Technical Data Report

for

SAMAMBAIA

Polypodium decumanum

Sage Press

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.

For additional copies or information regarding this document or other such products offered, call or write at sagepress@sbcglobal.net or (512) 506-8282.

Samambaia

Preprinted from *Herbal Secrets of the Rainforest*, 2nd edition, by Leslie Taylor.
Published and copyrighted by Sage Press, Inc., © 2003

Family: Polypodiaceae

Genus: *Polypodium*

Species: *decumanum*, *leucotomos*, aureum

Synonyms: *Phlebodium decumanum, P. multiseriale*, *Chrysopteris decumana*

Common Names: Samambaia, calaguala, huayhuashi-shupa, cotochupa, mirane, temakaje

Parts Used: Rhizome, aerial parts

Samambaia is a fern that grows in the rainforests of South America as well as drier tropical forests in Latin America. The Polypody family contains three-quarters of all ferns—over 6,000 species of plants, mostly native to the tropics of both hemispheres. There are 75 species of plants in the *Polypodium* genus, many of which have been used medicinally for centuries. The name is derived from *poly,* meaning "many," and *podus,* meaning "foot," for the many foot-like divisions of the root or rhizomes of polypody ferns. *Polypodium leucotomos* (also classified as *Polypodium aureum*) and *Polypodium decumanum* (also classified as *Phlebodium decumanum*) are indigenous to the Honduran rainforests but also can be found throughout the South American tropics and in parts of Latin America and the Caribbean. In Brazil, the common name is samambaia; in Mexico and other Spanish-speaking tropical countries, the plant is known as calaguala.

Samambaia, like most ferns, has an intricate, creeping root system; it is this rhizome, as well as the fronds or leaves, that is used most medicinally. The plant historically has been used by the indigenous peoples of Honduras for malignant tumors, rheumatoid arthritis, and psoriasis. In the Amazon rainforest a maceration of the rhizome is used for fever; grated fresh, it is made into a tea for whooping cough and renal indispositions. The indigenous Boras (in the Peruvian Amazon) prepare the leaves in a drink for coughs. The Witotos Indians (in the northwest Amazon) use the rhizome for treating coughs. Other Peruvian indigenous tribes use the rhizome for problems of the pancreas. In the rainforest in Guyana, Creole indigenous groups use a decoction of the rhizome in ritual baths for infants. Indigenous groups in Latin America call the plant *calaguala* and use the rhizome and leaves for many different maladies including cancer, psoriasis, peptic ulcers, kidney problems, diarrhea, arthritis, and pains in joints and tendons. It is generally considered throughout the Amazon to be a general tonic, to detoxify the body of wastes, and to support the immune system.

Many types of ferns are used in traditional medicine around the world. *Polypodium vulgare* is a common fern indigenous to the forests of Europe, where it has held a place in herbal medicine for centuries. Most ferns (including the European *P. vulgare* and the South American *P. decumanum*) are considered alterative, tonic, pectoral, and expectorant, and are used for numerous upper respiratory conditions. In Honduran traditional medicine systems today, samambaia commonly is used for tumors, psoriasis, atopic dermatitis, vitiligo, rheumatoid arthritis, and arthritis. In Brazilian traditional medicine samambaia is considered alterative, sudorific, antirheumatic, tonic, pectoral, and expectorant; it is widely used for coughs, bronchitis, grippe, and other upper respiratory problems—as well as for rheumatism and skin problems (including psoriasis and dermatitis). In Peruvian herbal medicine the rhizome is used for coughs, fevers, and urinary infections, as well as skin problems such as psoriasis, boils, ulcers, and abscesses.

Phytochemically, samambaia contains flavonoids, alkaloids and lipids. Samambaia is a rich source of lipids and fatty acids and its therapeutic activity is considered to hinge on these groups of chemicals. Within its lipids are a group of chemicals called *sulphoquinovosyldiacylglycerols,*

which have been documented and patented as part of the plant's "active" chemicals.[1] Toxicity studies in mice and rats have demonstrated no toxicity in acute or chronic dosages;[2] in humans, oral doses greater than 1000 mg have not shown toxicity.[3]

There has been a great deal of scientific interest in *Polypodium* plants, mostly focusing on their ability to treat psoriasis. In the mid-1970s, rhizome extracts of samambaia were first reported to decrease the proliferation of skin cells and epidermal thickening, and reduce the severity and extent of skin lesions in psoriasis patients.[4] In the early 1980s, a company in Spain produced an herbal drug from a water extract of samambaia (*P. leucotomos*) rhizome and named it *Anapsos*. Since that time it has been a prescription drug registered in the Health Ministry of Spain for the treatment of psoriasis. Clinical research also has been published on Anapsos since then (including various double-blind placebo human trials) indicating it to be an effective treatment for psoriasis—as well as dermatitis and vitiligo (with a 3–6 month course of treatment required).[5–12] The mechanism of action of Anapasos and crude rhizome extracts of samambaia is thought to be related to the modulation of certain cellular processes found in inflammation and psoriatic skin as well as the immune system. Scientists have shown that psoriatic skin has abnormally high quantities of leukotriene, which is believed to be one of the causes of inflammation in psoriasis. In a 1994 clinical study, the fatty acid components in samambaia were shown to be effective in blocking excess leukotriene production.[13] Other recent findings have indicated that PAF (platelet-activating factor) might be involved in the pathogenesis of psoriasis; elevated levels of this activity have been found in psoriatic skin. In several clinical studies, a crude extract of samambaia (with its lipid phytochemicals) was shown to inhibit this activity significantly.[14–16] These lipid components (including novel sulphoquinovosyldiacylglycerols) have been patented as some of the anti-psoriatic components of the plant.[1] Finally, psoriasis is considered an autoimmune disease (as many of the immune cells are overstimulated, while others are suppressed). These include cytokines, leukocytes, T-cells, lymphocytes, and B-cells. Extracts of samambaia clearly demonstrate some of the specific immunomodulating effects needed to treat the imbalances in the immune system peculiar to psoriasis.[9,10,16-22] Part of this immunomodulatory activity is the reduction of inflammatory chemicals called *cytokines.* Extracts of samambaia have been documented to have a direct anti-inflammatory activity in mice, rats, and humans with psoriasis.[1,23]

Some of the more recent research on samambaia has focused on other chronic and degenerative diseases. A U.S. patent was filed (in 2001) on a samambaia rhizome extract that indicated suitability in the treatment of AIDS- and cancer-related wasting syndrome (called cachexia), reporting marked benefits in several non-randomized human studies on cancer and AIDS patients.[24] In 1997, a U.S. patent was filed on a samambaia leaf and rhizome extract capable of treating cognitive and/or neuroimmune dysfunctions such as Alzheimer's disease and dementia.(25) The patent (and several other *in vivo* clinical studies) indicate that the antioxidant properties of the plant protect against neuronal degeneration, promote repair of brain damage, and have a neuroprotective effect (through regulation of specific cytokines).[25–29] In a double-blind placebo human trial (in 2000) with the rhizome extract Anapsos, researchers reported, "The present results show that Anapsos (360 mg/day) improves cognitive performance, cerebral blood perfusion and brain bioelectrical activity in patients with senile dementia. These effects of Anapsos were more marked in demented patients with mild mental deterioration and/or with dementia of the Alzheimer type."[30] Anapsos now is used in Spain and Europe for the treatment of Alzheimer's and dementia.[31]

The same antioxidant effect (providing protective effects to brain cells) seems to extend to skin cells as well. A 1997 U.S. patent was filed on an extract of samambaia, which indicated it is effective in preventing sunburn and skin damage (taken internally, as well as applied topically prior to exposure).[3] Its photoprotective effect (against ultraviolet radiation) was reported to be due, in part, to its ability to quench free radicals.[32] One of the *in vivo* human studies confirming this activity was performed at Massachusetts General Hospital's dermatology department.[33] Another study (with hairless mice), conducted at Harvard medical school, reported that a samambaia extract applied topically "helped to ameliorate and to partially inhibit some of the histologic damage associated with

photoaging of skin and appeared to contribute to a decrease in the prevalence of UV-induced skin tumors in mice."[34]

It is likely that scientists will continue studying samambaia and why it works; meanwhile, natural health practitioners around the world will continue to employ its many purposes without knowing which specific chemicals are creating the beneficial effects. In addition to psoriasis and Alzheimer's, health practitioners in the United States are using samambaia for coughs, bronchitis, chest colds, flu, and disorders of the respiratory tract, skin, and immune systems—much as it has been used in indigenous herbal medicine systems for years.

Documented Properties and Actions: Alterative, anticachexic, anti-inflammatory, antirheumatic, antitussive, antioxidant, antipsoriatic, antiproliferative, diaphoretic, diuretic, expectorant, hypotensive, immunomodulator, neuroprotective, pectoral, photoprotective, sudorific, tonic

Main Phytochemicals: Adenosine, alkaloids, arachidonic acid, arabinopyranosides, calagualine, ecdysone, ecdysterone, eicosapentaenoic acid, elaidic acid, juglanin, kaempferols,linoleic acid, linoleic acids, linolenic acids, melilotoside, oleic acid, polypodaureine, ricinoleic acid, rutin, selligueain, sulphoquinovosyldiacylglycerols

Traditional Remedy: One-half cup leaf or root infusion 1–3 times daily or 1–3 ml of a 4:1 tincture twice daily. Traditionally, a simple, cold maceration of the rhizome often is used; therefore, 1–2 g daily of powdered root or leaf in tablets or capsules can be substituted, if desired.

Contraindications: Reports indicate that samambaia may enhance the effects of the heart drug digitalis (a medication commonly used to increase the force of heart contractions in those diagnosed with certain heart conditions).[31] It is therefore contraindicated in combination with digitalis, and persons with any heart condition should seek the advice of a qualified health practitioner prior to using samambaia.

Drug Interactions: May potentiate the effects of digitalis and/or other digitalis-type prescription heart drugs.

The absorption of samambaia is reported to be reduced in the presence of antacids.

WORLDWIDE ETHNOBOTANICAL USES

Region	Uses
Amazonia	Cancer, cough, detoxification, fever, immune, pancreas, psoriasis, renal disorders, rheumatism, tonic, whooping cough
Colombia	Pertussis
Brazil	Alterative, bronchitis, coughs, expectorant, gout, grippe, pectoral, psoriasis, respiratory disorders, rheumatism, skin disorders, sudorific, tonic
Honduras	Arthritis, atopic dermatitis, cancer, joint pains, kidney disorders, psoriasis, rheumatoid arthritis, stomach ulcer, tendon pain, tumors
Mexico	Cough, fever, pectoral, sudorific

Region	Uses
Peru	Abscess, boils, cough, fever, pancreas, psoriasis, skin disorders, ulcer (skin), urinary infections, whooping cough
United States	Alzheimer's, bronchitis, colds, cough, dermatitis, detoxification, diaphoretic, diuretic, eczema, flu, gout, hypertension, immune disorders, psoriasis, skin disorders, respiratory disorders, rheumatism
Venezuela	Purgative, venereal disease
Elsewhere	Bronchitis, cancer, cold, cough, diuretic, fever, flu, gout, hypertension, immune, psoriasis, renal, respiratory disorders, rheumatism, skin, tonic, tumor

References

1. Vasange, M., et al. "Sulpholipid composition and methods for treating skin disorders." U.S. patent no. 6,124, 266; 2000.
2. Valetas, J. "Method for preparing a substance having properties against collagen diseases and products obtained." U.S. patent no. 4,206,222; 1980.
3. Pathak, M. A., et al. "*Polypodium* extract as photoprotectant." U.S. patent no. 5, 614, 197; 1997.
4. Padilla, H. C. "A new agent (hydrophilic fraction of *Polypodium leucotomos*) for management of psoriasis." *Int. J. Dermatol*. 1974; 13(5): 276–82.
5. Mercadal Peyri, O., et al. "Preliminary communication on the treatment of psoriasis with anapsos." *Actas Dermosifiliogr.* 1981; 72(1–2): 65–8.
6. Capella Perez, M. C., et al. "Double-blind study using 'anapsos' 120 mg. in the treatment of psoriasis." *Actas Dermosifiliogr*. 1981; 72(9-10):487-94.
7. Del Pino Gamboa , J., et al. "Comparative study between 120 mg. of anapsos and a placebo in 37 psoriasis patients." *Med. Cutan. Ibero. Lat. Am.* 1982; 10(3): 203–8.
8. Pineiro Alvarez, B. "2 years personal experience in anapsos treatment of psoriasis in various clinical forms." *Med. Cutan. Ibero. Lat. Am.* 1983; 11(1): 65–72.
9. Vargas, J., et al. "Anapsos, an antipsoriatic drug which increases the proportion of suppressor cells in human peripheral blood." *Ann. Immunol.* (Paris) 1983; 134C(3):393–400.
10. Jimenez, D., et al. "Anapsos modifies immunological parameters and improves the clinical course in atopic dermatitis." *Dermatologica* 1986; 173(3):154–5.
11. Jimenez, D., et al. "Anapsos, an antipsoriatic drug, in atopic dermatitis." *Allergol. Immunopathol*. (Madrid) 1987; 15(4):185–9.
12. Mohammad A. "Vitiligo repigmentation with Anapsos *(Polypodium leucotomos)*." *Int. J. Dermatol*. 1989; 28(7): 479.
13. Vasange, M., et al. "The fern *Polypodium decumanum*, used in the treatment of psoriasis, and its fatty acid constituents as inhibitors of leukotriene B4 formation." *Prostaglandins Leukotrienes Essent. Fatty Acids* 1994; 50: 279–284.
14. Tuominen, M., et al. "Effects of calaguala and an active principle, adenosine, on platelet activating factor." *Planta Med*. 1992; 58(4): 306–10.
15. Vasange, M., et al. "A sulphonoglycolipid from the fern *Polypodium decumanum* and its effect on the platelet activating factor receptor in human neutrophils." *J. Pharm. Pharmacol*. 1997; 49(5): 562–617.
16. Vasange, M., et al. "Flavonoid constituents of two *Polypodium* species (Calaguala) and their effect on the elastase release in human neutrophils." *Planta Med*. 1997; 63(6): 511–17.
17. Sempere-Ortells , J. M., et al. "Effect of Anapsos (Polypodium leucotomos extract) on *in vitro* production of cytokines." *Br. J. Clin. Pharmacol.* 1997; 43(1): 85–9.
18. Gonzalez, S., et al. "An extract of the fern *Polypodium leucotomos* (Difur) modulates Th1/Th2 cytokines balance in vitro and appears to exhibit anti-angiogenic activities in vivo: Pathogenic relationships and therapeutic implications." *Anticancer Res*. 2000; 20(3a): 1567–75.
19. Bernd, A., et al. "In vitro studies on the immunomodulating effects of *Polypodium leucotomos* extract on human leukocyte fractions. *Arzneimittelforschung.* 1995; 45(8): 901–4.
20. Sempere-Ortells, J. M., et al. "Anapsos (Polypodium leucotomos) modulates lymphoid cells and the

expression of adhesion molecules." *Pharmacol. Res*. 2002; 46(2): 185–90.
21. Rayward, J. et al., *Polypodium leucotomos* (PL), an herbal extract, inhibits the proliferative response of T. lymphocytes to polyclonal mitogens." *Second Intl. Cong. on Biol. Response Modifiers*, San Diego, U.S.A. 1993.
22. Tuominen, M. et al., "Enhancing effect of extract *Polypodium leucotomos* on the prevention of rejection on skin transplants" *Phytotherapy Research* 1991; 5: 234–37.
23. Navarro-Blasco, F. J., et al. "Modification of the inflammatory activity of psoriatic arthritis in patients treated with extract of *Polypodium leucotomos* (Anapsos)." *Br. J. Rheumatol.* 1998; 37(8): 912.
24. Ferrer, M. Y., et al. "Water-soluble fractions of *Phlebodium decumanum* and its use as nutritional supplement in AIDS and cancer patients." U.S. patent no. 6,228,366; 2001.
25. Quintanilla A. E., et al. "Pharmaceutical composition of activity in the treatment of cognitive and/or neuroimmune dysfunctions." U.S. patent no. 5,601,829; 1997.
26. Fernandez-Novoa, L., et al. "Effects of Anapsos on the activity of the enzyme Cu-Zn-superoxide dismutase in an animal model of neuronal degeneration." *Methods Find. Exp. Clin. Pharmacol*. 1997; 19(2): 99–106.
27. Gomes, A. J., et al. "The antioxidant action of *Polypodium leucotomos* extract and Kojic acid: Reactions with reactive oxygen species." *Braz. J. Med. Biol. Res*. 2001; 34(11): 1487–94.
28. Álvarez, X. A., et al. "Anapsos reverses interleukin-1 beta overexpression and behavioral deficits in nbM-lesioned rats." *Methods Find. Exp. Clin. Pharmacol.* 1997; 19(5): 299–309.
29. Álvarez, X. A., et al. "Anapsos improves learning and memory in rats with Beta-Amyloid (1-28) deposits in the hippocampus" in *Progress in Alzheimer's and Parkinson's diseases*, Ed. Fisher, A., Yoshida, M. and Hannin, I., Plenum Press, New York, pp. 699-703 (1998).
30. Álvarez, X. A., et al. "Double-blind, randomized, placebo-controlled pilot study with anapsos in senile dementia: effects on cognition, brain bioelectrical activity and cerebral hemodynamics." *Methods Find. Exp. Clin. Pharmacol.* 2000; 22(7): 585–94.
31. Cacabelos, R., et al. "A pharmacogenomic approach to Alzheimer's disease." *Acta Neurol. Scand. Suppl.* 2000; 176: 12–19.
32. Gonzalez, S., et al. "Inhibition of ultraviolet-induced formation of reactive oxygen species, lipid peroxidation, erythema and skin photosensitization by *Polypodium leucotomos*." *Photodermatol. Photoimmunol. Photomed.* 1996; 12(2): 45–56.
33. Gonzalez, S., et al. "Topical or oral administration with an extract of *Polypodium leucotomos* prevents acute sunburn and psoralen-induced phototoxic reactions as well as depletion of Langerhans cells in human skin." *Photodermatol. Photoimmunol. Photomed.* 1997; 13(1–2): 50–60.
34. Alcaraz, M. V., et al. "An extract of *Polypodium leucotomos* appears to minimize certain photoaging changes in a hairless albino mouse animal model. A pilot study." *Photodermatol. Photoimmunol. Photomed.* 1999; 15(3–4): 120–26.

Ethnomedical Information on Samambaia (Polypodium decumanum)

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Rhizome Amazonia	Used for coughs.	Not stated Oral	Human Adult	ZZ1005
Rhizome Amazonia	Used for fever, whooping cough and renal disorders.	Maceration Oral	Human Adult	L04137
Rhizome Amazonia	Used as a general tonic, to detoxify the body and support the immune system. Used for rheumatism.	Various Oral	Human Adult	ZZ1015
Leaf Amazonia	Used for cough.	Infusion Oral	Human Adult	L04137
Leaf + Rhizome Brazil	Used as a sudorific, for respiratory disorders and rheumatism.	Not stated Oral	Human Adult	ZZ1013
Leaf Brazil	Used as an alterative, tonic, pectoral and expectorant for coughs, bronchitis, gripe; used for skin disorders.	Not stated Oral	Human Adult	ZZ1007
Rhizome Colombia	Used to treat pertussis.	Infusion Oral	Human Adult	J19582
Aerial Parts Honduras	Used for cancer, psoriasis and atopic dermatitis.	Not stated Oral	Human Adult	AW1009
Leaf Honduras	Used for psoriasis.	H2O Ext Oral	Human Adult	K17243
Leaf + Rhizome Honduras	Used for tumors, rheumatoid arthritis and psoriasis.	Infusion Oral	Human Adult	AW1013
Plant Honduras	Used for peptic ulcers, kidney problems, arthritis, pains in joints and tendons.	Infusion Oral	Human Adult	AW1015
Rhizome Latin America	Used for cancer.	Not stated	Human Adult	ZZ1029
Rhizome Peru	Used for coughs, fever, urinary infections and skin affections like psoriasis.	Infusion Oral	Human Adult	ZZ1008
Rhizome Peru	Used for boils, skin ulcers and abscesses.	Grated External	Human Adult	ZZ1008
Rhizome Peru	Used to treat the pancreas.	Not stated Oral	Human Adult	ZZ1045
Leaf Peru	Used for coughs.	Not stated	Human Adult	AW1001
Rhizome Guyana	Used in ritual baths for infants.	Decoction Bath	Human Adult	ZZ1033
Leaf + Rhizome US	Used for cough, bronchitis, chest colds, flu, disorders of the respiratory tract, rheumatism, gout and high blood pressure. Used as a diuretic and diaphoretic.	Various Oral	Human Adult	ZZ1014
Rhizome US	Used for rheumatism and the detoxification of wastes.	Not stated	Human Adult	ZZ1067

Biological Activities for Extracts of Samambaia (Polypodium decumanum)

Part – Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Not stated	Toxicity (general)	Not stated	Oral Human Adult	80 mg-720 mg	Active	2 patients with side effects (pruritis and gastric disturbance) out of 316 total patients observed.	AW1002
Leaf + Rhizome Not stated	Toxicity (general)	Not stated	Oral Human Adult	>1000 mg	Inactive		AW1016
Aerial Part Not stated	Toxicity (general	H2O-ETOH Ext	Oral Rat Oral Mice	250 mg/kg 1000 mg/kg	Inactive Inactive		AW1020
Leaf + Rhizome Not stated	Drug Interaction	Not stated	Oral Human Adult	Not stated	Active	Appears to enhance the effect of digitalis.	AW1016
Leaf + Rhizome Not stated	Drug Interaction	Not stated	Oral Human Adult	Not stated	Active	Antacids reduce the absorption of samambaia.	AW1016
Leaf Honduras	Immunomodulating Activity	MEOH Ext	IG Mouse SC Mouse	1000 mg/kg 500.0 mg/kg	Active Active	Treatment enhanced allograft survival time.	M29265
Rhizome Spain	Immunomodulating Activity	Not stated	Not stated	Not stated	Active Active	Stimulates the proliferation and activation of T and natural killer lymphocytes. Down-regulates adhesion molecules CD11, CD18 and CD62-L on PBMN cells and on U-937 and HL-60 cell lines.	AW1003
Not stated	Immunomodulating Activity	Not stated	Cell Culture	Not stated	Active	Inhibited the production of Th1 cytokines - IL-2 (24%), IFN-gamma (72%) and TNF-alpha (53%). Increased Th2 cytokine IL-10 (33%). 100% inhibition of IL-6.	AW1005
Rhizome Guatemala	Immunomodulating Activity	Not stated	In vitro	Not stated	Active	Modulates the production and release of cytokines by PBMN cells.	AW1012
Rhizome Honduras	Immunomodulating Activity	Not stated	Oral Human Adult	Not stated	Active	The number of T8+ lymphocytes increased without affecting the number of T4+ lymphocytes or B cells.	AW1009

Part – Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Not stated	Immunomodulating Activity	Not stated	Mice	Not stated	Active	In mice immunized with Trichinella spiralis, from day 10 to day 1 prior to immunization treatment caused a significant reduction in total antibody levels, suppression of IgG1 response, increase of IgG2a and IgG2b and a potentiation of IgG3 response.	AW1010
Rhizome Guatemala	Immunomodulating Activity	Not stated	In vivo	Not stated	Active	Stimulates PBMN cell proliferation, delays IL-1 beta secretion and increased IL-2, IL-10 and INF-gamma secretion.	AW1012
Not stated	Immunomodulating Activity	Not stated	Oral Human Adult	Not stated	Active	Corrected imbalances between T4 helper cells and T8 suppressor cells. Increased low T8 cells.	AW1018
Leaf + Rhizome Not stated	Immunomodulating Activity	MEOH Ext	Cell Culture (PBMNc)	75 mu. g/ml 150 mu. g/ml 500 mu. g/ml 1000 mu. g/ml 1500 mu. g/ml 4500 mu. g/ml	Active	Increase in PHA-stimulated PBMN cells proliferation at 75-150 mu. g/ml. At doses of 1500-4500 mu. g/ml a decrease of proliferation was seen.	AW1014
Not stated	Anti-inflammatory Activity	Not stated	Topical Mice	Not stated	Active	Diminished mast cell infiltrate and blood vessels triggered by chronic UVB irradiation.	AW1005
Leaf Honduras	Anti-inflammatory Activity	MEOH Ext	Oral Rat Topical Rat	1000 mg/kg 400 mg	Active Active	vs. ear edema test. Both oral and topical resulted in a 32% decrease in edema.	AW1015
Leaf Honduras	Anti-inflammatory Activity	MEOH Ext	Oral Rat	500 mg/kg 1000 mg/kg 2000 mg/kg	Weak Activity Active Active	vs. paw edema test induced by carrageenan. 500 mg produced a 19% reduction in edema, 1000 mg a 22% inhibition and 2000 mg a 21% inhibition. Reduction in edema thought to be due to inhibition of PAF, which is involved in the early phase of carrageenan-induced edema.	AW1015
Leaf Honduras	Anti-inflammatory Activity	MEOH Ext	Oral Rat	Not stated	Inactive	Pre-treated rats showed no decrease in the edema formation when challeng-ed with carrangeenan on day 14.	AW1015
Not stated	Anti-inflammatory Activity	Not stated	Cell Culture	Not stated	Active	Inhibition of cyclooxygenase.	AW1015

Part – Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Not stated	Anti-inflammatory Activity Photo-protective Activity	Not stated	Topical or Oral Guinea pig Topical or Oral Human skin	Not stated	Active Active	Inhibited UVB-induced erythemal response and 8-methoxypsoralen plus UVA-induced phototoxic reaction.	AW1008
Frond Honduras	Elastase Inhibition	MEOH Ext	Human Adult	IC50 = 0.1 mg/ml	Active	Mononuclear leukocytes vs. PAF-induced elastase release.	K08016
Frond Honduras	Platelet Activating Factor Inhibition	MEOH Ext	Cell Culture	0.5 mg/ml	Active	Neutrophils—human vs. PAF-induced exocytosis.	J17352
Frond Honduras	Platelet Activating Factor Inhibition	MEOH Ext	Human Adult	IC50 = 0.2 mg/ml	Active	PAF synthesis inhibited.	K08016
Frond Honduras	Platelet Activating Factor Stimulation	MEOH Ext	Cell Culture	0.5 mg/ml	Active	Neutrophils—human.	J17352
Rhizome Honduras	Exocytosis Inhibition Platelet Activating Factor Stimulation	MEOH Ext	Cell Culture	0.5 mg/ml	Weak Activity	Neutrophils—human vs. PAF-induced exocytosis.	J17352
Frond Honduras	Leukotriene B4 Release Enhancement	MEOH Ext	Cell Culture	0.8 mg/ml	Active	Leukocytes.	J17352
Rhizome Honduras	Leukotriene B4 Release Enhancement	MEOH Ext	Cell Culture	0.8 mg/ml	Weak Activity	Leukocytes.	J17352
Rhizome Honduras	Antipsoriatic Activity	H20 Ext	Oral Human Adult	80 mg - 720 mg	Active	In 304 patients 61.41% achieved whitenings (80-100%) between the affected skin. 46 patients had whitened between 30-80% of their lesions. 15 patients of 304 obtained no result. 11 had relapses.	AW1002
Rhizome Brazil	Antipsoriatic Activity	H20 Ext	Human Adult	Not stated	Active	Caused decreases in hyperkeratosis, parakeratosis, epidermal mitosis, epidermal thickening, epidermal prolongations and the severity and extent of epidermal lesions.	AW1016
Rhizome + Leaf	Antipsoriatic Activity	Calcium salt lyophilized Ext	Oral Human Adult	12 mg	Active	11 patients suffering from long-lasting resistant psoriasis experienced an improvement with 1 having a complete remission.	AW1020

Part – Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Rhizome Honduras	Atopic Dermatitis Reduction	H20 Ext	Oral Human Adult	Not stated	Active	Activity and extension of cutaneous lesions improved more markedly under *Polypodium* than with an oral antihistamine and topical steroids. Effect still seen months after treatment ceased. Returned abnormal immune parameters to normal.	AW1018
Rhizome Honduras	Collagen Normalization Effect	H20 Ext	Cell Culture	1-2 mcg	Active	A lower rotatory power of collagen fractions was seen in samples from arthritic and psoriatic patients. Values restored to normal upon treatment.	AW1020
Leaf + Rhizome Not stated	Antioxidant Activity	Not stated	In vitro	0.01%	Active	Quenched superoxide anions by 42.4% and 55%.	AW1016
Not stated Brazil	Antioxidant Activity	Not stated	Not stated	1x10(9) M-1 s-1 0.2-1 mg/ml 1 mg/ml Not stated	Active Active Active Inactive	Hydroxyl radicals scavenged. Quenched superoxide anions by 30 & 31% Quenched singlet oxygen by 43%. Hydrogen peroxide.	AW1004
Not stated	Antioxidant Enzyme Modification	H2O Ext	IP Rat	4 mg/kg 20 mg/kg 100 mg/kg	Active Active Active	In an animal model of neuronal degeneration low doses produced decreased SOD activity in the hypothalamus, hippocampus, liver and spleen, while an increase of SOD activity was seen in the cerebral cortex.	AW1006
Not stated	Anti-angiogenic Activity	Not stated	Mice	Not stated	Active	Inhibited angiogenesis.	AW1005
Not stated	Antitumor Activity	Not stated	In vitro In vivo	Not stated Not stated	Active Active		AW1017
Not stated	Antiproliferative Activity	ETOH Ext	Cell Culture	Not stated	Active	Inhibited the proliferation of PBMN cells in response to PHA or anti CD3 monoclonal antibodies.	AW1007
Not stated	Photoprotective Activity	Not stated	Topical Mice	Not stated	Active	Mice treated had a reduction in skinfold thickness, less histologic damage and a reduction in the number of skin tumors at 8 weeks after cessation of UVB exposure.	AW1011

Part – Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf + Rhizome Not stated	Photoprotective Effect	Not stated	Topical Human Adult	10% 25% 50%	Active Active Active	Standard SPF 15 had a IPD=3.09. *Polypodium* had IPD=2.2-3.4. All doses retarded or prolonged the photo-oxidation reaction of melanin pigment.	AW1016
Leaf + Rhizome Not stated	Photoprotective Effect	Not stated	Topical Human Adult	10% 25% 50%	Active Active Active	Standard SPF 15 showed a SPF value of >2.94 for the minimum erythematic dose prevention. SPF values for *Polypodium* at 10% = 2.35, 25% = 2.71 and 50% = >2.94. Skin treated with *Polypodium* showed no visible sunburn reaction.	AW1016
Leaf + Rhizome Not stated	Photoprotective Effect	Not stated	Topical Human Adult	10% 25% 50%	Active Active Active	Protection factor for the minimal melanogenic dose of UV radiation required to stimulate delayed pigmentation or tanning for 10% was >147, 25% = >153, 50% = >167 and standard SPF 15 = >167 mJ/cm2.	AW1016
Leaf + Rhizome Not stated	Photoprotective Effect	Not stated	Oral Human Adult	720 mg	Active	Slightly better protection seen upon taking *Polypodium* 4 days before sun exposure and then 1 dose 3 hours before exposure than taking it 1 day and 3 hours before exposure. The skin of those treated showed no evidence of sunburn and delayed tanning reactions.	AW1016
Leaf + Rhizome Not stated	Photoprotective Effect	Not stated	Topical Human Adult Oral Human Adult	10% 25% 50% 1440 mg	Active Active Active Active	Psoralen-induced photosensitivity. IPD=1.5-4. IPD=3-7 J/cm2	AW1016
Leaf + Rhizome Not stated	Anti-cachexia Activity	H2O Ext	Oral Human Adult	Not stated	Active	Used for malnutrition, weight loss, wasting and cachectic syndrome in AIDS and cancer.	AW1013
Leaf + Rhizome Not stated	Anti-cachexia Activity	H2O Ext	Oral Human Adult	Syrup 1 gm Syrup 3 gm	Active Active	In 5 patients with advanced HIV infection body weight increased to normal figures in 3 and professional activity became normal at the end of the 2nd month of treatment.	AW1013

Part – Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf + Rhizome Not stated	Anti-cachexia Activity	H2O Ext	Oral Human Adult	Syrup 1 gm Syrup 3 gm	Active Active	In 5 patients with advanced HIV infection a rapid weight gain was seen with an improved quality of life and resumption of professional activities.	AW1013
Leaf + Rhizome Not stated	Neuroprotective Activity	Hydrosoluble Ext	Oral Human Adult	Not stated	Active	Produces hypoquinesia; improves the production in a training task and reduces IL-2 and IL-1beta in the cerebral crust and hippocampus while increasing cortical TNF-alpha.	AW1014
Leaf + Rhizome Not stated	Neuroprotective Activity	Hydrosoluble Ext	Oral Human Adult	300 mg	Active	In 24 patients with Alzheimer's disease and vascular dementia the cerebral bioelectrical activity showed attenuation of slow frequencies and activation of rapid frequencies.	AW1014
Not stated	CNS Effect	Not stated	Rat	Not stated	Active	Induced hypokinesia with no effect on psychomotor habituation; improved learning; decreased cytokines IL-1beta, IL-2 in frontoparietal cortices; decreased IL-1beta in hippocampus; increased TNF-alpha in cortex.	AW1019

Biological Activities for Compounds of Samambaia (Polypodium decumanum)

Compound	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Flavonoid Fraction	Platelet Activating Factor (PAF) Inhibition	Cell Culture	Not stated	Inactive Active Active	PAF activity. Inhibited spontaneous elastase release. Inhibited the potentiation of elastase release by PAF.	H21205
1,2-di-O-palmitoyl-3-O-(6-sulpho-alpha-D-quinovopyranosyl)-glycerol	Platelet Activating Factor (PAF) Inhibition	Cell Culture	IC50=2 microM	Active	Displacement of PAF from its receptor.	H19746
Lipidic Fraction	Platelet Activating Factor (PAF) Inhibition	Cell Culture	IC50=10 mu.M	Active	Inhibited the exocytosis induced by PAF.	AW1015
Adenosine	Platelet Activating Factor (PAF) Inhibition	Cell Culture	IC50=0.024 mcg/ml	Active	Inhibited the exocytosis induced by PAF.	K08016
Lipidic Fraction	Platelet Activating Factor (PAF) Antagonist Activity	Cell Culture	IC50=2 mu.M	Weak Activity	PAF receptor antagonism in the neutrophil seen.	AW1015
Selligueain	Elastase Inhibition	Cell Culture	Not stated	Active		H21205
PUFA's	Leukotriene Inhibition	Cell Culture	IC50=20-60 mcM	Active	Inhibition of LTB4 formation.	K17243
Arachidonic acid	Leukotriene Inhibition	Cell Culture	Not stated	Inactive	Stimulation of LTB4 formation.	K17243
8(R) hydroxylinoleic acid	Leukotriene Inhibition	Cell Culture	IC50=120 mcM	Active	30% inhibition.	K17243
Ricinoleic acid Oleic acid Elaidic acid Linoleic acid 8(R)-OH-linoleic acid Linolenic acid Eicosapentaenoic acid	Leukotriene B4 Inhibition	Cell Culture	IC50=41 mcM IC50=21 mcM IC50=54 mcM IC50=31 mcM Not stated IC50=42 mcM IC50=57 mcM	Active		AW1009
Lipidic Fraction	Antipsoriatic Activity	Not stated	Not stated	Active		AW1014

Presence of Compounds in Samambaia (Polypodium decumanum)

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Adenosine	Alkaloid	Frond	Honduras	00.00003%	K08016
Arachidonic acid	Lipid	Frond Rhizome Frond	Honduras Honduras Honduras	Not stated 00.0035% 00.0035%	K17243 J17352 J17352
Eicosapentaenoic acid	Lipid	Not stated	Not stated	Not stated	AW1009
Elaidic acid	Lipid	Not stated	Not stated	Not stated	AW1009
Glycerol, 1-2-di-o-palmitoyl-3-o-(6-sulfo-alpha-d-quinovopyranosyl)-	Lipid	Leaf	Honduras	00.00015%	H19746
Juglanin	Flavonol	Leaf	Honduras	00.001%	H21205
Kaempferol-3-o-beta-d-xylopyranosyl (1-2)-beta-d-arabinopyranoside	Flavonol	Leaf	Honduras	00.0003%	H21205
Linoleic acid	Lipid	Frond Rhizome Frond Rhizome Frond	Honduras Honduras Honduras Honduras Honduras	Not stated 00.0035% 00.014% 00.00088% 00.018%	K17243 J17352 J17352 J17352 J17352
Linoleic acid, 8(R) hydroxy-	Lipid	Not stated	Not stated	Not stated	K17243
Linolenic acid, alpha-	Lipid	Frond	Honduras	Not stated	K17243
Melilotoside		Not stated	Not stated	Not stated	H21205
Oleic acid	Lipid	Not stated	Not stated	Not stated	AW1009
Ricinoleic acid	Lipid	Not stated	Not stated	Not stated	AW1009
Rutin	Flavonol	Leaf	Honduras	00.0008%	H21205
Selligueain	Flavonoid	Rhizome Frond	Honduras Honduras	00.00048% 00.00024%	J17352 J17352

Literature Cited – Samambaia (Polypodium decumanum)

J12034	PLANTS WITH HYPOGLYCEMIC ACTIVITY IN HUMANS. ERNST,E: PHYTOMEDICINE 4 1: 73-78 (1997) (DEPT COMPLEMETNARY MED POSTGRAD MED SCH UNIV EXETER EXETER ENGLAND)
H19746	A SULPHONOGLYCOLIPID FROM THE FERN POLYPODIUM DECUMANUM AND ITS EFFECT ON THE PLATELET ACTIVATING-FACTOR RECEPTOR IN HUMAN NEUTROPHILS. VASANGE, M; ROLFSEN, W; BOHLIN, L. J PHARM PHARMACOL 49 5: 562-566 (1997) (DEPT PHARMACOG FAC PHARM UNIV UPPSALA UPPSALA S-751 23 SWEDEN)
H21205	FLAVONOID CONSTITUENTS OF TWO POLYPODIUM SPECIES (CALAGUALA) AND THEIR EFFECT ON THE ELASTASE RELEASE IN HUMAN NEUTROPHILS. VASANGE, M; LIU, B; WELCH, CJ; ROLFSEN, W; BOHLIN, L. PLANTA MED 63 6: 511-517 (1997) (DEPT PHARMACOG FAC PHARM UNIV UPPSALA UPPSALA S-751 23 SWEDEN)
J17352	QUANTITATIVE DETERMINATION OF ANTIINFLAMMATORY PRINCIPLES IN SOME POLYPODIUM SPECIES AS A BASIS FOR STANDARDIZATION. LIU, B; DIAZ, F; BOHLIN, L; VASANGE, M. PHYTOMEDICINE 5 3: 187-194 (1998) (DEPT PHARMACOG FAC PHARM UNIV UPPSALA UPPSALA S-751 23 SWEDEN)
J19582	USOS DE LOS HELECHOS EN SURAMERICA CON ESPECIAL REFERENCIA A COLOMBIA. MURILLO, MT. BOOK 1983: 156PP-. (1983) (INST DE CINEC NAT MUSEO DE HISTORIA NAT UNIV NACL DE COLOMBIA BO GOTA COLOMBIA)
K08016	EFFECTS OF CALAGUALA AND AN ACTIVE PRINCIPLE, ADENOSINE, ON PLATELET ACTIVATING FACTOR. TUOMINEN, M; BOHLIN, L; ROLFSEN, W. PLANTA MED 58 4: 306-310 (1992) (DEPT PHARMACOG FAC PHARM UNIV UPPSALA UPPSALA S-751 23 SWEDEN)
K17243	THE FERN POLYPODIUM DECUMANUM, USED IN THE TREATMENT OF PSORIASIS, AND ITS FATTY ACID CONSTITUENTS AS INHIBITORS OF LEUKOTRIENE B4 FORMATION. VASANGE-TUOMINEN, M; PERERA-IVARSSON, P; SHEN, J; BOHLIN, L; ROLFSEN, W. PROSTAGLANDINS LEUKOTRIENES ESSENT FATTY ACIDS 50: 279-284 (1994) (DEPT PHARMACOG FAC PHARM UNIV UPPSALA UPPSALA S-751 23 SWEDEN)
L04137	AMAZONIAN ETHNOBOTANICAL DICTIONARY. DUKE, JAMES: VASQUEZ, RUDOLFO. BOCA RATON, FL: CRC PRESS INC 1994.
M29265	ENHANCING EFFECT OF CALAGUALA ON THE PREVENTION OF REJECTION ON SKIN TRANSPLANTS IN MICE. TUOMINEN, M; BOHLIN, L; LINDBOM, LO; ROLFSEN, W. PHYTOTHER RES 5 5: 234-236 (1991) (DEPT PHARMACOG FAC PHARM UNIV UPPSALA UPPSALA S-751 23 SWEDEN)
ZZ1007	MANUAL DE FITOTERAPIA. 2ND ED. COIMBRA, RAUL. SAO PAULO, BRAZIL: DADOS INTERNACIONAIS DE CATALOGACAO NA PULICACAO, 1994.
ZZ1008	PLANTAS MEDICINALES DE USO POPULAR EN LA AMAZONIA PERUANA. MEJIA, KEMBER: RENGIFO, ELSA. LIMA: AECI AND IIAP. 1995.
ZZ1013	DICIONARIO DAS PLANTAS UTEIS DO BRAZIL, 5TH ED. CRUZ, GL: RIO DE JANEIRO: BERTRAND, 1995.
ZZ1014	HERBS OF THE AMAZON: TRADITIONAL AND COMMON USES. SCHWONTKOWSKIN, DONNA: UTAH: SCIENCE STUDENT BRAINTRUST PUBLISHING. 1993.

ZZ1015	WORLD PRESERVATION SOCIETY. POWERFUL AND UNUSUAL HERBS FROM THE AMAZON AND CHINA. GAINESVILLE, FL: THE WORLD PRESERVATION SOCIETY, INC. 1993.
ZZ1029	HANDBOOK OF NORTHEASTERN INDIAN MEDICINAL PLANTS. DUKE, JA: BOSTON, MA: QUARTERMAN PUBLICATIONS. 1986.
ZZ1033	PHARMACOPEES TRADITIONELLES EN GUYANE: CREOLES, PALIKUR, WAYPI. GRENAND, P: MORETTI, C: JACQUEMIN, H: EDITORIAL L-ORSTROM, COLL. MEM NO. 108. PARIS, FRANCE. 1987.
ZZ1045	USEFUL PLANTS OF AMAZONIAN PERU. VASQUEZ, MR: SECOND DRAFT. FILED WITH USDA'S NATIONAL AGRICULTURAL LIBRARY. 1990.
ZZ1067	HERBAL TREASURES FROM THE AMAZON. PARTS 1, 2, AND 3. SCHWONTKOWSKI, DONNA. HEALTHY & NATURAL JOURNAL. 1996.
AW1001	YOUNG MANAGED FALLOWS AT BRILLO NUEVO. DENEVAN, WM TREACY, JM: P 8-46 (1988) IN SWIDDEN-FALLOW AGROFORESTRY IN THE PERUVIAN AMAZON. ADVANCED IN ECON. BOT. 5. DENEVAN, WM: PADOCH, C: NEW YORK BOTANICAL GARDEN, NY. P107.
AW1002	2 YEARS PERSONAL EXPERIENCE IN ANAPSOS TREATMENT OF PSORIASIS IN VARIOUS CLINICAL FORMS PINEIRO ALVAREZ, B: MED CUTAN IBERO LAT AM 11 1: 65-72 (1983)
AW1003	ANAPSOS (POLYPODIUM LEUCOTOMOS) MODULATES LYMPHOID CELLS AND THE EXPRESSION OF ADHESION MOLECULES. SEMPERE-ORTELLS, JM: CAMPOS, A: VELASCO, I: MARCO, F: RAMIREZ-BOSCA, A: DIAZ, J: PARDO, J: PHARMACOL RES 46 2: 185-90 (2002) (DEPT OF BIOTECHNOLOGY, DIVISION OF IMMUNOLOGY, UNIVERSITY OF ALICANTE, ALICANTE, SPAIN)
AW1004	THE ANTIOXIDANT ACTION OF POLYPODIUM LEUCOTOMOS EXTRACT AND KOJIC ACID: REACTIONS WITH REACTIVE OXYGEN SPECIES. GOMES, AJ: LUNARDI, CN: GONZALEZ, S: TEDESCO, AC: BRAZ J MED BIOL RES 34 11: 1487-94 (2001) (DEPARTAMENTO DE QUIMICA, FACULDADE DE FILOSOFIA, CIENCIEAS E LETRAS DE RIBEIRAO PRETO, UNIVERSIDADE DE SAO PAULO, BRAZIL)
AW1005	AN EXTRACT OF THE FERN POLYPODIUM LEUCOTOMOS (DIFUR) MODULATES TH1/TH2 CYTOKINES BALANCE IN VITRO AND APPEARS TO EXHIBIT ANTI-ANGIOGENIC ACTIVITIES IN VIVO: PATHOGENIC RELATIONSHIPS AND THERAPEUTIC IMPLICATIONS. GONZALEZ, S: ALCARAZ, MV: CUEVAS, J: PEREZ, M: JAEN, P: ALVAREZ-MON, M: VILLARRUBIA, VG: ANTICANCER RES 20 (3A): 1567-75 (2000) (WELLMAN LABORATORIES OF PHOTOMEDICINE, HARVARD MEDICAL SCHOOL, BOSTON, MA, USA)
AW1006	EFFECTS OF ANAPSOS ON THE ACTIVITY OF THE ENZYME CU-ZN-SUPEROXIDE DISMUTASE IN AN ANIMAL MODEL OF NEURONAL DEGENERATION. FERNANDEZ-NOVOA, L: ALVAREZ, XA: SEMPERE, JM: MIGUEL-HIDALGO, JJ: DIAZ, J: FRANCO-MASIDE, A: CACABELOS, R: METHODS FIND EXP CLIN PHARMACOL 19 2: 99-106 (1997) (DEPT OF NEUROBIOLOGY, EUROESPES BIOMEDICAL RESEARCH CENTER, BERGONDO, LA CORUNA, SPAIN)
AW1007	AN EXTRACT OF THE FERN POLYPODIUM LEUCOTOMOS INHIBITS HUMAN PERIPHERAL BLOOD MONONUCLEAR CELLS PROLIFERATION IN VITRO. RAYWARD, J: VILLARRUBIA, VG: GUILLEN, C: PRIETO, A: RODRIGUEZ-ZAPATA, M: SADA, G: ALVAREZ-MON, M: INT J IMMUNOPHARMACOL 19 1: 9-14 (1997) (DEPARTAMENTO DE MEDICINEA, HOSPITAL PRINCIPE DE ASTURIAS, UNIVERSIDAD DE ALCALA DE HENARES, MADRID, SPAIN)

AW1008	INHIBITION OF ULTRAVIOLET-INDUCED FORMATION OF REACTIVE OXYGEN SPECIES, LIPID PEROXIDATION, ERYTHEMA AND SKIN PHOTOSENSITIZATION BY POLYPODIUM LEUCOTOMOS. GONZALEZ, S: PATHAK, MA: PHOTODERMATOL PHOTOIMMUNOL PHOTOMED 12 2: 45-56 (1996) (DEPT OF DERMATOLOGY, MASSACHUSETTS GENERAL HOSPITAL, HARVARD MEDICAL SCHOOL, BOSTON, USA)
AW1009	PHYTOCHEMISTRY OF PLANTS USED IN TRADITIONAL MEDICINE. PROCEEDINGS OF THE PHYTOCHEMICAL SOCIETY OF EUROPE. HOSTETTMANN, K: MARSTON, A: MAILLARD, M: HAMBURGER, M: CLARENDON PRESS: OXFORD: 1995.
AW1010	MODULATION BY ANAPSOS (POLYPODIUM LEUCOTOMOS EXTRACT) OF THE ANTIBODY RESPONSES AGAINST THE NEMATODE PARASITE TRICHINELLA SPIRALIS. DEA-AYUELA, M: RODERO, M: RODRIGUEZ-BUENO, R: BOLAS-FERNANDEZ, F: MARTINEZ-FERNANDEZ, AR: PHYTOTHER RES 13 7: 566-70 (1999) (DEPT OF PARASITOLOGY, FACULTY OF PHARMACY, COMPLUTENSE UNIVERSITY, MADRID, SPAIN)
AW1011	AN EXTRACT OF POLYPODIUM LEUCOTOMOS APPEARS TO MINIMIZE CERTAIN PHOTOAGING CHANGES IN A HAIRLESS ALBINO MOUSE ANIMAL MODEL. A PILOT STUDY. ALCARAZ, MV: PATHAK, MA: RIUS, F: KOLLIAS, N: GONZALEZ, S: PHOTODERMATOL PHOTOIMMUNOL PHOTOMED 15 3-4: 120-6 (1999) (DEPT. OF DERMATOLOGY, HARVARD MEDICAL SCHOOL, MASSACHUSETTS GENERAL HOSPITAL, BOSTON, USA)
AW1012	EFFECT OF ANAPSOS (POLYPODIUM LEUCOTOMOS EXTRACT) ON IN VITRO PRODUCTION OF CYTOKINES. SEMPERE, JM: RODRIGO, C: CAMPOS, A: VILLALBA, JF: DIAZ, J: BR J CLIN PHARMACOL 43 1: 85-9 (1997) (SCIENTIFIC DEPT., ASAC PHARMACEUTICAL INTERNATIONAL, ALICANTE, SPAIN)
AW1013	WATER-SOLUBLE FRACTIONS OF PHLEBODIUM DECUMANUM AND ITS USE AS NUTRITIONAL SUPPLEMENT IN AIDS AND CANCER PATIENTS. FERRER; MIGUEL YESARES: ET AL. US PATENT #6,228,366. 2001.
AW1014	PHARMACEUTICAL COMPOSITION OF ACTIVITY IN THE TREATMENT OF COGNITIVE AND/OR NEUROIMMUNE DYSFUNCTIONS. QUINTANILLA ALMAGRAO, ELISEO, ET AL. US PATENT #5,601,829. 1997.
AW1015	SULPHOLIPID COMPOSITION AND METHODS FOR TREATING SKIN DISORDERS. VASANGE, MERVI. ET AL. US PATENT #6,124,266. 2000.
AW1016	POLYPODIUM EXTRACT AS PHOTOPROTECTANT. PATHAK, MADHUKAR, A: ET AL. US PATENT #5,614,197. 1997.
AW1017	HORVATH, A. ET AL. NATURE. 214: 1256-1258 (1967)
AW1018	ANAPSOS, AN ANTIPSORIATIC DRUG, IN ATOPIC DERMATITIS. JIMENEZ, D: NARANJO, R: DOBLARE, E: MUNOZ, C: VARGAS, JF: ALLERGOL IMMUNOPATHOL (MADR) 15 4: 185-9 (1987) (DEPARTAMENTO DE DERMATOLOGIA Y VENEREOLOGIA, UNIVERSIDAD DE GRANADA, SPAIN)
AW1019	X. A. ALVAREZ, ET AL. ANNALS OF PSYCHIATRY 3: 329-341 (1992).
AW1020	METHOD FOR PREPARING A SUBSTANCE HAVING PROPERTIES AGAINST COLLAGEN DISEASES AND PRODUCTS OBTAINED. VALETAS, JEAN. US PATENT #4,206,222. 1980.