

Technical Data Report

for

Ajos Sacha **(*Mansoa alliacea*)**



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Ajos Sacha

Family: Bignoniaceae

Taxon: *Mansoa alliacea* (Lam.) A.H. Gentry

Synonyms: *Adenocalymma alliaceum*, *Adenocalymma pachypus*, *Adenocalymma sagotii*, *Bignonia alliacea*, *Pachyptera alliacea*, *Pseudocalymma alliaceum*, *Pseudocalymma pachypus*, *Pseudocalymma sagotti*

Common names: aboeja-mibia, ah-kah-pota, ajo macho, ajo sachá, ajos sachá, ajosacha, ajos del monte, Amazonian garlic bush, ayotete, be'o-ho, be'o-ja pusanga, bejuco de ajo, boens, cipo-alho, cipo-d'alho, false garlic, garlic rope, garlic vine, gonofroe-tite, ilay kamwi, ka ale, knof-looklian, knoflook liaan, koenofrokoetite, kwi-po-kan, liane-ail, nia boens, nishi boains, posatalu, sachá ajo, sucho ajo, shansque boains, tingi-tite, vova, wild garlic, woe-ipole

Parts Used: Leaves, bark, and roots.

Herbal Properties & Actions		
Main Actions:	Other Actions:	Standard Dosage: Leaf or Bark
relieves pain	lowers cholesterol	Decoction: 1 cup twice daily
reduces inflammation	fight free radicals	Tincture: 3-4 ml twice daily
reduces fever	kills fungi	Capsules: 1-2 g twice daily
calms coughs		
reduces spasms		
eases colds & flu		
kills viruses		

Ajos sachá is an evergreen tropical shrubby vine that is native to the Amazon rainforest. It can either be described as a shrub or a vine since it produces numerous woody vines from the root that grow only 2-3 m tall and form a shrub-like appearance. It is cataloged under two main Latin names, *Mansoa alliacea* and *Pseudocalymma alliaceum*, although several other synonyms are used as well. Its Spanish name, *ajos sachá*, means “false garlic” and refers to the strong garlic smell and flavor of the leaves when crushed. In the tropics and in the Amazon rainforest, the leaves are even used as a condiment or spice for its garlic flavor and odor.

Ajos sachá produces bright green leaves up to 15 cm long and beautiful deep lavender flowers with a white throat that fade to a pale lavender, then to almost white. All three flower colors can be found on the plant simultaneously. Its compact habitat and pretty continuous flowers make it a popular ornamental plant in gardens in the tropics. It has made its way to speciality tropical nurseries in the United States and can be found in some gardens in the South where freezing and frost won't kill this tropical vine (or it is grown as a house plant). It is called “garlic vine” here in the United States.

Ajos sachá is properly classified in the *Mansoa* taxon which include about 15 other species (some of which also smell like garlic) and are distributed throughout tropical South America. Ajos sachá can be found growing wild in the tropical rainforests of Brazil, Ecuador, Peru, the three Guyanas, as well as Costa Rica. It is especially abundant in the forests alongside the Amazon, Ucayali and Madre de Dios rivers in the Peruvian Amazon.

TRIBAL AND HERBAL MEDICINE USES

Ajos sachá is well used and respected by most of the indigenous Indian tribes of the Amazon and almost all parts of the plant are used; the leaves, vine bark, and root. Most consider the plant to be “magical” or “spiritual” and capable of driving away evil spirits or used for good luck. The leaves, tied in bunches, can often be found in local huts and houses for this purpose, or, the leaves are burned as smudge over people or in houses to “cleanse the spirit” or to bring good luck. The Shipibo-Conibo Indians give a tea of bark to dogs to make them good hunters and also drink the tea themselves to bring good luck when hunting or fishing. Oftentimes, ajos sachá can be found as an adjunctive ingredient in the hallucinogenic potion the shamans use in spiritual ceremonies called *ayahwasca*. It is added to the brew to drive away evil spirits, or to purify the blood and body to make the *ayahwasca* more readily accepted.

Ajos sachá is also used as a medicine by the Indian tribes in the Amazon. The Shipibo-Conibo prepare the bark into a poultice to use on bumps, swellings and inflammatory conditions of the skin. They prepare the bark in an infusion or the leaves in a decoction for rheumatism, arthritis, colds, uterine disorders, inflammation and epilepsy. The root is prepared in a cane alcohol tincture as an overall regenerative whole body tonic. The Ese'ejá Indians prepare a leaf tea for colds, while the Amuesha use a leaf tea to aid fertility. The Wayapi put the leaves in a bath to treat feverish conditions. The Creoles in Guyana use the leaves in baths for cramps and fatigue and the Tapajós in Brazil use it in baths for body aches and the flu.

Ajos sachá is also quite well known and popular in the cities and towns in the Amazon and has a long history of use in herbal medicine systems in Peru and Brazil. It is considered analgesic, anti-inflammatory, and antirheumatic and widely used for arthritis, rheumatism, body aches and pain, and muscle aches, injuries and pain. The bark is typically prepared in a tincture or a decoction for these types of conditions but the leaves are used similarly for the same conditions as well. In addition, the leaves of ajos sachá are also a common remedy for colds, flu, pneumonia, coughs, fever, and headaches. The leaves are generally prepared as an infusion or decoction. The root is also prepared in a tincture or a cold maceration (soaking it in cold water for 2-3 days) and taken as a general whole-body tonic.

PLANT CHEMICALS

Ajos sachá contains several of the main sulfur compounds that garlic does.¹⁻⁵ It is these compounds which are responsible for the garlic-like odor and taste of ajos sachá. The wood of the vine was reported to contain two lapachone chemicals which are well known plant chemicals of the *Bignoniaceae* family and documented with anticancerous and antimicrobial actions.⁶ The leaves and/or flowers contain the known anti-inflammatory and antibacterial plant steroids beta sitosterol, stigmasterol, daucosterol, and fucosterol.⁷⁻⁹

Chemicals reported in ajos sachá thus far include: 24-ethyl-cholest-7-en-3-beta-ol, 3-beta-hydroxy-urs-18-en-27-oic acid, alliin, allyl sulfides, alpha 4-hydroxy-9-methoxy-lapachone, alpha 9-methoxy-lapachone, apigenins, aspartic acid, beta-sitosterol, beta amyrrin, beta-peltoboykinolic acid, cosmosiin, cyanidin-3-o-beta-d-rutinoside, daucosterol, diallyl sulfides, 1-2: 3-vinyl-dithi-4-ene, 1-2: 3-vinyl-dithi-5-ene, dithiacyclopentene, dotriacontan-1-ol, fucosterol, glutamic acid, glycyrrhetol, hentriacontanes, hexacosan-1-ol, hexatriacontans, leucine, luteolin, n-nonacosane, oct-1-en-3-ol, octacosan-1-ol, pentatriacont-1-en-17-ol, scutellarein-7-o-beta-d-glucuronide, stigmasterol, triacontan-1-ol, triallyl sulfides, trithiacyclohexene, n-tritriacontane, and ursolic acid.

BIOLOGICAL ACTIVITIES AND CLINICAL RESEARCH

The sulfur compounds (the predominate ones being alliin and various allyl sulfides) in both garlic and ajos sacha have been studied by many and reported over the years to be able to lower cholesterol.¹⁰ When laboratory rats were fed dried ajos sacha flowers (2% of their dietary intake), scientists reported that cholesterol levels were lowered, and much like garlic, the absorption of cholesterol in the intestines was inhibited.¹¹ In research published in 1980, a water extract of ajos sacha leaves was reported to have an antioxidant effect which was attributed to the anthocyanin compounds found in the plant.^{12, 13} Researchers confirmed ajos sacha's long standing use for arthritis and rheumatism when they reported that the plant was capable of inhibiting COX (an enzyme required in the inflammatory process) and well as reduced ear edema in a study with rats in 1997.¹⁴ Ajos sacha has also been reported with antimicrobial actions against fungi,^{15,16} plant viruses,¹⁷⁻¹⁹ and bacteria^{20,21} which may help explain its long standing use for colds, flu, pneumonia and other upper respiratory infections.

CURRENT PRACTICAL USES

Ajos sacha is a very common and well respected plant remedy in the Amazon for the pain and inflammation of arthritis and rheumatism, as well as, colds, flu, and fever. Some capsule products of the leaves are sold in stores in Brazil and Peru, and it can be found as an ingredient in other various multi-herb formulas for cold and flu, pain, inflammation and arthritis in general. The use of ajos sacha is just catching on here in the U.S. market; a few products are now available and it is showing up in several formulas for colds and arthritis here as well.

Ajos Sacha Plant Summary
Main Actions (in order): analgesic, anti-inflammatory, antirheumatic, febrifuge, antitussive
Main Uses: <ol style="list-style-type: none">1. for arthritis and rheumatism2. for coughs, colds, flu, pneumonia and upper respiratory conditions3. as a general pain-reliever (headaches, muscles, joints, body aches)4. for fevers (malaria, flu, etc.)5. for general inflammation (external and internal)
Properties/Actions Documented by Research: antibacterial, antifungal, anti-inflammatory, antimicrobial, antioxidant, antiviral, COX-inhibitor, hypocholesterolemic
Other Properties/Actions Documented by Traditional Use: analgesic, anti-arthritic, anti-inflammatory, antipyretic, antirheumatic, antitussive, depurative, purgative, tonic, vermifuge
Cautions: None reported.

Traditional Preparation: Generally, if the bark is prepared into a natural remedy, a decoction or tincture method is used. The leaves are thought to have best the broad spectrum actions and generally they are prepared into decoctions, tinctures, and capsules.

Contraindications: None reported.

Drug Interactions: None reported.

WORLDWIDE ETHNOMEDICAL USES	
Amazonia	for arthritis, good luck, nervous shock, and rheumatism
Brazil	as an analgesic, antipyretic, antirheumatic, and tonic; for arthritis, body aches, colds, coughs, fevers, flu, respiratory ailments, and rheumatism
Colombia	for pulmonary ailments
Guyana	as an analgesic and antipyretic, for colds, cramps, fatigue, fevers, flu, general weakness, head colds, lameness, lumbago, muscle aches, pain, and rheumatism
Peru	as an analgesic, anti-arthritic, anti-inflammatory, antipyretic, antirheumatic, antitussive, depurative, purgative, and tonic; for aches, abdominal pain, arthritis, asthma, body aches, colds, coughs, cramps, epilepsy, fatigue, fertility, fevers, flu, good luck, headaches, inflammation, insect repellent, malaria, nervous shock, nervousness, pneumonia, rheumatism, skin problems, and uterine disorders
Suriname	for colds, fever, rheumatic pains and as a vermifuge and pregnancy tonic
Venezuela	as an emetic

References:

1. Das Gracias, B., et al. "Volatile sulfides of the Amazonian garlic bush." *J. Agr. Food Chem.* 1984; 32(5): 1009-1010.
2. Rao, L. J. M., et al. "Chemical composition of the volatile oil from garlic creeper (*Adenocalymma alliaceum*)." *J. Med. Aromat. Plant Sci.* 1999; 21(4): 987-989.
3. Apparao, M., et al. "Diallyl Di-, Tri- and Tetrasulphide from *Adenocalymma alliaceae*." *Phytochemistry.* 1978; 17: 1660-1661.
4. Zoghbi, M. G. B., et al. "Volatile constituents from *Adenocalymma alliaceum* Miers. and *Petiveria alliacea* L., Two medicinal herbs of the Amazon." *Flavour and Fragrance Journal* 2002; 17(2): 133-135.
5. Apparao, M., et al. "Aliin in the garlicky taxon *Adenocalymma alliaceum* (Bignoniaceae)." *Phytochemistry.* 1981; 20: 822-823.
6. Itokawa, H., et al. "Cytotoxic naphthoquinones from *Mansoa alliacea*." *Phytochemistry.* 1992; 31(3): 1061-1062.
7. Sharma, R. K.. "Phytosterols: Wide-spectrum antibacterial agents." *Bioorg. Chem.* 1993; 21(1): 49-60.
8. Apparao, M., et al. "Chemical components of *Adenocalymma alliaceae*." *Indian J. Pharm. Sci.* 1978; 40: 224A.
9. Rao, M. A., et al. "Flavonoids of the flowers of *Adenocalymma alliaceum*." *Curr. Sci.* 1980; 49: 468-469.
10. Yeh, Y. Y., et al. "Cholesterol-lowering effect of garlic extracts and organosulfur compounds: human and animal studies." *J. Nutr.* 2001 Mar; 131(3s): 989S-993S.
11. Srinivasan, M. R., et al., "Hypocholesterolemic efficacy of garlic-smelling flower *Adenocalymma alliaceum* Miers. in experimental rats." *Indian J. Exp. Biol.* 1995; 33(1): 64-66.
12. Scogin, R. "Anthocyanins of the Bignoniaceae." *Biochem. Syst. Ecol.* 1980; 273-276.
13. Desmarchelier, C., et al. "Total reactive antioxidant potential (TRAP) and total antioxidant reactivity (TAR) of medicinal plants used in Southwest Amazona (Bolivia and Peru)." *Int. J. Pharmacog.* 1997; 35(4): 288-296.
14. Dunstan, C. A., et al. "Evaluation of some Samoan and Peruvian medicinal plants by

- prostaglandin biosynthesis and rat ear oedema assays." *J. Ethnopharmacol.* 1997; 57: 35-56.
15. Rana, B. K., et al. "Antifungal activity of an aqueous extract of leaves of garlic creeper (*Adenocalymma alliaceum* Miers.)." *Pharmaceutical Biol.* 1999; 37(1):. 13-16.
 16. Singh, U. P., et al. "A rapid method for detecting fungi-toxic substances." *World Journal of Microbiology and Biotechnology.* 1996; 12(3): 301-302.
 17. Khurana, S., et al. "Effect of plant extracts on the activity of three papaya viruses." *J. Gen. Appl. Microbiol.* 1970; 16: 225-230.
 18. Ushamalini, C., et al. "Management of charcoal rot of cowpea using biocontrol agents and plant products." *Indian Phytopathol.* 1997; 50(4): 504-507.
 19. Ushamalini, C., et al. "Suppression of charcoal rot and wilt pathogens of cowpea by botanicals." *Plant Disease Research* 1997; 12(2): 113-117.
 20. Canapaty, S., et al. "Composition of leaf oil from *Adenocalymma alliaceum* and its antimicrobial activity." *Indian Perfumer* 2004; 48(3): 323-329.
 21. Rao, A. M., et al. "Antimicrobial activity of the leaf extract of *Adenocalymma alliaceum*." *Indian Drugs.* 1985: 22(7): 364-365.

Ethnomedical Information on Ajos Sacha (*Mansoa alliacea*)

Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Aerial parts / Peru	For body aches and rheumatism.	Tincture / Oral	Human adult	ZZ2007
Aerial parts / Suriname	Used for fever, colds, rheumatic pains and as a vermifuge.	Infusion / Oral	Human adult	J12451
Bark / Brazil	Considered analgesic, antipyretic, and antirheumatic.	Infusion / Oral Tincture / Oral	Human adult	ZZ2005
Bark / Guyanas	Used for fever.	Decoction / Oral	Human adult	ZZ1104
Bark / Peru	Shipibo-Conibo Indians give it to dogs to make them good hunters. They also take it themselves for good luck hunting or fishing.	Infusion / Oral Infusion / Oral	Dog Human adult	ZZ2003
Bark / Peru	Shipibo-Conibo use it in poultices for bumps and swellings on the skin.	Poultice / External	Human adult	ZZ2003
Bark / Peru	Used for epilepsy.	Decoction / Oral	Human adult	AJ2001 ZZ1101 ZZ2009 ZZ2011 ZZ2013
Bark / Peru	Use for abdominal pain. Used as an antipyretic.	Decoction / Oral	Human adult	ZZ2013
Bark / Peru	Used in baths for asthma and smoker's cough.	Infusion / External	Human adult	ZZ1011
Bark / Peru	Used for asthma. Used for arthritis.	Infusion / Oral Tincture / Oral	Human adult	ZZ1011
Bark / Peru	Used for rheumatism and arthritis.	Tincture / Oral Poultice / External	Human adult	ZZ2009
Bark + leaf / Peru	Used in baths for fever, nervous shock, and skin damage.	Bath / External	Human adult	ZZ2009
Bark + root / Peru	Shipibo-Conibo Indians use it for rheumatism, arthritis, to prevent a cold, uterine disorders, inflammation, epilepsy, and as a regenerative and energy tonic.	Infusion / Oral Tincture / Oral	Human adult	ZZ2003
Leaves / Amazon	Used in baths to relieve "manchiarí" (a nervous state caused by terror or sudden shock), especially in children.	Infusion / External	Human adult Human child	L04137

Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Leaves / Brazil	Considered analgesic, antipyretic, and antirheumatic.	Infusion / Oral Tincture / Oral	Human adult	ZZ2005
Leaves / Brazil	Used for arthritis and rheumatism.	Poultice / External	Human adult	ZZ2005
Leaves / Brazil	Tapajos Indians use it for body aches and flu.	Not stated	Human adult	L04137 ZZ1024
Leaves / Brazil	Used against colds and fevers.	Infusion / Oral	Human adult	ZZ1099 ZZ2005
Leaves / Guyanas	Cold water maceration used for fever.	Maceration / Oral	Human adult	ZZ1104
Leaves / Guyanas	Used for general weakness.	Decoction / Oral Infusion / Oral	Human adult	ZZ1104
Leaves / Peru	Smoke the leaves (as a smudge) in the house to drive away bad spirits. Prepare in a bath to get of bad spirits and protect against injury.	Leaves / Smoke Infusion / External	Human adult	ZZ2009
Leaves / Peru	Used for good luck, against "evil spirits" and in cleansing rituals.	Infusion / External	Human adult	ZZ1101 ZZ2005 L04137
Leaves / Peru	Shipibo- Conibo Indians hang bunches of leaves inside their houses to ward off evil spirits and to bring good luck.	Leaf bunches	Humans	ZZ2003
Leaves / Peru	Hung around the house as an insect and bat repellent.	Leaf bunches	Human adult	ZZ2011
Leaves / Peru	Shipibo-Conibo Indians use it for rheumatism, arthritis, inflammation, epilepsy, and as a regenerative and energy tonic.	Decoction / Oral Decoction / In baths	Human adult	ZZ2003
Leaves / Peru	Used for arthritis and rheumatism. Used for headaches.	Poultice / External Poultice / External	Human adult	AJ2001 ZZ1101 ZZ2011
Leaves / Peru	Used for rheumatism.	Decoction / External	Human adult	ZZ1008
Leaves / Peru	Used for colds and pneumonia.	Infusion / Oral	Human adult	L03868
Leaves / Peru	Used for arthritis.	Infusion / Oral	Human adult	AJ2001
Leaves / Peru	Used for arthritis and rheumatism.	Poultice / External	Human adult	ZZ1101 ZZ2013 ZZ2011

Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Leaves / Peru	Used for rheumatism and chronic arthritis. "Very good in chronic and difficult cases."	Infusion / Oral Poultice / External	Human adult	ZZ1084
Leaves / Peru	Used as an analgesic; for arthritis.	Infusion / Oral	Human adult	ZZ1101 ZZ2013 ZZ2011
Leaves / Peru	The Ese'ejia Indians use it against colds. The Amuesha use it to increase fertility.	Infusion / Oral	Human adult	ZZ2007
Leaf + stem / Guyana	Used for muscle aches and pains.	Decoction / External	Human adult	ZZ2005
Leaf + stem / Guyana	Wayapi Indians use it in antipyretic baths.	Infusion / External	Human adult	L04137 ZZ1033
Leaf + stem / Guyana	In a decoction for baths to treat fever, influenza, rheumatism and colds.	Decoction / External	Human adult	ZZ1104
Leaf + stem / Peru	Used for fever.	Decoction / Oral Decoction / External	Human adult	AJ2001 ZZ1101 ZZ2011
Leaf stem / Guyana	Creoles use it to relieve fatigue and small needle-like cramps.	Decoction / External	Human adult	L04137
Leaf stem / Guyana	External wash to treat fatigue, lameness and lumbago.	Decoction / External	Human adult	ZZ1104
Leaf stem / Suriname	A piece of stem in a glass of water is drunk in the last month of pregnancy for a healthy confinement.	Maceration / Oral	Human adult	ZZ1104
Plant / Amazon	Palikur Indians use it to protect themselves from bad spirits.	Not stated	Human adult	L04137
Plant / Brazil	Used for respiratory ailments.	Infusion / Oral	Human adult	ZZ2005
Plant / Brazil	Used for coughs.	Not stated	Human adult	ZZ2010
Plant / Colombia	Used for pulmonary ailments.	Infusion / Oral	Human adult	ZZ2007
Plant / Guyanas	To remedy fevers, head colds and rheumatic pains.	Not stated	Human adult	ZZ1104
Plant / Peru	Used as an antimalarial.	Infusion / Oral	Human adult	ZZ2016
Plant / Peru	Used as an adjunctive in ayahuasca for body/blood detoxification and to get rid of evil spirits.	Decoction / Oral	Human adult	M05165
Plant / Peru	Used for rheumatism.	Bath / External	Human adult	M05165

Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Plant / Peru	Used as an antirheumatic, anti-arthritic, and purgative.	Not stated	Human adult	ZZ1105
Plant / Peru	Used as a mosquito repellent.	Smoked in fires	Human adult	ZZ2016
Plant / Peru	Used for rheumatism.	Not stated	Human adult	ZZ1022
Plant / Peru	Used against evil spirits, fever, influenza, aches and pains, nervousness, fatigue and cramps.	Infusion / Oral Infusion / External	Human adult	ZZ1011
Plant / Peru	Used for rheumatism.	Not stated	Human adult	ZZ1022
Root / Brazil	Considered analgesic, antipyretic, and antirheumatic.	Infusion / Oral Tincture / Oral	Human adult	ZZ2005
Root / Brazil	Used for arthritis and rheumatism.	Tincture / Oral	Human adult	ZZ2005
Root / Brazil	A cold maceration of the root is taken as a regenerative tonic.	Maceration / Oral	Human adult	ZZ2005
Root / Peru	Used as a regenerative tonic.	Maceration / Oral	Human adult	AJ2001 ZZ1101 ZZ2013 ZZ2011
Root / Peru	Achuales use it against rheumatism.	Not stated	Human adult	L04137 ZZ1045
Root / Peru	Used for malaria.	Decoction / Oral	Human adult	ZZ2016
Root / Peru	Used for arthritis. (4 roots soaked for 2 days in a bottle of aguardiente)	Tincture / Oral	Human adult	ZZ1008
Root / Peru	Used as an anti-arthritic and antirheumatic.	Tincture / Oral	Human adult	ZZ1101 ZZ2013 ZZ2011
Root / Peru	Used for arthritis and rheumatism.	Tincture / Oral	Human adult	AJ2001
Root + stem / Amazon	Used for rheumatism.	Tincture / Oral	Human adult	L04137
Not stated / Venezuela	Used as an emetic.	Not stated	Human adult	ZZ1106

Presence of Compounds in Ajos Sacha (*Mansoa alliacea*)

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Alliin	Proteid	Leaf	India	01.0%	N09274
Allyl disulfide	Sulfur Compound	Leaf essential oil	India	Not stated	N01327
Allyl methyl disulfide	Sulfur compound	Leaf essential oil	Brazil	Trace	M13558
Allyl methyl tetrasulfide	Sulfur compound	Leaf essential oil	Brazil	02.51%	M13558
Allyl methyl trisulfide	Sulfur compound	Leaf essential oil	Brazil	00.96%	M13558
Allyl propyl disulfide	Sulfur compound	Leaf essential oil	Brazil	Trace	M13558
Allyl propyl trisulfide	Sulfur compound	Leaf essential oil	Brazil	00.75% %	M13558
Amyrin, beta:	Triterpene	Flowers	India	Not stated Not stated	N08060 N12908
Apigenin	Flavone	Flowers	India	Not stated	N08060 N12908
Apigenin-7-methyl-glucuronide	Flavone	Flowers	India	Not stated	N13910
Apigenin-7-o-(acyl)-glucuronide	Flavone	Flowers	India	Not stated	N12908
Apigenin-7-o-beta-d-glucuronide	Flavone	Flowers	India	Not stated	N08060 N12908
Apigenin-7-o-beta-d-glucuronyl-glucuronide	Flavone	Flowers	India	Not stated	N12908
Aspartic acid	Proteid	Leaf	India	00.2 mg/gm	N09274
Cholest-7-en-3-beta-ol, 24-ethyl:	Steroid	Leaf	India	Not stated	K14836
Cosmosiin	Flavone	Flowers	India	Not stated	N08060 N12908
Cyanidin-3-o-beta-d-rutinoside	Flavonoid	Flowers	USA	Not stated	M14652

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Daucosterol	Steroid	Flowers	India	Not stated	N08060 N12908
Diallyl disulfide	Sulfur Compound	Leaf essential oil Leaf essential oil Leaf Flowers	India India Brazil Brazil	37.0% 31.38% 34.00% 49.7%	L12222 M13558 AJ2002 AJ2002
Diallyl sulfide	Sulfur Compound	Leaf essential Oil	Brazil	Trace	M13558
Diallyl tetrasulfide	Sulfur Compound	Leaf essential oil	India Brazil India	04.0% 01.23% Not stated	L2222 M13558 N01327
Diallyl trisulfide	Sulfur Compound	Leaf essential oil Leaf essential oil Leaf essential oil Leaves Flowers	India Brazil India Brazil Brazil	44.0% 30.55% Not stated 58.2% 32.7%	L2222 M13558 N01327 AJ2002 AJ2002
Dithi-4-ene,1-2: 3-vinyl:	Sulfur Compound	Leaf essential oil	Brazil	04.71%	M13558
Dithi-5-ene,1-2: 3-vinyl:	Sulfur Compound	Leaf essential oil	Brazil	02.60%	M13558
Dithiacyclopentene	Sulfur Compound	Leaf essential oil	Brazil	02.18%	M13558
Dotriacontan-1-ol	Alkanol	Leaf	India	Not stated	K14836
Fucosterol	Steroid	Leaf	India	Not stated	K14836
Glutamic acid	Proteid	Leaf	India	00.6 mg/gm 20 mg/gm	N09274 N09274
Glycyrrhetol	Triterpene	Leaf	India	Not stated	M30978
Hentriacontane, N:	Alkane	Leaf	India	Not stated	K14836
Heptatriacontan-34-ol-5-one, 8-methyl:	Alkenone	Leaf	India	00.0011%	M27040
Hexacosan-1-ol	Alkanol	Leaf	India	Not stated	K14836
Hexatriacontan-18-one, 19-hydroxy:	Alkanone	Leaf	Brazil	00.0013%	M19119

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Hexatriacontan-4-one, 32-hydroxy:	Alkanone	Leaf	Brazil	00.0014%	M19119
Lapachone, alpha: 4-hydroxy-9-methoxy:	Quinoid	Wood	Peru	00.0190%	H08695
Lapachone, alpha: 9-methoxy:	Quinoid	Wood	Peru	00.02490%	H08695
Leucine	Proteid	Leaf	India	00.5 mg/gm	N09274
Luteolin	Flavone	Flowers	India	Not stated	N12908
Nonacosane, N:	Alkane	Leaf	India	Not stated	K14836
Oct-1-en-3-ol	Alkenol	Essential oil	India India	05.0% Not stated	L12222 N01327
Octacosan-1-ol	Alkanol	Leaf	India	Not stated	K14836
Peltoboykinolic acid, beta:	Triterpene	Leaf	India	Not stated	M30978
Pentatriacont-1-en-17-ol	Alkenol	Leaf	India	00.0009%	M27040
Scutellarein-7-o-beta-d-glucuronide	Flavone	Flowers	India	Not stated	N08060 N12908
Sitosterol, beta:	Steroid	Leaf Flowers Flowers	India India India	Not stated Not stated Not stated	K14836 N08060 N12908
Stigmasterol	Steroid	Leaf	India	Not stated	K14836
Triacontan-1-ol	Alkanol	Leaf	India	Not stated	K14836
Trithiacyclohexene	Sulfur compound	Leaf essential oil	Brazil	06.67%	M13558
Tritriacontane, N:	Alkane	Leaf	India	Not stated	K14836
Urs-18-en-27-oic acid, 3-beta-hydroxy:	Triterpene	Leaf	India	Not stated	H16559
Ursolic acid	Triterpene	Flowers	India	Not stated	N08060 N12908

Biological Activities of Ajos Sacha (*Mansoa alliacea*)

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf - Peru	Antioxidant Activity	H2O ext	In vitro	IC50 239.7 mg/ml	Active	Measured by quenching of luminol-enhanced chemiluminescence.	L03868
Leaf - Peru	Antioxidant Activity	MEOH ext	In vitro	IC50>1000 mg/ml	Inactive	Measured by quenching of luminol-enhanced chemiluminescence.	L03868
Root+Stem - Peru	Anti-inflammatory Activity	ETOH ext	Rat ear	.08 mg/ear	Active	vs. EPP-induced rat ear edema	L14626
Root+Stem - Peru	Prostaglandin synthesis inhibition	ETOH ext	In vitro	100 mcg/ml	Active	vs. COX-1 catalyzed prostaglandin biosynthesis	L14626
Flowers / India	Hypocholesterolemic Activity	Dried flowers	Rat oral	2% of diet for 6 weeks	Active	Exhibited cholesterol lowering effect at same levels as garlic oil; excreted higher amounts of sterols in feces similar to onion. Significantly lowered absorption of cholesterol from intestine like other sulfur containing plants (ie. garlic and onion).	AJ2005
Aerial parts - Suriname	Binding effect	ETOH ext	Human adult	10.0 mcg/ml	Inactive	Radioligand binding to adrenergic receptor in human frontal cortex.	J12451
Aerial parts - Suriname	Binding effect	ETOH ext	Human adult	10.0 mcg/ml	Inactive	Radioligand binding to serotonin receptor in human frontal cortex.	J12451
Aerial parts - Suriname	Binding effect	ETOH ext	Human adult	10.0 mcg/ml	Inactive	Radioligand binding to dopamine receptor in human frontal cortex.	J12451
Aerial parts - Suriname	Binding effect	ETOH ext	Human adult	10.0 mcg/ml	Inactive	Radioligand binding to muscarinic receptor in human hippocampus tissues.	J12451

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Aerial parts - Suriname	Binding effect	ETOH ext	Rat	10.0 mcg/ml	Inactive	Radioligand binding to adenosine NMDR receptor channel complex.	J12451
Aerial parts - Suriname	Binding effect	ETOH ext	Rat lung	10.0 mcg/ml	Inactive	Radioligand binding to beta-2-adrenergic receptor.	J12451
Aerial parts - Suriname	Serotonin (5-HT) Receptor Binding Activity	CHCL3 ext	Calf hippocampus	100.0 mcg/ml	Inactive	Binding of 3H-Rauwolscine to serotonin receptors.	J10986
Leaf - India	Antifungal Activity	H2O ext	Agar plate	0.7 gm/ml	Active Active Active Active Active	<i>Alternaria bassicola</i> <i>Alternaria alternata</i> <i>Alternaria brassicae</i> <i>Alternaria carthami</i> <i>Fusarium oxysporum</i>	L05173
Leaf - India	Antifungal Activity	H2O ext	Agar plate	0.5 gm/ml	Active Active	<i>Colletotrichum capsici</i> <i>Curvularia lunata</i>	L05173
Leaf - Peru	Antifungal Activity	Dichloro-methane ext	Agar plate	5.0 mg/disc 10 mg/disc	Inactive	<i>Aspergillus fumigatus</i> <i>Aspergillus niger</i> <i>Candida albicans</i> <i>Cladosporium cladosporioides</i> <i>Cryptococcus oxysporum</i> <i>Neurospora crassa</i> <i>Penicillium purpurogenum</i> <i>Saccharomyces cerevisiae</i>	L07136
Leaf - Peru	Antifungal Activity	MEOH ext	Agar plate	5.0 mg/disc 10 mg/disc	Inactive	<i>Aspergillus fumigatus</i> <i>Aspergillus niger</i> <i>Candida albicans</i> <i>Cladosporium cladosporioides</i> <i>Cryptococcus oxysporum</i> <i>Neurospora crassa</i> <i>Penicillium purpurogenum</i> <i>Saccharomyces cerevisiae</i>	L07136
Leaf - Peru	Antifungal Activity	Dichloro-methane ext	Agar plate	5.0 mg/disc 10.0 mg/disc	Active Active	<i>Microsporum gypseum</i> <i>Trichophyton metagrophytes</i>	L07136
Leaf - Peru	Antifungal Activity	MEOH ext	Agar plate	5.0 mg/disc 10.0 mg/disc	Active Active	<i>Microsporum gypseum</i> <i>Trichophyton metagrophytes</i>	L07136

Plant Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf - Peru	Antifungal Activity	Not stated	Silica plate	Not stated	Active		AJ2007
Leaf - India	Antiviral Activity	ETOH ext	Cell culture	Not stated	Inactive	Plant virus distortion ringspot	W00025
Leaf - India	Antiviral Activity	ETOH ext	Cell culture	Not stated	Active	Plant virus Mild Mosaic	W00025
Leaf - India	Antimicrobial Activity	Not stated	Cell culture	Not stated	Active	Plant (cowpea) charcoal rot	AJ2006
Leaf - India	Antimicrobial Activity	Not stated	Cell culture	Not stated	Active	Plant charcoal rot and wilt pathogens	AJ2003
Leaf - India	Antimicrobial Activity	ETOH ext	Agar plate	Not stated	Active		T13889
Leaf - India	Antimicrobial Activity	Oil ext	Agar plate	Various	Active		AJ2004

Literature Cited - Ajos Sacha

H08695	CYTOTOXIC NAPHTHOQUINONES FROM MANSOA ALLIACEA. ITOKAWA,H: MATSUMOTO,K: MORITA,H: TAKEYA,K: PHYTOCHEMISTRY (1992) 31 (3) PP. 1061-1062. TOKYO COLL PHARM TOKYO 192-03 JAPAN
H16559	A NOVEL PENTACYCLIC TRITERPENE ACID FROM ADENOCALYMMMA ALLIACEUM LEAVES. MISRA,TN: SINGH,RS: PANDEY,HS: PRASAD,C: J NAT PROD (1995) 58 (7) PP. 1056-1058 UNIV GORAKHPUR DEPT CHEM GORAKHPUR UP 273 009 INDIA
J10986	SCREENING OF MEDICINAL PLANTS FROM SURINAME FOR 5-HT 1A LIGANDS: BIOACTIVE ISOQUINOLINE ALKALOIDS FROM THE FRUIT OF ANNONA MURICATA. HASRAT,JA: PIETERS,L: DE BACKER,JP: VAUQUELIN,G: VLIETINCK,AJ: PHYTOMEDICINE (1997) 4 (2) UNIV ANTWERP DEPT PHARM SCI ANTWERP B-2610 BELGIUM
J12451	MEDICINAL PLANTS IN SURINAME: SCREENING OF PLANT EXTRACTS FOR RECEPTORBINDING ACTIVITY. HASRAT,JA: DE BACKER,JP: VAUQUELIN,G: VLIETINCK,AJ: PHYTOMEDICINE (1997) 4 (1) PP. 59-65. UNIV ANTWERP DEPT PHARM SCI ANTWERP B-2610 BELGIUM
K14836	PHYTOSTEROLS: WIDE-SPECTRUM ANTIBACTERIAL AGENTS. SHARMA,RK: BIOORG CHEM (1993) 21 (1) PP. 49-60. THAPAR CORP RES DEV CENT BIOTECH DIV PATIALA 147 001 INDIA
L03868	TOTAL REACTIVE ANTIOXIDANT POTENTIAL (TRAP) AND TOTAL ANTIOXIDANT REACTIVITY (TAR) OF MEDICINAL PLANTS USED IN SOUTHWEST AMAZONA (BOLIVIA AND PERU). DESMARCHELIER,C: REPETTO,M: COUSSIO,J: LLESUY,S: CICCIA,G: INT J PHARMACOG (1997) 35 (4) PP. 288-296 UNIV BUENOS AIRES CATEDRA MICROBIOL INDUST BIOTECHNOL BUENOS AIRES ARGENTINA
L04137	AMAZONIAN ETHNOBOTANICAL DICTIONARY. DUKE, JAMES AND RUDOLFO VASQUEZ. BOCA RATON, FL: CRC PRESS INC., (1994)
L05173	ANTIFUNGAL ACTIVITY OF AN AQUEOUS EXTRACT OF LEAVES OF GARLIC CREEPER (ADENOCILYMMMA ALLIACEUM MIERS.). RANA,BK: TANEJA,V: SINGH,UP: PHARMACEUTICAL BIOL (1999) 37 (1) PP. 13-16 BANARAS HINDU UNIV DEPT BIOCHEM FAC SCI VARANASI INDIA
L07136	SCREENING FOR ANTIFUNGAL ACTIVITY OF NINETEEN LATIN AMERICAN PLANTS. FREIXA,B: VILA,R: VARGAS,L: LOZANO,N: ADZET,T: CANIGUERAS,S: PHYTOTHER RES (1998) 12 (6) PP. 427-430 UNIV BARCELONA UNIT FARMACOL FARMACOG FAC FARM BARCELONA SPAIN
L12222	CHEMICAL COMPOSITION OF THE VOLATILE OIL FROM GARLIC CREEPER (ADENOCALYMMMA ALLIACEUM). RAO,LJM: SRINIVAS,P: GURUDUTT,KN: J MED AROMAT PLANT SCI (1999) 21 (4) PP. 987-989 CHEMICAL ABSTRACTS 133 174605 F CNTR FOOD TECHNOL RES INST PLANTATION PROD SPICES FLAVOUR TECHNOL DEPT MYSORE INDIA
L14626	EVALUATION OF SOME SAMOAN AND PERUVIAN MEDICINAL PLANTS BY PROSTAGLANDIN BIOSYNTHESIS AND RAT EAR OEDEMA ASSAYS. DUNSTAN,CA: NOREEN,Y: SERRANO,G: COX,PA: PERERA,P: BOHLIN,L: J ETHNOPHARMACOL (1997) 57 PP. 35-56. UNIV UPPSALA DEPT PHARMACOG FAC PHARM UPPSALA S-751 23 SWEDEN

M05165	THE HEALING PRACTICES OF A PERUVIAN SHAMAN. LUNA,LE: J ETHNOPHARMACOL (1984) 11 (2) PP. 123-133 PERHONKATU HELSINKI 00100 FINLAND
M13558	VOLATILE SULFIDES OF THE AMAZONIAN GARLIC BUSH. DAS GRACAS B ZOGHBI,M: RAMOS,LS: GUILHERME S MAIA,J: DA SILVA,ML: IRAN R LUZ,A: J AGR FOOD CHEM (1984) 32 (5) PP. 1009-1010. CONSELHO NAEL DESENVOLV
M14652	ANTHOCYANINS OF THE BIGNONIACEAE. SCOGIN,R: BIOCHEM SYST ECOL (1980) 8 PP. 273-276. RANCHO SANTA ANA BOT GARDEN CLAREMONT CA 91711 USA
M19119	ALIPHATIC HYDROXY-KETONES FROM ADENOCALYMMA ALLIACEUM LEAVES. MISRA,TN: SINGH,RS: PANDEY,HS: SHARMA,SC: PHYTOCHEMISTRY (1989) 28 (3) PP. 933-936. UNIV GORAKHPUR NAT PROD RES LAB DEPT CHEM GORAKHPUR UP 273 009 INDIA
M27040	ALIPHATIC COMPOUNDS FROM ADENOCALYMMA ALLIACEUM LEAVES. MISRA,TN: SINGH,RS: PANDEY,HS: PHYTOCHEMISTRY (1991) 30 (2) PP. 541-543 UNIV GORAKHPUR DEPT CHEM NATL PROD RES LAB GORAKHPUR UP 271009 INDIA
M30978	GLYCYRRHETOL AND BETA-PELTOBOYKINOLIC ACID FROM ADENOCALYMMA ALLIACEUM. PANDEY,HS: SHARMA,SC: SINGH,RS: MISRA,TN: PLANTA MED (1992) 58 (2) PP. 225-. UNIV GORAKHPUR DEPT CHEM GORAKHPUR UP 273 009 INDIA
N01327	DIALLYL DI-,TRI-AND TETRASULPHIDE FROM ADENOCALYMMA ALLIACEAE. APPARAO,M: KJAER,A: MADSEN,JO: RAO,EV: PHYTOCHEMISTRY (1978) 17 PP. 1660-1661. ANDHRA UNIV DEPT PHARM SCI VISHAKHAPATNAM AP 530 003 INDIA
N08060	CHEMICAL COMPONENTS OF ADENOCALYMMA ALLIACEAE. APPARAO,M: RAO,EV: INDIAN J PHARM SCI (1978) 40 PP. 224A-. ANDHRA UNIV DEPT PHARM SCI VISAKHAPATNAM AP 530 003 INDIA
N09274	ALIIN IN THE GARLICKY TAXON ADENOCALYMMA ALLIACEUM (BIGNONIACEAE). APPARAO,M: KJAER,A: OLSEN,O: RAO,EV: RASMUSSEN,KW: SORENSEN,H: PHYTOCHEMISTRY (1981) 20 PP. 822-823 ANDHRA UNIV DEPT PHARM SCI VISAKHAPATNAM AP 530 003 INDIA
N12908	FLAVONOIDS OF THE FLOWERS OF ADENOCALYMMA ALLIACEUM. RAO,MA: RAO,EV: CURR SCI (1980) 49 PP. 468-469 ANDHRA UNIV DEPT PHARM SCI VISHAKHAPATNAM AP 530 003 INDIA
N13910	APIGENIN-7-O-METHYLGLUCURONIDE FROM ADENOCALYMMA ALLIACEUM. VENKATA RAO,E: APPA RAO,M: CURR SCI (1982) 51 PP. 1040-. ANDHRA UNIV DEPT PHARM SCI VISAKHAPATNAM AP 530 003 INDIA
T08133	THE CONCEPT OF PLANTS AS TEACHERS AMONG FOUR MESTIZO SHAMANS OF IQUITOS, NORTHEASTERN PERU. LUNA,LE: J ETHNOPHARMACOL (1984) 11 (2) PP. 135-156 PERHONKATU HELSINKI 00100 FINLAND
T13889	ANTIMICROBIAL ACTIVITY OF THE LEAF EXTRACT OF ADENOCALYMMA ALLIACEUM. RAO,AM: RAO,VE: INDIAN DRUGS (1985) 22 (7) PP. 364-365 MEDICINAL AND AROMATIC PLANT ABSTRACTS 85 85042015 ANDHRA UNIV DEP PHARMACEUT SCI VISHAKHAPATNAM AP 530003 INDIA
W00025	EFFECT OF PLANT EXTRACTS ON THE ACTIVITY OF THREE PAPAYA VIRUSES. KHURANA,SMP: BHARGAVA,KS: J GEN APPL MICROBIOL (1970) 16 PP. 225-230. GORAKHPUR UNIV FAC SCI GORAKHPUR UP INDIA
AJ2001	JARDÍN BOTÁNICO - AJOSACHA; MINISTRY OF HEALTH, GOVERNMENT OF PERU. ONLINE: HTTP://WWW.MINSA.GOB.PE/PORTAL/VVIRTUAL/VV_JB12AJOSACHA.HTM

AJ2002	VOLATILE CONSTITUENTS FROM ADENOCOCALYMMA ALLIACEUM MIERS.AND PETIVERIA ALLIACEA L., TWO MEDICINAL HERBS OF THE AMAZON. ZOGHBI, M.G.B, ANDRADE, E.H.A., MAIA, J.G.S., FLAVOUR AND FRAGRANCE JOURNAL 2002; 17(2): 133-135.
AJ2003	SUPPRESSION OF CHARCOAL ROT AND WILT PATHOGENS OF COWPEA BY BOTANICALS. USHAMALINI, C.K., GRANGADHARAN, K. PLANT DISEASE RESEARCH 1997; 12(2): 113-117.
AJ2004	COMPOSITION OF LEAF OIL FROM ADENOCALYMMA ALLIACEUM AND ITS ANTIMICROBIAL ACTIVITY. GANAPATY, S., BEKNAL, A.L., INDIAN PERFUMER 2004; 48(3): 323-329. PHARACEUTICAL SCIENCES DEPT. COLLEGE OF ENGINEERING, ANDHRA UNIV. VISAKHAPATNAM 530 003 INDIA.
AJ2005	HYPOCHOLESTEROLEMIC EFFICACY OF GARLIC-SMELLING FLOWER ADENOCALYMMA ALLIACEUM MIERS. IN EXPERIMENTAL RATS. SRINIVASAN, MR., SRINIVASAN, K. INDIAN J EXP BIOL. (1995) 33(1): 64-66. DEPARTMENT OF BIOCHEMISTRY AND NUTRITION. CENTRAL FOOD TECHNOLOGY RESEARCH INSTITUTE. MYSORE, INDIA.
AJ2006	MANAGEMENT OF CHARCOAL ROT OF COWPEA USING BIOCONTROL AGENTS AND PLANT PRODUCTS. USHAMALINI, C.K., RAJAPPAN, K., GRANGADHARAN, K. INDIAN PHYTOPATHOL. 1997; 50(4): 504-507.
AJ2007	A RAPID METHOD FOR DETECTING FUNGI-TOXIC SUBSTANCES. RANA, B.K., SINGH, U.P., TANEJA, V. WORLD JOURNAL OF MICROBIOLOGY AND BIOTECHNOLOGY. 1996; 12(3): 301-302. DEPT OF BIOCHEMISTRY BANARAS HINDU UNIVERSITY VARANASI 221005 INDIA.
AJ2008	SPICES AS BENEFICIAL HYPOLIPIDEMIC FOOD ADJUNCTS: A REVIEW. SRINIVASAN, K., SAMBAIAH, K., CHANDRASEKHARA, N., FOOD REVIEWS INTERNATIONAL. 2004; 20(2): 187-220. DEPARTMENT OF BIOCHEMISTRY AND NUTRITION. CENTRAL FOOD TECHNOLOGY RESEARCH INSTITUTE. MYSORE, INDIA.
ZZ1008	PLANTAS MEDICINALES DE USO POPULAR EN LA AMAZONIA PERUANA; KEMBER MEIJA & ELAS RENG; TAREA ASOCIACION GRAFICA EDUCATIVE; LIMA PERU.
ZZ1011	A FIELD GUIDE TO THE MEDICINAL AND USEFUL PLANTS OF THE UPPER AMAZON; J.L. CASTNER, S.L. TIMME AND J.A. DUKE; FELINE PRESS; GAINESVILLE, FL (1998)
ZZ1022	THE ETHNOBOTANY DATABASE. BECKSTROM-STERNBERG, STEPHEN M: DUKE, JAMES A: WAIN, K.K: (ACEDB VERSION 4.3-DATA VERSION JULY 1994). NATIONAL GERMPLASM RESOURCES LABORATORY (NGRL), AGRICULTURAL RESEARCH SERVICE (ARS), U.S. DEPARTMENT OF AGRICULTURE.
ZZ1084	PLANTAS UTILES DEL AL AMAZONA PERUANA, CARACTERISTICAS, USOS, Y POSIBILIDADES;; RODOLFO BARRIGA RUIZ, CONCYTEC; LIMA PERU (1994)
ZZ1099	MEDICINAL PLANTS OF BRAZIL; WALTER MORS, CALOS RIZZINI, NUNO PEREIRA; REFERENCE PUBLICATIONS, INC.; ALGONAC, MI (2000)
ZZ1101	DICCIONARIO ENCICLOPEDICO DE PLANTAS UTILES DEL PERU. BRACK EGG, ANTONIO. CUZCO, PERU: CBC (1999)
ZZ1104	MEDICINAL PLANTS OF THE GUIANAS (GUYANA, SURINAM, FRENCH GUIANA) BY ROBERT A. DEFILIPPS, SHIRLEY L. MAINA AND JULIETTE CREPIN; ONLINE AT THE BIOLOGICAL BIODIVERSITY OF THE GUIANA SHIELD. SMITHSONIAN NATURAL MUSEUM OF NATURAL HISTORY 2006 HTTP://WWW.MNH.SI.EDU/BIODIVERSITY/BDG/MEDICINAL/

ZZ1105	PERU: INFORME NACIONAL PARA LA CONFERENCIA TECNICA INTERNACIONAL DE LA FAO SOBRE LOS RECURSOS FITOGENETICOS; SANTIAGO PASTOR SOPLIN, ET AL. LEIPZIG. LIMA PERU (1996)
ZZ1106	CRC ETHNOBOTANY DESK REFERENCE; TIMOTHY JOHNSON. CRC PRESS LLC., NY NY (1999)
ZZ2003	MEDICINA INDIGENA. LAS PLANTAS MEDICINALES Y SU BENEFICIO EN LA SALUD (SHIPIBO - CONIBO); GUILLERMO AREVALO VALERA; CENTRO ORIENTAMENTO EDUCATIVO; PULCALPA, PERU (1994)
ZZ2005	PLANTAS MEDICINAIS NO BRAZIL, NATIVAS E EXOTICAS; HARRI LORENZI AND FRANCISCO MATOS; INSTITUTO PLANTARUM DE ESTUDOS DA FLORA LTDA; SAO PAULO, BRAZIL (2002)
ZZ2007	SIXTY MEDICINAL PLANTS FROM THE PERUVIAN AMAZON: ECOLOGY, ETHNOMEDICINE AND BIOACTIVITY; CRISTIAN DESMACHELIER AND FERNANDO WITTING SCHAUS; (NO PUBLISHER EBIO2000.NET); COPYRIGHT IN LIMA PERU. (2000)
ZZ2009	SALUD PARA TODOS. PLANTAS MEDICINALES Y SALUD INDIGENA EN LA CUENCA DEL RIO MADRE DE DIOS, PERU; DIDIER LACAZE AND MIQUEL ALEXIADES; FENAMAD; MADRE DE DIOS, PERU (1995)
ZZ2010	PRINCIPALES PLANTAS REPUTADAS COMO MEDICINALES EN LA AMAZONIA. BERG,ME., RAMALHO,ME., VASQUEZ,R. PRORAMMA DE MECICINA TRADICIONAL ORGANIZACIOL MUNDAIL DE LA SALUD (WHO/TRM/91.4) (1991)
ZZ2011	PLANTAS MEDICINALES DE LA AMAZONÍA PERUANA. ESTUDIO DE SU USO Y CULTIVO PINEDO P, MARIO; RENGIFO S., ELSA; CERRUTI S., TEODORO. DIC. IIAP, IQUITOS, PERU (1997)
ZZ2013	FITOMEDICINA, 1100 PLANTAS MEDICINALES; TEODORO AGAPITO F. & ISABEL SUNG; EDITORIAL ISABEL; LIMA. PERU (2003)
ZZ2016	ETHNOBOTANICA MEDICINAL Y BIOCIDAS PARA MALARIA EN LA REGION UCAYALI. DIANA PEREZ. FOLIA AMAZONICA 2002; 13(1-2) IIAP UCAYALI, PERU.
ZZ2017	PHARMACOLOGY OF MEDICINAL PLANTS AND NATURAL PRODUCTS. S.A. DAHANUKAR, R.A. KULKARNI, N.N. REGE INDIAN JOURNAL OF PHARMACOLOGY 2000; 32: S81-S118 DEPARTMENT OF PHARMACOLOGY & THERAPEUTICS, SETH G.S. MEDICAL COLLEGE & KEM HOSPITAL, PAREL, MUMBAI-400 012.