, by destroying the appetite for alcohol.	Not stated Oral	Human Adult	ZZ1052
Wood USA	Used as a bitter tonic, sialagogue and anthelmintic for dyspeptic conditions due to a lack of tone, to stimulate the production of saliva and digestive juices and increase the appetite. Used for anorexia nervosa and digestive sluggishness.	H2O Ext Oral	Human Adult	ZZ1056
Wood USA	Used for lice infestations. Used to expel threadworms.	H2O Ext External Infusion Oral and H2O Ext Enema	Human Adult	ZZ1056
Not Stated USA	Used to stimulate the secretion of gastric juices, to increase appetite and aid digestion. May have a choleretic effect. Homeopathically it is used for gallbladder complaints, as a bitter tonic, purgative and anthelmintic (for ascarid and threadworms).	Not stated Homeopathic Oral	Human Adult	AC1003
Not Stated	Used as a digestive, insecticidal, narcotic, piscicidal, stomachic, tonic and vermifuge.	Not stated	Human Adult	ZZ1049

Presence of Compounds in Amargo (Quassia amara)

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Calcium tartrate		Root	Not Stated	Not stated	ZZ1095
Canthin-2-6-dione, 3-methyl:	Indole alkaloid	Wood	Not Stated	Not stated	M14762
Canthin-2-6-dione, 5-hydroxy-4-methoxy-3-methyl:	Indole alkaloid	Wood	Not Stated	Not stated	H06740
Canthin-5-6-dione, 3-methyl:	Indole alkaloid	Wood	Not Stated	Not stated	H06740
Canthin-6-one, 2-methoxy:	Indole alkaloid	Stemwood Stemwood	Nigeria Nigeria	Not stated Not stated	K20214 J13814
Canthin-6-one, 5-hydroxy-4-methoxy:	Indole alkaloid	Wood	Not Stated	Not stated	H06740
Canthin-6-one, 5-hydroxy-4-methoxy:3-n-oxide	Indole alkaloid	Wood	Not Stated	Not stated	H06740
Cantin-6-one, 5-hydroxy-4-methoxy:	Indole alkaloid	Wood	Not Stated	Not stated	H03550
Carboline,beta: 1-methoxy-carbonyl:	Indole alkaloid	Wood	Not Stated	Not stated	M14762
Carboline,beta: 4-8-dimethoxy: 1-vinyl:	Indole alkaloid	Wood	Not Stated	Not stated	M14762
Cathin-6-one, 2-methoxy:	Indole alkaloid	Stemwood	Nigeria	00.00480%	H11809
Gallic acid		Root	Not Stated	Not stated	ZZ1095
Gentisic acid	Benzenoid	Leaf	Trinidad	Not stated	A06190
Malic acid		Root	Not Stated	Not stated	ZZ1095
Methyl-d-glucoside	Alkane to c4	Trunkwood	Not Stated	Not stated	H11904
Nigakilactone a	Triterpene	Wood	Not Stated	Not stated	H21039
Parain	Triterpene	Trunkwood	Not Stated	Not stated	H11904
Parain, 11-acetyl:	Triterpene	Trunkwood	Not Stated	Not stated	H11904
Parain, 11-alpha-acetyl:	Triterpene	Trunkwood	Not Stated	Not stated	H11904
Parain, 13-18-dehydro: 12-alpha-hydroxy:	Triterpene	Trunkwood	Not Stated	Not stated	H11904

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Parain, iso:	Triterpene	Trunkwood	Not Stated	Not stated	H11904
Paraine	Triterpene	Wood	Not Stated	00.01200%	H03550
Paraine, iso:	Triterpene	Wood	Not Stated	00.00900%	H03550
Potassium-acetate	Mineral	Wood	Not Stated	Not stated	ZZ1095
Quassia amara substance	Structure unknown	Wood	Jamaica	00.015%	A02521
Quassialactol	Triterpene	Wood	Not Stated	Not stated	H21039
Quassimarin	Triterpene	Wood Sap Sap	Not Stated Costa Rica Costa Rica	Not stated Not stated 00.003%	N02682 K00622 K00622
Quassin	Triterpene	Wood Suspension culture Leaf Trunkwood Wood Stemwood Stemwood Wood Wood Callus tissue Wood Wood Stemwood Wood Wood Leaf Petals Trunkwood Petals Twig bark Twig Wood Endosperm Seedcoat	Not Stated Not Stated England(cult) Not Stated Not Stated Nigeria Nigeria Surinam Not Stated Not Stated Not Stated Not Stated Nigeria Not Stated Not Stated England(cult) England(cult) Not Stated England(cult) England(cult) England(cult) England(cult) England(cult) England(cult)	Not stated Not stated Not stated Not stated Not stated Not stated Not stated 00.18% Not stated Not stated Not stated Not stated 00.0062% 00.03300% Not stated Not stated Not stated Not stated Not stated Not stated Not stated Not stated Not stated Not stated	A02658 K12094 M12812 N12644 N19679 K20214 J13814 N01125 J10154 K12094 A06088 H21039 H11809 H03550 A02592 M12812 M12812 H11904 M12812 M12812 M12812 M12812 M12812 M12812

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Quassin, 1-alpha-o-methyl:	Triterpene	Trunkwood	Not Stated	Not stated	H11904
Quassin, 12-hydroxy:	Triterpene	Wood	Not Stated	Not stated	N19679
Quassin, 14-15-dehydro:	Triterpene	Wood	Not Stated	Not stated	N19679
Quassin, 18-hydroxy:	Triterpene	Wood Leaf Wood Wood Wood Leaf(immature) Petals Petals Twig bark Twig Wood Endosperm Seedcoat	Italy England(cult) Not Stated Not Stated Not Stated England(cult) England(cult) England(cult) England(cult) England(cult) England(cult) England(cult) England(cult)	Not stated Not stated 4.0% Not stated Not stated Not stated Not stated Not stated Not stated Not stated Not stated Not stated Not stated	A02539 M12812 A05019 N19679 H21039 M12812 M12812 M12812 M12812 M12812 M12812 M12812 M12812
Quassin, iso:	Triterpene	Wood Wood Wood Wood Wood Leaf Trunkwood Wood Wood Wood Wood	Not Stated Jamaica Not Stated Not Stated Not Stated England(cult) Not Stated Surinam Not Stated Not Stated Not Stated	Not stated Not stated Not stated Not stated Not stated Not stated Not stated 00.61% Not stated Not stated 00.01800%	A05019 A02521 A06088 A02658 A05019 M12812 N12644 N01125 A02592 H21039 H03550
Quassin, neo: 11-dihydro-12-nor:	Triterpene	Wood	Not Stated	00.00900%	H03550
Quassin, neo: 12-nor: 11-dihydro:	Triterpene	Trunkwood	Not Stated	Not stated	H11904
Quassin, neo: 16-alpha-o-methyl:	Triterpene	Trunkwood	Not Stated	Not stated	H11904
Quassin, neo: 16-alpha-o-methyl: 11-alpha-o-(beta-d-glucopyranoside)	Triterpene	Trunkwood	Not Stated	Not stated	H11904

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Quassin, neo: 16-alpha:	Triterpene	Wood	Not Stated	Not stated	N19679
Quassin, neo: 16-beta:	Triterpene	Wood	Not Stated	Not stated	N19679
Quassin, neo:	Triterpene	Leaf Trunkwood Petals Petals Twig bark Twig Wood Endosperm Seedcoat	England(cult) Not Stated England(cult) England(cult) England(cult) England(cult) England(cult) England(cult) England(cult)	Not stated Not stated Not stated Not stated Not stated Not stated Not stated Not stated Not stated	M12812 H11904 M12812 M12812 M12812 M12812 M12812 M12812 M12812
Quassinol	Triterpene	Wood	Not Stated	Not stated	A12114
Quassol	Triterpene	Wood	Not Stated	Not stated	ZZ1095
Simalikalactone D	Triterpene	Sap Sap	Costa Rica Costa Rica	Not stated 00.005%	K00622 K00622
Sitostenone, beta:	Steroid	Wood	Not Stated	Not stated	A02592
Sitosterol, beta:	Steroid	Wood	Not Stated	Not stated	A02592
Zr	Inorganic	Wood	Jamaica	Not stated	A00713

Other Phytochemical Screening:

Alkaloids Present Leaf W01226

Biological Activities for Extracts of Amargo (Quassia amara)

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf India	Toxic Effect (general)	H2O Ext	Not Stated	0.01 gm/ml	Active	*Gambusia affinis*	M19731
Leaf India	Toxic Effect (general)	H2O Ext	Frog	0.01 gm/ml	Active	*Bufo melanostictus* tadpoles.	M19731
Leaf India	Toxic Effect (general)	H2O Ext	Frog	Not stated	Inactive	*Bufo melanostictus* tadpoles.	M19731
Leaf India	Toxic Effect (general)	H2O Ext	Gambusia affinis	Not stated	Inactive		M19731
Bark Brazil	Toxicity (general)	ETOH(70%) Ext ETOH(100%) Ext CH2Cl2 Ext Hex Ext	Oral Mice	5000 mg/kg	Inactive	No toxicity and death seen.	AC1006
Bark Brazil	Toxicity (general)	ETOH(70%) Ext ETOH(100%) Ext CH2Cl2 Ext Hex Ext	IP Mice	1000 mg/kg	Inactive	No toxicity and death seen.	AC1006
Wood Costa Rica	Toxicity (general)	H2O Ext	Oral Mice Male	250 mg/kg 500 mg/kg 750 mg/kg 1000 mg/kg	Inactive	No toxicity seen at any dose.	AC1010
Wood Costa Rica	Toxicity (general)	H2O Ext	IP Mice Male	500 mg/kg 1000 mg/kg	Active Active	Acute toxicity signs with a 24 hour recovery. Lethal to 100% within 24 hours.	AC1010
Not Stated	Anticoagulant Activity	Not stated	Not stated	Not stated	Active	May increase the risk of bleeding or potentiate the effects of warfarin therapy.	AC1008
Bark India	Blood Parameters	CHCl3 Ext	IM Rat	Not stated	Inactive	No change in cell counts, hemoglobin levels, bilirubin, SGPT, SGOT, protein and urea parameters.	AC1005
Stemwood Nigeria	Antifertility Effect	MEOH Ext	Rat Male	Not stated	Active	A reduction in the weight of the testis, epididymis and seminal vesicle seen, with an increase in the anterior pituitary gland.	J13814

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Bark India	Antifertility Activity	CHCl3 Ext	IM Rat Male	Not stated	Active Inactive Active Active Inactive	After 15 days a reduction in the weight of testis and epididymis was seen. No effect on seminal vesicle and prostate weight. Decrease in sperm count, motility and viability seen. An increase in double heads, double tails, detached heads and fragile tails seen. Alpha-glucosidase reduced. Prostatic acid phosphatase activity, citric acid levels and seminal vesicle fructose concentrations unchanged.	AC1005
Stemwood Nigeria	Sperm Count Decrease	MEOH Ext	PO Rat Male	100.0 mg/kg	Active		J13814
Stemwood Nigeria	FSH Levels Decreased	MEOH Ext	PO Rat Male	100.0 mg/kg	Active	Serum.	J13814
Stemwood Nigeria	LH Levels Decreased	MEOH Ext	PO Rat Male	100.0 mg/kg	Active	Serum.	J13814
Stemwood Nigeria	Testosterone Level Decreased	MEOH Ext	PO Rat Male	100.0 mg/kg	Active	Serum.	J13814
Stemwood Nigeria	Testosterone Release Inhibition	MEOH Ext	Rat Leydig Cells	150.0 mcg/ml	Active	Inhibited basal or LH-stimulated secretion.	K20214
Stemwood Nigeria	Testosterone Release Inhibition	MEOH Ext	PO Rat Male	100.0 mg/kg	Active	Leydig cells.	J13814
Rootbark Nigeria Rootwood	Testosterone Release Inhibition	MEOH Ext	Rat Leydig cells	150.0 mcg/ml	Inactive		K20214
Bark Bolivia	Antiviral Activity	H2O Ext	Cell Culture	50.0 microliters	Active	Virus-*HIV*. MT-2 T-lymphoblastoid cells infected with HIV.	K29837
Wood Not Stated	Antimalarial Activity	H2O Ext	PO Chicken	1.10 gm/kg	Inactive	*Plasmodium gallinaceum*	A00785

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf Nigeria	Anti-malarial Activity	Hex Ext MEOH Ext	Oral Mice	100 mg/kg 200 mg/kg 100 mg/kg 200 mg/kg	Strong Activity	*Plasmodium berghei berghei*	AC1009
Wood Spain	Antiparasitic Activity	ETOH(75%) Ext	External Human Child	Not stated	Active	*Pediculus humanus humanus*. A double-blind, placebo controlled study was performed with 148 school children to assess the prophylactic action of quassia in pediculosis. The treated group had fewer numbers of new cases of lice infestation. No adverse effects were reported.	J11517
Wood Not stated	Antiparasitic Activity	Tincture	External Human	2 applications with an interval of 1 week	Active	454 patients were treated with quassia tincture for head lice (*Pediculosis capitis*). 1 week later only 3 had hatched lice with evidence they were reinfested. No side-effects seen.	AC1014
Wood Surinam	Insecticide Activity	H2O Ext	Not Stated	Not stated	Active	Used as an aphicide.	A07482
Leaf India	Larvicidal Activity	Ether Ext	Not Stated	Not stated	Weak Activity	*Culex quinquefasciatus*	M19731
Leaf India	Larvicidal Activity	ETOH(95%) Ext	Not Stated	Not stated	Active	*Culex quinquefasciatus*	M19731
Leaf India	Larvicidal Activity	H2O Ext	Not Stated	LC100=0.02 gm/ml	Active	*Culex quinquefasciatus*	M19731
Leaf India	Larvicidal Activity	Pet Ether Ext	Not Stated	Not stated	Weak Activity	*Culex quinquefasciatus*	M19731
Leaf + Bark + Wood + Flowers	Larvicidal Activity	Not stated	Not stated	Not stated	Active	*C. quinquefasciatus*	AC1013
Stemwood Nigeria	Cytotoxic Activity	MEOH Ext	Cell Culture Leydig cells	Not stated	Inactive		J13814
Trunkwood Costa Rica	Antitumor Activity	H2O Ext	IP Mouse	200.0 mg/kg	Active	26% inhibition Leukemia - P388.	T05868
Sap Costa Rica	Antitumor Activity	ETOH(95%) Ext	IP Mouse	Not stated	Active	Leukemia - P388.	K00622

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Sap Costa Rica	Antitumor Activity	ETOH(95%) Ext	IP Mouse	Not stated	Active	Leukemia - P388.	K00622
Sap Costa Rica	Antitumor Activity	Sap	IP Mouse	12.5 mg/kg	Active	81% inhibition of Leukemia - P388.	T05868
Sap Costa Rica	Crown Gall Tumor Inhibition	Sap	Potato Disc	2.0 mg/ml	Active	*Agrobacterium tumefaciens.* Assay system is intended to predict for antitumor activity.	T05868
Trunkwood Costa Rica	Crown Gall Tumor Inhibition	H2O Ext	Potato Disc	2.0 mg/ml	Inactive	*Agrobacterium tumefaciens.* Assay system is intended to predict for antitumor activity.	T05868
Wood Not Stated	Diuretic Activity	ETOH(95%) Ext	SC Mouse	Not stated	Inactive		N01301
Bark Brazil	Anti-ulcer Activity	ETOH(70%) Ext ETOH(100%) Ext CH2Cl2 Ext Hexane Ext	Oral Mice	100 mg/kg	Active	22.5% inhibition of ulcer. 23.4% inhibition of ulcer. 50.5% inhibition of ulcer. 46.8% inhibition of ulcer. vs. indomethacin/bethanechol-induced gastric ulcer.	AC1006
Bark Brazil	Anti-ulcer Activity	ETOH(70%) Ext ETOH(100%) Ext CH2Cl2 Ext Hexane Ext	Oral Mice	100 mg/kg	Active	70.7% inhibition of ulcer. 80% inhibition of ulcer. 60% inhibition of ulcer. 82.7% inhibition of ulcer. vs. gastric injury induced by hypothermic restrain-stress test.	AC1006
Bark Brazil	Anti-ulcer Activity	ETOH(70%) Ext ETOH(100%) Ext CH2Cl2 Ext Hexane Ext	IP Mice	100 mg/kg	Inactive Active Active Active	Gastric juice secretion. ETOH(100%), CH2Cl2 and Hex extracts decreased gastric juice content, increased pH values and decreased acid output.	AC1006
Bark Brazil	Anti-ulcer Activity	ETOH(70%) Ext ETOH(100%) Ext CH2Cl2 Ext Hexane Ext ETOH(70%) Ext ETOH(100%) Ext CH2Cl2 Ext Hex Ext	Oral Mice Oral Mice	25, 50, 75, 100mg/kg 25, 50, 75, 100mg/kg 25, 50, 75, 100mg/kg 25, 50, 75, 100mg/kg 25, 50, 75, 100mg/kg 25, 50, 75, 100mg/kg 25, 50, 75, 100mg/kg 25, 50, 75, 100mg/kg	Inactive Active Active Active Active Active Active Active	HCl-ETOH-induced gastric ulcers. All extracts increased gastric free mucous inhibited by indomethacin.	AC1006

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Bark Brazil	Anti-ulcer Activity	Hex Ext	Oral Mice	100 mg/kg	Active	Increased prostaglandin synthesis inhibited by indomethacin by 52.3%.	AC1006
Bark Brazil	Anti-inflammatory Activity	ETOH(70%) Ext ETOH(100%) Ext CH2Cl2 Ext HEX Ext ETOH(70%) Ext ETOH(100%) Ext CH2Cl2 Ext HEX Ext	Oral Not Stated IP Not Stated	100, 250, 500 mg/kg 100, 250, 500 mg/kg 100, 250, 500 mg/kg 100, 250, 500 mg/kg 100, 250, 500 mg/kg 100, 250, 500 mg/kg 100, 250, 500 mg/kg 100, 250, 500 mg/kg	Inactive Inactive Inactive Inactive Inactive Inactive Inactive Active	Paw edema induced by carrageenan.	AC1004
Bark Brazil	Antinociceptive Activity	Hex Ext	IP Not Stated	100, 250, 500 mg/kg	Active	vs. hot-plate test and acetic acid-induced writhing.	AC1004
Bark Brazil	Sedative Effect	Hex Ext	IP Not Stated	100, 250, 500 mg/kg	Active	Sedative effect on pentobarbital-induced sleep.	AC1004
Bark Brazil	Muscle Relaxant Activity	Hex Ext	IP Not Stated	100, 250, 500 mg/kg	Active		AC1004
Wood Costa Rica	Gastrointestinal Effect	H2O Ext	Oral Mice Male	500 mg/kg 1000 mg/kg	Active	Both doses increased intestinal movement. Only statistically significant at 1000 mg/kg.	AC1010

Biological Activities for Compounds of Amargo (Quassia amara)

Compound Tested	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Quassin	Antifertility Activity	Rat Male	Not stated	Active	Reduced the weight of the testis, epididymis and seminal vesicle; increased weight of the anterior pituitary. Reduced sperm count, serum testosterone, LH and FSH.	J13814
Quassin	Antifertility Activity	Cell Culture	Not stated	Active	Inhibited basal or LH-stimulated secretion.	K20214
Simalikalactone D	Antimalarial Activity	in vitro	Not stated	Active		AC1011
Simalikalactone D	Antimalarial Activity	in vitro	IC50=0.0008-0.0009 mcg ml-1	Active	*Plasmodium falciparum*	AC1017
Simalikalactone D	Antimalarial Activity	in vitro	IC100=0.005 mcg/ml	Active	*Plasmodium falciparum* (chloroquine-resistant).	AC1018
Simalikalactone D	Antiviral Activity	in vitro	0.2-20 ug/ml	Active	*Poliomyelitis* *Semliki forest virus* *Herpes simplex virus type 1 (HSV-1)* *Vesicular stomatitis (VSV)* At 0.2 ug/ml it reduced HSV-1 and VSV viral titer by 99%.	AC1007
Quassin	Antiviral Activity	in vitro	0.2-20 ug/ml	Inactive	*Herpes simplex virus type 1* *Vesicular stomatitis* *Poliomyelitis* *Semliki forest virus*	AC1007
Simalikalactone D	Anti-HIV Activity	in vitro	0.2-20 ug/ml	Inactive	*HIV* strain IIIB.	AC1007
Quassin	Anti-HIV Activity	in vitro	0.2-20 ug/ml	Inactive	*HIV* strain IIB.	AC1007
Quassin	Larvicidal Activity	in vitro	Not stated	Active	*Culex quinquefasciatus*	AC1012
Quassin	Larvicidal Activity	in vitro	6 ppm	Active	Mosquito larvae.	AC1013
Quassinoids	Anti-ulcer Activity	Oral or IM Rat	1-2500 mg	Active	Effective in the prophylaxis or treatment of the peptic ulcers such as a gastric or duodenal ulcer.	AC1019
Simalikalactone D	Cytotoxic Activity	in vitro	5 ug/ml 1.02 ug/ml	Active Strong Activity		AC1007

Compound Tested	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Quassin	Cytotoxic Activity	in vitro	CC50=134 ug/ml	Active		AC1007
Quassin	Cytotoxic Activity	in vitro	Not stated	Inactive	Artemia salina (brine shrimp) assay.	AC1015
Quassimarin	Antitumor Activity	Cell Culture	ED50=0.26-0.012 g/mL	Active	Human tumor cell lines KB, A-549, HCT-8, CAKI-1, MCF-7, SK-MEL-2.	AC1016
Simalikalactone D	Antitumor Activity	Cell Culture	ED50=0.26-0.012 g/mL	Active	Human tumor cell lines KB, A-549, HCT-8, CAKI-1, MCF-7, SK-MEL	AC1016

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