

Technical Data Report

for

CHUCHUHUASI

Maytenus krukovii



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CHUCHUHUASI

Family: Celastraceae

Genus: *Maytenus*

Species: *krukovii*

Synonyms: *Maytenus ebenifolia*, *M. laevis*, *M. macrocarpa*, *M. multiflora*, *M. terapotensis*, *Celastrus macrocarpus*, *Haenkea macrocarpa*, *H. multiflora*

Common Names: Chuchuhuasi, chucchu huashu, chuchuasi, chuchasha, chuchuhuasha

Parts Used: Bark, root, leaves

HERBAL PROPERTIES AND ACTIONS

Main Actions	Other Actions	Standard Dosage
<ul style="list-style-type: none">• reduces inflammation	<ul style="list-style-type: none">• kills cancer cells	Bark
<ul style="list-style-type: none">• relieves pain	<ul style="list-style-type: none">• prevents tumors	Decoction: 1 cup 2-3 times daily
<ul style="list-style-type: none">• relaxes muscles	<ul style="list-style-type: none">• stimulates digestion	Tincture: 3-5 ml 2-3 times daily
<ul style="list-style-type: none">• enhances immunity		
<ul style="list-style-type: none">• increases libido		
<ul style="list-style-type: none">• supports adrenals		

Chuchuhuasi is an enormous canopy tree of the Amazon rainforest that grows to 30 m high. It has large leaves (10–30 cm), small, white flowers, and extremely tough, heavy, reddish-brown bark. Several botanical names have been given to this species of tree. It is referenced as *Maytenus krukovii*, *M. ebenifolia*, *M. laevis*, and *M. macrocarpa*; all botanical names refer to the same tree. Chuchuhuasi is indigenous to the tropical rainforests of Bolivia, Colombia, Ecuador, and Peru.

Tribal and Herbal Medicine Uses

Indigenous people of the Amazon rainforest have been using the bark of chuchuhuasi medicinally for centuries. Its Peruvian name, chuchuhuasi, means “trembling back,” which refers to its long-standing use for arthritis, rheumatism, and back pain. One local Indian remedy for arthritis and rheumatism calls for 1 cup of a bark decoction taken three times a day for more than a week. Local people and villagers along the Amazon believe that chuchuhuasi is an aphrodisiac and tonic, and the bark soaked in the local sugarcane rum (aguardiente) is a popular jungle drink that is even served in bars and to tourists (often called “go-juice” to relieve pain and muscle aches and to “keep going” during long treks in the rainforest). Local healers and curanderos in the Amazon use chuchuhuasi as a general tonic, to speed healing and, when combined with other medicinal plants, as a synergist for many types of illnesses. In Colombia, the Siona Indians boil a small piece of the bark (5 cm) in 2 liters of water until 1 liter remains, and drink it for arthritis and rheumatism. In the Ecuadorian rainforest, the Quijos Quichua Indians prepare a bark decoction for general aches and pains, rheumatism, sore muscles, menstrual pain, and stomachaches.

In the Peruvian Amazon, chuchuhuasi is still considered the best remedy for arthritis among both city and forest dwellers. It is also used as a muscle relaxant, aphrodisiac, and pain reliever, for adrenal support, as an immune stimulant, and for menstrual balance and regulation. In Peruvian

herbal medicine systems, chuchuhuasi alcohol extracts are used to treat osteoarthritis, rheumatoid arthritis, bronchitis, diarrhea, hemorrhoids, and menstrual irregularities and pain.

Plant Chemicals

Chuchuhuasi is a powerhouse of plant chemicals—mostly triterpenes, flavonols, and sesquiterpene alkaloids. Two of the more well-known chemicals in chuchuhuasi are mayteine and maytansine—alkaloids long documented (since the 1960s) with antitumor activity and which occur in other *Maytenus* plants as well. While these chemicals are found in chuchuhuasi, they don't occur in high enough amounts to really be therapeutic for cancer, however. Another rainforest *Maytenus* plant, *espinheira santa* (also featured in this book), is a much better source of these anticancerous chemicals. Other novel compounds found only in chuchuhuasi thus far include dammarane- and friedelane-type triterpenes, which are considered to be some of the plant's active constituents.¹⁻³

The main plant chemicals found in chuchuhuasi include: agarofuran sesquiterpenes, canophyllol, catechin tannins, dammarane triterpenes, dulcitol, ebenifoline alkaloids, euojaponine alkaloids, friedelan triterpenes, krukovine triterpenes, laevisine alkaloids, macrocarpin triterpenes, maytansine, mayteine, maytenin, mebeverine, phenoldienones, pristimeran, proanthocyanidins, and tingenone (and its derivatives).

Biological Activities and Clinical Research

Chuchuhuasi's long history of use has fueled much clinical interest in the research community. In the 1960s, an American pharmaceutical company discovered potent immune-stimulating properties of a leaf extract and a bark extract, documenting that it increased phagocytosis (the ability of immune cells to attack bacteria and foreign cells) in mice.⁴ Researchers in 1977 reported that alcohol extracts of the bark evidenced anti-inflammatory and analgesic activities in various studies with mice, which validated chuchuhuasi's traditional uses for arthritic pain.⁵ Its anti-inflammatory action again was reported in the 1980s by an Italian research group. They reported that this activity (in addition to radiation protectant and antitumor properties) was at least partially linked to triterpenes and antioxidant chemicals isolated in the trunk bark.⁶ In 1993, a Japanese research group isolated another group of novel alkaloids in chuchuhuasi that may be responsible for its effectiveness in treating arthritis and rheumatism.⁷ In the United States, a pharmaceutical company studying chuchuhuasi's anti-inflammatory and anti-arthritic properties determined that these alkaloids can effectively inhibit enzyme production of protein kinase C (PKC).⁸ PKC inhibitors have attracted much interest worldwide, as there is evidence that too much PKC enzyme is involved in a wide variety of disease processes (including arthritis, asthma, brain tumors, cancer, and cardiovascular disease).⁹ A Spanish research team found more new phytochemicals in 1998, one of which was cited as having activity against aldose reductase.¹⁰ (This enzyme is implicated in nerve damage in diabetic patients.)

In the mid-1970s, Italian researchers tested a chuchuhuasi extract against skin cancers and identified its antitumor properties.¹¹ They attributed these effects to two chemicals in chuchuhuasi called tingenone and pristimerin. Three groups found new and different sesquiterpene compounds in 1999, two of which showed marginal antitumor activity against four cell lines, and one of which was documented as effective against leishmaniasis (a tropical parasitic disease).¹³⁻¹⁵ Other researchers found four more chemicals in the roots of chuchuhuasi (named macrocarpins) in 2000—three of which were documented as cytotoxic to four tumor cell lines.¹²

Current Practical Uses

If the constituents in chuchuhuasi responsible for inhibiting PKC can be synthesized, it is possible that a new arthritis drug will be developed. In the meantime, the natural bark of this important Amazon rainforest tree will continue to be an effective natural herbal remedy for arthritis, for adrenal support, and as an immune tonic--as it has been for centuries. It is best prepared as it has been traditionally: as an alcohol tincture or a decoction. It normally takes about three to four days of daily use to get a beneficial effect for arthritic pain, and up to a month or longer of daily use is necessary for adrenal support.

Traditional Preparation: Traditionally, 2 to 3 cups daily of a standard bark decoction or 2-4 ml of a standard tincture three times daily is used for this rainforest remedy.

Contraindications: None reported.

Drug Interactions: None reported.

Worldwide Ethnomedical Uses

Region	Uses
Brazil	for skin cancer
Colombia	as a pain-reliever and aphrodisiac and for arthritis, rheumatism
Ecuador	for aches (menstrual, muscles), arthritis, fever, pain, rheumatism, stomachache, tumors (skin), and as an aphrodisiac
Peru	for aches (back, muscles), influenza, arthritis, bronchitis, cancer, diarrhea, dysentery, gastrointestinal disease, hemorrhoids, impotency, inflammation, menstrual disorders, nausea, osteoarthritis, pain, rheumatism, tumors, virility, and as an aphrodisiac

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Ethnomedical Information on Chuchuhuasi (*Maytenus krukovi*)

Plant Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Bark Amazonia	Used for rheumatism.	Tincture Oral	Human Adult	BS1002
Bark Amazonia	Used as a muscle relaxant and to break up and disperse lactic acid. Considered adrenal supportive and a tonic.	ETOH Ext Oral	Human Adult	ZZ1016
Stembark Brazil	Used to treat skin cancer.	Infusion External	Human Adult	H18768
Bark Brazil	Used as a stimulant and antirheumatic.	Not Stated	Human Adult	ZZ1099
Not Stated Brazil	Used to treat skin cancer.	Infusion External	Human Adult	J12871
Rootbark Colombia	Used as an aphrodisiac. Used for treatment of rheumatism.	Tincture Oral Tincture Oral	Human Male Human Adult	T04489
Bark Colombia	Used for arthritis, rheumatism and as a stimulant.	Decoction Oral	Human Adult	BS1002
Stems Colombia	Used for arthritis and rheumatism. Considered a stimulant.	Decoction Oral	Human Adult	ZZ1005
Not Stated Colombia	Used as an insect repellent, for rheumatism and as an aphrodisiac.	Not Stated	Human Adult	ZZ1037
Stem + Bark Ecuador	Called 'trembling back.' Used for rheumatism, aching muscles, menstrual aches, stomach aches and general aches. Considered a general tonic for those recovering from tuberculosis, those with a pale complexion, those with bronchitis, stomach ache or fever. Used for rheumatism.	Decoction Oral Tincture Oral	Human Adult	BS1002
Bark Peru	Used for diarrhea, arthritis, upset stomach, rheumatism and as an aphrodisiac. Used to regulate menstrual periods.	H2O Ext Oral	Human Adult Human Female	L04137
Bark Peru	Used as a hallucinogen. Added to the ayahuasca (<i>Banisteriopsis-Psychotria</i>) beverage. Effects described are from a multi-component Rx.	Decoction Oral	Human Adult	M05165
Bark Peru	Used for diarrhea, arthritis, for upset stomach and to regulate menstruation. Used for dysentery.	Maceration Oral Decoction Oral	Human Adult	ZZ1045

Plant Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Stembark Peru	Used as an anti-inflammatory and antitumor agent.	Decoction Oral	Human Adult	H09216
Stembark Peru	Used for rheumatism. Used for influenza and gastrointestinal disease. Used for skin cancer.	Infusion Not Stated Infusion Oral Infusion External	Human Adult	H21673
Not Stated Peru	Used for hallucinogenic effect during shamanic training. May be taken with ayahuasca beverage (<i>Banisteriopsis caapi</i> plus <i>Psychotria viridis</i> decoction). Effects described are from a multi-component Rx.	Decoction Oral	Human Adult	T08133
Not Stated Peru	Used for treatment of rheumatism.	Tincture Oral	Human Adult	H12039
Not Stated Peru	Used as a stimulant, for hepatic problems, rheumatism, colds, for after childbirth and for diarrhea.	Tincture Oral	Human Adult	BS1001
Not Stated Peru	Used as an insect repellent, for rheumatism and as an aphrodisiac.	Not Stated	Human Adult	ZZ1037
Stem Not Stated	Used for skin cancer.	Maceration External	Human Adult	ZZ1011

Presence of Compounds in Chuchuhuasi (*Maytenus krukovii*)

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Agarofuran, 1(s)-6(r)-beta-dihydro-15-triacetoxy-8-alpha-9-beta-dibenzoyl-oxy-4-beta-hydroxy-4(s)-7(s)-8(s)-9(r)-	Sesquiterpene	Leaf	Peru	00.00026%	H25315
Agarofuran, beta-dihydro-1-alpha-6-beta-8-beta-15-tetracetoxy-9-alpha-(benzoyl-oxy)-4-beta-hydroxy-	Sesquiterpene	Leaf	Peru	00.00035%	H25315
Agarofuran, beta-dihydro- 6-beta-8-beta-15-triacetoxy-1-alpha-9-alpha-dibenzoyl-oxy-4-beta-hydroxy-	Sesquiterpene	Leaf	Peru	00.00107%	H25315
Canophyllol	Triterpene	Stembark	Peru	00.02777%	H21673
Dammara-20-24-diene, 25-nor- 3-25-dioxo-cis-23-	Triterpene	Stembark	Peru	00.00666%	H19699
Dammara-20-cis-24-dien-26-al, 3-oxo-	Triterpene	Stembark	Peru	00.01111%	H19699
Dammara-20-trans-24-dien-26-al, 3-oxo-	Triterpene	Stembark	Peru	00.02777%	H19699
Dammara-20-trans-24-dien-26-oic acid, 3-oxo-23-methylene-	Triterpene	Stembark	Peru	00.00333%	H19699
Dammara-20-trans-24-dien-26-ol, 3-oxo-	Triterpene	Stembark	Peru	00.02777%	H19699
Dammara-23-alpha-hydroxy-20-trans-2-4-dien-26-al, 3-oxo-	Triterpene	Stembark	Peru	00.001666%	H19699
Dammara-23-beta-hydroxy-20-trans-24-dien-26-al, 3-oxo-triterpene	Triterpene	Stembark	Peru	00.00222%	H19699
Dammara-6-beta-hydroxy-20-trans-24-dien-26-al, 3-oxo-	Triterpene	Stembark	Peru	00.02222%	H19699
Dammara-6-beta-hydroxy-20-trans-24-dien-26-ol, 3-oxo-	Triterpene	Stembark	Peru	00.00555%	H19699
Dulcitol	Carbohydrate	Stembark	Peru	00.13333%	J18914
Ebenifoline E-I	Sesquiterpene Alkaloid	Stembark Stembark Bark	Peru Peru Ecuador	Not Stated 00.004% 00.00145%	H09216 H12039 H23422

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Ebenifoline E-II	Sesquiterpene Alkaloid	Stembark Stembark	Peru Peru	Not Stated 00.0222%	H09216 H12039
Ebenifoline E-III	Sesquiterpene Alkaloid	Stembark	Peru	00.0037%	H12039
Ebenifoline E-IV	Sesquiterpene Alkaloid	Stembark	Peru	00.0013%	H12039
Ebenifoline E-V	Sesquiterpene Alkaloid	Stembark	Peru	00.0014%	H12039
Ebenifoline W-1	Sesquiterpene Alkaloid	Stembark	Peru	Not Stated	H09216
Ebenifoline W-I	Sesquiterpene Alkaloid	Stembark	Peru	00.0071%	H12039
Ebenifoline W-II	Sesquiterpene Alkaloid	Stembark	Peru	00.0004%	H12039
Euojaponine C	Sesquiterpene Alkaloid	Stembark	Peru	00.0007%	H12039
Euojaponine F	Sesquiterpene Alkaloid	Stembark Bark	Peru Ecuador	00.0063% 00.00132%	H12039 H23422
Euojaponine I	Sesquiterpene Alkaloid	Bark	Ecuador	00.00518%	H23422
Euonymine	Sesquiterpene Alkaloid	Stembark Bark	Peru Ecuador	00.0059% 00.00945%	H12039 H23422
Friedelan-25-al, 3-oxo-	Triterpene	Stembark	Peru	00.00833%	H21673
Friedelane, 29-hydroxy-3-oxo-	Triterpene	Stembark	Peru	00.05555%	H21673
Friedelane-1-3-dione, 28-hydroxy-	Triterpene	Stembark	Peru	00.01388%	H21673
Friedelin	Triterpene	Stembark	Peru	00.01666%	H21673
Gallocatechin, epi-4'-methyl(-)	Flavonoid	Rootbark	Colombia	00.15%	T04489
Krukovine A	Triterpene	Stembark Not Stated	Brazil Brazil	00.00084% Not Stated	H18768 J12871
Krukovine B	Triterpene	Not Stated Stembark	Brazil Brazil	Not Stated 00.0026%	J12871 H18768

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Krukovine C	Triterpene	Stembark	Brazil	00.00085%	H18768
Krukovine D	Triterpene	Stembark	Brazil	00.00096%	H18768
Krukovine E	Triterpene	Stembark	Brazil	00.00077%	H18768
Laevisine A	Sesquiterpene Alkaloid	Bark	Ecuador	00.00145%	H23422
Laevisine B	Diterpene Alkaloid	Bark	Ecuador	00.00118%	H23422
Macrocarpin A	Triterpene	Root	Canary Islands	Not Stated	H25843
Macrocarpin B	Triterpene	Root	Canary Islands	Not Stated	H25843
Macrocarpin C	Triterpene	Root	Canary Islands	Not Stated	H25843
Macrocarpin D	Triterpene	Root	Canary Islands	Not Stated	H25843
Mayteine	Sesquiterpene Alkaloid	Stembark Bark Stembark	Peru Ecuador Peru	00.28% 00.01127% 00.01923%	H12039 H23422 H16646
Mayteine, 6-deacetyl-6-benzoyl-	Sesquiterpene Alkaloid	Stembark	Peru	00.00153%	H16646
Ouratea proanthocyanidin A	Flavonoid	Rootbark	Colombia	00.19%	T04489
Ouratea proanthocyanidin B	Flavonoid	Rootbark	Colombia	00.075%	T04489
Sitosterol, beta-	Steroid	Rootbark	Colombia	00.05%	T04489
Tingenone	Triterpene	Rootbark	Colombia	00.0625%	T04489
Tingenone, 22-hydroxy-	Triterpene	Rootbark	Colombia	00.055%	T04489
Wilformine	Sesquiterpene Alkaloid	Stembark Bark	Peru Ecuador	00.0007% 00.00690%	H12039 H23422
Wilforine	Sesquiterpene Alkaloid	Bark	Ecuador	00.00145%	H23422

Biological Activities for Extracts of Chuchuhuasi (*Maytenus krukovii*)

Plant Part – Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism Tested	Ref #
Root Bark Not Stated	Antitumor Activity	Not Stated	Not Stated	Not Stated	Active		T04489
Bark Colombia	Analgesic Activity	ETOH (95%) Ext	SC Mouse	50.0 mg/kg	Active		M00960
Bark Colombia	Anti-inflammatory Activity	ETOH (95%) Ext	SC Rat	200.0 mg/kg	Active	vs. carrageenin-induced pedal edema.	M00960
Root Bark Not Stated	Anti-inflammatory Activity	Not Stated	Not Stated	Not Stated	Active		T04489
Bark Venezuela	Immunostimulant Activity	Bark MeOH Ext	IV Mouse Female	50.0 mg/kg		vs. rate of clearance of colloidal carbon.	A05936
Leaf Venezuela	Immunostimulant Activity	Leaves	IV Mouse Female Oral Mouse Female	50.0 mg/kg 250.0 mg/kg	Active	vs. rate of clearance of colloidal carbon.	A05936

GI = Gastric Intubation IG = Intra gastric IP = Intraperitoneally IV = Intravenously SC = Subcutaneously IM = Intramuscular

Biological Activities for Compounds of Chuchuhuasi (*Maytenus krukovii*)

Compound Tested	Activity Tested For	Test Model	Dosage	Result	Notes/Organism Tested	Ref #
Macrocarpins A-D	Cytotoxic Activity	In vitro	IC50=0.4-5.2 microM	Active	Four tumor cell lines.	H25843
3-oxofriedelan-29-oic acid	Cytotoxic Activity	In vitro	ED50=0.21 mcg/ml	Active	A-549 lung carcinoma cell line.	BS1003
Beta-dihydroagarofuran sesquiterpenes	Antitumor Activity	In vitro	Not Stated	Active	Four tumor cell lines.	H25315
Tingenone	Antimicrobial Activity	Agar Plate	Not Stated	Active	<i>Bacillus cereus</i> <i>B. subtilis</i> <i>Sarcina lutea</i> <i>Staphylococcus aureus</i> <i>Microsporium gypseum</i> <i>Klebsiella pneumoniae</i>	BS1006
Krukovine	Antiplasmodial Activity	In vitro	IC50=0.44 mcg/ml IC50=0.022 mcg/ml	Active Active	K1 chloroquine-resistant <i>P. falciparum</i> . T9-96 chloroquine-sensitive <i>P. falciparum</i> .	BS1009
Tingenone	Antiparasitic Activity	In vitro	30 microM	Active	<i>Trypanosoma cruzi</i> <i>Crithidia fasciculata</i>	BS1007
Dihydro-beta-agarofuran sesquiterpenes	Antiparasitic Activity	In vitro	Not Stated	Active	Multi-drug resistant Leishmania line.	BS1004
Tingenone	Insecticidal Activity	Larvae	Not Stated	Weak Activity	Codling moth larvae (<i>Cydia pomonella</i>).	BS1005
Canophyllol	Human Leucocyte Elastase Inhibitor	Cell Culture	IC50=2.5 microM	Active		BS1008

GI = Gastric Intubation IG = Intra gastric IP = Intraperitoneally IV = Intravenously SC = Subcutaneously IM = Intramuscular

Literature Cited – Chuchuhuasi (*Maytenus krukovi*)

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