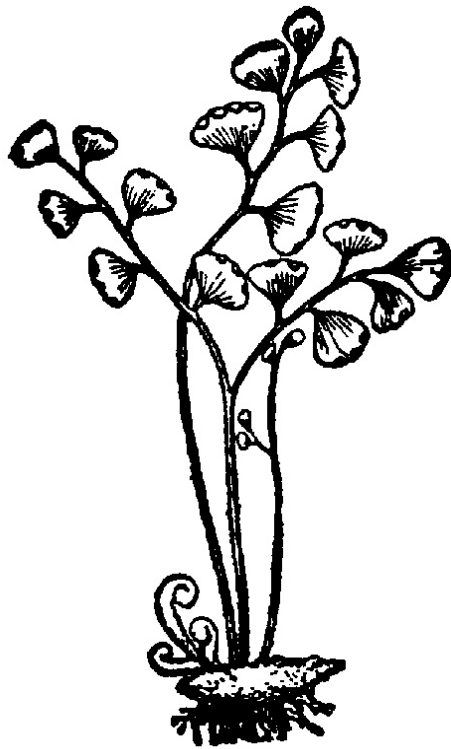


Technical Data Report

for

AVENCA

Adiantum capillus-veneris



Written by [Leslie Taylor, ND](#) Published by Sage Press, Inc.

All rights reserved. No part of this document may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage or retrieval system, without written permission from Sage Press, Inc.

This document is not intended to provide medical advice and is sold with the understanding that the publisher and the author are not liable for the misconception or misuse of information provided. The author and Sage Press, Inc. shall have neither liability nor responsibility to any person or entity with respect to any loss, damage, or injury caused or alleged to be caused directly or indirectly by the information contained in this document or the use of any plants mentioned. Readers should not use any of the products discussed in this document without the advice of a medical professional.



© Copyright 2003 Sage Press, Inc., P.O. Box 80064, Austin, TX 78708-0064. All rights reserved. For additional copies or information regarding this document or other such products offered, call or write at sagepress@sbcglobal.net or (512) 506-8282.

Avenca

Preprinted from [Herbal Secrets of the Rainforest](#), 2nd edition, by Leslie Taylor
Published and copyrighted by Sage Press, Inc., © 2003

Family: Adiantaceae

Genus: *Adiantum*

Species: *capillus-veneris*

Synonyms: *Adiantum capillus*, *A. michelii*, *A. modestum*, *A. schaffneri*, *A. tenerum*

Common Names: Avenca, maidenhair fern, adianto, alambriillo, barun, cabello de venus, capilera, capille e jenere, celantillo, centaurea, cilantrillo, culandrillo, culantrillo de pozo, culantrillo, fern karn dam, frauenhaar, hansraj, helecho culantrillo, herba capillorum veneris, horaishida, krafis al bir, ladies' hair, pare cyavash, pare cyavashan, parswshan, tremolante, venus hair fern

Parts Used: Leaves, rhizome

Avenca is a small, slow-growing evergreen fern found throughout the world in moist forests. It reaches 35 cm tall, growing in stands from its creeping rhizome bearing leaves up to 50 cm long. It can be found in the rainforests of the Amazon as well as in the more temperate, moist forests of Southern Europe and the United States (where it is commonly referred to as *maidenhair fern*). It is called *culantrillo* in Peru and *avenca* in Brazil.

In the Peruvian Amazon, local people prepare the fronds of the plant as an infusion or syrup and consider it a diuretic, antitussive, sudorific, emmenagogue, expectorant, and emollient to treat coughs, urinary disorders, colds, rheumatism, heartburn, gallstones, alopecia (hair loss), and sour stomach. In the highlands of the Peruvian Andes, local shamans and healers decoct the rhizome and use it for alopecia, gallstones, and jaundice. In the Brazilian Amazon it is recommended as a good expectorant and used for bronchitis, coughs, and other respiratory problems.

Avenca has long held a place in herbal medicine systems worldwide. In European herbal medicine, this predates the era of Dioscorides and Pliny (23–79 A.D.). Culpepper (1787 ed.) said, "This and all other Maiden Hair Ferns is a good remedy for coughs, asthmas, pleurisy, etc., and on account of its being a gentle diuretic also in jaundice, gravel and other impurities of the kidneys." In France, the fronds and rhizomes were once made into a syrup called 'Sirop de Capillaire,' which was a favorite medicine for pulmonary catarrh. The plant is also used widely throughout the world for dandruff, hair loss, and menstrual difficulties.

In Brazilian herbal medicine today, the frond and leaf are employed for hair loss, coughs, bronchitis, laryngitis and throat dryness, and to improve appetite and digestion, stimulate renal function, regulate menstruation, and facilitate childbirth. In Peruvian herbal medicine the frond and rhizome are used for alopecia, gallstones, hepatic calculi, hydrophobia, asthma, coughs, catarrh, and to regulate menstruation. In India the entire plant is used for its cooling effects, for diabetes, colds, bronchial disease, and for its emmenagogue properties. Externally it is used for boils, eczema, and wounds.

Phytochemical analysis of avenca reveals an array of compounds including triterpenes, flavonoids, phenylpropanoids, and carotenoids. The plant has demonstrated little toxicity; however, it has been shown to have an antifertility effect (in animal studies). In the 1980s, two separate researchers in India found that a pet ether extract of the plant had an anti-implantation effect in rats, preventing conception.^{1,2}

In 1989 scientists in Iraq demonstrated avenca's antimicrobial properties.³ A methanol extract of the aerial parts was reported to have *in vitro* antimicrobial actions against *Bacillus subtilis*, *Escherichia coli*, *Staphylococcus aureus*, *Proteus vulgaris*, *Pseudomonas aeruginosa*, and *Candida albicans*. French scientists demonstrated that an ethanol extract of the rhizome evidenced antiviral properties *in vitro* against *Vesicular stomatitis virus*.⁴ Other early (1967) research showed that a water extract of the entire plant had hypoglycemic activity when given to mice (10 mg/kg) orally.⁵ Much later (in 1993), Belgium scientists confirmed that avenca leaves had *in vivo* antihyperglycemic properties in mice. In one study, a water extract of the aerial parts was given to mice (25 mg/kg) orally and found to reduce glucose-induced hyperglycemia.⁶ An ethanol extract, however, showed no activity. They reconfirmed these findings in 1995 by demonstrating that a water extract reduced glucose-induced hyperglycemia.⁷

Despite the plant's ancient history of use for respiratory disorders, no clinical research has been done to validate these traditional uses. In spite of the lack of scientific research done on avenca, herbalists and healthcare practitioners throughout the world continue to use the plant based on its traditional uses, for respiratory disorders and hair loss, and to regulate menstruation.

Documented Properties & Actions: Antibacterial, antioxidant, antitussive, antiviral, astringent, cardiotonic, cholagogue, choleric, choliokinetic, depurative, detoxifier, diuretic, emmenagogue, expectorant, hemostat, hepatic, hepatoprotective, hypocholesterolemic, hypoglycemic, hypotensive, stimulant, tonic

Main Phytochemicals: Adiantone, adiantoxide, astragalol, beta-sitosterol, caffeic acids, caffeylglucose, caffeylglucoside, campesterol, carotenes, coumaric acids, coumarylglucosides, diplopterol, epoxyfillicane, fernadiene, fernene, filicanes, hopanone, hydroxy-adiantone, hydroxy-cinnamic acid, isoadiantone, isoquercetin, kaempferols, lutein, mutatoxanthin, naringin, neoxanthin, nicotiflorin, oleananes, populnin, procyanidin, prodelphinidin, quercetins, querciturone, quinic acid, rhodoxanthin, rutin, shikimic acid, violaxanthin, zeaxanthin

Traditional Remedy: One-half cup leaf infusion twice daily or 1–3 ml of a 4:1 root tincture twice daily. One to 2 g of powdered leaf or root in tablets or capsules twice daily can be substituted if desired.

Contraindications: Avenca has been documented to lower blood sugar levels in animal studies. Diabetics and people with hypoglycemia should use this plant with caution and monitor their blood sugar levels accordingly.

Avenca has a long history of use in herbal medicine systems as an emmenagogue and is contraindicated in pregnancy. The plant has shown to have an anti-implantation effect in animal studies and may prevent conception. Couples seeking fertility treatment or pregnancy should not take avenca.

Drug Interactions: May potentiate insulin and antidiabetic drugs.

WORLDWIDE ETHNOBOTANICAL USES

Country	Uses
Amazonia	Aperitive, cough, diaphoretic, diuretic, emmenagogue, emollient, expectorant, pectoral, urinary
Brazil	Alopecia, asthma, appetite, bronchitis, catarrh, childbirth, cough, digestion, diuretic, emmenagogue, expectorant, laryngitis, menstruation, pectoral, renal, respiratory, rheumatism, throat
Egypt	Asthma, catarrh, chest, cough, cold, diaphoretic, diuretic, dropsy, hepatitis, snakebite, spider bite, splenitis
England	Alopecia, asthma, cough, diuretic, emmenagogue, jaundice, kidney calculi, pleurisy, shortness of breath, swellings, yellow jaundice
Europe	Alcoholism, alopecia, amenorrhea, bronchitis, bronchial diseases, catarrh, cough, dandruff, diabetes, detoxicant, emollient, expectorant, hair loss, menstruation
India	Amenorrhea, boils, bronchial diseases, colds, diabetes, emmenagogue, eczema, febrifuge, skin diseases, tonic, wounds
Iraq	Astringent, bronchitis, catarrh, cold, cough, diaphoretic, diuretic, emmenagogue, emollient, expectorant, pectoral, stimulant, sudorific, tonic
Jamaica	Emmenagogue
Mexico	Alopecia, amenorrhea, bladder, contraceptive, depurative, laxative, liver, menstruation, pectoral, stone
Peru	Alopecia, asthma, catarrh, cold, cough, congestion, diuretic, expectorant, gallstones, heartburn, hepatic calculi, hydrophobia, icteric, menstruation, pectoral, stomach, sudorific, throat
Spain	Amenorrhea, childbirth, placenta retention
U.S.	Amenorrhea, astringent, catarrh, chill, demulcent, diuretic, dysmenorrhea, emmenagogue, emollient, expectorant, fever, lung, menstrual disorders, menstrual pain, pectoral, respiratory, sclerosis (spleen), sore, stimulant, sudorific, tonic
Elsewhere	Alopecia, antitussive, astringent, bee stings, bronchitis, bronchial diseases, bronchitis, catarrh, cold, cough, dandruff, demulcent, depurative, diaphoretic, emetic, emmenagogue, emollient, expectorant, febrifuge, galactagogue, head, hepatitis, laxative, pectoral, refrigerant, stimulant, sudorific, snakebite, throat, tonic, worms

References

1. Murti, S. "Post coital anti-implantation activity of Indian medicinal plants." *Abstr. 32nd Indian Pharmaceutical Cong. Nagpur.* 1981; Abstract D14: 23–5.
2. Murthy, R. S. R., et al. "Anti-implantation activity of isoadiantone." *Indian Drugs* 1984; 21(4): 141–44.
3. Mahmoud, M. J., et al. "*In vitro* antimicrobial activity of *Salsola rosmarinus* and *Adiantum capillus-veneris*." *Int. J. Crude Drug Res.* 1989; 27(1): 14–16.
4. Husson, G. P., et al. "Research into antiviral properties of a few natural extracts." *Ann. Pharm. Fr.* 1986; 44(1): 41–8.
5. Jain, S. R., et al. "Hypoglycaemic drugs of Indian indigenous origin." *Planta Med.* 1967; 15(4): 439–42.
6. Neef, H., et al. "Hypoglycemic activity of selected European plants." *Pharm. World & Sci.* 1993; 15(6): H11.
7. Neef, H., et al. "Hypoglycaemic activity of selected European plants." *Phytother. Res.* 1995; 9(1): 45–8.

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 Avenca (*Adiantum capillus-veneris*)

Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Fronde Amazonia	Used as a diaphoretic, emollient and pectoral; for urinary disorders and cough. Used as a mosquito repellent. Used as an emmenagogue, expectorant, emollient, aperitive and diuretic.	Not Stated Oral Not Stated Infusion Oral	Human Adult	L04137
Fronde Brazil	Used for respiratory catarrh, coughs, bronchitis, laryngitis. Considered expectorant and pectoral.	Infusion Oral Infusion Oral	Human Adult	ZZ1007
Fronde Brazil	Used for coughs, raspy throat/laryngitis and throat inflammation. Used as a diuretic to stimulate renal function. Used for hair loss and to strengthen the scalp. Used to regulate menstruation.	Decoction Oral Infusion Oral Decoction Oral Infusion Oral	Human Adult	ZZ1081
Leaf Brazil	Used for pulmonary catarrh, coughs, raspy throats, throat dryness, problems of the chest, as an expectorant, to improve appetite and digestion, for rheumatism, to regulate menstruation and to facilitate childbirth.	Infusion Oral	Human Adult	ZZ1079
Leaf Brazil	Used for coughs, bronchitis, raspy throats and other affections of the respiratory tract.	Infusion Oral	Human Adult	ZZ1013
Leaf Brazil	Used as an expectorant for respiratory affections and used as an emmenagogue.	Infusion Oral	Human Adult	ZZ1092
Fronde Canary Islands	Used as an antitussive.	Infusion Oral	Human Adult	T10928
Plant China	Used for coughs.	Syrup Oral	Human Adult	AG1003
Plant England	Used for troubled cough, shortness of breath and yellow jaundice.	Decoction Oral	Human Adult	AG1002
Plant England	Used for coughs, asthma, pleurisy, jaundice and gravel and other impurities of the kidneys. Said to be a gentle diuretic.	Not Stated Oral	Human Adult	ZZ1052
Not Stated England	Used for hard swellings and to make the hair on the head or beard grow.	Not Stated	Human Adult	ZZ1052
Not Stated England	Used as an emmenagogue.	Infusion Oral	Human Female	ZZ1052
Aerial Parts Europe	Used for diabetes.	Infusion Oral	Human Adult	K20532
Entire Plant Europe	Used as an expectorant.	Hot H2O Ext Oral	Human Adult	W02290

Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Not Stated Europe	Used to induce menses.	Not Stated	Human Female	A04537
Not Stated Europe	Used as a detoxicant in alcoholism.	Not Stated	Human Adult	AG1005
Fronde + Rhizome France	Made into 'sirop de capillaire' for pulmonary catarrh.	Syrup Oral	Human Adult	AG1002
Plant Germany	Used for bronchitis, coughs, respiratory tract disorders and as a hair tonic.	Powder Oral	Human Adult	AG1002
Entire Plant India	Used as an emmenagogue.	Not Stated Oral	Human Female	A04132
Entire Plant India	Used as an emmenagogue.	Hot H2O Ext Oral	Human Female	W03487
Entire Plant India	Used for diabetes.	Hot H2O Ext Oral	Human Adult	A14379
Entire Plant India	Used for its cooling effects.	Hot H2O Ext Oral	Human Adult	T09390
Entire Plant India	Used as a general tonic. Whole plant is fried in ghee and taken for a month.	Plant Oral	Human Adult	T10115
Leaf India	Used for boils and eczema.	Leaves External	Human Adult	T09390
Leaf India	Used to treat colds and bronchial disease.	Decoction Oral	Human Adult	K26519
Leaf India	Used to heal wounds.	Leaves External	Human Adult	M29901
Plant Juice India	Used for skin diseases. Used as a febrifuge.	Juice External Juice Oral	Human Adult Human Adult	T09390 T09390
Leaf Iran	Used as an expectorant and diaphoretic in the common cold, chronic or acute catarrh and bronchitis. Used as a potent expectorant.	Infusion Oral Decoction Oral	Human Adult	I00005
Entire Plant Italy	Used for dandruff.	Decoction Oral	Human Adult	T16136
Aerial Parts Italy	Used as an emollient and expectorant; used for bronchial diseases.	Hot H2O Ext Oral	Human Adult	T16240
Fronde Italy	Used to treat dandruff and hair loss.	Decoction Oral	Human Adult	T16715
Entire Plant Jamaica	Used as an emmenagogue.	Not Stated Oral	Human Female	W01316
Entire Plant Mexico	Used for four consecutive mornings after intercourse as a contraceptive.	Hot H2O Ext Oral	Human Female	L01490
Leaf + Stem Mexico	Used for retarded periods in women.	Hot H2O Ext Oral	Human Female	T05045

Part / Location	Documented Ethnomedical Uses	Type Extract / Route	Used For	Ref #
Not Stated Mexico	Taken for amenorrhea.	Hot H2O Ext Oral	Human Female	T05045
Leaf Philippines	Used as an emmenagogue.	Not Stated	Human Female	A00115
Fronde Peru	Used as an expectorant, for rheumatism, colds, heartburn and sour stomach.	Infusion Oral	Human Adult	ZZ1045
Fronde + Rhizome Peru	Used for coughs, raspy throats, asthma, congestion and catarrh, hepatic calculi, for hydrophobia, hair loss and to regulate menstruation.	Decoction Oral	Human Adult	ZZ1093
Not Stated Peru	Considered diuretic, pectoral and sudorific. Used for alopecia, gallstones and ictericia.	Decoction Oral	Human Adult	ZZ1027
Aerial Parts Spain	Used for amenorrhea and placental retention.	Infusion Oral	Human Female	K26708
Entire Plant Taiwan	Used to treat hepatitis.	Decoction Oral	Human Adult	M29355
Entire Plant USA	Used for menstrual discomfort.	Hot H2O Ext Oral	Human Female	A04588
Entire Plant USA	Used as an emmenagogue.	Hot H2O Ext Oral	Human Female	A05958
Fronde + Rhizome USA	Used for pectoral complaints and pulmonary catarrh. Acts as a demulcent and slight expectorant.	Syrup Oral	Human Adult	ZZ1052
Not Stated USA	Used to treat menstrual irregularities.	Not Stated Oral	Human Female	A03475
Not Stated USA	Used as a tea to stimulate menstruation.	Hot H2O Ext Oral	Human Female	N00314
Fronde Not Stated	Considered antidandruff, antitussive, astringent, demulcent, depurative, emetic, emmenagogue, emollient, weakly expectorant, febrifuge, galactagogue, laxative, pectoral, refrigerant, stimulant, sudorific and tonic.	Not Stated	Human Adult	AG1003 AG1004 AG1005
Fronde Not Stated	Used for coughs, throat afflictions and bronchitis. Used to expel worms, as a hair tonic and for dandruff.	Infusion or Syrup Oral Not Stated	Human Adult	AG1004
Plant Not Stated	Used on snake bites and bee stings.	Poultice External	Human Adult	AG1003 AG1004

Presence of Compounds in Avenca (*Adiantum capillus-veneris*)

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Adiantone	Triterpene	Fronde	France	Not Stated	A11674
Adiantone, 21-hydroxy	Triterpene	Not Stated	Italy	Not Stated	W03604
Adiantone, iso	Triterpene	Entire Plant	India	Not Stated	T09075
Adiantoxide		Plant	Not Stated	Not Stated	ZZ1095
Astragalin	Flavonoid	Not Stated Not Stated Fronde	Japan Italy Not Stated	Not Stated Not Stated Not Stated	W03577 N15415 T07056
Caffeic acid 1-galactose-6-sulfate	Phenylpropanoid	Fronde	Italy	00.05000%	N13229
Caffeic acid 1-glucose-3-sulfate	Phenylpropanoid	Fronde	Italy	Not Stated	N13229
Carbohydrates(soluble)	Carbohydrate	Shoots	Taiwan	Not Stated	T02583
Carotene, alpha	Carotenoid	Leaf	France	Not Stated	M11195
Carotene, beta	Carotenoid	Leaf Leaf	France Netherlands	Not Stated Not Stated	M11195 M11195
Cinnamic acid, hydroxy	Phenylpropanoid	Leaf	Not Stated	Not Stated	ZZ1095
Coumaric acid, para: 1-glucose-2-sulfate	Phenylpropanoid	Fronde	Italy	00.03000%	N13229
Coumaric acid, para: 1-glucose-6-sulfate	Phenylpropanoid	Fronde	Italy	Not Stated	N13229
Diplopterol	Triterpene	Fronde	Egypt	Not Stated	K26888
Fern-9(11)-en-12beta-ol	Triterpene	Not Stated	Japan	Not Stated	AG1001
Fernene, 7	Triterpene	Leaf	Not Stated	Not Stated	ZZ1095
Fernadiene, 7,9-(11)	Triterpene	Leaf	Not Stated	Not Stated	ZZ1095
Filicane, 3-alpha-4-alpha-epoxy	Triterpene	Fronde	Italy	Not Stated	W03784
Filican-3-one, 4-alpha-hydroxy	Triterpene	Not Stated	Japan	Not Stated	AG1001

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Hopanone, 21-beta-hydroxy-29nor-22	Triterpene	Plant	Not Stated	Not Stated	ZZ1095
Kaempferol	Flavonoid	Leaf	France	Not Stated	W04211
Kaempferol-3-o-beta-d-glucuronide	Flavonoid	Fron Fron	Japan Not Stated	Not Stated Not Stated	W03577 T07056
Kaempferol-3-o-galactoside sulfate	Flavonoid	Fron	Italy	Not Stated	N15415
Kaempferol-3-o-rutinoside sulfate	Flavonoid	Fron	Italy	Not Stated	N15415
Kaempferol-3-rutinoside	Flavonoid	Fron	Not Stated	Not Stated	T07056
Kaempferol-3-sulfate	Flavonoid	Fron	Italy	00.01500%	N13058
Kaempferol-3,7-diglucoside	Flavonoid	Plant	Not Stated	Not Stated	ZZ1095
Lutein epoxide	Carotenoid	Leaf Leaf	France Netherlands	Not Stated Not Stated	M11195 M11195
Mutatoxanthin	Carotenoid	Leaf	France	Not Stated	M11195
Naringin	Flavonoid	Fron	Not Stated	Not Stated	T07056
Neoxanthin	Carotenoid	Leaf	France	Not Stated	M11195
Nicotiflorin	Flavonoid	Fron Fron	Italy Japan	Not Stated Not Stated	N15415 W03577
Olean-18-en-3-one	Oleanane	Not Stated	Japan	Not Stated	AG1001
Olean-12-en-3-one	Oleanane	Not Stated	Japan	Not Stated	AG1001
Populnin	Flavonoid	Fron	Not Stated	Not Stated	T07056
Procyanidin	Flavonoid	Fron	Not Stated	Not Stated	T07056
Prodelphinidin	Flavonoid	Fron	Not Stated	Not Stated	T07056
Quercetin-3-o-(6"-malonyl)-d-galactoside	Flavonoid	Fron Fron	Italy Italy	Not Stated Not Stated	M15326 N13060
Quercetin-3-o-beta-d-glucuronide	Flavonoid	Fron	Not Stated	Not Stated	T07056

Compound	Chemical type	Plant Part	Plant Origin	Quantity	Ref #
Quercitrin, iso	Flavonoid	Fron Fron Fron	Japan Italy Not Stated	Not Stated Not Stated Not Stated	W03577 N15415 T07056
Querciturone	Flavonoid	Fron	Japan	Not Stated	W03577
Quinic acid	Alicyclic	Fron Fron	Japan Japan	00.898% 898 mcg/gm	W03870 W04119
Rhodoxanthin	Carotenoid	Leaf Leaf	France Netherlands	Not Stated Not Stated	M11195 M11195
Rutin	Flavonoid	Fron Fron Fron	Italy Japan Not Stated	Not Stated Not Stated Not Stated	N15415 W03577 T07056
Shikimic acid	Alicyclic	Fron Fron	Japan Japan	00.017% 17 mcg/gm	W03870 W04119
Violaxanthin	Carotenoid	Leaf Leaf	France Netherlands	Not Stated Not Stated	M11195 M11195
Zeaxanthin	Carotenoid	Leaf Leaf	France Netherlands	Not Stated Not Stated	M11195 M11195

OTHER PHYTOCHEMICAL SCREENING:

ALKALOIDS ABSENT	ENTIRE PLANT	M15415
FLAVONOIDS ABSENT	ENTIRE PLANT	M15415
SAPONINS(UNSPECIFIED TYPE OR HEMOLYTIC) PRESENT	ENTIRE PLANT	M15415
TANNINS(FERRIC CHLORIDE TEST) PRESENT	ENTIRE PLANT	M15415

Biological Activities for Extracts of Avenca (*Adiantum capillus-veneris*)

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant India	Antiimplantation Effect	Chromatographic fraction ETOH(95%)Ext Pet ether Ext	GI Rat(pregnant) GI Rat(pregnant) IP Rat(pregnant) IP Rat(pregnant) IP Rat(pregnant) IP Rat(pregnant) IP Rat(pregnant) IP Rat(pregnant)	100.0 mg/kg 30.0 mg/kg 10.0 mg/kg 15.0 mg/kg 5.0 mg/kg 100.0 mg/kg 100.0 mg/kg	Active Active Active Active Active Active Active Active	78% activity was reported. 78% activity was reported. 78% activity was reported. 78% activity was reported. 78% activity was reported. Not Stated. 83% activity is reported.	T11618
Entire Plant India	Antiimplantation Effect	Pet ether Ext	GI Rat(pregnant)	Not Stated	Active		T09075
Aerial Parts Belgium	Antihyperglycemic Activity	H2O Ext	Oral Mouse	25.0 mg/kg	Active	vs. glucose-induced hyperglycemia.	K27342
Aerial Parts Europe	Antihyperglycemic Activity	Decoction ETOH(80%)Ext	Oral Mouse Male Oral Mouse Male	25.0 gm/kg 25.0 gm/kg	Active Inactive	vs. glucose-induced hyperglycemia. vs. glucose-induced hyperglycemia.	K20532
Entire Plant India	Hypoglycemic Activity	H2O Ext	Oral Rabbit	10.0 mg/kg	Weak Activity		A14379
Aerial Parts Iraq	Antibacterial Activity	MEOH Ext	Agar Plate	0.5 mg/ml 1.0 mg/ml 1.0 mg/ml 2.0 mg/ml 2.0 mg/ml	Active Active Active Active Active	<i>Bacillus subtilis</i> <i>Escherichia coli</i> <i>Staphylococcus aureus</i> <i>Proteus vulgaris</i> <i>Pseudomonas aeruginosa</i>	M20795 M20795 M20795 M20795 M20795
Entire Plant Thailand	Antibacterial Activity	ETOH(95%)Ext ETOH(95%)Ext ETOH(95%)Ext ETOH(95%)Ext ETOH(95%)Ext H2O Ext H2O Ext H2O Ext H2O Ext H2O Ext	Agar Plate	100.0 mg 100.0 mg 100.0 mg 100.0 mg 100.0 mg 20.0 mg 20.0 mg 20.0 mg 20.0 mg 20.0 mg	Inactive Inactive Inactive Inactive Inactive Inactive Inactive Inactive Inactive Inactive	<i>Bacillus subtilis</i> <i>Escherichia coli</i> <i>Salmonella typhosa</i> <i>Shigella dysenteriae</i> <i>Staphylococcus aureus</i> <i>Bacillus subtilis</i> <i>Escherichia coli</i> <i>Salmonella typhosa</i> <i>Shigella dysenteriae</i> <i>Staphylococcus aureus</i>	P00004

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf Iran	Antibacterial Activity	ETOH(80%)Ext ETOH(80%)Ext	Agar Plate Agar Plate	100.0 mcg/ml 100.0 mcg/ml	Inactive Inactive	Several gram + organisms. Several gram - organisms.	T09667
Not Stated	Antibacterial Activity	Fluid Ext	Agar Plate	Not Stated Not Stated	Inactive Inactive	<i>Escherichia coli</i> <i>Staphylococcus aureus</i>	A05300
Stem Iran	Antibacterial Activity	ETOH(80%)Ext ETOH(80%)Ext	Agar Plate Agar Plate	100.0 mcg/ml 100.0 mcg/ml	Inactive Inactive	Several gram + organisms. Several gram - organisms.	T09667
Aerial Parts Iraq	Antiyeast Activity	MEOH Ext MEOH Ext	Agar Plate Agar Plate	2.0 mg/ml 20.0 mg/ml	Active Active	<i>Candida albicans</i> <i>Candida pseudotropicalis</i>	M20795 M20795
Entire Plant Thailand	Antiyeast Activity	ETOH(95%)Ext H2O Ext	Agar Plate	100.0 mg 20.0 mg	Inactive Inactive	<i>Candida albicans</i> <i>Candida albicans</i>	P00004
Rhizome France	Antiviral Activity	ETOH(100%)Ext	Cell Culture	Variable	Active	<i>Vesicular stomatitis virus</i>	T14737
Aerial Parts Iraq	Benzopyrene-protein Binding Inhibition	ETOH(80%)Ext ETOH(80%)Ext H2O Ext H2O Ext	Not Stated Not Stated Rat Microsomes Rat Microsomes	8.0 mcg/ml 8.0 mg/ml Not Stated Not Stated	Inactive Inactive Inactive Inactive	Aryl-hydrocarbon hydroxylase activity measured. Benzopyrene binding to rat liver microsomal protein measured.	M22513
Entire Plant Japan	Moulting Activity(insect)	MEOH Ext	Injection	10.0 microliters	Weak Activity	<i>Sarcophaga peregrina</i>	W02556
Entire Plant Taiwan	Moulting Activity(insect)	MEOH Ext	Not Stated	10.0 mg	Inactive	<i>Sarcophaga peregrina</i>	A14723

Biological Activities for Compounds of Avenca (*Adiantum capillus-veneris*)

Compound Tested	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Naringin	Antiplatelet-activating factor Activity	In vitro	Not Stated	Active	Inhibited the function of platelet-activating factor.	AG1019
Rutin	Antiplatelet-activating Factor Activity	Cell Culture	9.55 x 10(-9) mol/L	Active	Inhibited platelet-activating factor and platelet aggregation.	AG1016
Astragaln	Histamine Inhibition	Cell Culture	Not Stated	Active	Inhibited histamine release by basophils.	AG1006
Astragaln	Histamine Inhibition	Cell Culture	Not Stated	Active	Inhibited the release of histamine by the human basophilic cell line KU812.	AG1008
Rutin	Serotonin Release Inhibition	Cell Culture	IC50=0.73 mmol/L IC50=1.13 mmol/L	Active Active	5-HT release from platelets.	AG1016
Rutin	Intracellular Calcium Modulation	Cell Culture	68.3 mumol/L 136 mumol/L 274 mumol/L 545 mumol/L	Active	Inhibited the increase of intraplatelet free calcium.	AG1016
Astragaln	Antidermatitis Activity	Oral Mice	1.5 mg/kg	Active	Reduced the severity of pre-existing dermatitis and prevented the development of atopic dermatitis.	AG1006
Astragaln	Antidermatitis Activity	Oral Mice	Not Stated	Active	Reduced the development of atopic dermatitis, scratching behavior and serum IgE elevation. Histology revealed reduced infiltration of inflammatory cells, degranulated mast cells, thickening of the epidermis and hyperkeratosis.	AG1008
Naringin	Antioxidant Activity	Rabbit	0.5 g/kg	Active	Increased hepatic superoxide dismutase and catalase activity. Decreased hepatic mitochondrial hydrogen peroxide. Increased plasma vitamin E concentrations.	AG1010
Naringin	DNA Protecting Effect	Cell Culture	2 mg/kg	Active	Protected mouse bone marrow cells against gamma-radiation induced DNA damage and reduced cell proliferation.	AG1009
Astragaln	Antiproliferative Activity	Cell Culture	Not Stated	Active	Inhibited human mesangial cell proliferation and matrix over-synthesis possibly through decreasing beta-1-integrin gene over-expression. These effects may prevent the progression of chronic renal disease.	AG1007

Compound Tested	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Naringin	Hepatoprotective Activity	Oral Rabbit	500 mg/kg	Active		AG1012
Rutin	Hepatoprotective Activity	Oral Mice	20 mg/kg	Active Active	Pretreatment of mice with rutin before paracetamol overdose reduced the death rate from 100% to 40%. Pretreatment prevented the paracetamol rise in liver enzymes. Pretreatment prevented CCl(4) rise in liver enzymes and prevented the CCl(4)-induced prolongation in pentobarbital sleeping time.	AG1017
Naringin	Anticholesterolemic Activity	Chick	Not Stated	Active	Reduced total cholesterol, LDL, VLDL and triglycerols. No reduction in HDL seen.	AG1011
Rutin	Anticholesterolemic Activity	Chick	Not Stated	Active	Reduced total cholesterol, LDL, VLDL and triglycerols. No reduction in HDL seen.	AG1011
Naringin	Anticholesterolemic Activity	Oral Rat	0.1%	Active	Lowered plasma cholesterol and triglyceride concentrations as well as HMG-CoA reductase activity.	AG1013
Rutin	Gastroprotective Activity	Rat	Not Stated	Active	Protected against reflux oesophagitis by inhibiting gastric acid secretion, oxidative stress, inflammatory cytokine production and intracellular calcium mobilization in PMNs.	AG1018
Shikimic acid	Neuroprotective Activity	IP Rat	50 mg/kg	Active	Reduced focal cerebral ischemic injury induced by middle cerebral artery thrombosis.	AG1014
Zeaxanthin	Photoreceptor Protective Effect	Oral Quail	35 mg/kg	Active	Protected photoreceptors from light-induced death.	AG1015

Literature Cited - Avenca (*Adiantum capillus-veneris*)

A00115	MEDICINAL PLANTS OF THE PHILIPPINES. QUISUMBING,E: TECH BULL 16,REP PHILIPPINES,DEPT AGR NAT RESOURCES,MANILLA 1951 : 1- (1951) (NO ADDRESS GIVEN)
A03475	ETHNOBOTANICAL USES OF CALIFORNIA PTERIDOPHYTES BY WESTERN AMERICAN INDIANS. LLOYD,RM: AMER FERN J 54 2: 76-83 (1964) (NO ADDRESS GIVEN)
A04132	ECBOLIC PROPERTIES OF INDIAN MEDICINAL PLANTS. PART 1. SAHA,JC: SAVINI,EC: KASINATHAN,S: INDIAN J MED RES 49 : 130-151 (1961) (DEPT BIOL PHARMACOL MED COLL PONDICHERRY UT INDIA)
A04537	MENSES-INDUCING DRUGS: THEIR ROLE IN ANTIQUE, MEDIEVAL AND RENAISSANCE GYNECOLOGY AND BIRTH CONTROL. JOCHLE,W: CONTRACEPTION 10 : 425-439 (1974) (INTERNAT VET SEC SYNTEX RESEARCH PALO ALTO CA 94304 USA)
A04588	MEDICINAL PLANTS OF THE UNITED STATES. QUADRANGLE, THE NEW YORK TIMES BOOK CO., NEW YORK. KROCHMAL,A: KROCHMAL,C: BOOK : - (1973) (NO ADDRESS GIVEN)
A05300	INVESTIGATION OF THE PRESENCE OF SUBSTANCES HAVING ANTIBIOTIC ACTION IN HIGHER PLANTS. D'AMICO,ML: FITOTERAPIA 21 : 77- (1950) (INVERNI DELLA BEFFA SPA MILAN ITALY)
A05958	INDEX OF THE PLANTS OF TEXAS WITH REPUTED MEDICINAL AND POISONOUS PROPERTIES. PUBLISHED BY THE AUTHOR. BURLAGE,HM: BOOK : - (1968) (COLL PHARM UNIV TEXAS AUSTIN TX USA)
A11674	STRUCTURE OF THE NATURAL NORTRITERPENE, ADIANTONE. BERTI,G: BOTTARI,F: MARSILI,A: LEHN,JM: WITZ,P: OURISSON,G: TETRAHEDRON LETT 1963 : 1283-1287 (1963) (INST CHIM FARMACEUTE TOSSICOL PISA UNIV PISA ITALY)
A14379	HYPOGLYCAEMIC DRUGS OF INDIAN INDIGENOUS ORIGIN. JAIN,SR: SHARMA,SN: PLANTA MED 15 4: 439-442 (1967) (MP UNIV SAGAR SAGAR MP INDIA)
A14723	SCREENING OF FORMOSAN FERNS FOR PHYTOECDYSONES. I. YEN,KY: YANG,LL: OKUYAMA,T: HIKINO,H: TAKEMOTO,T: CHEM PHARM BULL 22 4: 805-808 (1974) (TAIPEI MED COLL TAIPEI TAIWAN)
I00005	MEDICINAL PLANTS. VOL 5, 4TH ED, TEHRAN UNIVERSITY PUBLICATIONS, NO 1810/5, TEHRAN, IRAN, 1991. ZARGARI,A: BOOK 5 : 974-PP (1991) (DEPT PHARMACOGNOSY COLL PHARMACY TEHRAN UNIV MED SCI TEHRAN IRAN)
K20532	HYPOGLYCAEMIC ACTIVITY OF SELECTED EUROPEAN PLANTS. NEEF,H: DECLERCQ,P: LAEKEMAN,G: PHYTOTHER RES 9 1: 45-48 (1995) (LAB PHARMACOL INST PHARM SCI CATHOLIC UNIV LEUVEN LEUVEN B-3000 BELGIUM)
K26519	FOLK UTILIZATION OF SOME PTERIDOPHYTES OF DEOPRAYAG AREA IN GARHWAL HIMALAYA:INDIA. GAUR,RD: BHATT,BP: ECON BOT 48 2: 146-151 (1994) (BOTANY DEPT ETHNOBOT SYSTEM LAB GARHWAL UNIV SRINGAR GARHWAL INDIA)

K26708	ETHANOBOTANICAL RESOURCES IN THE PROVINCE OF ALMERIA, SPAIN: CAMPOS DE NIJAR. MARTINEZ-LIROLA,MJ: GONZALEZ-TEJERO,MR: MOLERO-MESA,J: ECON BOT 50 1: 40-56 (1996) (DEPT ORG CHEM FAC SCI UNIV GRANADA GRANADA SPAIN)
K26888	A CONTRIBUTION TO THE STUDY OF CHEMICAL CONSTITUENTS OF ADIANTUM CAPILLUS VENERIS L. GROWING IN EGYPT. MAHRAN,GH: EL-ALFY,TS: EL-TANTAWY,M: EL-SAKHAWY,F: AL-AZHAR J PHARM SCI 13 : 1-14 (1994) (PHARMACOGNOSY DEPT FAC PHARM CAIRO UNIV CAIRO EGYPT)
K27342	HYPOGLYCEMIC ACTIVITY OF SELECTED EUROPEAN PLANTS. NEEF,H: DE CLERCQ,P: LAEKEMAN,G: PHARM WORLD & SCI 15 6: H11-. (1993) (DEPT CLIN CHEM CATHOLIC UNIV LEUVEN LEUVEN BELGIUM)
L01490	PLANTS USED BY THE MEXICAN KICKAPOO INDIANS. LATORRE,DL: LATORRE,FA: ECON BOT 31 : 340-357 (1977) (3406 WEST AVE AUSTIN TX USA)
L04137	AMAZONIAN ETHNOBOTANICAL DICTIONARY. DUKE, JAMES AND RUDOLFO VASQUEZ. BOCA RATON, FL: CRC PRESS INC., (1994)
M11195	CAROTENOIDS IN SIXTY-SIX REPRESENTATIVES OF THE PTERIDOPHYTA. CZECZUGA,B: BIOCHEM SYST ECOL 13 3: 221-230 (1985) (DEPT GEN BIOL MED ACAD BIALSTOK 15-230 POLAND)
M15326	A NEW ACYLATED FLAVONOL GLYCOSIDE FROM THE FERN ADIANTUM CAPILLUS-VENERIS L. IMPERATO,F: CHEM IND(LONDON) 1982 16: 604-. (1982) (INST CHEM & INDUST CHEM UNIV CATANIA CATANIA I-95125 ITALY)
M15415	SURVEY OF IRANIAN PLANTS FOR SAPONINS, ALKALOIDS, FLAVONOIDS AND TANNINS. III. AYNEHCHI,Y: SALEHI SORMAGHI,MH: AMIN,GH: KHOSHKHOW,M: SHABANI,A: INT J CRUDE DRUG RES 23 1: 33-41 (1985) (DEPT PHARMACOGNOSY SCH PHARM UNIV TEHRAN TEHRAN IRAN)
M20795	IN VITRO ANTIMICROBIAL ACTIVITY OF SALSOLA ROSMARINUS AND ADIANTUM CAPILLUS-VENERIS. MAHMOUD,MJ: JAWAD,ALM: HUSSAIN,AM: AL-OMARI,M: AL-NAIB,A: INT J CRUDE DRUG RES 27 1: 14-16 (1989) (PHARMACOL PHARMACOG DEPT SCI RES COUNC BIOL RES CENT BAGHDAD IRAQ)
M22513	INHIBITION OF THE BINDING OF 3H-BENZO[A]PYRENE TO RAT LIVER MICROSOMAL PROTEIN BY PLANT EXTRACTS. ALWAN,AH: AL-GAILLANY,KAS: NAJI,A: INT J CRUDE DRUG RES 27 1: 33-37 (1989) (PHARMACOGN PHARMCOL DEPT BIO RES CEN SCI RES COUNCIL BAGHDAD IRAQ)
M29355	MEDICINAL PLANTS USED FOR THE TREATMENT OF HEPATITIS IN TAIWAN. LIN,CC: KAN,WS: AMER J CHINESE MED 18 1/2: 35-43 (1990) (SCH MED KAOHSIUNG MED COLL KAOHSUING TAIWAN)
M29901	MEDICINAL FERNS IN THE HARDO DISTRICT OF CENTRAL UTTER PRADESH. SIDDIQUI,MB: HUSAIN,W: FITOTERAPIA 62 5: 541-542 (1991) (DEPT BOTAN ALIGARH MUSLIM UNIV ALIGARH UP 202002 INDIA)
N00314	LOS REMEDIOS DE LA GENTE. PUBLISHED BY THE AUTHOR. MOORE,M: BOOK : - (1979) (204 JEFFERSON SANTA FE NM 87501 USA)
N13058	KAEMPFEROL 3-SULPHATE IN THE FERN ADIANTUM CAPILLUS-VENERIS. IMPERATO,F: PHYTOCHEMISTRY 21 : 2158-2159 (1982) (DEPT CHEM & CHEM IND UNIV CATANIA CATANIA ITALY)

N13060	A NEW ACYLATED FLAVONOL GLYCOSIDE FROM THE FERN ADIANTUM CAPILLUS-VENERIS L IMPERATO,F: CHEM IND(LONDON) 1982 : 604-. (1982) (INST CHEM & IND CHEM UNIV CATANIA CATANIA I-95125 ITALY)
N13229	SULPHATE ESTERS OF HYDROXYCINNAMIC ACID-SUGAR DERIVATIVES FROM ADIANTUM. IMPERATO,F: PHYTOCHEMISTRY 21 : 2717-2718 (1982) (IST DEPT CHIM & CHIM IND UNIV CATANIA CATANIA ITALY)
N15415	NEW PHENOLIC GLYCOSIDES IN THE FERN ADIANTUM CAPILLUS-VENERIS L. IMPERATO,F: CHEM IND(LONDON) 1982 : 957-958 (1982) (INST CHEM & INDUST CHEM UNIV CATANIA CATANIA I-95125 ITALY)
P00004	THE ANTIMICROBIAL ACTIVITY OF SOME THAI FLOWERS AND PLANTS. AVIRUTNANT,W: PONGPAN,A: MAHIDOL UNIV J PHARM SCI 10 3: 81-86 (1983) (DEPT MICROBIOL FAC PHARM MAHIDOL UNIV BANGKOK THAILAND)
T02583	INSOLUBLE CARBOHYDRATES IN THE SHOOT APICAL MERISTEM OF ADIANTUM CAPILLUS-VENERIS L. CHIANG,SHT: LIN,BL: TAIWANIA 24 : 1-10 (1979) (DEPT BOT NATL TAIWAN UNIV TAIPEI TAIWAN)
T05045	FLAVONOL GLYCOSIDES IN THE FLOWERS OF HIBISCUS MUTABILIS F. VERSICOLOR. ISHIKURA,N: AGR BIOL CHEM 46 : 1705-1706 (1982) (FAC PHARM SCI KUMAMOTO UNIV KUMAMOTO 862 JAPAN)
T07056	PHENOLIC CHEMOTAXONOMY AND PHYTOGEOGRAPHY OF ADIANTUM. COOPER-DRIVER,G: SWAIN,T: BOT J LINN SOC 74 : 1-21 (1977) (ARC LAB BIOCHEMICAL SYSTEMATIC ROYAL BOTANIC GARDENS KEW SURREY ENGLAND)
T09075	ANTI-IMPLANTATION ACTIVITY OF ISOADIANTONE. MURTHY,RSR: BASU,DK: MURTI,VVS: INDIAN DRUGS 21 4: 141-144 (1984) (COLL PHARM PUSHPA VIHAR NEW DELHI UT 110 007 INDIA)
T09390	ETHNOMEDICINAL PLANTS OF JAUN SAR-BAWAR HILLS, UTTAR PRADESH, INDIA. JAIN,SP: PURI,HS: J ETHNOPHARMACOL 12 2: 213-222 (1984) (CENT INST MED AROMATIC PLANTS LUCKNOW UP 226016 INDIA)
T09667	SCREENING OF IRANIAN PLANTS FOR ANTIMICROBIAL ACTIVITY. AYNEHCHI,Y: SALEHI SORMAGHI,MH: SHIRUDI,M: SOURI,E: ACTA PHARM SUECICA 19 4: 303-308 (1982) (DEPT PHARMACOGNOSY SCH PHARM UNIV TEHRAN TEHRAN IRAN)
T10115	MEDICO-BOTANIC SURVEY OF MEDICINAL AND AROMATIC PLANTS OF KATRA VALLEY (J. & K.STATE) INDIA. KAPUR,SK: SARIN,YK: INDIAN DRUGS 22 1: 4-10 (1984) (REGIONAL RESEARCH LAB JAMMU TAWI J & K 180 001 INDIA)
T10928	CONTRIBUTION TO THE ETHNOPHARMACOLOGICAL STUDY OF THE CANARY ISLANDS. DARIAS,V: BRAVO,L: BARQUIN,E: HERRERA,DM: FRAILE,C: J ETHNOPHARMACOL 15 2: 169-193 (1986) (DEPT FARMACOG FARMACODIN FAC FARM UNIV LA LAGUNA TENERIFE CANARY IS SPAIN)
T11618	POST COITAL ANTI-IMPLANTATION ACTIVITY OF INDIAN MEDICINAL PLANTS. MURTI,S: ABSTR 32ND INDIAN PHARMACEUTICAL CONGR NAGPUR JAN 23-25 1981 1981 : ABSTR-D14 (1981) (DEPT CHEM COLL PHARM DELHI UNIV NEW DELHI UT 110 012 INDIA)
T14737	RESEARCH INTO ANTIVIRAL PROPERTIES OF A FEW NATURAL EXTRACTS. HUSSON,GP: VILAGINES,R: DELAVEAU,P: ANN PHARM FR 44 1: 41-48 (1986) (LAB HYDROL FAC SCI PHARM BIOL PARIS F 75270 FRANCE)

T16136	NEW OR UNCOMMON USES OF SEVERAL MEDICINAL PLANTS IN SOME AREAS OF CENTRAL ITALY. LEPORATTI,ML: PAVESI,A: J ETHNOPHARMACOL 29 2: 213-223 (1990) (DIPT BIOL VEG UNIV ROME ROME ITALY)
T16240	TRADITIONAL PHYTOTHERAPY IN THE ROCCAMONFINA VOLCANIC GROUP, CAMPANIA, SOUTHERN ITALY. ANTONONE,R: DE SIMONE,F: MORRICA,P: RAMUNDO,E: J ETHNOPHARMACOL 22 3: 295-306 (1988) (DIPT CHIM SOSTANZE NATURAL UNIV NAPOLI NAPLES I-80131 ITALY)
T16715	HERBAL REMEDIES IN THE TRADITIONAL MEDICINE OF THE VENEZIA GIULIA REGION (NORTH EAST ITALY). LOKAR,LC: POLDINI,L: J ETHNOPHARMACOL 22 3: 231-239 (1988) (DEPT BIOL UNIV TRIESTE TRIESTE 34100 ITALY)
W01316	MEDICINAL PLANTS OF JAMAICA. III. ASPREY,GF: THORNTON,P:WEST INDIAN MED J 4 : 69-82 (1955) (UNIV PENNSYLVANIA PHILADELPHIA PA USA)
W02290	DIE HEILPFLANZEN DER VERSCHIEDENEN VOLKER UND ZEITEN,F.ENKE,STUTTGART. DRAGENDORFF,G: BOOK 1898 : 885PP- (1898) (NO ADDRESS GIVEN)
W02556	SCREENING OF JAPANESE FERNS FOR PHYTOECDYSONES. I. HIKINO,H: OKUYAMA,T: JIN,H: TAKEMOTO,T: CHEM PHARM BULL 21 10: 2292-2302 (1973) (PHARM INST TOHOKU UNIV SENDAI 980 JAPAN)
W03487	INDIGENOUS DRUGS OF INDIA. THEIR MEDICAL AND ECONOMIC ASPECTS. THE ART PRESS,CALCUTTA,INDIA. CHOPRA,RN: BOOK : 550PP-. (1933) (SCH TROP MED & HYG CALCUTTA WEST BENGAL INDIA)
W03577	FLAVONOID PATTERN IN THE PTERIDACEAE. II. FLAVONOID CONSTITUENTS IN THE FRONDS OF ADIANTUM CAPILLUS-VENERIA AND A. CUNEATUM. AKABORI,Y: HASEGAWA,M: SHOKUBUTSUGAKU ZASSHI 82 973: 294-297 (1969) (TOKYO METROP UNIV TOKYO JAPAN)
W03604	TRITERPENOIDS FROM FERNS. BERTI,G: CORSI SEMIN CHIM 11 : 65-67 (1968) (FAC FARM UNIV PISA PISA ITALY)
W03784	STRUCTURE AND STEREOCHEMISTRY OF A TRITERPENOID EPOXIDE FROM ADIANTUM CAPILLUS-VENERIS. BERTI,G: BOTTARI,F: MARSILI,A: TETRAHEDRON 25 : 2939-2947 (1969) (INSTITUTES OF ORGANIC CHEM & PHARMACEUTICAL CHEMISTRY, UNIVERSITY OF PISA, PISA ITALY)
W03870	OCCURRENCE OF QUINIC ACID IN THE FERNS. MINAMIKAWA,T: YOSHIDA,S: SHOYAKUGAKU ZASSHI 85 : 153-155 (1972) (DEPT OF BIOLOGY TOKYO METROPOLITAN UNIV TOKYO 158 JAPAN)
W04119	OCCURRENCE OF QUINIC ACID IN THE FERNS. MINAMIKAWA,T: YOSHIDA,S: SHOKUBUTSUGAKU ZASSHI 85 : 153-155 (1972) (DEPT OF BIOLOGY TOKYO METROPOLITAN UNIV TOKYO 158 JAPAN)
W04211	CHARACTERIZATION OF FLAVONOIDS. NUNG VIEN NGHIA: BEZANGER-BEAUQUESNE,L: TORCK,M: PLANT MED PHYTOTHER 5 3: 177-187 (1971) (LAB MATIERE MEDICALE FAC PHARM LILLE F-59045 FRANCE)
ZZ1007	MANUAL DE FITOTERAPIA, 2 ND ED. COIMBRA, RAUL. SAO PAULO, BRAZIL: DADOS INTERNACIONAIS DE CATALOGACAO NA PULICACAO (1994)
ZZ1027	MEDICINAL AND MAGICAL PLANTS IN THE NORTHERN PERUVIAN ANDES. FEO, DE, V: FITOTERAPIA 63: 417-40 (1992)

ZZ1045	USEFUL PLANTS OF AMAZONIAN PERU. VASQUEZ, MR: SECOND DRAFT. FILED USDA'S NATIONAL AGRICULTURAL LIBRARY (1990)
ZZ1052	A MODERN HERBAL. GRIEVE, MRS MM: NEW YORK: DOVER PUBLICATIONS (1971)
ZZ1079	PLANTAS DE CURAM: CUDIE DA SUA SAUDE ATRAVES DE NATUREZA, 5 TH ED. MOREIRA, FREDERICO. SAO PAULO, BRAZIL: HEMUS EDITORA LTDA (1996)
ZZ1081	PLANTAS QUE CURAM: PANIZZA, SYLVIO: DE MATO, CHERIO. 11 TH ED. SAO PAULO, BRAZIL: IBRASA (1997)
ZZ1092	AGROMIDIA SOFTWARE. PLANTAS MEDICINAIS (CD-ROM). SAO PAULO, BRAZIL. (2002)
ZZ1093	PERU-EL LIBRO DE LAS PALNTAS MAGICAS, 2 ND ED. ZADRA, DE, ADRIANA ALARCO. LIMA: CONCYTEC (2000)
ZZ1095	HANDBOOK OF PHYTOCHEMICAL CONSTITUENTS OF GRAS HERBS AND OTHER ECONOMIC PLANTS. DUKE, JA: BOCA RATON, FL: CRC PRESS. (1992)
AG1001	FERN CONSTITUENTS: TRETERPENOIDS FORM ADIANTUM CAPILLUS-VENERIS. NAKANE, T: MAEDA, Y: EBIHARA, H: ARAI, Y: MASUDA, K: TAKANO, A: AGETA, H: SHIOJIMA, K: CAI, SQ: ABDEL-HALIM, OB: CHEM PHARM BULL (TOKYO) 50 9: 1273-5 (2002) (SHOWA PHARMACEUTICAL UNIVERSITY, MACHIDA, TOKYO, JAPAN)
AG1002	ADIANTUM CAPILLUS-VENERIS. HERBAL REMEDIES. HEILPFLANZEN. CD-ROM. GERMANY (1996)
AG1003	MEDICINAL PLANTS OF CHINA. DUKE, JA: AYENSU, ES: REFERENCE PUBLICATIONS INC (1985)
AG1004	A FIELD GUIDE TO MEDICINAL PLANTS. EASTERN AND CENTRAL NORTH AMERICA. FOSTER, S: DUKE, JA: HOUGHTON MIFFLAN CO (1990)
AG1005	ENCYCLOPAEDIA OF MEDICINAL PLANTS. CHIEJ, R: MAC DONALD (1984)
AG1006	ORAL ADMINISTRATION OF PERSIMMON LEAF EXTRACT AMELIORATES SKIN SYMPTOMS AND TRANSEPIDERMAL WATER LOSS IN ATOPIC DERMATITIS MODEL MICE, NC/NGA. MATSUMOTO, M: KOTANI, M: FUJITA, A: HIGA, S: KISHIMOTO, T: SUEMURA, M: TANAKA, T: BR J DERMATOL 146 2: 221-7 (2002) (RESEARCH AND DEVELOPMENT CENTER, SUNSTAR INCORPORATION, OSAKA, JAPAN)
AG1007	EFFECT OF ASTRAGALIN ON MATRIX SECRETION AND BETA 1 INTEGRIN MRNA EXPRESSION IN HUMAN MESANGIAL CELLS. NI,Z: ZHANG, Q: QIAN, J: WANG, L: CHIN MED J (ENGL) 112 12: 1063-7 (1999) (RENAL DIVISION, RENJI HOSPITAL, SHANGHAI SECOND MEDICAL UNIVERSITY, SHANGHAI, CHINA)
AG1008	PERSIMMON LEAF EXTRACT AND ASTRAGALIN INHIBIT DEVELOPMENT OF DERMATITIS AND IGE ELEVATION IN NC/NGA MICE. KOTANI, M: MATSUMOTO, M: FUJITA, A: HIGA, S: WANG, W: SUEMURA, M: KISHIMOTO, T: TANAKA, T: J ALLERGY CLIN IMMUNOL 106 (1 PT 1): 159-66 (2000) (RESEARCH AND DEVELOPMENT CENTER, SUNSTAR INCORPORATION, OSAKA, JAPAN)
AG1009	THE GRAPEFRUIT FLAVANONE NARINGIN PROTECTS AGAINST THE RADIATION-INDUCED GENOMIC INSTABILITY IN THE MICE BONE MARROW: A MICRONUCLEUS STUDY. JAGETIA, GC: REDDY, TK: MUTAT RES 519 (1-2): 37-48 (2002) (DEPARTMENT OF RADIOBIOLOGY, KASTURBA MEDICAL COLLEGE, MANIPAL, INDIA)

AG1010	COMPARISON OF ANTIOXIDANT EFFECTS OF NARINGIN AND PROBUCOL IN CHOLESTEROL-FED RABBITS. JEON, SM: BOK, SH: JANG, MK: KIM, YH: NAM, KT: JEONG, TS: PARK, YB: CHOI, MS: CLIN CHIM ACTA 317 1-2: 181-90 (2002) (DEPARTMENT OF FOOD SCIENCE AND NUTRITION, KYUNGPOOK NATIONAL UNIVERSITY, SANKYUK DONG PUK-KU, TAEGU, SOUTH KOREA)
AG1011	HYPOCHOLESTEROLEMIC EFFECT OF NARINGIN AND RUTIN FLAVONOIDS. DA SILVA, RR: DE OLIVEIRA, TT: NAGEM, TJ: PINTO, AS: ALBINO, LF: DE ALMEIDA, MR: DE MORAES, GH: PINTO, JG: ARCH LATINOAM NUTR 51 3: 258-64 (2001) (UNIVERSIDADE FEDERAL DE VICOSA, MINAS GERAIS, BRAZIL)
AG1012	NARINGIN HAS AN ANTIATHEROGENIC EFFECT WITH THE INHIBITION OF INTERCELLULAR ADHESION MOLECULE-1 IN HYPERCHOLESTEROLEMIC RABBITS. CHOE, SC: KIM, HS: JEONG, TS: BOK, SH: PARK, YB: J CARDIOVASC PHARMACOL 38 6: 947-55 (2001) (DEPARTMENT OF INTERNAL MEDICINE, SOONCHUNHYANG UNIVERSITY BUCHEON HOSPITAL, BUCHEON, KOREA)
AG1013	EFFECT OF NARINGIN SUPPLEMENTATION ON CHOLESTEROL METABOLISM AND ANTIOXIDANT STATUS IN RATS FED HIGH CHOLESTEROL WITH DIFFERENT LEVELS OF VITAMIN E. CHOI, MS: DO, KM: PARK, YS: JEON, SM: JEONG, TS: LEE, YK: LEE, MK: BOK, SH: ANN NUTR METAB 45 5: 193-201 (2001) (DEPARTMENT OF FOOD SCIENCE AND NUTRITION, KYUNGPOOK NATIONAL UNIVERSITY, YANK-SUK DONG PAK-KU, TAEGU, KOREA)
AG1014	ANTAGONISTIC EFFECTS OF SHIKIMIC ACID AGAINST FOCAL CEREBRAL ISCHEMIA INJURY IN RATS SUBJECTED TO MIDDLE CEREBRAL ARTERY THROMBOSIS. MA, Y: XU, QP: SUN, JN: BAI, LM: GUO, YJ: NIU, JZ: ZHONGGUO YAO LI XUE BAO 20 8: 701-4 (1999) (DEPARTMENT OF PHARMACOLOGY, BEIJING UNIVERSITY OF TRADITIONAL CHINESE MEDICINE, CHINA)
AG1015	LONG TERM DIETARY SUPPLEMENTATION WITH ZEAXANTHIN REDUCES PHOTORECEPTOR DEATH IN LIGHT-DAMAGED JAPANESE QUAIL. THOMSON, LR: TOYODA, Y: DELORI, FC: GARNETT, KM: WONG, ZY: NICHOLS, CR: CHENG, KM: CRAFT, NE: KATHLEEN DOREY, C: EXP EYE RES 75 5: 529-42 (2002) (SCHEPENS EYE RESEARCH INSTITUTE AND DEPARTMENT OF OPHTHALMOLOGY, HARVARD MEDICAL SCHOOL, BOSTON, MA, USA)
AG1016	EXPERIMENTAL STUDY ON INHIBITORY EFFECT OF RUTIN AGAINST PLATELET ACTIVATION INDUCED BY PLATELET ACTIVATING FACTOR IN RABBITS. CHEN, WM: JIN, M: WU, W: ZHONGGUO ZHONG XI YI JIE HE ZA ZHI 22 4:283-5 (2002) (BEIJING INSTITUTE OF HEART, LUNG AND VASCULAR DISEASES, BEIJING)
AG1017	PROTECTIVE EFFECT OF RUTIN ON PARACETAMOL-AND CCL(4)-INDUCED HEPATOTOXICITY IN RODENTS. JANBAZ, KH: SAEED, SA: GILANI, AH: FITOTERAPIA 73 7-8: 557-63 (2002) (FACULTY OF PHARMACY, BAHAUDDIN ZAKARIYA UNIVERSITY, MULTAN, PAKISTAN)
AG1018	EFFECTS OF RUTIN AND HARMALINE ON RAT REFLUX OESOPHAGITIS. SHIN, YK : SOHN, UD: CHOI, MS: KUM, C: SIM, SS: LEE, MY: AUTON AUTACOID PHARMACOL 22 1: 47-55 (2002) (DEPARTMENT OF PHARMACOLOGY, COLLEGE OF MEDICINE, SEOUL, KOREA)
AG1019	MODULATION BY FLAVONOIDS OF PAF AND RELATED PHOSPHOLIPIDS IN ENDOTHELIAL CELLS DURING OXIDATIVE STRESS. BALESTRIERI, ML: CASTALDO, D: BALESTRIERI, C: QUAGLIUOLO, L: GIOVANE, A: SERVILLO, L: J LIPID RES 44 2: 380-7 (2003) (DEPARTMENT OF BIOCHEMISTRY AND BIOPHYSICS, SECOND UNIVERSITY OF NAPLES, ITALY)