

Technical Data Report

for

SUMA

Pfaffia paniculata



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Suma

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Family: Amaranthaceae

Genus: *Pfaffia*

Species: *paniculata*

Synonyms: *Hebanthe paniculata*, *Gomphrena paniculata*, *G. eriantha*, *Iresine erianthos*, *I. paniculata*, *I. tenuis*, *Pfaffia eriantha*, *Xeraea paniculata*

Common Names: Suma, Brazilian ginseng, pfaffia, para toda, corango-acu

Part Used: Root

Suma is a large, rambling, shrubby ground vine with an intricate, deep, and extensive root system. It is indigenous to the Amazon basin and other tropical parts of (southern) Brazil, Ecuador, Panama, Paraguay, Peru, and Venezuela. Since its first botanical recording in 1826, it has been referred to by several botanical names, including *Pfaffia paniculata*, *Hebanthe paniculata*, and *Gomphrena paniculata*. The genus *Pfaffia* is well known in Central and South America, with over 50 species growing in the warmer tropical regions.

In South America suma is known as *para toda* (which means “for all things”) and as *Brazilian ginseng*, since it is widely used as an adaptogen with many applications (much as “regular” ginseng). The indigenous peoples of the Amazon region who named it *para toda* have used suma root for generations for a wide variety of health purposes, including as a general tonic; as an energy, rejuvenating, and sexual tonic; and as a general cure-all for many types of illnesses. Suma has been used as an aphrodisiac, a calming agent, and to treat ulcers for at least 300 years. It is an important herbal remedy in the folk medicine of several rainforest Indian tribes today.

In herbal medicine throughout the world today, suma is considered a tonic and an adaptogen. The herbal definition of an *adaptogen* is a plant that increases the body’s resistance to adverse influences by a wide range of physical, chemical, and biochemical factors and has a normalizing or restorative effect on the body as a whole. In modern Brazilian herbal medicine practices, suma root is employed as a cellular oxygenator and taken to stimulate appetite and circulation, increase estrogen production, balance blood sugar levels, enhance the immune system, strengthen the muscular system, and enhance memory. In North American herbal medicine, suma root is used as an adaptogenic and regenerative tonic regulating many systems of the body; as an immunostimulant; to treat exhaustion and chronic fatigue, impotence, arthritis, anemia, diabetes, cancer, tumors, mononucleosis, high blood pressure, PMS, menopause, and hormonal disorders, and many types of stress. In herbal medicine in Ecuador today, suma is considered a tonic and “normalizer” for the cardiovascular system, the central nervous system, the reproductive system, and the digestive system; it is used to treat hormonal disorders, sexual dysfunction and sterility, arteriosclerosis, diabetes, circulatory and digestive disorders, rheumatism, and bronchitis. Thomas Bartram, in his book *Encyclopedia of Herbal Medicine*, reports that suma is used in Europe to restore nerve and glandular functions, to balance the endocrine system, to strengthen the immune system, for infertility, menopausal, and menstrual symptoms, to minimize the side effects of birth control medications, for high cholesterol, to neutralize toxins, and as a general restorative tonic after illness.

Suma has also been called “the Russian secret,” as it has been taken by Russian Olympic athletes for many years and has been reported to increase muscle-building and endurance without the side effects associated with steroids. This action is attributed to an anabolic-type phytochemical called *beta-ecdysterone* and three novel ecdysteroid glycosides that are found in high amounts in suma.^{1,2} Suma is such a rich source of beta-ecdysterone that it is the subject of a Japanese patent

for the extraction methods employed to obtain it from suma root (approximately 2.5 g of beta-ecdysterone can be extracted from 400 g of powdered suma root—or .63%).³ These same Japanese researchers filed a U.S. patent in 1998 for a proprietary extract of suma (which extracted the ecdysterone and beta-ecdysterone); it claimed (through various *in vivo* and *in vitro* studies) that their compound maintained health, enhanced the immune system, and had a tonic and an anti-allergenic effect.⁴ A French company also filed a U.S. patent on the topical use of these ecdysterone chemicals, claiming that their suma ecdysterone extract strengthened the water barrier function of the skin, increased skin keratinocyte differentiation (which would be helpful for psoriasis), gave the skin a smoother, softer appearance and, also, improved hair appearance.

Nutritionally, suma root contains 19 different amino acids, a large number of electrolytes, trace minerals, iron, magnesium, zinc, vitamins A, B1, B2, E, K, and pantothenic acid.² Its high germanium content probably accounts for its properties as an oxygenator at the cellular level; its high iron content may account for its traditional use for anemia. The root also contains novel phytochemicals including saponins, pfaffic acids, glycosides, and nortriterpenes.

Suma root has a very high saponin content (up to 11%).⁶ In phytochemistry, plant saponins are well known to have a wide spectrum of activities including lowering blood cholesterol, inhibiting cancer cell growth, and acting as antifungal and antibacterial agents. They are also known as natural detergent and foaming agents. Phytochemists report that saponins can act by binding with bile acids and cholesterol. It is thought that these chemicals “clean” or purge these fatty compounds from the body (thus lowering blood cholesterol levels). One of the most famous plant saponins is digitalis, derived from the common foxglove garden plant, which has been used as a heart drug for over 100 years. The specific saponins found in the roots of suma include a group of novel phytochemicals that scientists have named *pfaffosides*. These saponins have clinically demonstrated the ability to inhibit cultured tumor cell melanomas (*in vitro*) and help to regulate blood sugar levels (*in vivo*).⁷⁻⁹ The *pfaffosides* and *pfaffic acid* derivatives in suma were patented as antitumor compounds in several Japanese patents in the mid-1980s.¹⁰⁻¹³ In a study described in one of the patents, researchers reported that an oral dosage of 100 mg/kg (of suma saponins) given to rats was active against abdominal cancer.¹³ The other patents and Japanese research report that the *pfaffic acids* found in suma root had a strong *in vitro* activity against melanoma, liver carcinoma, and lung carcinoma cells at only 4–6 mcg of *pfaffic acids*.⁹⁻¹¹ However, it should be noted that 18 kg (about 40 pounds) of raw suma root was required to extract only 180 mcg of *pfaffic acids*. This equates to taking 400 to 600 g (about 1 pound) of natural suma root daily to achieve the therapeutic dosage of *pfaffic acids* reported to demonstrate toxic activity against these cancer cells. As such, it will probably be left up to the pharmaceutical companies to provide synthesized versions of these chemicals in therapeutic amounts. However, a more recent (2000) study in Japan reported that natural suma root had anti-cancerous activity at lower dosages. In this *in vivo* study, an oral administration of powdered suma root (750 mg/kg) was reported to inhibit the proliferation of lymphoma and leukemia in mice and, otherwise, delay mortality.¹⁴ Notice, however, that this antiproliferative effect slowed the growth of these cancer cells—it did not eradicate them. These researchers postulated that the inhibitory effect evidenced might be due to the enhancement of the nonspecific and/or cellular immune systems.

In 1995, another U.S. patent was filed which detailed some beneficial effects of suma root against sickle-cell anemia. In a double blind placebo human study, they reported that 15 patients taking suma root for three months (1000 mg three times daily) increased hemoglobin levels, inhibited red blood cell sickling and, generally, improved their physical condition by reducing side effects during the treatment.¹⁵ These results were statistically higher than the 15 other patients on placebo. Unfortunately, once treatment was discontinued, symptoms and blood parameters returned to their pretreated state within 3–6 months. It was reported, however, that several patients in the study remained on the suma supplement for three years or longer. They reportedly maintained consistent improvement and a higher quality of life with no side effects. Other U.S. researchers (in 2000) studied suma root’s actual mechanism of action in its ability to resickle blood cells and reported their findings—which again confirmed an antisickling effect and a rehydration effect of sickled cells (*in vitro*).¹⁶

In other research, suma demonstrated analgesic and anti-inflammatory activities in various *in vivo* rat and mouse studies.^{17,18} Another tested activity focused on its long history of use as a sexual stimulant and aphrodisiac. Researchers verified this traditional use, reporting in a 1999 clinical study that a suma root extract was able to increase the sexual performance in healthy, sexually sluggish and impotent rats.¹⁹ In 2001, a U.S. patent was filed on a multi-plant combination containing suma for sexual enhancement in humans. The patent indicated that the suma extract tested increased sexual performance and function.²⁰

Toxicity studies with humans indicated no toxicity at an oral dosage of 1.5 g of the root.¹¹ Another orally-administered toxicity study with rats also reported no toxicity—even when suma root represented 50% of the rats' food supply for 30 days.¹⁵ However, mice injected subcutaneously with the equivalent of 5 gm/kg (in an ethanol extract) evidenced sedation, drop in body temperature, and loss of motor coordination;¹⁷ mortality was observed at 10 g/kg (again, in an ethanolic extract) when injected intraperitoneally in mice.¹⁸

Suma is another excellent example of a highly beneficial rainforest plant that has many activities and applications—with clinical research validating its traditional uses. No wonder it's called "for all things" throughout South America! With its varied applications—from cancer and sickle cell anemia to its sexual stimulant and tonic qualities—it is finally becoming more popular and well known in North American herbal medicine practices as well. Suma root products are now more widely available in health food stores; several encapsulated, ground-root products (and root extracts in capsules and liquid extracts) are available on the shelves under various labels. There is also at least one standardized extract (standardized to the saponin content) that has made a recent appearance on the market.

Documented Properties and Actions: Anabolic, analgesic, anticancerous, anti-inflammatory, antileukemic, antimutagenic, antiproliferative, anti-tumorous, aphrodisiac, estrogenic, hypocholesterolemic, immunostimulant, nutritive, sedative, steroidal, tonic

Main Phytochemicals: Allantoin, beta-ecdysterone, beta-sitosterol, daucosterol, germanium, iron, magnesium, nortriterpenoids, pantothenic acid, pfaffic acids, pfaffosides A–F, polypodine B, saponins, silica, stigmasterol, stigmasterol-3-o-beta-d-glucoside, vitamins A, B1, B2, E, K, zinc

Traditional Remedy: The Brazilian traditional remedy calls for preparing a standard decoction with 10 g of suma root boiled in a liter of water; two cups of the decoction are generally taken daily. Herbalists and health practitioners also employ suma root powder in capsules (the decoction tastes quite bitter) with the reported dosage being 2–4 g daily depending on body weight and health condition and this daily dosage is usually taken in two or three divided dosages throughout the day. For standardized or liquid extract products, follow the labeled dosage instructions.

Contraindications:

- Suma has been documented to contain a significant amount of phytosterols including a significant amount of beta-ecdysterone and small amounts of stigmasterol and beta-sitosterol. These sterols might have estrogenic properties or activities and/ or cause an increase in estrogen production (not clinically proven) as this plant has been used traditionally to regulate menstrual processes, as well as to treat menopause, PMS, and other hormonal disorders. As such, it is advisable for women with estrogen-positive cancers to avoid the use of this plant.
- The root powder has been reported to cause asthmatic allergic reactions if inhaled.²¹ When handling raw suma root powder or preparing decoctions with root powder, avoid inhalation of the root powder/dust.
- Ingestion of large amounts of plant saponins in general (naturally occurring chemicals in suma) has shown to sometimes cause mild gastric disturbances including nausea and stomach cramping. Reduce dosages if these side effects are noted.

Drug Interactions: None reported.

WORLDWIDE ETHNOBOTANICAL USES

Country	Uses
Brazil	Analgesic, anemia, aphrodisiac, appetite stimulant, arthritis, anti-inflammatory, antimicrobial, antioxidant, asthma, cancer, chronic fatigue syndrome, circulation, diabetes, Epstein-Barr, hypertension, hypoglycemia, immunostimulant, impotence, leukemia, lymphatic, mononucleosis, rejuvenator, rheumatism, skin, stress, tonic, tranquilizer, tremors, tumors, ulcers
Ecuador	Arteriosclerosis, bronchitis, circulatory, diabetes, digestive, hormonal, rheumatism, sexual dysfunction, sterility, tonic
Europe	Endocrine, fertility, high cholesterol, immunostimulant, menopause, menstrual disorders, nerve, nervine, tonic
Japan	Cancer, steroidal, tumor
Russia	Muscle growth, tonic
Peru	Fever, malaria, diarrhea, dysentery, emetic, flatulence, stomach pains
U.S.	Chronic fatigue syndrome, diabetes, Epstein-Barr, hormonal disorders, hypertension, impotence, menopause, mononucleosis, nervine, PMS

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

Ethnomedical Information on Suma (*Pfaffia paniculata*)

Plant Part/ Location	Documented Ethnomedical Use	Type Extract / Route	Used For	Ref #
Root Brazil	Used as an aphrodisiac and tonic; used to treat diabetes and rheumatism.	Infusion / Oral	Human Adult	K18218
Root Brazil	Used as an aphrodisiac and tonic; used to treat diabetes and leukemia.	Root / Oral	Human Adult	L16508
Root Brazil	Used as a tonic an aphrodisiac. Used to treat diabetes.	Hot H2O Ext / Oral	Human Adult	M10662
Root Brazil	Used as a tonic, aphrodisiac and antidiabetic.	Hot H2O Ext / Oral	Human Adult	N13347
Root Brazil	Used as a tonic, aphrodisiac and antidiabetic.	Hot H2O Ext / Oral	Human Adult	N19878
Root Brazil	Used as a tonic, aphrodisiac, tranquilizer, and to treat ulcers, cancer, leukemia and diabetes.	Hot H2O Ext / Oral	Human Adult	T13148
Root Brazil	Used as a general tonic, energy and rejuvenating tonic and a general cure-all for many types of illnesses.	Decoction / Oral	Human Adult	AM1007
Root Brazil	Used as a mental and physical tonic, used to treat stress, depression, headaches, memory loss, and anemia.	ETOH Ext / Oral	Human Adult	ZZ1081
Root Brazil	Used to increase muscular strength, as an appetite stimulant, to diminish tremors in the elderly, to treat stress, anemia, circulatory disorders and the growth of tumor cells.	Not stated / Oral	Human Adult	AM1001
Root Brazil	Used as a general tonic, as an anti-inflammatory, a cellular oxygenator, appetite stimulate, cicatrizant, vulnerary, aperient and muscle relaxant. Used to treat cancer, leukemia, anxiety, poor memory, arthritis, fluid in the ear, digestive diseases, rheumatism, to enhance muscle tone and estrogen production.	Decoction / Oral	Human Adult	ZZ1076

Plant Part/ Location	Documented Ethnomedical Use	Type Extract / Route	Used For	Ref #
Leaf + Root Brazil	Used to prevent wrinkles and rejuvenate the skin, to stimulate circulation and eliminate fluids (edema); used for damaged hair and split ends.	Not stated / External	Human Adult	AM1001
Leaf + Root Brazil	Used as an analgesic, antiinflammatory, antimicrobial, antioxidant and antitumor; to stimulate peripheral circulation, the lymphatic system and the immune system; used as a rejuvenating and revitalizing tonic.	Not stated / Oral	Human Adult	AM1001
Root Ecuador	Used as a tonic for the digestive system, to treat hormonal disorders, sexual dysfunction and sterility, arteriosclerosis, diabetes, circulatory and digestive disorders, rheumatism and bronchitis.	Not Stated / Oral	Human Adult	ZZ1006

Presence of Compounds in Suma (*Pfaffia paniculata*)

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Allantoin	Alkaloid	Root	Brazil	00.00013%	M10662
Daucosterol	Steroid	Root	Brazil	00.00128%	M10662
Ecdysone, beta:	Steroid	Root Root	Japan Brazil	00.63250% 00.63250%	M05710 T12906
Pfaffic acid	Triterpene	Root	Brazil	00.00100%	M10662
		Root	Brazil	00.006%	N13347
		Root	Brazil	01.00000%	T12915
		Root	Brazil	Not stated	K22411
Pfaffoside A	Triterpene	Root	Brazil	Not stated	T11992
		Root	Brazil	00.00047%	M10662
		Root	Brazil	00.00047%	T13148
Pfaffoside B	Triterpene	Root	Brazil	Not stated	T11992
		Root	Brazil	00.00094%	M10662
		Root	Brazil	00.00094%	T13148
Pfaffoside C	Triterpene	Root	Brazil	Not stated	T11992
		Root	Brazil	Not stated	T13148
		Root	Brazil	00.00019%	M10662
Pfaffoside D	Triterpene	Root	Brazil	00.00078%	T13148
		Root	Brazil	00.00700%	N19878
		Root	Brazil	Not stated	T11992
		Root	Brazil	Not stated	N19878
Pfaffoside E	Triterpene	Root	Brazil	00.00900%	N19878
		Root	Brazil	Not stated	T11992
		Root	Brazil	00.00100%	T13148
		Root	Brazil	Not stated	N19878

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Pfaffoside F	Triterpene	Root	Brazil	00.00100%	N19878
		Root	Brazil	Not stated	T11992
		Root	Brazil	00.00011%	T13148
		Root	Brazil	Not stated	N19878
Polypodine B	Steroid	Root	Japan	00.01950%	M05710
Saponins (total)	Saponin	Root	Brazil	11.1%	N11494
Sitosterol, beta:	Steroid	Root	Brazil	00.00078%	M10662
Stigmasterol	Steroid	Root	Brazil	00.00078%	M10662
Stigmasterol-3-o-beta-d-glucoside	Steroid	Root	Brazil	00.00128%	M10662

Biological Activities for Extracts of Suma (*Pfaffia paniculata*)

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Root Brazil	Toxic Effect(general)	Root	Oral Human Adult	1-1.5 gm	Inactive	Daily dosing produced no side effects or toxicity.	T12915
Root Brazil	Toxic Effect (general)	Powdered Root	Oral Rat	50% of food ration	Inactive	No signs of toxicity noted after 30 days.	AM1003
Root Brazil	Toxic Effect (general)	ETOH (60%) Ext	SC Mouse	10.0 gm/kg	Active	100% mortality at this dose.	K18218
Root Brazil	Toxic Effect (general)	ETOH (20%) Ext	IP Mouse	5.0 gm/kg	Active	Animals experienced sedation, motor incoordination, piloerection and hypothermia.	K11098
Root Brazil	Allergenic Activity	Buffer	Intradermal Human Adult	Not stated	Active		M29212
Root Brazil	Irritant Activity	Buffer	Inhalation Human Adult	Not stated	Active	The patient experienced an asthmatic response after inhaling root powder.	M29212
Root Brazil	Irritant Activity	ETOH (60%) Ext	Injection Rat	0.5 ml	Inactive		K18218
Root Brazil	CNS Depressant Activity	ETOH (70%) Ext	SC Mouse	5.0 gm/kg	Weak Activity		K18218
Root Brazil	Vascular Permeability Decreased	ETOH (60%) Ext	SC Rat	1.0 gm/kg	Active	48.1% inhibition of dye leakage.	K18218
Root Brazil	Antiproliferative Activity	Root	IP Mouse Oral Mouse	750.0 mg/kg	Active Active	vs. spontaneously occurring leukemia caused by endogenous recombinant murine leukemia viruses and; vs. thymic lymphoma	L16508
Root Brazil	Antitumor Activity	Pfaffoside fraction	Cell Culture	Not stated	Active	Pfaffosides D, E, and F inhibited the growth of cultured tumor cell melanoma (B-16)	N19875
Root Brazil	Antitumor Activity	Pfaffic Acid fraction	Cell culture	4 - 6 mcg / ml	Active	vs. HeLa cells and melanoma B-16. (180 mg of pfaffic acids were obtained from 18 kg dried roots)	T12915
Root Brazil	Antitumor Activity	Pfaffic Acid fraction	Cell Culture	.05 mg / ml	Strong Activity	vs. melanoma B-16, HeLa (S-3), and Lewis lung carcinoma cells	N13347
Root Brazil	Antitumor Activity	Pfaffoside fraction	Oral Mouse	Not stated	Active	vs. ascites tumors	T11992

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Root Brazil	Antitumor Activity	Saponin fraction	Oral Mouse	100.0 mg/kg 200.0 mg/kg 400.0 mg/kg	Active Active Active	Abdominal cancer cells.	T13148
Root Brazil	Immunostimulant Activity	Favonoid fractions	Broth Culture	0.1 ml	Strong Activity	Strong macrophage activating activity of 100 - 200% over controls.	AM1002
Root Brazil	Analgesic Activity	ETOH(20%) Ext	IP Mouse	0.5 gm/kg	Active	vs. acetic acid-induced writhing.	K11098
Root Brazil	Analgesic Activity	ETOH(60%) Ext	IP Rat	0.5 gm/kg	Active	34% inhibition. vs.acetic acid-induced writhing.	K18218
Root Brazil	Analgesic Activity	ETOH(60%) Ext	SC Rat	2.0 gm/kg	Inactive	vs.hot plate method.	K18218
Root Brazil	Antiinflammatory Activity	ETOH(20%) Ext	IP Mouse	0.15 gm/kg	Active	vs. carrageenan-induced pedal edema.	K11098
Root Brazil	Antiinflammatory Activity	ETOH(60%) Ext	IP Rat	0.5 gm/kg	Active	vs. carrageenan-induced pedal edema.	K18218
Root Brazil	Antisickling Activity	Powder	Cell Culture	0.4 mg/ml	Active	RBC vs. sickle cell anemia	L13666
Root Brazil	Anti-Sickle Cell Anemia Activity	Root powder	Human (double blind placebo study)	1000 mg TID	Active	In 15 sickle cell anemia patients taking compound for 3 months (HB) levelst increased to 8-9 g/dL, hematocrit (HT) levels increased, and the number of peripheral erythrocytes (fetal hemoglobin) decreased, indicating desickling. Reduction of other symptoms reported. Results statistically higher than other 15 patients on placebo with no improve-ments in signs or symptoms.	AM1003
Root Brazil	Aphrodisiac Activity	Fluid Ext	Intragastric Rat (Male)	1.0 ml/kg	Active	Improved copulatory performance of sexually sluggish/impotent rat.	L05439
Root Brazil	Ejaculation Stimulant	Fluid Ext	Intragastric Rat (Male)	1.0 ml/kg	Active	Test on normal and impotent rats in all cases.	L05439
Root Brazil	Ejaculation Stimulant	Fluid Ext	Intragastric Rat (Male)	1.0 ml/kg	Active	Coadministration with other compounds.	L05439
Root Brazil	Keratinocyte Differentiation Activity	Ecdysteroid fractions	Cell Culture (Human skin)	250 .mu.g/ml	Active	Normalized and increased keratinocyte differentiation.	AM1004

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Root Brazil	Multiple Effects	Favonoid fractions	Oral Mice	Various	Active	Various tests performed indicating extracts were immunoenhancement, antiallergic, psychotropic, and/or tonic activities. Tests performed on suma root fractions and multi-drug compound of suma, guarana, and indigo.	AM1002

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K18218	ANALGESIC AND ANTIINFLAMMATORY ACTION OF PFAFFIA PANICULATA (MARTICUS) KUNTZE. MAZZANTI,G: BRAGHIROLI,L: PHYTOTHER RES 8 7: 413-416 (1994) (INST PHARMACOL PHARM UNIV LA SAPIENZA ROME 00185 ITALY)
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M29212	OCCUPATIONAL ASTHMA CAUSED BY BRAZIL GINSENG DUST. SUBIZA,J: SUBIZA,JL: ESCRIBANO,PM: HINOJOSA,M: GARCIA,R: JERE,M: SUBIZA,E:J ALLERGY CLIN IMMUNOL 88 5: 731-736 (1991) (MADRID SPAIN)
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