Technical Data Report

for

CHANCA PIEDRA

“Stone Breaker”

(Phyllanthus niruri)

Sage Press

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Chanca piedra (Stone Breaker)

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Family: Euphorbiaceae

Genus: *Phyllanthus*

Species: *niruri, amarus*

Synonyms: *Phyllanthus carolinianus, P, sellowianus, P. fraternus, P. kirganella, P. lathyroides, P. lonphali, Nymphanthus niruri*

Common Names: Chanca piedra, quebra pedra, stone-breaker, arranca-pedras, punarnava, amli, bhonya, bhoomi amalaki, bhui-amla, bhui amla, bhuianvalah, bhuimy-amali, bhuin-amla, bhumyamalaki, cane peas senna, carry-me-seed, creole senna, daun marisan, derriere-dos, deye do, erva-pombinha, elrageig, elrigeg, evatbimi, gale-wind grass, graine en bas fievre, hurricane weed, jar-amla, jar amla, kizha nelli, malva-pedra, mapatan,para-parai mi, paraparai mi, pei, phyllanto, pombinha, quinine weed, sacha foster, cane senna, creole senna, shka-nin-du, viernes santo, ya-taibai, yaa tai bai, yah-tai-bai, yerba de san pablo

Parts Used: Entire Plant

Chanca piedra is a small, erect, annual herb that grows 30–40 cm in height. It is indigenous to the rainforests of the Amazon and other tropical areas throughout the world, including the Bahamas, southern India, and China. *P. niruri* is quite prevalent in the Amazon and other wet rainforests, growing and spreading freely (much like a weed). *P. amarus* and *P. sellowianus* are closely related to *P. niruri* in appearance, phytochemical structure, and history of use, but typically are found in the drier tropical climates of India, Brazil, and even Florida and Texas.

The *Phyllanthus* genus contains over 600 species of shrubs, trees, and annual or biennial herbs distributed throughout the tropical and subtropical regions of both hemispheres. Unfortunately, there remains a great deal of confusion among scientists regarding plant identification and, in many cases, plant misidentification makes evaluation of published information difficult. *P. amarus* (Thonn. & Schum) and *P. sellowianus* are often considered a variety of *P. niruri,* or no distinction is made among these three species in published clinical research. Oftentimes one name is indicated to be synonymous with another and, sometimes, both names are used interchangeably as if referring to one plant. It became so confusing that, in the 1990s, a major reorganization of the *Phyllanthus* genus was conducted (which classified *P. amarus* as a type of *P. niruri*).

The Spanish name of the plant, *chanca piedra*, means “stone breaker” or “shatter stone.” It was named for its effective use to generations of Amazonian indigenous peoples in eliminating gallstones and kidney stones. In Brazil, the plant is known as *quebra-pedra* or *arranca-pedras* (which also translates to “break-stone”). The plant is employed for numerous other conditions by the indigenous peoples, including blennorrhagia, colic, diabetes, malaria, dysentery, fever, flu, tumors, jaundice, vaginitis, and dyspepsia. Based on its long documented history of use in the region, the plant is considered analgesic and as an aperitif, carminative, digestive, emmenagogue, laxative, stomachic, tonic, and vermifuge.

Chanca piedra has a long history in herbal medicine systems in every tropical country where it grows. For the most part, it is employed for similar conditions worldwide. The natural remedy is usually just a standard infusion or weak decoction of the whole plant or its aerial parts. Its main uses are for many types of biliary and urinary conditions including kidney and gallbladder stones; for hepatitis, cold, flu, tuberculosis, and other viral infections; liver diseases and disorders including anemia, jaundice and liver cancer; and for bacterial infections such as cystitis, prostatitis, venereal diseases and urinary tract infections. It is also widely employed for diabetes and hypertension as well as for its diuretic, analgesic, stomachic, antispasmodic, febrifugal, and cell protective properties in many other conditions. It is little wonder that chanca piedra is used for so many purposes in herbal medicine systems: in clinical research

over the years, the plant has demonstrated antihepatotoxic, antilithic, analgesic, hypotensive, antispasmodic, antiviral, antibacterial, diuretic, antimutagenic, and hypoglycemic activities.

Since the mid-1960s, chanca piedra has been the subject of much phytochemical research to determine the active constituents and their pharmacological activities. It is a rich source of phytochemicals, including many which have been found only in the *Phyllanthus* genus. Many of the "active" constituents are attributed to biologically active lignans, glycosides, flavonoids, alkaloids, ellagitannins, and phenylpropanoids found in the leaf, stem, and root of the plant. Common lipids, sterols, and flavonols also occur in the plant. Because of the confusion among *P. niruri, P. amarus,* and *P. sellowianus* over the years (and the reclassification of the genus), the research reviewed herein will encompass that which has been reported on all three of these very similar species.

The first notable area of study has validated chanca piedra's longstanding traditional use for kidney stones. In 1990, the Paulista School of Medicine in São Paulo, Brazil, conducted studies with humans and rats with kidney stones. They were given a simple tea of chanca piedra for 1–3 months and it was reported that the tea promoted the elimination of stones.[1] They also reported a significant increase in diuresis and sodium and creatine excretion. Subsequently the medical school educated new doctors about the ability to treat kidney stones with this natural remedy and now it is found in many pharmacies throughout Brazil. In a 1999 *in vitro* clinical study, a chanca piedra extract exhibited a potent and effective inhibitory effect on the formation of calcium oxalate crystals (the building blocks of most kidney stones).[2] In a 2002 *in vivo* study, researchers seeded the bladders of rats with calcium oxalate crystals and treated them for 42 days with a water extract of chanca piedra. Their results indicated that chanca piedra "strongly inhibited the growth of the matrix calculus and reduced the number of stone satellites compared with the group receiving water."[3] Several of the animals even passed the stones which did form. Previously (in the mid-1980s) the antispasmodic activity of chanca piedra was reported. This led researchers to surmise that "smooth muscle relaxation within the urinary or biliary tract probably facilitates the expulsion of kidney or bladder calculi."[4] Researchers had already reported chanca piedra's antispasmodic properties[5] and smooth muscle relaxant properties (including a uterine relaxant effect) in earlier studies.[6] In 1990, Nicole Maxwell reported that Dr. Wolfram Wiemann (of Nuremburg, Germany) treated over 100 kidney stone patients with chanca piedra obtained in Peru and found it to be 94% successful in eliminating stones within a week or two.[7]

Chanca piedra is also used in herbal medicine for gallstones and, while no research has been performed that specifically validated this use, one study does indicate that chanca piedra has an effect on gallbladder processes. In a 2002 study, Indian researchers reported that chanca piedra increased bile acid secretion (demonstrated choleretic activity) and significantly lowered blood cholesterol levels in rats.[8] The beneficial effects of lowering cholesterol and triglyceride levels was also confirmed by another *in vivo* (rat) study in 1985.[9]

The plant's traditional use for hypertension has been explored by research as well. The hypotensive effects were first reported in a dog study in 1952 (in which a diuretic effect was noted also).[6] The hypotensive effects were attributed to a specific phytochemical in chanca piedra called *geraniin* (an ellagitannin phytochemical) in a 1988 study.[10] In 1995 Indian researchers gave human hypertensive subjects chanca piedra leaf powder in capsules and reported a significant reduction in systolic blood pressure, a significant increase in urine volume, and in urine and serum sodium excretion.[11] Chanca piedra's diuretic effect in humans was recorded as far back as 1929[12] and, in India, a tablet of chanca piedra (called *Punarnava*) is sold as a diuretic there.[13] In the above 1995 study, researchers also reported that blood glucose levels were reduced significantly in human subjects studied.[11] Two other studies with rabbits [14] and rats [15] document the hypoglycemic effect of chanca piedra in diabetic animals. Yet another study documented chanca piedra with aldose reductase inhibition (ARI) properties.[16] ARIs are substances that act on nerve endings exposed to high blood sugar concentration to prevent some of the chemical imbalances that occur and thus protect the nerve. (This activity also supports chanca piedra's traditional use for diabetes). This ARI effect was attributed, in part, to another ellagitannin phytochemical—ellagic acid—found in chanca piedra. This well-studied phytochemical has been documented with many other beneficial effects in numerous clinical studies (over 300 to date).

Another area of research has focused on the pain-relieving and/or antinociceptive effects of chanca piedra and performed at a Brazilian university. So far, they've published six studies on their findings. The first three studies (published in 1994–1995) reported strong and dose-dependent analgesic effects in mice administered water and/or alcohol extracts of chanca piedra (orally, intragastrically, and intraperitoneally) against six different laboratory-induced nociception (pain) models.[17–19] Even when mice were fed orally with a hydroalcohol extract at only 35 mg/kg these marked analgesic effects were recorded.[19] In 1996, they isolated and tested the hypotensive phytochemical geraniin from chanca piedra and reported that it was seven times more potent as an analgesic than aspirin or acetaminophen.[20] Their last two studies, published in 2000, continued to document chanca piedra's analgesic properties against normal pain models in mice (as well as newly-tested neurogenic pain models) and report their effectiveness.[21,22] Again they related this effect to the phytochemical geraniin and reported its ability to inhibit several neurotransmitter processes that relay and receive pain signals in the brain.[22] Unlike aspirin (which can harm the mucosal lining of the stomach and cause ulcers), geraniin has been reported to have antiulcerous and gastroprotective properties instead.[23] This analgesic effect is probably why so many people taking chanca piedra for kidney stones (a *very* painful affair) report such quick relief (and long before chanca piedra could actually break down and expel a stone).

The antihepatotoxic (liver-protecting) activity of chanca piedra is another subject which has been established with clinical research. These effects have been attributed to (at least) two novel lignan phytochemicals named *phyllanthin* and *hypophyllanthin*. The researchers who reported the cholesterol-lowering effects also reported that chanca piedra protected rats from liver damage induced by alcohol, and normalized a "fatty liver."[9] One *in vitro* study and four *in vivo* studies (with rats and mice) document that extracts of chanca piedra effectively protect against liver damage from various chemical liver toxins.[24–27] Two human studies reported chanca piedra's antihepatotoxic actions in children with hepatitis and jaundice. Indian researchers reported that chanca piedra was an effective single drug in the treatment of jaundice in children,[28] and British researchers reported that children treated with a chanca piedra extract for acute hepatitis had liver function return to normal within five days.[29] Researchers in China also reported antihepatotoxic actions when chanca piedra was administered (900 mg powdered herb twice daily) to adults with chronic hepatitis.[30] A recent (2000) study even documented that chanca piedra (in a water extract given orally) increased the life span of mice with liver cancer from 33 weeks (control group without treatment) to 52 weeks.[31] Another research group tried to induce liver cancer in mice that had been pre-treated with a water extract of chanca piedra. Their results indicated the chanca piedra extract dose-dependently lowered tumor incidence, levels of carcinogen-metabolizing enzymes, levels of liver cancer markers, and liver injury markers.[32] Both studies indicate that the plant has more of a protective and antiproliferative effect against cancer than a direct anti-tumorous effect or selective ability to kill a cancer cell.

It may well be that chanca piedra's documented antimutagenic effect plays an important factor in this reported anticancerous activity. In several animal studies (as well as within cell cultures), extracts of chanca piedra have stopped or inhibited cells (including liver cells) from mutating in the presence of chemical substances known to create cellular mutations and DNA strand breaks (which can lead to the creation of cancerous cells).[33–36] One of these studies indicated that chanca piedra inhibited several enzyme processes peculiar to cancer cells' replication and growth—rather than a direct cytotoxic ability to kill the cancer cell (sarcoma, carcinoma, and lymphoma cells were studied).[36] This cellular-protective quality was evidenced in other research which indicated that chanca piedra protected against chemically-induced bone marrow chromosome damage in mice,[37] as well as against radiation-induced chromosome damage in mice.[38] The latter study reported that only 25 mg of extract per kg of animal body weight protected mouse chromosomes against 4 gy of gamma radiation damage.

The last area of published research (which is the most extensive and the most confusing) concerns chanca piedra's antiviral properties. Both human and animal studies indicate that chanca piedra can protect the liver, even during hepatitis infection. Chanca piedra has also been reported to have direct antiviral activity in human, animal, and test tube studies against the Hepatitis B virus. Over 20 clinical studies have been published to date about these effects, and the results have been inconsistent and confusing (unless thoroughly evaluated).

Hepatitis is enough of a worldwide concern to merit sifting through the disparate studies. Hepatitis B infection (HBV) is the leading cause of liver cancer (hepatoma) worldwide; hepatoma is considered 100% fatal. Carriers of HBV are 200 times more likely to develop liver cancer decades after initial infection. Many people who contract HBV become chronic (and, often, asymptomatic) carriers of the disease while still being contagious to others. HBV is reported to be 100 times more infectious than HIV and, like HIV, is transmitted through blood transfusions, needles, sexual contact, and *in utero* (from mother to child). Statistics on HBV are staggering: one out of every 250 Americans are HBV carriers! The Center for Disease Control (CDC) estimates that 200,000 new U.S. cases of HBV infection per year are added to the current estimate of one million carriers in the U.S. (and an estimated 300 million worldwide). The CDC also reports that (in the U.S.) 3,000–4,000 annual deaths from cirrhosis and 1,000 deaths from hepatoma are HBV-related. So when Dr. Baruch Blumberg reported that chanca piedra could clear up the chronic carrier state of Hepatitis B in 1988, it was a *big* deal. Dr. Blumberg was the winner of the 1963 Nobel Prize for discovering the HBV antigen. This led to the discovery that HBV was the primary cause of liver cancer and initiated development of HBV vaccines.

Most of Blumberg's early research was carried out in India in collaboration with an Indian research group. Their first human study reported that a water extract of *Phyllanthus amarus* cleared the HBV surface antigen from 22 of 37 chronic HBV patients in only 30 days (and they continued to test negative for 9 months, at which time the report was published).[39] This same group had published several earlier *in vitro* studies as well as animal (woodchuck) studies. (Woodchucks respond to chronic HBV infection in much the same manner as do humans). All reported similar and effective anti-HBV effects.[40,41] By that time, Blumberg was employed with the Fox Chase Cancer Center in Philadelphia; he, Fox Chase, and the Indian researchers filed two patents on the plant's (now called *P. niruri*) ability to treat HBV and its antiviral properties in 1985 and 1988.[42,43] The first patent was specific to HBV; the second stated that the plant's antiviral properties were achieved in part through a strong inhibition of reverse transcriptase (which made it possible to treat such retroviruses as HIV and sarcoma and leukemia viruses). It was also during this time that the group developed a new and "better" extraction process. This process involved multiple, complicated extractions (in which the plant was first macerated in cold water, then filtered to extract the resulting fluid first in hexane, then in benzene, then in methanol, and back into water). Their documentation revealed, however, that they didn't know specifically what the active chemicals were in the final extract that were providing the antiviral effects. While it was certainly a patentable process, much of the subsequent published research by this group throughout the 1990s using this new, patented "water extract" conflicted with their earlier studies, and was not as effective in the *in vivo* research for HBV. This caused much confusion as to whether chanca piedra (*P. niruri* or *P. amarus*) was an effective treatment or not. To add to the confusion, in 1994, a New Zealand research group prepared a chemically-altered extract (of *P. amarus*) which was standardized to the geraniin content (the chemical documented with analgesic and hypotensive properties). They started a double-blind HBV human trial, later discontinued it due to lack of response, and published another negative result study.

Meanwhile, a separate research group in China (where HBV is endemic) working with a straight water extract and/or herb powder published two positive studies showing good results with human HBV patients in 1994 and 1995.[44,45] Their second study suggested that different results were obtained through different *Phyllanthus* species of plants used (and that yet another species–*P. urinaria* provided the best anti-HBV results). The Chinese published a more recent (2001) study which compared 30 chronic HBV patients taking a chanca piedra extract to 25 patients taking interferon (IFN-alpha 1B) for three months. Both treatments showed an equal effectiveness of 83%, but the chanca piedra group rated significantly higher in the normalization of liver enzymes (ALT, AG, and SB) and recovery of liver function than the interferon-treated group.[46] Finally, The Cochrane Hepato-Biliary Research Group in Copenhagen reviewed all the HBV published research (22 randomized trials) and published an independent review of the results. It stated that treatment with "*Phyllanthus* herb" (they acknowledged the confusion in nomenclature among the species) had "a positive effect on clearance of serum HBsAg" (HBV surface antigen) comparable to interferon and was better than nonspecific treatment or other herbal medicines for HBV and liver enzyme normalization.[47] They also indicated that large trials were warranted due to these documented effects and the lack of standardization of the research methods and herb species used in the various published studies.

Concerned with HIV specifically, a Japanese research group reported *P. niruri*'s HIV-1 reverse transcriptase inhibition properties in 1992 when a simple water extract of the plant was used.[48] They attributed this effect to a phytochemical in chanca piedra called *repandusinic acid A.* When they tested chemical individually it demonstrated significant reverse transcriptase inhibition and cytotoxicity to HIV-1 at very small dosages (a 90% *in vitro* inhibition using only 2.5 mcg). In 1996, Bristol-Myers Squibb Pharmaceutical Research Institute isolated yet another chemical in chanca piedra with HIV reverse transcriptase inhibition activity—a novel compound that they named *niruriside* and described in a 1996 study.[49] In addition to these antiviral properties, the plant has also been documented other antimicrobial effects. Chanca piedra demonstrated *in vitro* antibacterial actions against *Staphylococcus, Micrococcus,* and *Pasteurella* bacteria[50,51] as well as *in vivo* and *in vitro* antimalarial properties,[52,53] which validates other traditional uses.

Chanca piedra is a perfect example of a highly beneficial medicinal plant which is deserving of much more research—but one which is fraught with the typical problems of working with a complicated, phytochemically-rich plant. Unless a major (and well-funded) pharmaceutical or research company can isolate a single, patentable chemical (or can come up with a patentable extraction process that actually works as well as a simple water extract) to justify the high cost of research, chanca piedra probably will remain in the "unproven herbal remedy" category. There just aren't enough non-profit dollars or government grant funds available to fund research on natural plant extracts that can't be patented. Since chanca piedra's many biological activities and benefits are attributed to many different chemicals (whose synergistic interactions are unclear), and most seem to be completely water soluble, for-profit research dollars will probably be spent elsewhere.

But what a natural remedy it is! With its applications for kidney and gallstones, cellular and liver protection, hypertension and high cholesterol, cancer prevention, and its analgesic and antiviral effects, it is gaining in popularity on many continents as an herbal remedy. It's also important to note than in all the research published over the last 20 years, no signs of toxicity or side effects have been reported in any of the human or animal studies, even in acute or chronic use. Animal studies report no genotoxic, mutagenic or carcinogenic effects.

Documented Properties and Actions: Analgesic, antibacterial, antihepatotoxic, anti-inflammatory, antilithic, antimalarial, antimutagenic, antinociceptive, antispasmodic, antiviral, aperitif, carminative, choleretic, deobstruent, digestive, diuretic, febrifuge, hepatotonic, hepatoprotective, hypoglycemic, hypotensive, laxative, stomachic, tonic, vermifuge

Main Phytochemicals: Alkaloids, astragalin, brevifolin, carboxylic acids, corilagin, cymene, ellagic acid, ellagitannins, gallocatechins, geraniin, hypophyllanthin, lignans, lintetralins, lupeols, methyl salicylate, niranthin, nirtetralin, niruretin, nirurin, nirurine, niruriside, norsecurinines, phyllanthin, phyllanthine, phyllanthenol, phyllochrysine, phyltetralin, repandusinic acids, quercetin, quercetol, quercitrin, rutin, saponins, triacontanal, tricontanol

Traditional Remedy: A standard herb infusion or weak decoction is prepared as the traditional remedy. Depending on what it's employed for, 1–3 cups are taken daily. Prevention and health maintenance dosages are reported by practitioners to be 1–3 cups weekly. Some pharmacies in Brazil and South America sell concentrated fluid extracts or water/glycerine extracts. Depending on the concentration of the extracts, 2–6 ml are taken 2–3 times daily. Alcohol tinctures have not been traditionally used with chanca piedra (as the more fragile, water-soluble phytochemicals and sterols are thought to be damaged in alcohol).

Contraindications:

- Chanca piedra has demonstrated hypotensive effects in animals and humans. People with a heart condition and/or taking prescription heart medications should consult their doctor before taking this plant. It may be contraindicated for some individuals depending on the condition and/or medications may need monitoring and adjusting.
- Chanca piedra has been considered in herbal medicine to be abortive (at high dosages) as well as an emmenagogue. While not studied specifically in humans or animals, animal studies do indicate it has uterine relaxant effects. It is therefore contraindicated during pregnancy.
- Chanca piedra has been documented with female antifertility effects in one mouse study (the effect was reversed 45 days after cessation of dosing).[54] While this effect has not been documented in humans, the use of the plant is probably contraindicated in women seeking pregnancy or taking fertility drugs. This effect has not been substantiated sufficiently to be used as a contraceptive, however, and should not be relied on for such.
- Chanca piedra has demonstrated hypoglycemic effects in animals and humans. It is contraindicated for people with hypoglycemia. Diabetics should consult their doctor before taking this plant as it may be contraindicated for some individuals and/or insulin medications may need monitoring and adjusting.
- Chanca piedra has been documented in human and animal studies with diuretic effects. Chronic and acute use of this plant may be contraindicated in various other medical conditions where diuretics are not advised. Chronic long-term use of any diuretic can cause electrolyte and mineral imbalances; however, human studies with chanca piedra (for up to three months of chronic use) has not reported any side effects. Consult your doctor if you choose to use this plant chronically for longer than three months concerning possible side effects of long term diuretic use.

Drug Interactions:

- May potentiate insulin and antidiabetic drugs.
- This plant contains a naturally-occurring phytochemical called geraniin. This chemical has been documented with negative chronotropic, negative inotropic, hypotensive and angiotensin-converting enzyme inhibitor effects in animal studies with frogs, mice and rats.[10] As such, this plant may potentiate antihypertensive drugs, Beta-blocker drugs and other heart medications (including chronotropic and inotropic drugs).
- May potentiate prescription diuretic drugs.

WORLDWIDE ETHNOBOTANICAL USES

Region	Uses
Amazonia	Anodyne, apertif, blennorrhagia, carminative, colic, diabetes, digestive, diuretic, dropsy, dysentery, dyspepsia, emmenagogue, fever, flu, gallstones, gonorrhea, itch, jaundice, kidney aliments, kidney stones, laxative, malaria, proctitis, stomachache, stomachic, tenesmus, tonic, tumor, vaginitis, vermifuge
Bahamas/ Caribbean	Antihepatotoxic, antispasmodic, appetite stimulant, antiviral, aperitif, bactericidal, cold, constipation, diuretic, fever, flu, hypoglycemic, laxative, stomachache, typhoid
Brazil	Abortifacient, ache (joint), albuminuria, analgesic, antibacterial, anticancerous, antidiabetic, anti-inflammatory, antilithic, antispasmodic, antiviral, aperient, arthritis, biliary conditions, bladder problems, bladder stones, calculi, catarrh (liver and kidney), chologogue, cystitis, deobstruent, diabetes, diaphoretic, digestion stimulant, diuretic, fever, gallbladder, gallstones, gastritis, gastrointestinal problems, gout, hepatitis, hepatoprotective, hydropsy, hypertension, hypoglycemic, jaundice, kidney colic, kidney pain, kidney stones, liver, malaria, muscle relaxant, obesity, prostatitis, purgative, renal colic, renal problems, stomachic, sudorific, tonic, uric acid excess, urinary problems, uterine relaxant

Region	Uses
Haiti	Carminative, colic, digestive, diuretic, fever, indigestion, malaria, spasmolytic, stomachache, stomachic, tenesmus
India	Anemia, asthma, astringent, bronchitis, conjunctivitis, cough, deobstruent, dropsy, diabetes, diarrhea, diuretic, dysentery, fevers, eye disorders, galactagogue, genitourinary disorders, gonorrhea, hepatitis, jaundice, leucorrhea, menorrhagia, oligogalactia, ringworm, scabies, stomachic, thirst, tuberculosis, tumor (abdomen), urogenital tract infections, warts
Malaya	Caterpillar sting, dermatosis, diarrhea, diuretic, emmenagogue, itch, miscarriage, piscicide, purgative, renosis, syphilis, vertigo
Peru	Calculus, diuretic, emmenagogue, gallstones, hepatitis, kidney pain, kidney problems, kidney stones, renal problems, urinary infections, vermifuge
United States	Analgesic, bronchitis, chologogue, deobstruent, diabetes, fever, gallbladder problems, gallstones, gout, hepatitis, hypertension, kidney problems, kidney stones, liver disease, uric acid excess, urinary tract infections
Elsewhere	Analgesic, antipyretic, appetite stimulant, blennorrhagia, bruises, chologogue, cough, cuts, diabetes, diarrhea, diuretic, dropsy, dysentery, dyspepsia, emmenagogue, eye diseases, fever, gallstones, gonorrhea, itch, jaundice, kidney disease, kidney stones, laxative, malaria, menorrhagia, menstrual problems, poultice, purgative, rectitis, stomachache, tonic, tuberculosis, urinary tract infections, vaginitis, venereal diseases

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Ethnomedical Information on Chanca Piedra (Phyllanthus niruri, amarus)

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Entire Plant Amazonia	Used to eliminate kidney and gallstones.	Hot H2O Ext / Oral	Human Adult	ZZ1037
Entire Plant Amazonia	Considered anodyne, aperitif, carminative, digestive, diuretic, emmenagogue, laxative, stomachic, tonic, and vermifuges. Used to treat blennorrhagia, colic, diabetes, dropsy, dysentery, dyspepsia, fever, flu, gonorrhea, itch, jaundice, kidney aliments, malaria, proctitis, stomachache, tenesmus, tumor and vaginitis.	Not stated / Oral	Human Adult	ZZ1050
Entire Plant Argentina	Used to treat kidney disease.	Infusion / Oral	Human Adult	L04223
Entire Plant Bahamas	Used to treat poor appetite, constipation, typhoid fever, flu and colds.	Decoction / Oral	Human Adult	QP1027
Entire Plant Bimini	Used to reduce fevers and as a laxative.	Hot H2O Ext / Oral	Human Adult	T00359
Entire Plant Brazil	Used to dissolve kidney and bladder stones and for renal diseases. Used as a treatment for painful kidneys. Used as a diuretic. Used as an abortifacient by the rural populace. Used to treat malaria.	Infusion / Oral Hot H2O Ext / Oral Decoction / Oral Not stated / Not stated Infusion / Oral	Human Adult Human Adult Human Adult Human Adult Human Adult	T15975 QP1028 A14531 J01423 J14512
Entire Plant Brazil	Used to treat urinary problems, hydropsy, albuminuria, liver problems, kidney stones, liver and kidney catarrh, and to eliminate excess uric acid.	Not stated / Oral	Human Adult	ZZ1013
Entire Plant Brazil	Considered aperient, diuretic, sudorific, and antidiabetic; used to treat prostatitis, arthritis, gout, stomach problems, kidney and bladder stones, hepatitis, diabetes, and obesity.	Decoction / Oral	Human Adult	ZZ1076
Entire Plant Brazil	Considered stomachic, chologogue, diuretic and tonic; used for lack of appetite, gastrointestinal problems, hypertension, liver and kidney problems, diabetes, hydropsy, renal and urinary problems, kidney and gallbladder stones.	Hot H2O Ext / Oral	Human Adult	ZZ1007
Entire Plant Brazil	Used as an antispasmodic and muscle relaxant for the urinary tract. Also as a diuretic, and to decrease uric acid in the urine, to treat hepatitis, jaundice, kidney and bladder stones.	Hot H2O Ext / Oral	Human Adult	ZZ1078

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Entire Plant Brazil	Abortive and purgative in high dosages. Considered diuretic, uterine relaxant, aperient, digestive, analgesic, and muscle relaxant. Used to treat urinary affections, hypertension, kidney and bladder stones.	Hot H2O Ext / Oral	Human Adult	ZZ1092
Entire Plant Brazil	Used to dissolve sand and calculi in the urinary tract. Considered diuretic, aperient, stomachic, anti-inflammatory, abortive, antidiabetic, and anti-spasmodic. Used to treat kidney colic, cystitis, chronic bladder problems, hydropsy, and prostate disturbances.	Hot H2O Ext / Oral	Human Adult	ZZ1002
Entire Plant Brazil	Used to treat kidney stones, renal colic, renal insufficiency, and to remove uric acid. Also used for hepatitis, and diabetes. Documented clinically with antibacterial, antispasmodic, antiviral, anticancerous, hypoglycemic, and antihepatotoxic activities.	Various / Oral	Human Adult	ZZ1088
Entire Plant Brazil	Considered diuretic, deobstruent, digestive stimulant, sudorific, antilithic, stomachic, aperient, and antidiabetic. Used to treat renal calculi, biliary conditions, renal colic, urinary disorders, liver problems, high uric acid, gastritis, poor appetite and diabetes.	Decoction / Oral	Human Adult	ZZ1072
Entire Plant Caribbean	“Plant has proven antihepatotoxic, antispasmodic, antiviral, bactericidal, diuretic, febrifugal, and hypoglycemic activity.”	Not stated / Oral	Human Adult	ZZ1082
Entire Plant Fiji	Used for jaundice. (Whole plant is ground in buttermilk.)	Plant / Oral	Human Adult	T10632
Entire Plant Ghana	Used to treat malaria.	Infusion / Oral	Human Adult	H22295
Entire Plant Haiti	Used as a spasmolytic and for fevers.	Hot H2O Ext / Oral	Human Adult	T04647
Entire Plant India	Used for diabetes. Used as a diuretic. Used for jaundice. Used for jaundice. Used for jaundice. Used for gonorrhea and urogenital tract infections. Used for leucorrhea. Used for asthma. Considered deobstruent, diuretic, astringent and cooling. Used to treat jaundice, dropsy, gonorrhea, menorrhagia and other genitourinary affections.	Hot H2O Ext / Oral Decoction / Oral Hot H2O Ext / Oral Plant / Oral Plant / Oral Hot H2O Ext / Oral Plant / Oral Hot H2O Ext / Oral Hot H2O Ext / Oral	Human Adult Human Adult Human Adult Human Adult Human Adult Human Adult Human Adult Human Adult Human Adult	A14379 K08911 M16717 L12582 QP1024 M22721 M23826 T09366 QP1025
Entire Plant Pakistan	Used for menorrhagia.	Not stated / Not stated	Human Adult	A01908

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Entire Plant Papua-New guinea	Used to treat venereal diseases. Used for malaria and tuberculosis. Used for diarrhea.	Decoction / Oral Decoction / Oral Decoction / Oral	Human Adult Human Adult Human Adult	M23272 T09033 K18559
Entire Plant Peru	Used for eliminating kidney and gall stones. Used as an emmenagogue and vermifuge. Used for gallstones, as a diuretic, for renal calculi. Recommended for kidney troubles. Used as a diuretic and to treat urinary infections.	Hot H2O Ext / Oral Hot H2O Ext / Oral Hot H2O Ext / Oral Decoction / Oral Infusion / Oral	Human Adult Human Adult Human Adult Human Adult Human Adult	L04137 L04137 T15323 ZZ1005 ZZ1008
Entire Plant Philippines	Used as an emmenagogue. Used as an emmenagogue. Used as a bath for newborns. Used for coughs in infants.	Hot H2O Ext / Oral Hot H2O Ext / Oral Decoction / External Decoction / Oral	Human Adult Human Adult Human Child Human Child	A00115 A04508 T10116 T10116
Entire Plant Tanzania	Used in traditional medicine. Used for gonorrhea.	Not stated / Not stated Hot H2O Ext / Oral	Human Adult Human Adult	T10354 T10354
Entire Plant Thailand	Used as an anti-inflammatory agent. Used as an antipyretic.	Hot H2O Ext / Oral Hot H2O Ext / Oral	Human Adult Human Adult	W03804 W3022a
Entire Plant West Indies	Used for malaria and malarial fever.	Hot H2O Ext / Oral	Human Adult	T00701 W01316
Entire Plant East Indies	Used for menstrual troubles/complaints, and diabetes, as a purgative and a tonic.	Hot H2O Ext / Oral	Human Adult	W02290
Entire Plant US	Use to clear obstructions, to promote elimination of mucous and calculi (kidney stones), strengthen liver and gallbladder function, stimulate bile production, used for liver maladies, urinary tract infections, hypertension, diabetes, bronchitis, fever, and high uric acid.	Not stated / Oral	Human Adult	ZZ1014
Entire Plant Various	Used as a diuretic and to treat urinary tract infections and fever.	Not stated	Human Adult	QP1028
Aerial Parts East Africa	Used as a diuretic.	Hot H2O Ext / Oral	Human Adult	W01586
Aerial Parts Brazil	Used to treat kidney and bladder calculi.	Infusion / Oral	Human Adult	T09046
Aerial Parts India	Used for diarrhea. Used for jaundice.	Decoction / Oral Hot H2O Ext / Oral	Human Adult Human Adult	K17122 T08388
Aerial Parts Thailand	Used as a diuretic and antipyretic; to treat malaria.	Hot H2O Ext / Oral	Human Adult	M18836

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Leaf Brazil	Considered diuretic, diaphoretic, deobstruent, and bitter tonic. Highly valued to treat kidney and bladder stones. Also used for diabetes, jaundice and malarial fevers.	Hot H2O Ext / Oral	Human Adult	ZZ1099
Leaf Dominican Republic	Used as a popular fever remedy.	Hot H2O Ext / Oral	Human Adult	W00673
Leaf French Guiana	Used as a cholagogue.	Hot H2O Ext / Oral	Human Adult	J10155
Leaf Fiji	Used for dysentery and diarrhea.	Infusion / Oral	Human Adult	T10632
Leaf Haiti	Used for fever and indigestion.	Decoction / Oral	Human Adult	T13846
Leaf India	Used for menorrhagia. Used as a stomachic. Used for intermittent fever. Used for diabetes.	Hot H2O Ext / Oral Hot H2O Ext / Oral Hot H2O Ext / Oral Hot H2O Ext / Oral	Human Adult Human Adult Human Adult Human Adult	A06590 L02008 W01145 M22721
Leaf Malaysia	Used after a miscarriage and an emmenagogue. Used as an emmenagogue and purgative.	Hot H2O Ext / Oral Infusion / Oral	Adult Female Human Adult	A06590 J13478
Leaf Mexico	Emetic when taken as a strong tea.	Hot H2O Ext / Oral	Human Adult	W02493
Leaf Papua-New Guinea	Fresh leaves used for venereal diseases.	Juice / Oral	Human Adult	M23272
Leaf Sudan	Used as an analgesic.	Hot H2O Ext / Oral	Human Adult	T06766
Leaf Juice Fiji	Used for cuts and bruises. Used for eye diseases.	Juice / External Juice / Ophthalmic	Human Adult Human Adult	T10632 T10632
Leaf + Stem Admiralty Islands	Used for acute venereal disease. Decoction (500.ml) is taken twice daily for up to six months.	Hot H2O Ext / Oral	Human Adult	T07369
Leaf + Stem Puerto Rico	Used for fevers.	Hot H2O Ext / Oral	Human Adult	A04418
Leaf + Root West Indies	Used for diabetes, and as a diuretic.	H2O Ext / Oral	Human Adult	T00701
Leaf + Root Fiji	Used for fever and for good health.	Decoction / Oral	Human Adult	T10632
Plant Juice India	Used for conjunctivitis. Used for genitourinary disorders.	Juice / Ophthalmic Plant Juice / Oral	Human Adult Human Adult	K23294 T10133
Root Brazil	Used for urinary disorders. Used for jaundice.	Hot H2O Ext / Oral Decoction / Oral	Human Adult Human Adult	ZZ1099 T15975

Plant Part / Location	Documented Ethnic Use	Type Extract / Route	Used For	Ref #
Root Fiji	Used to treat heavy menstrual periods.	Infusion / Oral	Adult Female	T10632
Root India	Used as a galactagogue. Used for oligogalactia. Used for jaundice. Used to remove warts, corns, and other excrescences. Used for corneal opacity. Used for jaundice.	H2O Ext / Oral Powder / Oral Not stated / Oral Root / External Root / Ophthalmic Root / Oral	Adult Female Human Adult Human Adult Human Adult Human Adult Human Adult	A04766 K23294 L02008 T10133 T10133 T10133
Root Papua-New Guinea	Used for venereal diseases.	Juice / Oral	Human Adult	M23272
Root Peru	Used to treat hepatitis.	Decoction / Oral	Human Adult	ZZ1008
Root West Indies	Used to increase appetite.	Hot H2O Ext / Oral	Human Adult	T00701
Seed Brazil	Used for diabetes.	Decoction / Oral	Human Adult	T15975
Fruit India	Used for tubercular ulcers, scabies and ringworm.	Not Stated / External	Human Adult	L02008
Fruit Brazil	Used for diabetes.	Hot H2O Ext / Oral	Human Adult	T15975
Fresh Shoots India	Used for dysentery. Used for dysentery and jaundice.	Infusion / Oral Hot H2O Ext / Oral	Human Adult Human Adult	K27721 M22721
Not Stated Argentina	Used as an emmenagogue by the rural populace.	Not stated / Not stated	Human Adult	J01423
Not Stated Bangladesh	Used for hepatitis.	Infusion / Oral	Human Adult	K24884
Not Stated Virgin Islands	Used for increasing the appetite.	Hot H2O Ext / Oral	Human Adult	W00903

Biological Activities for Extracts of Chanca Piedra (Phyllanthus niruri, amarus)

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant Thailand	Toxic Effect (general)	Plant	Oral Human Child	Not stated	Inactive	No toxic effects noticed.	J15003
Entire Plant Congo	Toxic Effect (general)	CH2CL2 Ext	IG Mouse	500.0 mg/kg	Inactive		L14698
Entire Plant Congo	Toxic Effect (general)	ETOH (100%) Ext	IG Mouse	500.0 mg/kg	Inactive		L14698
Entire Plant Congo	Toxic Effect (general)	H2O EXT	IG Mouse	500.0 mg/kg	Inactive		L14698
Aerial Parts Thailand	Toxic Effect (general)	Not stated	Oral Mouse Oral Rat	Not stated	Inactive		M18836
Entire Plant Thailand	Toxic Effect (general)	ETOH-H2O Ext	GI Mouse SC Mouse	10.0 gm/kg	Inactive	Dose expressed as dry weight of plant.	R00001
Aerial Parts India	Toxic Effect (general)	Not stated	Oral Mouse	0.2 mg/day	Inactive	Dosed for 90 days. No mortality nor weight loss in experimental animals.	M16877
Entire Plant India	Toxic Effect (general)	ETOH (100%) Ext	Oral Mouse	100 mg/kg	Inactive	Dosing for 30 days showed no toxic effects.	QP1011
Entire Plant India	Toxicity Assessment	ETOH-H2O Ext	IP Mouse	1.0 gm/kg	Equiv.	Maximum tolerated dosage.	A03335
Entire Plant India	Toxic Effect (general)	H2O Ext	IP Mouse	1.8 mg/animal	Inactive		M17062
Entire Plant India	Toxicity Assessment	H2O Ext	Oral Mouse	0.1 mg/animal	Inactive	No loss of weight found 7 days after treatment with Phyllanthus niruri extract.	M16717
Entire Plant Thailand	Cardiotoxic Activity	ETOH-H2O Ext	IV Dog	Variable	Inactive		W3022a
Aerial Parts India	Hepatotoxic Activity	Not stated	Oral Mouse	0.2 mg/day	Inactive	Dosed for 90 Days.	M16877
Leaf Malaysia	Tumor Promoting Activity	Ether Ext	Cell Culture	1.0 mcg/ml	Inactive	Epstein Barr Assay (Designed to test for tumor promoting activity.)	J13478
Leaf Malaysia	Inflammation Induction	Ether Ext	External Mouse	10.0 mcl	Inactive	Ear	J13478
Not stated Hawaii	Antiimplantation Effect	Not stated	SC Mouse	0.2 ml/animal	Inactive		A05104

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

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant India	Contraceptive Effect	ETOH (100%)Ext	Oral Mouse Female	100 mg/kg	Active	Female mice evidenced a change in the hormonal milieu (HSDs hormonal conversion levels) that governs female reproductive function and manifested a definite contraceptive effect. Effects were reversible upon withdrawal of feeding for 45 days.	QP1011
Aerial Parts Thailand	Convulsant Activity	Fraction	IP Mouse IP Rat SC Mouse SC Rat	Not stated	Active		M18836
Aerial Parts Thailand	Uterine Relaxation Effect	Not stated	Not stated	Not stated	Active		M18836
Aerial Parts Thailand	Uterine Relaxation Effect	Fraction	Not stated	Not stated	Active		M18836
Not stated China	Cell Proliferation Inhibition	H2O Ext	Cell Culture	50.0 mcg/ml	Inactive	Mononuclear leukocytes	L12764
Entire Plant Brail	Mitogenic Activity	Infusion	Cell Culture	Not Stated	Inactive	Splenocytes (mouse)	L07194
Entire Plant India	Anticancer Activity	ETOH-H2O Ext	Oral Mouse	IC50: 540 mcg/ml	Active	In tumor bearing mice, extract inhibited aniline hydroxylase (P-450 enzyme)	QP1006
Entire Plant India	Anticancer Activity	ETOH-H2O Ext	Cell Culture	IC50: 25 mcg/ml	Active	Inhibited DNA topoisomerase II of *Saccharomyces cerevisiae* mutant cell cultures and inhibited cell cycle regulatory enzyme CDC25 tyrosine phosphatase.	QP1006
Entire Plant India	Anticancer Activity	H2O Ext	Oral Mouse	150 mg/kg	Active	Increased survival rate from 33 weeks (control group) to 52 weeks in rats with hepatocellular carcinoma.	QP1012
Entire Plant India	Anticancer Activity	H2O Ext	Oral Mouse	Not stated	Active	vs. N-nitrosodiethylamine induced hepatocarcinogeniesis. Dose-dependently lowered tumor incidence, levels of carcinogen metabolizing enzymes, levels of liver cancer markers and liver injury markers.	QP1015

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant India	Antitumor Activity	ETOH-H2O Ext	IP Mouse	Not stated	Active	Leukemia (Friend - Virus-solid)	A03335
Entire Plant India	Antitumor Activity	ETOH-H2O Ext	Oral Mouse	Not stated	Active	vs. 20-methylcholanthrene induced sarcoma development	QP1006
Entire Plant India	Antitumor Activity	ETOH-H2O Ext	Oral Mouse	Not stated	Active	Prolonged lifespan of mice with Dalton's Lymphoma Ascites and Ehrlich Ascites carcinoma and reduced the volume of transplanted solid tumors.	QP1006
Aerial Parts Indonesia	Antitumor Activity	ETOH (95%) Ext H2O Ext	IP Mouse IP Mouse	100.0 mg/kg	Inactive	vs. Sarcoma 180(asc)	M23643
Leaf Brazil	Antitumor Activity	ETOH (50%) Ext	IP Rat	142.0 mg/kg	Inactive	Cancer - Walker-256	L13474
Entire Plant India	Cytotoxic Activity	ETOH (50%) Ext	Cell Culture	ED50 >20 mcg/ml	Inactive	Cancer - 9kb	A03335
Entire Plant Mexico	Cytotoxic Activity	ETOH (70%) Ext	Cell Culture	100.0 mcg/ml	Inactive	Cancer - HeLa	L09666
Entire Plant Japan	Cytotoxic Activity	MEOH EXT	Cell Culture	50.0 mcg/ml	Equiv.	Cancer - 9kb (18% Inhibition)	K27314
Leaf India	Antimutagenic Activity	H2O Ext	IG Mouse	10.0 ml/kg	Active	vs. nickle-induced clastogenicity.	K07087
Entire Plant India	Antimutagenic Activity	H2O Ext	Cell Culture	0.25 mg/plate	Active	vs. *Salmonella typhimuriums* (3 strains)	QP1005
Entire Plant India	Antimutagenic Activity	H2O Ext	Cell Culture	0.25 mg/plate	Active	vs. 2-acetominofluorene and aflatoxin B(1)- induced mutagenicity.	QP1005
Entire Plant India	Antimutagenic Activity	H2O Ext	Cell Culture	1 mg/plate	Active	vs. NaN3- MNNG- and NPD-induced mutagenicity.	QP1005
Entire Plant India	Antimutagenic Activity	H2O Ext	Oral Rat	Not stated	Active	vs. benzoapyrene-induced mutagenicity.	QP1005
Entire Plant Thailand	Antimutagenic Activity	H2O Ext	Cell Culture	Not stated	Active	Evidenced a dose-dependent antimutagenic effect against various chemical mutagens in hamster liver cells, *Salmonella* strains and *E. coli* strains.	QP1007

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant Thailand	Antimutagenic Activity	H2O Ext	Oral Hamster	Not stated	Active	Inhibited DNA single -strand breaks caused by dimethyl-nitrosamine in liver cells.	QP1007
Fruit + Leaf India	Chromosome Aberration Inhibition	H2O Ext	GI Mouse	685.0 mg/kg	Active	vs. chromosome damage induced by lead nitrate and aluminum sulphate in bone marrow chromosomes. Dosing for 7 days.	M25745
Entire Plant India	Antigenotoxic	H20 Ext	Plant Culture	0.25 to 1 %	Active	vs. chemical induced chromosomal irregularities. Dose dependent antigenotoxic effect observed.	QP1018
Entire Plant India	Antihepatotoxic Activity	Not stated	Oral Human Child	Various	Active	Plant is reported as an effective single drug in the treatment of infective hepatitis in children. Appetite returned to normal within five weeks of the treatment. No side effects were seen.	M16690
Entire Plant China	Antihepatotoxic Activity	Plant Powder	Oral Human Adult	0.9 gm/day	Active	vs. 42 cases of chronic hepatitis	E00447
Entire Plant Thailand	Antihepatotoxic Activity	Plant	Oral Human Child	Not stated	Active	Children treated with *P. niruri* extract for acute hepatitis had liver function return to normal within 5 days.	J15003
Aerial Parts India	Antihepatotoxic Activity	Hexane Ext	Cell Culture	1.0 mg/ml	Active	Cells-rat-liver. vs. CCL4-induced hepatotoxicity. (Results significant at $p < 0.01$ level.)	T11593
Aerial Parts India	Antihepatotoxic Activity	Hexane Ext	Cell Culture	1.0 mg/ml	Active	Cells-rat-liver. vs. carbon tetrachloride- and galactosamine-induced toxicity	T11593
Entire Plant India	Antihepatotoxic Activity	H2O Ext	IG Rat	100.0 mg/animal	Active	vs. carbon tetrachloride induced mitochondrial dysfunction.	L06121
Entire Plant India	Antihepatotoxic Activity	Plant Powder	IG Rat	200.0 mg/kg	Active	Liver homogenates vs. ethanol treated rats. Dosed for 45 days. Triglyceride, cholesterol and phospholipid contents in fatty liver were reduced to normal levels.	M17464
Part - Origin	**Activity Tested For**	**Type Extract**	**Test Model**	**Dosage**	**Result**	**Notes/Organism tested**	**Ref #**

Entire Plant India	Antihepatotoxic Activity	Not stated	Rat	Not stated	Active	vs. CCL4-induced hepatotoxicity. Pretreatment was required for effect.	M15897
Entire Plant India	Glutamate-Oxaloacetate-Transaminase Inhibition	Saline Ext	IG Rat	400.0 mg/kg	Active	vs. CCL4-induced hepatotoxicity.	K29665
Entire Plant Brail	Colony-Stimulating Factor Production Stimulation	Infusion	IP Mouse	0.5 Ml/animal	Active	vs. lPS-induced proliferation	L07194
Aerial Parts India	Radioprotective Effect	ETOH (35%) Ext	IP Mouse	25.0 mg/kg	Active	Protected mouse chromosomes against 4 gy of gamma radiation damage.	L09295
Entire Plant Brazil	Anti-lithogenic Activity	H2O Ext	Oral Rat	1.25 mg/ml/day	Strong Activity	vs. CaOx seeded bladder. Strongly inhibited the growth of calculus and reduced the number of stone satellites.	QP1001
Entire Plant Brazil	Anti-lithogenic Activity	H2O Ext	Cell Culture	1 mg/ml	Strong Activity	Cells-renal tubular epithelium vs. calcium oxalate induced endocytosis. Strongly inhibited CaOx crystal formation.	L04139
Leaf India	Antihyperglycemic Activity	H2O Ext	GI Rabbit	Not stated	Active	vs. alloxan-induced Hyperglycemia	M09944
Entire Plant India	Antihyperglycemic Activity	H2O Ext	IG Rat	Not stated	Active	vs. alloxan-induced hyperglycemia.	M22721
Entire Plant India	Hypoglycemic Activity	Plant Powder	Oral Human Adult	Various	Active	Blood glucose levels were significantly reduced in the nine human subjects studied.	QP1003
Leaf India	Hypoglycemic Activity	H2O Ext	GI Rabbit	Not stated	Active		M09944
Aerial Parts Tanzania	Hypoglycemic Activity	H2O Ext	Oral Human Adult	12.5 gm /100 ml	Inactive	21 non-insulin dependent diabetic patients	QP1009
Entire Plant India	Hypoglycemic Activity	H2O Ext	Oral Rabbit	10.0 mg/kg	Equiv.	Drop in blood sugar of 15 mg relative to inert-treated control indicated positive results.	A14379

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant Paraguay	Aldose Reductase Inhibition	ETOH (70%) Ext	Not stated	LC50: 1.0 mcg/ml	Active		M21373
Entire Plant India	Antihypercholesterolemic Activity	Plant	Oral Rat	Not stated	Active	Fatty liver was induced with alcohol. The plant material reduced the increased deposition of triglycerides, cholesterol and phospholipids in the liver, heart and kidney that resulted from alcohol treatment.	T14998
Entire Plant India	Antihyperlipemic Activity	H20 Ext	Oral Rat	250 mg/kg	Active	Serum lipids were lowered in single dose. Inhibited hepatic cholesterol biosynthesis and increased bile acid excretion.	QP1002
Entire Plant India	Antihyperlipemic Activity	H20 Ext	Oral Rat	100 mg/kg	Active	Animals fed extract with cholesterol (25 mg/kg) for 30 days had lower apoprotein levels of VLDL and LDL than controls.	QP1002
Entire Plant India	Antihyperlipemic Activity	Plant Powder	Oral Rat	Not stated	Active	Triglycerides, cholesterol and phospholipids in the liver, heart and kidney that resulted from alcohol treatment.	T14998
Callus Tissue Brazil	Spasmolytic Activity	MEOH Ext	Guinea Pig	320.0 mcg/ml	Inactive	Ileum. vs. ACH-induced contractions.	K17672
Entire Plant Brazil	Antispasmodic Activity	Alkaloid fraction	In vitro	Not stated	Active	Demonstrated a dose dependent antispamodic effect on guinea pig ileum and rat uterus strips comparable to papaverine.	T09046
Entire Plant India	Antispasmodic Activity	ETOH-H2O Ext	Guinea Pig	Not stated	Active	Ileum. vs. ACH: and histamine-induced spasms	A03335
Entire Plant Thailand	Antispasmodic Activity	ETOH-H2O Ext	Guinea Pig	Variable	Inactive	Ileum	W3022a
Entire Plant Paraguay	Angiotensin-Converting Enzyme Inhibition	Fraction: geraniin	Not stated	100.0 mcg/ml	Active		M18866
Aerial Parts Thailand	Chronotropic Effect Negative	Fraction: geraniin	Frog IP Mouse SC Rat	Not stated Not stated Not stated	Active		M18836
Entire Plant Thailand	Chronotropic Effect Positive	ETOH-H2O Ext	IV Dog	Variable	Inactive		W3022a

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Aerial Parts Thailand	Inotropic Effect Negative	Fraction: geraniin	Frog IP Mouse SC Rat	Not stated	Active		M18836
Entire Plant India	Hypotensive Activity	Powdered Plant	Oral Human Adult	Various	Active	A significant reduction in systolic blood pressure in non-diabetic hypertensive and female subjects was noted.	QP1003
Aerial Parts Thailand	Hypotensive Activity	Fraction: geraniin	IV Dog	Not stated	Active		M18836
Entire Plant Thailand	Hypotensive Activity	ETOH (50%) Ext	IV Dog	Variable	Inactive		W3022a
Aerial Parts Thailand	Diuretic Activity	Not stated	Oral Human Adult	Not stated	Active		M18836
Aerial Parts India	Diuretic Activity	Alcohol Ext	Rat	0.27 ml/kg	Weak Activity	Activity was increased when the dosage was halved and combined with *Boerhaavia diffusa*	J12663
Not stated Brazil	Diuretic Activity	Fluid Ext	Oral Human Adult	Not stated	Active		A14531
Entire Plant India	Diuretic Activity	Powdered Plant	Human Adult	Various	Active	Significant increase in 24 hr urine volume, urine and serum Na levels was observed in 9 mild hypertensive human subjects.	QP1003
Aerial Parts India	Antidiarrheal Activity	ETOH (50%) Ext	Guinea Pig	300.0 mg/ animal	Inactive	vs. *E. coli*- and rotoxin-induced diarrhea.	K17122
Leaf Nigeria	Anti-diarrheal Activity	H20 Ext	Oral Mice	100 mg/kg	Active	vs. castor oil induced diarrhea.	QP1010
Aerial Parts Thailand	Smooth Muscle Relaxant Activity	Fraction: geraniin	Not stated	Not stated	Active	Blood vessel , intestine, stomach	M18836
Entire Plant India	Antiinflammatory Activity	Plant	Oral Human Adult	Variable	Active		T06320
Callus Tissue Brazil	Analgesic Activity	MEOH Ext	IP Mouse	10.0 mg/kg	Active	vs. acetic acid-induced writhing.	K17672
Callus Tissue Brazil	Analgesic Activity	MEOH Ext	IP Mouse	10.0 mg/kg	Active	vs. formalin-induced pedal edema	K17672
Callus Tissue Brazil	Analgesic Activity	MEOH Ext	IP Mouse	50.0 mg/kg	Inactive	vs. tail flick response to radiant heat.	K17672

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant Brazil	Analgesic Activity	ETOH (50%) Ext	IG Mouse	50 mg/kg	Active	Antinociceptive effects demonstrated using 5 different models of nociception.	K19491
Entire Plant Brazil	Analgesic Activity	ETOH (50%) Ext	IP Mouse	0.3 mg/kg	Active	Antinociceptive effects demonstrated using 5 different models of nociception.	K19491
Entire Plant Brazil	Analgesic Activity	Hydroalcohol Ext	IP Mouse	ED50: 4.3 mg/kg	Active	vs. the second phase. vs. formalin-induced pain.	L11330
Entire Plant Brazil	Analgesic Activity	Hydroalcohol Ext	IG Mouse	200.0 mg/kg	Active	vs. the second phase. Vs. formalin-induced pain.	L11330
Entire Plant Brazil	Analgesic Activity	Hydroalcohol Ext	IG Mouse	ED50: 31.0 mg/kg	Active	vs. capsaicin-induced licking.	L11330
Entire Plant Brazil	Analgesic Activity	Hydroalcohol Ext	IP Mouse	ED50: 6.7 mg/kg	Active	vs. capsaicin-induced neurogenic pain.	L11330
Entire Plant Brazil	Analgesic Activity	Hydroalcohol Ext	IP Mouse	ED50: 7.4 mg/kg	Active	vs. acetic acid-induced writhing.	L11330
Entire Plant Brazil	Analgesic Activity	Hydroalcohol Ext	IP Mouse	ED50: 2.1 to 6.1 mg/kg	Strong Activity	caused marked and dose-dependent inhibition to capsaicin-induced pain	K28213
Entire Plant Brazil	Analgesic Activity	Hydroalcohol Ext	Oral Mouse	ED50: 35mg/kg	Strong Activity	caused marked and dose-dependent inhibition to capsaicin-induced pain	K28213
Entire Plant Thailand	Antihistamine Activity	ETOH-H2O Ext	Guinea Pig	Not stated	Inactive	Ileum	W3022a
Aerial Parts Thailand	Antipyretic Activity	Not stated	Not stated	Not stated	Active	vs. typhoid vaccine-induced fever.	M18836
Entire Plant Thailand	Antipyretic Activity	ETOH-H2O Ext	GI Rabbit	Variable	Inactive	vs. yeast-induced pyrexia.	W3022a
Entire Plant Japan	Antiaging Activity	Not stated	External Human Adult	1.0%	Active		J10972
Entire Plant India	Reverse Transcriptase Inhibition	H2O Ext		ID50: 50 mcg/ml	Active	Virus- HIV-1	K08911
Entire Plant Taiwan	Reverse Transcriptase Inhibition	H2O Ext		ID50: 50 mcg/ml	Active	Virus- HIV-1	K08911
Entire Plant India	DNA Polymerase Inhibition	H2O Ext		Variable	Active		M17062
Entire Plant India	DNA Polymerase Inhibition	MEOH Ext		Variable	Active		M17062

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant Pakistan	DNA Polymerase Inhibition	H2O Ext		IC50: 410 mcg/ml	Inactive		M30257
Flowers Puerto Rico	DNA Polymerase Inhibition	H2O Ext		IC50: 381 mcg/ml	Inactive		M30257
Entire Plant Usa	DNA Polymerase Inhibition	H2O Ext		IC50: 230 mcg/ml	Inactive		M30257
Entire Plant India	DNA Polymerase Inhibition	H2O Ext		50.0 mg/ml	Active	vs. activity of woodchuck hepatitis virus DNA polymerase 50 mg/ml gave about 25% inhibition.	M16717
Entire Plant India	Hepatitis B Surface Antigen Inactivation	H2O Ext		0.2 mg/ml 0.63 mg/ml	Active	Virus - hepatitis B vs. reaction of woodchuck hepatitis surface antigen with hepatitis B (human) antibody.	M16717
Leaf Gabon	Hepatitis Antigen Expression Inhibition	H2O Ext MEOH Ext		IC50: 650 Ng/ml IC50: 1.2 mcg/ml	Active	Hepatitis B surface antigen inactivation was assayed.	K10104
Root India	Hepatitis B Surface Antigen Inactivation	CHCL3 Ext		2.0%	Active		T06317
Root India	Hepatitis B Surface Antigen Inactivation	H2O Ext		2.0%	Active		M17007
Leaf + Stem India	Hepatitis B Surface Antigen Inactivation	H2O Ext		2.0%	Active		M17007
Leaf + Stem India	Hepatitis B Surface Antigen Inactivation	CHCL3 Ext		2.0%	Active		T06317
Leaf Senegal	Hepatitis Antigen Expression Inhibition	H2O Ext		IC50: 3.3 mcg/ml	Active	Hepatitis B Surface Antigen Inactivation Was Assayed.	K10104
Entire Plant India	Hepatitis B Surface Antigen Inactivation	H2O Est MEOH Ext		Variable	Active	Biological activity reported has been patented.	M17062
Entire Plant China	Antiviral Activity	Powder	Oral Human Adult	Not stated	Active	35 patients with chronic Hepatitis B seroconverted on HbeAG from positive to negative. No effect on HbsAg.	E00447

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Aerial Parts India	Antiviral Activity	ETOH (95%) Ext	Oral Human Adult	Not stated	Active	Virus - Hepatitis B. Antiviral activity was measured in serum of patients who were positive for the hepatitis B virus.	M24831
Entire Plant China	Antiviral Activity	Plant Powder	Oral Human Adult	900 mg TID	Active	Thirty patients treated with extract performed better than interferon treated control group of 25 patients. The total effective rate of the extract treated group was 83.3% Normalization of ALT, A/G and SB was significantly higher than the interferon-treated group. Seroconversion rate of HbeAg and HBV- DNA was 47.8%	QP1008
Entire Plant India	Antiviral Activity	H2O Ext	IG Woodchuck	Not stated	Active	Virus - Hepatitis B	M17062
Entire Plant India	Antiviral Activity	H2O Ext	IP Woodchuck	9.0 mg/animal	Active	vs. Hepatitis B. in recently infected woodchucks. 3 out of 4 experimental animals showed elimination of woodchuck hepatis surface antigen and woodchuck hepatitis DNA polymerase after 72 days. They remained negative for both for 300 days. Control animal did not show any change.	M16717
Entire Plant India	Antiviral Activity	H2O Ext	IP Woodchuck	9.0 mg/animal	Active	vs. hepatitis in long-term chronic carriers of woodchuck hepatitis. Titre of woodchuck hepatitis surface. Antigen was lowered relative to untreated controls. 0.5 ml extract was given once a week.	M16717
Entire Plant China	Antiviral Activity	Plant Powder	Oral Human Adult	2.7 gm/day	Active	42 chronic Hepatitis B patients were enrolled in study of efficacy of given extract at altering immune status.	K25123

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Entire Plant India	Antiviral Activity	H2O Ext	Oral Human Adult	Not stated	Active	22 of 37 carriers of Hepatitis B lost HBV surface antigen after 30 days treatment with extract. They continue negative for 9 months.	QP1021
Entire Plant USA	Antiviral Activity	H20 Ext	Oral Human Adult	Not stated	Active	60% of human carriers of Hepatitis B treated for one month with the extract seroconverted.	QP1020
Entire Plant USA	Antiviral Activity	H20 Ext	IP Woodchuck	Not stated	Active	3 of 4 animals recently infected with Hep B seroconverted. Animals infected for 3 months or longer decreased viral levels.	QP1020
Entire Plant India	Antiviral Activity	Not stated	Mice	Not stated	Active	Virus - Hepatitis B Decreased hepatic HBsAg mRNA levels.	QP1016
Entire Plant Taiwan	Antiviral Activity	H2O Ext	Cell Culture	Various	Active	Virus - Hepatitis B Dose dependently inhibited cellular proliferation and suppressed HBsAg gene expression in cultured hepatoma cell line HepA2.	QP1019
Entire Plant India	Antiviral Activity	Not stated	Cell Culture	Not stated	Active	Virus - Hepatitis B	QP1016
Entire Plant India	Antiviral Activity	H2O Ext	Cell Culture	1 mg/ml	Active	Dose dependently inhibited secretion of HBsAg in a human hepatocellular carcinoma cell line for 48 hours.	QP1017
Entire Plant USA	Antiviral Activity	H2O Ext	Cell Culture	Not stated	Active	Virus - Hepatitis B	QP1014
Entire Plant USA	Antiviral Activity	H2O Ext	Cell Culture	IC50: 381 mcg/ml	Inactive	Virus - Hepatitis vs. the Hepadnavirus DNA Polymerase.	K21201
Entire Plant USA	Antiviral Activity	H2O Ext	Cell Culture	IC50: 410 mcg/ml	Inactive	Virus - Hepatitis vs. the Hepadnavirus DNA Polymerase.	K21201
Entire Plant India	Antiviral Activity	ETOH (95%) Ext	Cell Culture	Not stated	Equiv.	Virus - Tobacco Mosaic (Viral inhibitory activity was 7%)	K09718

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Leaf India	Antiviral Activity	Buffered Ext		4.0%	Active	Virus - Peanut Green Mosaic Virus - Tobacco Mosaic Virus - Tobacco Ring Spot	T10824
Root India	Antiviral Activity	Buffered Ext		4.0%	Active	Virus - Green Mosaic Virus - Tobacco Mosaic Virus - Tobacco Ring Spot	T10824
Entire Plant Mexico	Antibacterial Activity	ETOH (70%) Ext	Agar Plate	MIC: 200.0 mcg	Active	*Staphylococcus aureus*	L09666
Leaf Indonesia	Antibacterial Activity	Saline Ext	Agar Plate	1-10%	Active	*Pasteurella pestis* *Staphylococcus aureus*	W01047
Flower + Fruit + Leaf Mexico	Antibacterial Activity	ETOH (70%) Ext	Agar Plate	CD: 900.0 mcg	Active	*Micrococcus luteus*	L09666
Leaf Sudan	Antibacterial Activity	MEOH Ext	Agar Plate	1.0 mg/ml	Active	*Staphylococcus aureus*	T06766
Entire Plant Mauritius	Antibacterial Activity	MEOH Ext	Agar Plate	2.0 mg/ml 4.0 mg/ml 8.0 mg/ml	Weak Activity	*Pseudomonas aeruginosa* *Salmonella typhi* *Staphylococcus aureus*	L13564
Entire Plant Tanzania	Antibacterial Activity	H2O Ext	Agar Plate	1.0%	Inactive	*Neisseria gonorrhea*	T10354
Leaf Indonesia	Antibacterial Activity	Saline Ext	Agar Plate	1-10	Inactive	*Escherichia coli*	W01047
Entire Plant Mexico	Antibacterial Activity	ETOH (70%) Ext	Agar Plate	MIC >50.0 mcg	Inactive	*Escherichia coli*	L09666
Entire Plant Mauritius	Antibacterial Activity	MEOH Ext	Agar Plate	Not stated	Inactive	*Escherichia coli*	L13564
Leaf Sudan	Antibacterial Activity	CHCL3 Ext	Agar Plate	1.0 gm/ml	Inactive	*Bacillus subtilis* *Escherichia coli* *Pseudomonas aeruginosa* *Staphylococcus aureus*	T06766
Leaf Sudan	Antibacterial Activity	MEOH Ext	Agar Plate	1.0 gm/ml	Inactive	*Bacillus subtilis* *Escherichia coli* *Pseudomonas aeruginosa*	T06766
Entire Plant Puerto Rico	Molluscicidal Activity	H2O Ext		LD100: > 1m ppm	Inactive	*Lymnaea columella* *Lymnaea cubensis*	T04621
Root Brazil	Molluscicidal Activity	Hot H2O Ext		10,000 ppm	Inactive	*Biomphalaria straminea*	W00500
Stem Sudan	Molluscicidal Activity	ETOH (95%) Ext		250 ppm	Inactive	*Biomphalaria pfeifferi*	T07986
Stem Sudan	Molluscicidal Activity	ETOH (95%) Ext		250 ppm / lb	Inactive	*Bulinus Truncatus*	T07986
Stem Sudan	Molluscicidal Activity	Pet Ether Ext		25 ppm	Active	*Biomphalaria pfeifferi*	T07986

Part - Origin	Activity Tested For	Type Extract	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Stem Sudan	Molluscicidal Activity	Pet Ether Ext		25 ppm	Active	*Bulinus truncatus*	T07986
Bark Sri Lanka	Nematocidal Activity	Decoction		1.0 mg/ml	Active	*Toxocara canis*	M26175
Entire Plant Congo	Antimalarial Activity	CH2CL2 Ext	IG Mouse	200 mg/kg	Active	*Plasmodium berghei*	L14698
Entire Plant Congo	Antimalarial Activity	CH2CL2 Ext		6 mcg/ml	Active	*Plasmodium falciparum*	L08513
Entire Plant Congo	Antimalarial Activity	ETOH (100%) Ext		6 mcg/ml	Active	*Plasmodium falciparum*	L08513
Entire Plant Congo	Antimalarial Activity	ETOH (100%) Ext	IG Mouse	200 mg/kg	Active	*Plasmodium berghei* Reduced parasitaemia by 74%.	L14698
Entire Plant Congo	Antimalarial Activity	H2O Ext	IG Mouse	200 mg/kg	Inactive	*Plasmodium berghei*	L14698
Entire Plant Mauritius	Antifungal Activity	MEOH Ext	Agar Plate	Not stated	Inactive	*Aspergillus niger*	L13564
Entire Plant Mauritius	Antiyeast Activity	MEOH Ext	Agar Plate	Not stated	Inactive	*Candida albicans*	L13564

Biological Activities for Compounds in Chanca Piedra (Phyllanthus niruri, amarus)

Compound	Activity Tested For	Test Model	Dosage	Result	Notes/Organism tested	Ref #
Corilagin	Antiviral Activity	Cell Culture	IC50: 20.7 mcl	Active	Virus - HIV-1 (protease)	QP1037
Corilagin	TNF-Alpha Release Inhibition	In vitro	IC50: 76 mcl	Active		QP1029
Corilagin	Antihypertensive Activity	IP Rat	5 mg/kg	Active	Lowered blood pressure through the reduction of noradrenaline release and (or) direct vasorelaxation.	Qp1038
Niruriside	Antiviral Activity	Cell Culture	IC50: 3.3 mcg/ml	Active	Virus - HIV Inhibitory activity against the binding of REV protein to RRE RNA.	H18818
Repandusinic acid A	Antiviral Activity	Cell Culture	2.5 mcg	Active	Virus- HIV-1 Inhibited up to 90% of HIV-1 specific p24 antigen production.	K08911
Repandusinic acid A	Antiviral Activity	Cell Culture	4.5 mcg	Active	Virus- HIV-1 Inhibited HIV-1 induce giant cell formation of SUP-T1 by 50%	K08911
Repandusinic acid A	Antiviral Activity	Cell Culture	ID50: 0.05 mcg ID50: 0.06 mcg	Active Active	vs. HIV-1-RT vs. HIV-1 DNA polymerase alpha	K08911
Repandusinic acid	Antiviral Activity	Cell Culture	ID50: 12.5 mcl	Active	Virus - HIV-1 (protease)	QP1037
Ellagic acid	Aldose Reductase Inhibitory Activity	In vitro	Not stated	Active	Was 6 times more potent at AR inhibition than quercitrin.	M21373
Phyllanthin	Antihepatotoxic Activity	Cell Culture	1.0 mg/ml	Active	Cells-rat-liver. vs. carbon tetrachloride- and galactosamine-induced toxicity	T11593
Hypophyllanthin	Antihepatotoxic Activity	Cell Culture	1.0 mg/ml	Active	Cells-rat-liver. vs. carbon tetrachloride- and galactosamine-induced toxicity	T11593
Phyllanthin Hypophyllanthin	Ancticancerous Activity	Cell Culture	not stated	Active	No direct cytotoxic effect noted on cancer cells, however, both chemicals shown to enhance the cytotoxic response of vinblastine to multidrug-resistant KB cells. Suggested interation with P-glycoprotein.	QP1023
Compound	**Activity Tested For**	**Test Model**	**Dosage**	**Result**	**Notes/Organism tested**	**Ref #**

Triacontanal	Antihepatotoxic Activity	Cell Culture	1.0 mg/ml	Active	Cells-rat-liver. vs. galactosamine-induced toxicity	T11593
Geraniin	Immunostimulant Activity	Cell Culture	Not stated	Active	Induced phagocytosis	QP1036
Geraniin Furosin	Analgesic Activity	IP Mouse	3 mg/kg to 30 mg/kg	Active	7-fold more potent than aspirin and acetamtominophin	QP1013
Geraniin	TNF-Alpha Release Inhibition Activity	Mouse	IC50: 0.43 mcg	Active		QP1029
Geraniin	Cancer Preventative Activity	Mice	0.43 mg	Active	Pretreatment with geraniin prior to chemical induced skin tumors, reduced the percentage of tumor bearing mice from 80% to 40%	QP1029
Geraniin	Antitumor Activity	Cell Culture	ED50: 0.1 to 0.8 mcg/ml	Active	Moderate selective cytotoxicity to PRMI-7951 melanoma human tumor cell line.	QP1035
Geraniin	Antinociceptive Activity	Rat	Not stated	Active	Inhibited neurochemical [3H]GMP-PNP binding.	QP1031
Geraniin	Gastroprotective Activity Antiulcerogenic Activity	Rat	10-100 mg/kg	Active	vs. HCl-NaCl induced gastric acid back-diffusion, mucus production and mucosal ulcerations.	QP1033
Geraniin	Antihypertensive Activity	IV Rat	Not stated	Active	Reduced the plasma noradrenaline in a dose-dependent fashion.	QP1039
Geraniin	NFkappaB Regulatory Activity	Cell Culture	Not stated	Active	Inhibited NFkappaB and inhibited increases in nitric oxide synthase levels in activated machophages.	QP1032

Presence of Compounds in Chanca Piedra (Phyllanthus niruri)

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Ascorbic Acid	Vitamin	Leaf	India	00.40853%	M09820
Astragalin	Flavonone	Leaf Entire Plant Leaf	Not stated India French Guiana		L02704 08172 M22356
Brevifolin, ethyl: Carboxylate	Coumarin	Entire Plant	Paraguay	00.00067%	M21373
Butyrolactone, dibenzyl:	Lignan	Leaf	India	00.0015%	H07424
Butyrolactone, trans-2-(3-4-dimethox y-benzyl)-3-(3-4-methylenedioxy-benzyl):	Lignan	Leaf	India		H03800
Catechin,(+):	Flavonoid	Root	Japan		K07878
Catechin, epi: (-):	Flavonoid	Root	Japan		K07878
Catechin-3-o-gallate,epi: (-):	Flavonoid	Root	Japan		K07878
Cholesterol, 24-iso-propyl:	Steroid	Aerial Parts	India	00.00180%	M13237
Corilagin	Tannin	Entire Plant	Paraguay	00.0007%	M21373
Cymene	Monoterpene	Essential Oil	Brazil	11.0%	W00664
Deca-trans-2-cis-4-dienamide	Alkaloid-misc	Entire Plant	Ghana	00.00103%	H22295
Dotriacontanoic Acid	Lipid	Aerial Parts	India	00.00650%	M13237
Ellagic Acid	Coumarin	Entire Plant Entire Plant Entire Plant	Paraguay Paraguay Taiwan	00.01081% 00.09729%	M18866 M21373 K08911
Eriodictyol-7-o-alpha-l-rhamnoside	Flavanone	Root	India		L02008
Estradiol	Steroid	Entire Plant Entire Plant	Bangladesh Bangladesh	00.0003%	N00731 T06353
Fisetin-41-o-beta-d-glucoside	Flavonol	Entire Plant	India	00.04000%	T08172
Compound	**Chemical Type**	**Plant Part**	**Plant Origin**	**Quantity**	**Ref #**

Fraternusterol	Steroid	Root	India		H26478
Gallic Acid	Benzenoid	Root Entire Plant Entire Plant Entire Plant	Japan Taiwan Paraguay Paraguay	 00.00027% 00.0027%	K07878 K08911 M21373 M18866
Gallocatechin, (+):	Flavonoid	Root	Japan		K07878
Gallocatechin, epi: (-):	Flavonoid	Root	Japan		K07878
Gallocatechin-3-o-gallate, epi: (-):	Flavonoid	Root	Japan		K07878
Geraniin	Tannin	Entire Plant	Paraguay	00.23243%	M18866
Heptacosanoic Acid Derivative 4	Lipid	Root	India	00.0142%	H27051
Hinokinin	Lignan	Entire Plant	Taiwan		H09754
Hypophyllanthin	Lignan	Entire Plant Entire Plant Entire Plant Aerial Parts Entire Plant Leaf Leaf Leaf	India India Not stated East Africa Taiwan India India India	 00.05% 00.14% 00.167%	A07266 T02532 T02987 W01586 H09754 W01145 H07424 A01168
Kaempferol	Flavonol	Stem	India		K08700
Kaempferol-4'-o-alpha-l-rhamnoside	Flavonol	Root	India		L02008
KCL	Inorganic	Aerial Parts	Thailand	00.9%	M18836
Lariciresinol Trimethyl Ether, iso:seco:	Lignan	Leaf	India	00.00150%	H03800
Lariciresinol, iso: Seco: Trimethyl Ether	Lignan	Leaf	India	00.015%	H07424
Limonene,(-):	Monoterpene	Essential Oil	Brazil	04.5%	W00664
Linnanthin	Lignan	Leaf	India	00.0002%	H07424
Linoleic Acid	Lipid	Seed Oil	India	21.0%	T03665
Linolenic Acid	Lipid	Seed Oil	India	51.4%	T03665

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Lintetralin	Lignan	Leaf Entire Plant Entire Plant Leaf Not Stated Aerial Parts	India Taiwan Not sated India Not stated India	00.0015% 00.0005% 00.0005%	H07424 H09754 T02987 H03800 T00993 M13237
Lintetralin, 4-hydroxy: Seco:	Lignan	Leaf	India	00.02%	H07424
Lintetralin, iso:	Lignan	Entire Plant	Taiwan	00.000335	H09754
Lintetralin, iso: 2-3-demethoxy: Seco:	Lignan	Leaf	India	00.0002%	H07424
Lintetralin, iso: 2-3-demethoxy: Seco:kiacetate	Lignan	Leaf	India	00.00025%	H07424
Lintetralin, seco-4-hydroxy:	Lignan	Leaf	India	00.00200%	H03800
Lupeol	Triterpene	Root Root	India India		A14231 T01051
Lupeol Acetate	Triterpene	Root Root	India India		A14231 T01051
Niranthin	Lignan	Leaf Leaf Entire Plant Aerial Parts	India India Taiwan India	00.0009% 00.043%	H07424 A01168 H09754 M13237
Niranthin, demethylenedioxy:	Lignan	Leaf	India	00.0002%	H07424
Niranthin, hydroxy:	Lignan	Leaf Leaf	India India	00.00040% 00.0004%	H03800 H07424
Nirphyllin	Lignan	Aerial Parts	India	00.0007%	H04831
Nirtetralin	Lignan	Entire Plant Leaf Leaf Aerial Parts Entire Plant	Not stated India India India Taiwan	00.0009% 00.093%	T02987 H07424 A01168 K24152 H09754
Nirurin	Flavanone	Entire Plant	India	00.04000%	T08681

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Nirurine	Indolizidine Alkaloid	Not stated Aerial Parts	Thailand Thailand	 00.00398%	N15589 T12165
Nirurinetin	Flavanone	Entire Plant	India		T08681
Niruriside	Phenylpropanoid	Flower + Leaf + Stem	India	00.016%	H18818
Octa-trans-2-trans-4-dienamide	Alkaloid-misc	Entire Plant	Ghana	00.00655%	H22295
Pentacosanol Ester	Alkanol C5 or more	Root	India	00.007%	H27051
Phyllanterpenyl Ester	Diterpene	Root	India	00.012%	H27051
Phyllanthenol	Triterpene	Aerial Parts	India	00.002%	H16370
Phyllanthenone	Triterpene	Aerial Parts	India	00.0008%	H16370
Phyllantheol	Triterpene	Aerial Parts	India	00.0015%	H16370
Phyllanthin	Lignan	Leaf Entire Plant Aerial Parts Leaf Aerial Parts Aerial Parts Leaf Entire Plant Leaf Aerial Parts Leaf	India India India India East Africa India India Taiwan India India India	 00.11% 00.04000% 00.325% 00.2% 00.18%	A14228 L20904 K24152 W00522 W01586 T11593 W01145 H09754 A01168 M13237 H07424
Phyllanthin, hypo:	Lignan	Entire Plant Leaf Aerial Parts Leaf Aerial Parts Aerial Parts	India India India India India India	 00.05% 00.01000%	M19653 A14228 K24152 W00522 T11593 M13237
Phyllanthine	Indolizidine Alkaloid	Aerial Parts Root Leaf Stem	India India India India		T08388 T08388 T08388 T08388

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Phyllanthosecosteryl Ester	Steroid	Root	India		H26478
Phyllanthosterol	Steroid	Root	India		H26478
Phyllanthostigmasterol	Steroid	Root	India		H26478
Phyllanthus Flavonoid FG-1	Flavonoid	Entire Plant	India		M22721
Phyllanthus Flavonoid FG-2	Flavonoid	Entire Plant	India		M22721
Phyllanthusone	Tetraterpenoid	Root	India	00.013%	H27051
Phyllester	Benzenoid	Aerial Parts	India	00.00120%	M13237
Phyllnirurin	Lignan	Aerial Parts	India	00.0006%	H04831
Phyllochrysine	Indolizidinealkaloid	Leaf + Stem	Cuba		T02592
Phylltetrin	Lignan	Aerial Parts	India		M13237
Phyltetralin	Lignan	Entire Plant Leaf Leaf	Not stated India India	 00.14%	T02987 A01168 H07424
Phytol,trans:	Diterpene	Entire Plant	India		M26687
Quercetin	Flavonol	Leaf Aerial Parts Entire Plant Leaf	Not stated East Africa India French Guiana		L02704 W01586 T08172 M22356
Quercetin-3-o-beta-d-glucopyranosyl (1-4)-alpha-l-rhamnopyranoside	Flavonol	Stem	India		K08700
Quercitrin	Flavonol	Leaf Entire Plant Leaf	Not stated India French Guiana		L02704 T08172 M22356
Quercitrin, iso:	Flavonol	Leaf Leaf	Not stated French Guiana		L02704 M22356
Repandusinic Acid	Tannin	Entire Plant	Not stated	00.11709%	K07799
Repandusinic Acid A	Tannin	Entire Plant	Taiwan		K08911

Compound	Chemical Type	Plant Part	Plant Origin	Quantity	Ref #
Ricinoleic Acid	Lipid	Seed Oil Seed Oil	India India	01.2% 01.2%	M19652 T03665
Rutin	Flavonol	Entire Plant Leaf Leaf	India Not stated French Guiana		T08172 L02704 M22356
Salicylic Acid Methyl Ester	Benzenoid	Essential Oil	Brazil	05.0-7.2%	W00664
Securinine, nor:	Pyrrolizidine Alkaloid	Root	India		L02008
Securinine, nor: (-):	Pyrrolizidine Alkaloid	Entire Plant	Not stated		W00640
Securinine, nor: 4-methoxy:	Pyrrolizidine Alkaloid	Aerial Parts Root Leaf Stem	India India India India		T08388 T08388 T08388 T08388
Securinine, nor: Ent	Pyrrolizidine Alkaloid	Entire Plant Entire Plant	India Bangladesh	00.00500%	H02389 K20111
Sesamin,4-hydroxy:	Lignan	Entire Plant	Bangladesh		K20111
Sitosterol, beta:	Steroid	Leaf Aerial Parts	India India	00.07% 00.00850%	A01168 M13237
Tetracosahexa-cis-2-cis-6-cis-10-trans-14-trans-18-trans-22-en-1-ol,3-7-11-15-19-23-hexamethyl:	Triterpene	Aerial Parts	Not stated	00.004%	M19792
Triacontan-1-al	Alkanal C5 or more	Aerial Parts	India	00.00600%	T11593
Triacontan-1-ol	Alkanol C5 or more	Aerial Parts	India	00.05600%	T11593

Other Phytochemical Screening:

Alkaloids Absent	Leaf	W00673	Flavonoids Present	Shoots	M15310
	Leaf + Stem	A04418	Saponins Present	Shoots	M15310
Alkaloids Present	Aerial Parts	W01586		Root	M15310
	Leaf	T07856	Flavonoids Absent	Leaf	W01361
	Stem	T07856		Root	M15310
	Shoots	M15310			
	Root	M15310			

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K17672	ANALGESIC EFFECTS OF CALLUS CULTURE EXTRACTS FROM SELECTED SPECIES OF PHYLLANTHUS IN MICE. SANTO,ARS: FILHO,VC: NIERO,R: VIANA,AM: MORENO,FN: CAMPOS,MM: YUNES,RA: CALIXTO,JB: J PHARM PHARMACOL 46 9: 755-759 (1994) (DEPT PHARMACOL UNIV FED SANTA CATARINA FLORIANOPOLIS 88049 BRAZIL)
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K19491	FURTHER STUDIES ON THE ANTINOCICEPTIVE ACTION OF THE HYDROALCOHLIC EXTRACTS FROM PLANTS ON THE GENUS PHYLLANTHUS. SANTOS,ARS: FILHO,VC: YUNES,RA: CALIXTO,JB: J PHARM PHARMACOL 47 1: 66-71 (1995) (DEPT PHARMACOL UNIV FED SANTA CATARINA FLORIANOPOLIS 88049 BRAZIL)
K20111	ISOLATION OF 4-HYDROXYSESAMIN AND ENT-NORSECURININE FROM PHYLLANTHUS NIRURI AND THEIR CHEMOTAXONOMIC SIGNIFICANCE. QUADER,MA: KHATUN,M: MOSIHUZZAMAN,M: J BANGLADESH ACAD SCI 18 2: 229-234 (1994) (DEPT CHEM UNIV DHAKA DHAKA 1000 BANGLADESH)
K21201	USAGE AND BIOASSAYS IN PHYLLANTHUS (EUPHORBIACEAE). IV. CLUSTERING OF ANTIVIRAL USES AND OTHER EFFECTS. UNANDER,DW: WEBSTER,GL: BLUMBERG,BS: J ETHNOPHARMACOL 45 1: 1-18 (1995) (DIV POPULAITON SCI FOX CHASE CANCER CENTER PHILADELPHIA PA 19111 USA)
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K24152	A NOVEL CLASS OF NON-PEPTIDIC ENDOTHELIN ANTAGONISTS ISOLATED FROM THE MEDICINAL HERB PHYLLANTHUS NIRURI. HUSSAIN,RA: DICKEY,JK: ROSSER,MP: BRITTAIN,RJ: WEBB,ML: ROSE,PM: RERNANDES,P: J NAT PROD 58 10: 1515-1520 (1995) (NATL PROD ISOL SCREEN BRISTOL-MYERS SQUIBB PHARM RES WALLINGFORD CT 06492 USA)
K24884	MEDICINAL PLANTS USED IN TRADITIONAL SYSTEMS OF MEDICINE IN BANGLADESH. ATAHAR,A: WAHID,M: CHOWDHURY,M: ROY,J: THIRD INT CONF TRADITIONAL ASIAN MED, BOMBAY, INDIA, 1990 : 55-65 (1990) (THIRD INT CONFERENCE TRADITIONAL ASIAN MED BOMBAY INDIA)
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K29665	COMPARATIVE HEPATOPROTECTIVE ACTIVITY OF THREE PHYLLANTHUS SPECIES, P.URINARIA,P.NIRURI AND P.SIMPLEX, ON CARBON TETRACHLORIDE INDUCED LIVER INJURY IN THE RAT. PRAKASH,A: SATYAN,KS: WAHI,SP: SINGH,RP: PHYTOTHER RES 9 8: 594-596 (1995) (DEPT PHARMACEUT INST TECHNOL BANARAS HINDU UNIV VARANASI 221005 INDIA)
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L06121	PROTECTIVE EFFECT OF PHYLLANTHUS FRATERNUS AGAINST CARBON TETRACHLORIDE-INDUCED MITOCHONDRIAL DYSFUNCTION. PADMA,P: SETTY,OH: LIFE SCI 64 25: 2411-2417 (1999) (DEP BIOCHEM SCH LIFE SCI UNIV HYDERABAD HYDERABAD INDIA)
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L08513	ANTIMALARIAL ACTIVITY OF 20 CRUDE EXTRACTS FROM NINE AFRICAN MEDICINAL PLANTS USED IN KINSHASA, CONGO. TONA,L: NGIMBI,NP: TSAKALA,M: MESIA,K: CIMANGA,K: ASPERS,S: DE BRUYNE,T: PIETERS,L: TOTTE,J: VLIETINCK,AJ: J ETHNOPHARMACOL 68 1/3: 193-203 (1999) (FAC PHARMACY UNIV KINSHASA KINSHASA CONGO)
L09295	RADIOPROTECTIVE EFFECT OF PHYLLANTHUS NIRURI ON MOUSE CHROMOSOMES. DEVI,PU: KAMATH,R: RAO,BSS: CURR SCI 78 10: 1245-1247 (2000) (DEPT RADIOBIOL KASTURBA MED COLL MANIPAL 576 119 INDIA)

L09666	NAHUA INDIAN MEDICINAL PLANTS (MEXICO): INHIBITORY ACTIVITY ON NF-KB AS ANTI-INFLAMMATORY MODEL AND ANTIBACTERIAL EFFECTS. BORK,PM: SCHMITZ,ML: WEIMANN,C: KIST,M: HEINRICH,M: PHYTOMEDICINE 3 3: 263-269 (1996) (INST PHARMACEUT ALBERT LUDWIGS UNIV FREIBURG GERMANY)
L11330	ANTINOCICEPTIVE PROPERTIES OF EXTRACTS OF NEW SPECIES OF PLANTS OF THE GENUS PHYLLANTHUS (EUPHORBIACEAE). SANTOS,ARS: DE CAMPOS,RAP: MIGUEL,OG: FILHO,VC: SIANI,AC: YUNES,RA: CALIXTO,JB: J ETHNOPHARMACOL 72 1/2: 229-238 (2000) (DEPT PHARMACOL CNTR BIOL SCI UNIV FEDERAL SANTA CATARINA FLORIANOPOLIS BRAZIL)
L12582	SOME FOLK MEDICINAL PLANTS USED FOR JAUNDICE IN GUJARAT-INDIA. GOPAL,GV: SHAH,GL: J RES INDIAN MED 4 3/4: 45-49 (1985) (DEPT BIO SCI SARDAR PATEL UNIV VALLABHVIDYANAGAR GUJARAT INDIA)
L12686	PHARMACOLOGICAL ACTIVITY AND CHEMICAL COMPOSITION OF CALLUS CULTURE EXTRACTS FROM SELECTED SPECIES OF PHYLLANTHUS. CATAPAN,E: OTUKI,MF: VIANA,AM: YUNES,RA: BRESCIANI,LFV: FERRIERA,J: SANTOS,ARS: CALIXTO,JB: CECHNEL FILHO,V: PHARMAZIE 55 12: 945-946 (2000) (DEPT FARM UNIV FED SANTA CATARINA FLORIANOPOLIS SC 88049 BRAZIL)
L12764	EVALUATION OF CHINESE HERBS THAT AFFECT THE CELL-MEDIATED IMMUNITY (I). KUO,YC: OU,JC: TSAI,WJ: WU,CL: SUN,CM: J CHIN MED 6 3: 211-221 (1995) (NATL RES INST CHIN MED TAIPEI TAIWAN)
L13474	SCREENING FOR ANTICANCER ACTIVITY OF PLANTS FROM THE NORTHEAST OF BRAZIL. MORAES,MO: FONTELES,MC: MORAES,MEA: MACHADO,MIL: MATOS,FJA: FITOTERAPIA 68 3: 235-239 (1997) (DEPT FISIOLOGIA FARMACOLOGIA LAB FARMACOLOGIA UNIV FEDERAL CEARA CEARA BRAZIL)
L13564	ANTIBACTERIAL AND ANTIFUNGAL ACTIVITY OF MEDICINAL PLANTS OF MAURITIUS. JELAGER,L: GURIB FAKIM,A: ADSERSEN,A: PHARMACEUTICAL BIOL 36 3: 153-161 (1998) (ROYAL DANISH SCH PHARM COPENHAGEN DK-2100 DENMARK)
L14698	IN-VITRO ANTIMALARIAL ACTIVITY OF CASSIA OCCIDENTALIS, MORINDA MORINDOIDES AND PHYLLANTHUS NIRURI. MESIA,LTK: NGIMBI,NP: CHRIMWAMI,B: CIMANGA,K: DEBRUYNE,T: APERS,S: HERMANS,N: TOTTE,J: PIETERS,L: VLIETINCK,AL: ANN TROP MED PARASITOL 95 1: 47-57 (2001) (FACULTY PHARMACY UNIV KINSHASA DEMOCRATIC REPUBLIC CONGO)
L20904	ISOLATION AND ESTIMATION OF AN ANTIHEPATOTOXIC COMPOUND PHYLLANTHIN FROM PHYLLANTHUS NIRURI BY HPLC. KALE,KU: PARAG,D: VIVEK,C: INDIAN DRUGS 38 6: 303-306 (2001) (INST SCI MUMBAI 400032 INDIA)
M09820	VARIATION IN THE LEVEL OF VITAMIN C, TOTAL PHENOLICS AND PROTEIN IN PHYLLANTHUS NIRURI LINN. DURING LEAF MATURATION. SINHA,SKP: DOGRA,JVV: NATL ACAD SCI LETT(INDIA) 4 12: 467-469 (1981) (PL PHYSIOL LAB PG DEPT BOT BHAGALPUR UNIV BHAGALPUR BIHAR 812007 INDIA)
M09944	ORAL HYPOGLYCAEMIC EFFECT OF PHYLLATHUS NIRURI LINN. LEAVES. RAMAKRISHNAN,PN: MURUGESAN,R: PALANICHAMY,S: MURUGESH,N: INDIAN J PHARM SCI 44 1: 10-12 (1982) (DEPT PHARMACEUT MADURAI MED COLL MADURAI TAMIL NADU 625020 INDIA)
M13237	CHEMICAL CONSTITUENTS OF PHYLLANTHUS NIRURI LINN. SINGH,B: AGRAWAL,PK: THAKUR,RS: INDIAN J CHEM 25B : 600-602 (1986) (CENTRAL INST MED + AROMATIC PL LUCKNOW UP 226 010 INDIA)
M15310	A SURVEY OF THE PLANTS OF BHAGALPUR AND SANTHAL PARGANA FOR SAPONINS, FLAVONOIDS AND ALKALOIDS. SINHA,SKP: DOGRA,JVV: INT J CRUDE DRUG RES 23 2: 77-86 (1985) (DEPT BOT PLANT PHYSIOL LAB BHAGALPUR UNIV BHAGALPUR BIHAR 812007 INDIA)

M15897	EXPERIMENTAL PRODUCTION OF LIVER DAMAGE AND ITS PROTECTION WITH PHYLLANTHUS NIRURI AND CAPPARIS SPINOSA (BOTH INGREDIENTS OF LIV 52) IN WHITE ALBINO RATS. SREENIVASA RAO,Y: PROBE 24 2: 117-119 (1985) (IS & WP HOSP JAMSHEDPUR BIHAR INDIA)
M16690	BHUMYAMALAKI (PHYLLANTHUS NIRURI) AND JAUNDICE IN CHILDREN. DIXIT,SP: ACHAR,MP: J NATL INTEG MED ASS 25 8: 269-272 (1983) (TTD AYURVEDIC COLLEGE TIRUPATI AP INDIA)
M16717	EFFECTS OF AN EXTRACT FROM PHYLLANTHUS NIRURI ON HEPATITIS B AND WOOD CHUCK HEPATITIS VIRUSES: IN VITRO AND IN VIVO STUDIES. VENKATESWARAN,PS: MILLMAN,I: BLUMBERG,BS: PROC NAT ACAD SCI(USA) 84 1: 274-278 (1987) (FOX CHASE CANCER CENT PHILADELPHIA PA 19111 USA)
M16877	ANTI-HEPATITIS-B VIRUS PROPERTIES OF PHYLLANTHUS NIRURI LINN. AND ECLIPTA ALBA HASSK: IN VITRO AND IN VIVO SAFETY STUDIES. JAYARAM,S: THYAGARAJAN,SP: PANCHANADAM,M: SUBRAMANIAN,S: BIO-MEDICINE 7 2: 9-16 (1987) (DEPT MICROBIOL PG INST BASIC MED SCI UNIV MADRAS MADRAS TAMIL NADU 600 113 INDIA)
M17007	IN VITRO INACTIVATION OF HBSAG BY ECLIPTA ALBA HASSK AND PHYLLANTHUS NIRURI LINN. THYAGARAJAN,SP: THIRUNEELAKANTAN,K: SUBRAMANIAN,S: SUNDARAVELU,T: INDIAN J MED RES 76S : 124-130 (1982) (INST MICROBIOL MADRAS MED COLL MADRAS TAMIL NADU INDIA)
M17062	COMPOSITION, PHARMACEUTICAL PREPARATION AND METHOD FOR TREATING VIRAL HEPATITIS. VENKATESWARAN,PS: MILLMAN,I: BLUMBERG,BS: PATENT-US-4,673,575 : 10PP-. (1987) (FOX CHASE CANC CENT PHILADELPHIA PA USA)
M17464	ETHANOL INDUCED METABOLIC ALTERATIONS AND THE EFFECT OF PHYLLANTHUS NIRURI IN THEIR REVERSAL. UMARANI,D: DEVAKI,T: GOVINDARAJU,P: SHANMUGASUNDARAM,KR: ANCIENT SCI LIFE 4 3: 174-180 (1985) (DEPT BIOCHEM POST-GRA INS BASIC MED SCI UNIV MADRAS MADRAS TAMIL NADU 600 113 INDIA)
M18836	PHARMACOLOGICAL STUDIES. 3. PHYLLANTHUS NIRURI. KITISIN,T: SIRRIAJ HOSP GAZ 4 : 641-649 (1952) (SIRIRAJ HOSPITAL BANGKOK THAILAND)
M18866	CHEMICAL AND PHARMACEUTICAL STUDIES ON MEDICINAL PLANTS IN PARAGUAY. GERANIIN, AN ANGIOTENSIN-CONVERTING ENZYME INHIBITOR FROM "PARAPARAI MI", PHYLLANTHUS NIRURI. UENO,H: HORIE,S: NISHI,Y: SHOGAWA,H: KAWASAKI,M: SUZUKI,S: HAYASHI,T: ARISAWA,M: SHIMIZU,M: YOSHIZAKI,M: MORITA,N: J NAT PROD 51 2: 357-359 (1988) (FAC PHARM SCI TOYAMA MED & PHARM UNIV TOYAMA 930-01 JAPAN)
M19652	RICINOLEIC ACID IN PHYLLANTHUS NIRURI SEED OIL. AHMAD,MU: HUSAIN,SK: OSMAN,SM: J AMER OIL CHEM SOC 58 6: 673-674 (1981) (DEPT CHEM ALIGARH MUSLIM UNIV ALIGARH UP 202 001 INDIA)
M19653	STRUCTURE AND SYNTHESIS OF THE ARYLTETRALIN LIGNANS HYPOPHYLLANTHIN AND NIRTETRALIN. SCHNEIDERS,GE: STEVENSON,R: J CHEM SOC PERKIN TRANS I 1982 4: 999-1004 (1982) (DEPT CHEM BRANDEIS UNIV WALTHAM MA 02254 USA)
M19792	AN ACYCLIC TRITERPENE FROM PHYLLANTHUS NIRURI. SINGH,B: AGRAWAL,PK: THAKUR,RS: PHYTOCHEMISTRY 28 7: 1980-1981 (1989) (CENTRAL INST MED + AROMATIC PL LUCKNOW UP 226 016 INDIA)

M21373	STUDIES ON ALDOSE REDUCTASE INHIBITORS FROM NATURAL PRODUCTS. II. ACTIVE COMPONENTS OF A PARAGUAYAN CRUDE DRUG "PARA-PARAI MI", PHYLLANTHUS NIRURI. SHIMIZU,M: HORIE,S: TERASHIMA,S: UENO,H: HAYASHI,T: ARISAWA,M: SUZUKI,S: YOSHIZAKI,M: MORITA,N: CHEM PHARM BULL 37 9: 2531-2532 (1989) (FAC PHARM SCI TOYAMA MED & PHARM UNIV TOYAMA 930-01 JAPAN)
M22356	FLAVONOIDES DE PHYLLANTHUS NIRURI L. PHYLLANTHUS URINARIA L. PHYLLANTHUS ORBICULATUS L. C. RICH. NARA,TK: GLEYE,J: DE CERVAL,EL: STANISLAS,E: PLANT MED PHYTOTHER 11 2: 82-86 (1977) (U E R SCI PHARM SERV MAT MED TOULOUSE 31400 FRANCE)
M22721	HYPOGLYCEMIC ACTIVITY OF FLAVONOIDS OF PHYLLANTHUS FRATERNUS IN RATS. HUKERI,VI: KALYANI,GA: KAKRANI,HK: FITOTERAPIA 59 1: 68-70 (1988) (COLL PHARM JN MED COLL BELGAUM KARNATAKA 590 010 INDIA)
M23272	TRADITIONAL MEDICINE OF NEW IRELAND, PAPUA NEW GUINEA PART III KONOS, CENTRAL NEW IRELAND. HOLDSWORTH,D: GIDEON,O: PILOKOS,B: INT J CRUDE DRUG RES 27 1: 55-61 (1989) (CHEM EDUC SEC UNIV EAST ANGLIA NORWICH ENGLAND)
M23643	SCREENING TEST FOR ANTITUMOR ACTIVITY OF CRUDE DRUGS (III). STUDIES ON ANTITUMOR ACTIVITY OF INDONESIAN MEDICINAL PLANTS. ITOKAWA,H: HIRAYAMA,F: TSURUOKA,S: MIZUNO,K: TAKEYA,K: NITTA,A: SHOYAKUGAKU ZASSHI 44 1: 58-62 (1990) (TOKYO COLL PHARM TOKYO 192-03 JAPAN)
M23826	TRIBAL REMEDIES FROM SARANDA FOREST, BIHAR, INDIA-I. JAIN,SP: INT J CRUDE DRUG RES 27 1: 29-32 (1989) (CENTRAL INST MED & AROMATIC PL LUCKNOW UP 226 016 INDIA)
M24831	IN VITRO STUDIES ON THE EFFECT OF CERTAIN NATURAL PRODUCTS AGAINST HEPATITIS B VIRUS. MEHROTRA, R: RAWAT,S: KULSHRESHTHA,DK: PATNAIK,GK: DHAWAN,BN: INDIAN J MED RES [B] 92 2: 133-138 (1990) (CENTRAL DRUG RESEARCH INST LUCKNOW UP 226 001 INDIA)
M25745	PROTECTION AFFORDED BY AQUEOUS EXTRACTS OF PHYLLANTHUS SPECIES AGAINST CYTOTOXICITY INDUCED BY LEAD AND ALUMINIUM SALTS. DHIR,H: ROY,AK: SHARMA,A: TALUKDER,G: PHYTOTHER RES 4 5: 172-176 (1990) (DEPT BOT UNIV CALCUTTA CALCUTTA WEST BENGAL 700019 INDIA)
M26175	SCREENING OF CRUDE DRUGS USED IN SRI LANKA FOR NEMATOCIDAL ACTIVITY ON THE LARVA OF TOXOCARIA CANIS. KIUCHI,F: HIOKI,M: NAKAMURA,N: MIYASHITA,N: TSUDA,Y: KONDO,K: SHOYAKUGAKU ZASSHI 43 4: 288-293 (1989) (FAC PHARM SCI KANAZAWA UNIV KANAZAWA 920 JAPAN)
M26687	ISOLATION OF TRANS-PHYTOL FROM PHYLLANTHUS NIRURI. SINGH,B: AGRAWAL,PK: THAKUR,S: PLANTA MED 57 1: 98-. (1991) (CENTRAL INST MED & AROMATIC PL LUCKNOW UP 226 016 INDIA)
M30257	IN VITRO ACTIVITY OF PHYLLANTHUS (EUPHORBIACEAE) SPECIES AGAINST THE DNA POLYMERASE OF HEPATITIS VIRUSES: EFFECTS OF GROWING ENVIRONMENT AND INTER-AND INTRA-SPECIFIC DIFFERENCES. UNANDER,DW: BLUMBERG,BS: ECON BOT 45 2: 225-242 (1991) (DIV POPUL SCI FOX CHASE CANCER CENTER PHILADELPHIA PA 19111 USA)
N00731	A SHORT NOTE ON THE OCCURRENCE OF SEX HORMONES IN BANGALADESH PLANTS. MANNAN,A: AHMAD,K: BANGLADESH J BIOL SCI 5 : 45- (1976) (DEPT BIOCHEM UNIV DACCA DACCA BANGLADESH)

N15589	NIRURINE-A NEW SECURINEGA ALKALOID FROM PHYLLANTHUS NIRURI (EUPHORBIACEAE). BUNYAPRAPHATSARA,N: CORDELL,GA: COWE,HJ: COX,PJ: ABSTR 24TH ANNUAL MEETING AMERICAN SOCIETY OF PHARMACOGNOSY UNIV MISSISSIPPI OXFORD JULY 24-28 1983 : ABSTR-25 (1983) (FAC PHARM MAHIDOL UNIV BANGKOK THAILAND)
R00001	STUDY ON TOXICITY OF THAI MEDICINAL PLANTS. MOKKHASMIT,M: SWATDIMONGKOL,K: SATRAWAHA,P: BULL DEPT MED SCI 12 2/4: 36-65 (1971) (THAILAND)
T00359	TRADITIONAL MEDICAL PRACTICES AND MEDICINAL PLANT USAGE ON A BAHAMIAN ISLAND. HALBERSTEIN,RA: SAUNDERS,AB: CUL MED PSYCHIAT 2 : 177-203 (1978) (USA)
T00701	MEDICINAL PLANTS OF THE WEST INDIES. AYENSU,ES: UNPUBLISHED MANUSCRIPT : 110 P- (1978) (OFFICE OF BIOLOGICAL CONSERVAT SMITHSONIAN INSTITUTION WASHINGTON DC 20560 USA)
T00993	THE CASE FOR A REVISED STRUCTURE FOR HYPOPHYLLATHIN - AN ANALYSIS OF THE 13-CNMR SPECTRA OF ARYLTETRALINS. WARD,RS: SATYANARAYANA,P: ROW,LR: RAO,BVG: TETRAHEDRON LETT 1979 : 3043-3046 (1979) (CHEM DEPT UNIV COLLEGE SWANSEA SWANSEA ENGLAND)
T01051	CHEMICAL INVESTIGATION OF THE ROOTS OF PHYLLANTHUS NIRURI. CHAUHAN,JS: SULTAN,M: SRIVASTAVA,SK: J INDIAN CHEM SOC 56 : 326A- (1979) (DEPT CHEM UNIV ALLAHABAD ALLAHABAD UP 211 002 INDIA)
T02532	CONCERNING HYPOPHYLLANTHIN. BHADBHADE,MM: SUBBA RAO,GSR: VENKATESAN,K: TETRAHEDRON LETT 21 : 3097-3098 (1980) (DEPT ORG CHEM INDIAN INST SCI BANGALORE KARNATAKA INDIA)
T02592	A PRELIMINARY PHYTOCHEMICAL STUDY OF CUBAN PLANTS. V. PHYLLANTHUS NIRURI EUPHORBIACEAE. CUELLAR CUELLAR,A: ESTEVEZ,PF: REV CUBANA FARM 14 : 63-68 (1980) (FAC BIOL UNIV HABANA HAVANA CUBA)
T02987	STRUCTURE AND SYNTHESIS OF HYPOPHYLLANTHIN, NIRTETRALIN, PHYLTETRALIN AND LINTETRALIN. GANESHPURE,PA: SCHNEIDERS,GE: STEVENSON,R: TETRAHEDRON LETT 22 : 393-396 (1981) (BRANDEIS UNIV WALTHAM MA 02254 USA)
T03665	RICINOLEIC ACID IN PHYLLANTHUS NIRURI SEED OIL. AHMAD,MU: HUSAIN,SK: OSMAN,SM: J AMER OIL CHEM SOC 58 : 673-674 (1981) (DEPT CHEM ALIGARH MUSLIM UNIV ALIGARH UP 202 001 INDIA)
T04621	TERRESTRIAL PLANTS MOLLUSCICIDAL TO LYMNAEID HOSTS OF FASCILIASIS HEPATICA IN PUERTO RICO. MEDINA,FR: WOODBURY,R: J AGR UNIV PUERTO RICO 63 : 366-376 (1979) (PUERTO RICO JUNIOR COLLEGE RIO PIEDRAS PUERTO RICO)
T04647	PLANTS OF HAITI USED AS ANTIFERTILITY AGENTS. WENINGER,B: HAAG-BERRURIER,M: ANTON,R: J ETHNOPHARMACOL 6 1: 67-84 (1982) (LAB CHIM FAC MED PORT-AU-PRINCE HAITI)
T06317	IN VITRO INACTIVATION OF HBSAG BY ECLIPTA ALBA HASSK AND PHYLLANTHUS NIRURI LINN. THYAGARAJAN,SP: THIRUNEELAKANTAN,K: SUBRAMANIAN,S: SUNDARAVELU,T: INDIAN J MED RES SUPPL 76 : 124-130 (1982) (INST MICROBIOL MADRAS MED COLL MADRAS TAMIL NADU INDIA)
T06320	EVALUATION OF THE ROLE OF RUMALAYA AND GERIFORTE IN CHRONIC ARTHRITIS-A PRELIMINARY STUDY. DABRAL,PK: SHARMA,RK: PROBE 22 2: 120-127 (1983) (DEPT ORTHOPEDICS M.L.B. MEDICAL COLLEGE JHANSI UP INDIA)

T06353	PRELIMINARY STUDY OF SEX HORMONES OF MEDICAL IMPORTANCE IN BANGLADESHI PLANTS. MANNAN,A: AHMAD,K: BANGLADESH MED RES COUNC BULL 4 : 78-85 (1978) (DEPT BIOCHEM UNIV DACCA DACCA BANGLADESH)
T06766	ANTIMICROBIAL ACTIVITY OF CERTAIN SUDANESE PLANTS USED IN FOLKLORIC MEDICINE. SCREENING FOR ANTIBACTERIAL ACTIVITY (I). FAROUK,A: BASHIR,AK: SALIH,AKM: FITOTERAPIA 54 1: 3-7 (1983) (DEPARTMENT OF PHARMACEUTICS FACULTY OF PHARMACY UNIVERSITY OF KHARTOUM KHARTOUM SUDAN)
T07369	MEDICINAL PLANTS OF THE ADMIRALTY ISLANDS,PAPUA NEW GUINEA. PART I. HOLDSWORTH,D: WAMOI,B: INT J CRUDE DRUG RES 20 4: 169-181 (1982) (CHEM DEPT UNIV PAPUA NEW GUINEA PAPUA-NEW GUINEA)
T07856	INVESTIGATION OF THE ALKALOIDAL COMPONENTS IN THE SUDAN FLORA. III. YOUSIF,G: ISKANDER,GM: EL BEIT,D: FITOTERAPIA 54 6: 269-272 (1983) (MOHAMMED DEPT OF CHEMISTRY UNIVERSITY OF KHARTOUM SUDAN)
T07986	INVESTIGATIONS OF MOLLUSCICIDAL ACTIVITY OF CERTAIN SUDANESE PLANTS USED IN FOLK-MEDICINE. PART IV. AHMED,EM: BASHIR,AK: EL KHEIR,YM: PLANTA MED 50 1: 74-77 (1984) (DEPT PHARM FAC PHARM UNIV KHARTOUM KHARTOUM SUDAN)
T08172	A NEW FLAVONE GLYCOSIDE FROM PHYLLANTHUS NIRURII LINN. GUPTA,DR: AHMED,B: SHOYAKUGAKU ZASSHI 38 3: 213-215 (1984) (DEPT OF CHEM UNIV OF ROORKEE ROORKEE UP 247 667 INDIA)
T08282	ONE HUNDRED USEFUL RAW DRUGS OF THE KANI TRIBES OF TRIVANDRUM FOREST DIVISION, KERALA, INDIA. JOHN,D: INT J CRUDE DRUG RES 22 1: 17-39 (1984) (BIOLOGICAL SCIENCES UNIV OF CALABAR CALABAR NIGERIA)
T08388	4-METHOXY-NOR-SECURININE, A NEW ALKALOID FROM PHYLLANTHUS NIRURI. MULCHANDANI,NB: HASSARAJANI,SA: PLANTA MED 50 1: 104-105 (1984) (BIO-ORG DIV BHABHA ATOMIC RES CENT BOMBAY MAHARASTRA 400 085 INDIA)
T08681	NIRURIN: A NEW PRENYLATED FLAVANONE GLYCOSIDE FROM PHYLLANTHUS NIRURII. GUPTA,DR: AHMED,B: J NAT PROD 47 6: 958-963 (1984) (DEPT CHEM UNIV ROORKEE ROORKEE UP INDIA)
T09033	PHYTOMEDICINE OF THE MADANG PROVINCE, PAPUA NEW GUINEA PART I. KARKAR ISLAND. HOLDSWORTH,D: INT J CRUDE DRUG RES 22 3: 111-119 (1984) (CHEM DEPT UNIV PAPUA NEW GUINEA PAPUA-NEW GUINEA)
T09046	ANTISPASMODIC EFFECTS OF AN ALKALOID EXTRACTED FROM PHYLLANTHUS SELLOWIANUS: A COMPARATIVE STUDY WITH PAPAVERINE. CALIXTO,JB: YUNES,RA: NETO,ASO: VALLE,RMR: RAE,GA: BRAZ J MED BIOL RES 17 : 313-321 (1984) (DEPT QUIMICA UNIV FEDERAL SANTA CATARINA FLORIANOPOLIS 88000 BRAZIL)
T09366	PHARMACO-THERAPEUTICS OF DASEMANI DRUGS. SIRCAR,NN: ANCIENT SCI LIFE 3 3: 132-135 (1984) (CALCUTTA WEST BENGAL 700 032 INDIA)
T10116	HERBAL AND TRADITIONAL PRACTICES RELATED TO MATERNAL AND CHILD HEALTH CARE. VELAZCO,EA: RURAL RECONSTRUCTION REVIEW : 35-39 (1980) (NO ADDRESS GIVEN)
T10133	LESS KNOWN USES OF WEEDS AS MEDICINAL PLANTS. SAHU,TR: ANCIENT SCI LIFE 3 4: 245-249 (1984) (DEPT BOTANY DR HARISINGH GOUR VISHWAVIDYALAYA SAGAR MP 470003 INDIA)

T10354	STUDIES ON THE RATIONALE OF AFRICAN TRADITIONAL MEDICINE. PART II. PRELIMINARY SCREENING OF MEDICINAL PLANTS FOR ANTI-GONOCCOCI ACTIVITY. SAWHNEY,AN: KHAN,MR: NDAALIO,G: NKUNYA,MHH: WEVERS,H: PAK J SCI IND RES 21 5/6: 189-192 (1978) (DEPT MICROBIOL & IMMUNOL FAC MED UNIV DAR ES SALAAM DAR ES SALAAM TANZANIA)
T10632	TRADITIONAL MEDICINE IN FIJI: SOME HERBAL FOLK CURES USED BY FIJI INDIANS. SINGH,YN: J ETHNOPHARMACOL 15 1: 57-88 (1986) (SCH NAT RES UNIV SOUTH PACIFIC SUVA FIJI)
T10824	ANTIVIRAL ACTIVITY IN EXTRACTS OF PHYLLANTHUS FRATERNUS WEBST (P. NIRURI). SAIGOPAL,DVR: PRASAD,VS: SREENIVASULU,P: CURR SCI 55 5: 264-265 (1986) (DEPT BOTANY SV UNIV TIRUPATI AP 517 502 INDIA)
T11208	A SHORT NOTE ON CONTRACEPTIVE IN AYURVEDA. VENKATARAGHAVAN,S: SUNDARESAN,TP: J SCI RES PL MED 2 1/2: 39-. (1981) (VHS MED CENT MADRAS TAMIL NADU 600020 INDIA)
T11593	ANTIHEPATOTOXIC PRINCIPLES OF PHYLLANTHUS NIRURI HERBS. SYAMASUNDAR,KV: SINGH,B: THAKUR,RS: HUSAIN,A: KISO,Y: HIKINO,H: J ETHNOPHARMACOL 14 1: 41-44 (1985) (CENTRAL INST MED + AROMATIC PL LUCKNOW UP 226 010 INDIA)
T12165	X-RAY CRYSTAL AND MOLECULAR STRUCTURE OF NIRURINE, A NOVEL ALKALOID RELATED TO THE SECURINEGA ALKALOID SKELETON, FROM PHYLLANTHUS NIRURI (EUPHORBIACEAE). PETCHNAREE,P: BUNYAPRAPHATSARA,N: CORDELL,GA: COWE,HJ: COX,PJ: HOWIE,RA: PATT,SL: J CHEM SOC PERKIN TRANS I 1986 : 1551-1556 (1986) (PROGRAM COLLAB RES PHARM SCI COLL PHARM-HEALTH SCI CENT UNIV ILLINOIS AT CHICAGO CHICAGO IL 60612 USA)
T13846	POPULAR MEDICINE OF THE CENTRAL PLATEAU OF HAITI. 2. ETHNOPHARMACOLOGICAL INVENTORY. WENIGER,B: ROUZIER,M: DAGUILH,R: HENRYS,D: HENRYS,JH: ANTON,R: J ETHNOPHARMACOL 17 1: 13-30 (1986) (LAB PHARMACOG FAC PHARM STRASBOURG 67048 FRANCE)
T14998	ETHANOL INDUCED METABOLIC ALTERATIONS AND THE EFFECT OF PHYLLANTHUS NIRURI IN THEIR REVERSAL. UMARANI,D: DEVAKI,T: GOVINDARAJU,P: SHANMUGASUNDARAM,KR: ANCIENT SCI LIFE 4 3: 174-180 (1985) (DEPT BIOCHEM BOST GRAD INST BASIC MED SCI UNIV MADRAS TAMIL NADU 600113 INDIA)
T15323	VEGETALES EMPLEADOS EN MEDICINA TRADICIONAL NORPERUANA. RAMIREZ,VR: MOSTACERO,LJ: GARCIA,AE: MEJIA,CF: PELAEZ,PF: MEDINA,CD: MIRANDA,CH: BANCO AGRARIO DEL PERU & NACL UNIV TRUJILLO, TRUJILLO, PERU, JUNE, 1988 : 54PP- (1988) (UNIV TRUJILLO TRUJILLO PERU)
T15975	A SURVEY OF MEDICINAL PLANTS OF MINAS GERAIS, BRAZIL. HIRSCHMANN,GS: ROJAS DE ARIAS,A: J ETHNOPHARMACOL 29 2: 159-172 (1990) (INST INVEST CIENCIAS SALUD FAC CIENCIAS QUIM ASUNCION PARAGUAY)
W00500	MOLLUSCICIDAL ACTIVITY OF PLANTS FROM NORTHEASTERN BRAZIL. SILVA,MJM: PINHEIRO DE SOUSA,M: ROUQUAYROL,MZ: REV BRASIL FARM 52 : 117-123 (1971) (UFFC RIO DE JANIERO BRAZIL)
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Clinical Abstracts

J Viral Hepat 2001 Sep;8(5):358-66

Genus Phyllanthus for chronic hepatitis B virus infection: a systematic review.

Liu J, Lin H, McIntosh H. The Cochrane Hepato-Biliary Group, The Copenhagen Trial Unit, Centre for Clinical Intervention Research, Copenhagen University Hospital, Copenhagen, Denmark.

To evaluate the efficacy and safety of genus Phyllanthus for chronic hepatitis B virus (HBV) infection we performed a systematic review of randomized clinical trials. Randomized trials comparing genus Phyllanthus vs. placebo, no intervention, general nonspecific treatment, other herbal medicine, or interferon treatment for chronic HBV infection were identified by electronic and manual searches. Trials of Phyllanthus herb plus interferon (IFN) vs. IFN alone were also included. No blinding and language limitations were applied. The methodological quality of trials was assessed by the Jadad scale plus allocation concealment. Twenty-two randomized trials (n=1947) were identified. The methodological quality was high in five double-blind trials and low in the 17 remaining trials. The combined results showed that Phyllanthus species had positive effect on clearance of serum HBsAg (relative risk 5.64, 95% CI 1.85-17.21) compared with placebo or no intervention. There was no significant difference on clearance of serum HBsAg, HBeAg and HBV DNA between Phyllanthus and IFN. Phyllanthus species were better than nonspecific treatment or other herbal medicines for the clearance of serum HbsAg, HBeAg, HBV DNA, and liver enzyme normalization. Analyses showed a better effect of the Phyllanthus plus IFN combination on clearance of serum HBeAg (1.56, 1.06-2.32) and HBV DNA (1.52, 1.05-2.21) than IFN alone. No serious adverse event was reported. Based on this review Phyllanthus species may have positive effect on antiviral activity and liver biochemistry in chronic HBV infection. However, the evidence is not strong due to the general low methodological quality and the variations of the herb. Further large trials are needed.

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The effect of Phyllanthus niruri on urinary inhibitors of calcium oxalate crystallization and other factors associated with renal stone formation. Freitas AM, Schor N, Boim MA. Nephrology Division, Universidade Federal de Sao Paulo, Escola Paulista de Medicina, Sao Paulo, Brazil.

OBJECTIVE: To evaluate the effect of an aqueous extract of Phyllanthus niruri (Pn), a plant used in folk medicine to treat lithiasis, on the urinary excretion of endogenous inhibitors of lithogenesis, citrate, magnesium and glycosaminoglycans (GAGs). MATERIALS AND METHODS: The effect of chronic (42 days) administration of Pn (1.25 mg/mL/day, orally) was evaluated in a rat model of urolithiasis induced by the introduction of a calcium oxalate (CaOx) seed into the bladder of adult male Wistar rats. The animals were divided into four groups: a sham control (16 rats); a control+Pn (six); CaOx+water instead of Pn (14); and CaOx+Pn (22). Plasma and urine were collected after 42 days of treatment for biochemical analysis and the determination of urinary excretion of citrate, magnesium and GAGs. The animals were then killed and the calculi analysed. RESULTS: The creatinine clearance or urinary and plasma concentrations of Na+, K+, Ca2+, oxalate, phosphate and uric acid were unaffected by Pn or the induction of lithiasis. Treatment with Pn strongly inhibited the growth of the matrix calculus and reduced the number of stone satellites compared with the group receiving water. The calculi were eliminated or dissolved in some treated animals (three of 22). The urinary excretion of citrate and magnesium was unaffected by Pn treatment. However, the mean (sd) urinary concentration of GAGs was significantly lower in rats treated with CaOx+Pn, at 5.64 (0.86) mg/g creatinine, than when treated with CaOx + water, at 11.78 (2.21) mg/g creatinine. In contrast, the content of GAGs in the calculi was higher in the CaOx + Pn rats, at 48.0 (10.4) g/g calculus, than in the CaOx + water group, at 16.6 (9.6) g/g calculus. CONCLUSION: These results show that Pn has an inhibitory effect on crystal growth, which is independent of changes in the urinary excretion of citrate and Mg, but might be related to the higher incorporation of GAGs into the calculi.

Nephron 1999;81(4):393-7

Phyllanthus niruri inhibits calcium oxalate endocytosis by renal tubular cells: its role in urolithiasis.

Campos AH, Schor N. Nephrology Division, Department of Medicine, Universidade Federal de Sao Paulo, Brazil.

We investigated the in vitro effect of an aqueous extract of Phyllanthus niruri L. on a model of CaOx crystal endocytosis by Madin-Darby canine kidney cells. The extract exhibited a potent and effective non-concentration-dependent inhibitory effect on the CaOx crystal internalization. This response was present even at very high (pathologic) CaOx concentrations and no P. niruri L.-induced toxic effect could be detected. Biochemical analysis of culture media containing P. niruri L. did not provide any clues for the elucidation of the cellular pathways affected by this natural product. Although further studies are necessary for a better understanding of the role of P. niruri L. in urolithiasis, our findings show that this natural product could be an attractive alternative for the treatment of urinary stones.

J Nat Prod 1996 Feb;59(2):196-9
Niruriside, a new HIV REV/RRE binding inhibitor from Phyllanthus niruri.
Qian-Cutrone J, Huang S, Trimble J, Li H, Lin PF, Alam M, Klohr SE, Kadow KF.
Bristol-Myers Squibb Pharmaceutical Research Institute, Wallingford, Connecticut 06492, USA.
During the screening of natural products for their ability to inhibit the binding of HIV-REV protein to [33P]-labeled RRE RNA, one novel compound, niruriside (1), was isolated from the MeOH extract of the dried leaf of Phyllanthus niruri L. by bioassay-guided fractionation. The structure of niruriside was determined by spectroscopic methods. Niruriside showed specific inhibitory activity against the binding of REV protein to RRE RNA with an IC50 value of 3.3 microM; however, niruriside did not protect CEM-SS cells from acute HIV infection at concentrations up to 260 microM using an XTT dye reduction assay.

Teratog Carcinog Mutagen 2002;22(4):285-91
Anti-mutagenic activity of Phyllanthus amarus Schum & Thonn in vitro as well as in vivo.
Raphael KR, Ajith TA, Joseph S, Kuttan R.
Amala Cancer Research Centre, Thrissur, Kerala, India.
Methanolic extract of Phyllanthus amarus was tested for its anti-mutagenic activity in Salmonella typhimurium strains TA1535, TA100, and TA102 (Ames test). P. amarus extract was able to inhibit the activation and mutagenicity of 2-acetaminofluorene (2-AAF) and aflatoxinB(1) at concentrations of 0.25-2 mg/plate. It was also found to inhibit mutagenicity induced by direct acting mutagens sodium azide (NaN(3)), N-methyl-N-nitro-N-nitrosoguanidine (MNNG), and 4-nitro-0-phenylenediamine (NPD), at concentrations of 1 mg to 0.25 mg/plate. Urinary mutagenicity produced in rats by benzo[a] pyrene was found to be significantly inhibited by the oral administration of Phyllanthus extract. These results indicate significant anti-mutagenicity of the extract in vitro as well as in vivo. Copyright 2002 Wiley-Liss, Inc.

J Ethnopharmacol 2002 Jun;81(1):17-22
Antitumour and anticarcinogenic activity of Phyllanthus amarus extract.
Rajeshkumar NV, Joy KL, Kuttan G, Ramsewak RS, Nair MG, Kuttan R.
Amala Cancer Research Centre, Thrissur, Kerala, 680-553, India.
Aqueous extract of Phyllanthus amarus (P. amarus) treatment exhibited potent anticarcinogenic activity against 20-methylcholanthrene (20-MC) induced sarcoma development and increased the survival of tumour harboring mice. The extract administration (p.o) was also found to prolong the life span of Dalton's Lymphoma Ascites (DLA) and Ehrlich Ascites Carcinoma (EAC) bearing mice and reduced the volume of transplanted solid tumours. The extract inhibited aniline hydroxylase, a P-450 enzyme. The concentration required for 50% inhibition (IC(50)) was found to be 540 microg/ml. The extract was found to inhibit DNA topoisomerase II of Saccharomyces cerevisiae mutant cell cultures and inhibited cell cycle regulatory enzyme cdc25 tyrosine phosphatase (IC(50-25) microg/ml). Antitumour and anticancer activity of P. amarus may be related with the inhibition of metabolic activation of carcinogen as well as the inhibition of cell cycle regulators and DNA repair.

Phytomedicine 2002 Jan;9(1):26-32
Antimutagenic and anticarcinogenic effects of Phyllanthus amarus.
Sripanidkulchai B, Tattawasart U, Laupatarakasem P, Vinitketkumneun U, Sripanidkulchai K, Furihata C, Matsushima T.
Department of Pharmaceutical Chemistry, Faculty of Pharmaceutical Sciences, Khon Kaen University, Thailand.
This study aimed to examine the antimutagenic and anticarcinogenic potential of Phyllanthus amarus Schum. et Thonn. using the bacterial preincubation mutation assay and an in-vivo alkaline elution method for DNA single-strand breaks in hamster liver cells. The aqueous extract of the entire plant showed an antimutagenic effect against induction by 2-aminofluorene (AF2), 2-aminoanthracene (2AA) and 4-nitroquinolone-1-oxide (4-NQO) in Salmonella typhimurium strains TA98 and TA100, and in Escherichia coli WP2 uvrA/pKM101. All the results were dose-dependent; however, inhibition of N-ethyl-N-nitrosoguanidine (ENNG)-induced mutagenesis was observed only with S. typhimurium TA100. The extract also exhibited activity against 2-nitrofluorene (2NF) and sodium azide-induced mutagenesis with S. typhimurium TA98 and TA100, respectively. Based on the alkaline elution method, the plant extract prevented in vivo DNA single-strand breaks caused by dimethylnitrosamine (DMN) in hamster liver cells. When the extract was administered 30 min prior to the administration of DMN, the elution rate constant decreased more than 2.5 times, compared to that of control. These results indicate that P. amarus possesses antimutagenic and antigenotoxic properties.

Southeast Asian J Trop Med Public Health. 2001 Mar;32(1):140-2.
A comparative study of Phyllanthus amarus compound and interferon in the treatment of chronic viral hepatitis B.
Xin-Hua W, Chang-Qing L, Xing-Bo G, Lin-Chun F.
Tropical Medicine Institute, Guangzhou University of Traditional Chinese Medicine, People's Republic of China.
Fifty-five patients with chronic viral hepatitis B were randomly divided into two groups. Thirty patients were treated with Phyllanthus amarus compound (PA Co) for three months in the treatment group, another 25 patients were treated with domestic recombinant human interferon alpha-1b (IFN-alpha 1b) for three months as controls. The total effective rate in the treatment group was 83.3%, showing no significant difference from the control (p>0.05). The normalization rates of ALT, A/G and SB in the treatment group were 73.3%, 80.0% and 78.2% respectively, which were significantly higher than that in the control (p<0.05). The negative conversion rates of HBeAg and HBV-DNA in the treatment group were 42.3% and 47.8%, showing no significant difference from the control (p>0.005). It is indicated that PA Co has remarkable effect for chronic viral hepatitis B in recovery of liver function and inhibition of the replication of HBV.

Phytother Res 2001 Nov;15(7):577-80
The effect of Phyllanthus amarus aqueous extract on blood glucose in non-insulin dependent diabetic patients.
Moshi MJ, Lutale JJ, Rimoy GH, Abbas ZG, Josiah RM, Swai AB. Institute of Traditional Medicine, MUCHS, Box 65001, Dar es Salaam, Tanzania.
The glycaemic response to 124.5 +/- 9.3 (mean +/- SD) g of pancakes was monitored in 21 non-insulin dependent diabetic (NIDDM) patients while on oral hypoglycaemics, after a 1-week washout period and after a 1-week twice daily treatment with 100 mL of an aqueous extract from 12.5 g of powdered aerial parts of Phyllanthus amarus. After the 1-week washout period, the fasting blood glucose (FBG) and postprandial blood glucose increased significantly compared with treatment on oral hypoglycaemics ($p < 0.05$). After a 1-week herbal treatment no hypoglycaemic activity was observed. Both FBG and postprandial blood glucose remained very similar to that recorded after the washout period ($p > 0.05$). Both liver and renal functions based on alanine transaminase (ALAT) and serum creatinine, respectively, were not significantly affected by the use of the extract. Although the lymphocyte and monocyte levels were significantly decreased ($p < 0.05$) and the granulocyte level was significantly increased after treatment ($p < 0.05$) the overall total white blood cell (WBC) count and haemoglobin (Hb) were not significantly affected by the 1 week herbal treatment. We conclude that 1 week treatment with the aqueous extract of Phyllanthus amarus was incapable of lowering both FBG and postprandial blood glucose in untreated NIDDM patients.

Afr J Med Med Sci 2000 Jun;29(2):119-22
Anti-diarrhoeal and gastro-intestinal potentials of the aqueous extract of Phyllanthus amarus (Euphorbiaceae). Odetola AA, Akojenu SM. Biochemistry Department, University of Ibadan, Ibadan, Nigeria.
The anti-diarrhoeal and gastro-intestinal protective potentials of aqueous extract of leaves of Phyllanthus amarus were investigated in mice. Graded doses of the aqueous extract (100-800 mg/kg) administered orally produced a dose-related inhibition of gut meal travel distance in normal mice. The highest intestinal transit inhibition of 31.65% was obtained with 400 mg/kg. In castor oil induced diarrhoea in mice, P. amarus extract (400 mg/kg) delayed the onset of diarrhoea, reduced frequency of defecation and reduced gut meal travel distance significantly resulting in intestinal transit inhibition of 79.94% compared to 86.92% produced by morphine (100 mg/kg). In addition, the activities of some intestinal mucosa enzymes (maltase, sucrase, lactase and alkaline phosphatase) in mice pretreated with extract before castor oil were not as severely depressed as those in the control (castor oil treated mice). Phytochemical screening revealed the presence of many secondary metabolites. The results are discussed with a view to establishing the basis of the use of this plant in traditional medicine for treatment of diarrhoea and other gastrointestinal disorders.

Phytother Res 2001 May;15(3):265-7
Contraceptive effects of Phyllanthus amarus in female mice.
Rao MV, Alice KM.
Reproductive Endocrinology and Toxicology Division, Zoology Department, School of Sciences, Gujarat University, Ahmedabad - 380009, India.
Antifertility effects of an alcohol extract of the whole plant, Phyllanthus amarus at a dose of 100 mg/kg body weight for 30 days orally was investigated in cyclic adult female mice. The results revealed no -significant change in absolute body and organ weights in extract-fed animals, indicating no alteration in general metabolic status. Further, feeding had no effect on haematological and clinical biochemical tests reflecting its non-toxicity. Similarly, uterine and ovarian biochemical tests showed no change except in 3beta and 17beta hydroxy steroid dehydrgenase (HSDs) levels, probably affecting hormonal conversions in the latter. Cohabited females with normal male mice were unable to become pregnant as their cyclicity was affected. These factors are related to a change in the hormonal milieu that governs female reproductive function. Upon withdrawal of feeding for 45 days, these effects were reversible. Thus this extract manifests a definite contraceptive effect in female mice.

J Ethnopharmacol 2000 Nov;73(1-2):215-9
Phyllanthus amarus extract administration increases the life span of rats with hepatocellular carcinoma.
Rajeshkumar NV, Kuttan R. Amala Cancer Research Centre, Thrissur, 680 553, Kerala, India.
The effect of Phyllanthus amarus extract administration after induction of hepatocellular carcinoma (HCC) by N-nitrosodiethylamine (NDEA) was studied in Wistar rats. Administration of an aqueous extract of P. amarus was found to significantly increase the survival of hepatocellular carcinoma harboring animals. All the untreated rats died of tumour burden by 33.7+/-1.6 weeks. Administration of P. amarus extract (150 mg/kg b.w.) after tumour development increased the survival of animals to an average of 52. 2+/-2.3 weeks. Serum gamma-glutamyl transpeptidase activity which was elevated to 182+/-23 U/l by NDEA administration was lowered to 112+/-19 U/l by the administration of P. amarus extract. Similarly elevated glutathione S-transferase activity (1534+/-116 nmol/min per mg protein) and glutathione (20.5+/-2.4 nmol/mg protein) levels in the NDEA administered group were found to be lowered to 1112+/-89 nmol/min per mg protein and 14.2+/-2.2 nmol/mg protein respectively. P. amarus administration was found to be ineffective in controlling the liver weight, elevation of tissue gamma-glutamyl transpeptidase, serum alkaline phosphatase and serum glutamate pyruvate transaminase of HCC harboring animals.

Indian J Exp Biol 1995 Nov;33(11):861-4
Diuretic, hypotensive and hypoglycaemic effect of Phyllanthus amarus.
Srividya N, Periwal S. Department of Home Science, Sri Sathya Sai Institute of Higher Learning, Anantapur, India.
Diuretic, hypotensive and hypoglycaemic effects of Phyllanthus amarus (syn. Phyllanthus niruri) on human subjects were assessed. Nine mild hypertensives (four of them also suffering from diabetes mellitus) were treated with a preparation of the whole plant of P. amarus for 10 days. Suitable parameters were studied in the blood and urine samples of the subjects, along with physiological profile and dietary pattern before and after the treatment period. Significant increase in 24 hr urine volume, urine and serum Na levels was observed. A significant reduction in systolic blood pressure in non-diabetic hypertensives and female subjects was noted. Blood glucose was also significantly reduced in the treated group. Clinical observations revealed no harmful side effects. These observations indicate that P. amarus is a potential diuretic, hypotensive and hypoglycaemic drug for humans.

Gen Pharmacol 1995 Nov;26(7):1499-1506
Analysis of the mechanisms underlying the antinociceptive effect of the extracts of plants from the genus Phyllanthus.
Santos AR, Filho VC, Yunes RA, Calixto JB.
Department of Pharmacology, Universidade Federal de Santa Catarina, Florianopolis, Brazil.
1. We examine some of the mechanisms underlying the analgesic effects of the hydroalcoholic extracts (HE) of Phyllanthus urinaria and P. niruri against formalin-induced nociception in mice. In addition, we also investigate the action of both HEs against capsaicin-mediated pain. 2. Both prazosin and yohimbine (0.15 mg/kg, i.p.) induced a marked inhibition of the analgesic effect caused by phenylephrine (10 mg/kg, i.p.) and clonidine (0.1 mg/kg, i.p.), respectively, but had no effect on the antinociceptive action caused by HE of P. urinaria (10 mg/kg, i.p.) or P. niruri (30 mg/kg, i.p.). 3. NG-nitro-L-arginine (L-NOARG, 75 mg/kg, i.p.) caused marked analgesic effect against the second phase of formalin-induced pain. Treatment of animals with L-arginine (600 mg/kg) completely antagonized the antinociceptive effect of L-NOARG but had no significant effect against the HE of P. urinaria (10 mg/kg, i.p.) or P. niruri (30 mg/kg. i.p.) analgesic properties. 4. The antinociceptive effects caused by the HEs of P. urinaria (10 mg/kg, i.p.) and P. niruri (30 mg/kg, i.p.) were unaffected by methysergide (5 mg/kg, i.p.), p-chloro-phenylalanine-methyl-ester (100 mg/kg, i.p., once a day for 4 consecutive days) or after previous adrenalectomy of animals. 5. The HE of P. urinaria and P. niruri given either intraperitoneally (1-30 mg/kg) or orally (25-200 mg/kg) caused marked and dose-related inhibition of capsaicin-induced pain with ID50 of 2.1 and 6.1 mg/kg given intraperitoneally and 39 and 35 mg/kg given orally, respectively. PMID: 8690236 [PubMed - indexed for MEDLINE]

J Lab Clin Med 1995 Oct;126(4):350-2
Herbs of the genus Phyllanthus in the treatment of chronic hepatitis B: observations with three preparations from different geographic sites. Wang M, Cheng H, Li Y, Meng L, Zhao G, Mai K.
Henan Institute of Medical Sciences, Henan Medical University, People's Republic of China.
It has been suggested that herbs of the Phyllanthus family may have antiviral activity. We therefore tested the effects of three different Phyllanthus extracts on the serologic status of 123 patients with chronic hepatitis B. Eleven patients received an extract of Phyllanthus amarus (L) provided by S.P. Thyagarajan, Madras, India. Forty-two patients received Phyllanthus niruri (L), gathered from Hainan Province in China, and 35 patients received an extract of Phyllanthus urinaria (L), which had been gathered in Henan Province. Thirty-five control patients received no herbal therapy. The patients receiving Phyllanthus urinaria (L) were both more likely to lose detectable hepatitis B e-antigen from their serum and more likely to seroconvert hepatitis B e-antibody status from negative to positive than were patients given either of the other two preparations. No patient changed status with respect to hepatitis B s-antigen.

Zhongguo Zhong Yao Za Zhi 1994 Dec;19(12):750-1, 764
[Efficacy of Phyllanthus spp. in treating patients with chronic hepatitis B] [Article in Chinese]
Wang MX, Cheng HW, Li YJ, Meng LM, Mai K. Henan Institute of Medical Sciences, Zhengzhou.
The efficacy of Phyllanthus amarus produced in india, P. niruri gathered from hainan province and P. urinaria from henan province was assessed in a total of 88 cases of chronic hepatitis B with 11.42 and 35 each. It was shown that P. urinaria had the effect of seroconversion on HBeAg from positive to negative as well as on HBeAb from negative to positive, while the other two herbs had not. In addition none of these three herbs had similar effect on HbsAg.

J Ethnopharmacol 1985 Sep;14(1):41-4
Antihepatotoxic principles of Phyllanthus niruri herbs. Syamasundar KV, Singh B, Thakur RS, Husain A, Kiso Y.
Among phyllanthin, hypophyllanthin, triacontanal and tricontanol isolated from a hexane extract of Phyllanthus niruri, phyllanthin and hypophyllanthin protected against carbon tetrachloride- and galactosamine-induced cytotoxicity in primary cultured rat hepatocytes, while triacontanal was protective only against galactosamine-induced toxicity.

J Pharm Pharmacol 1994 Sep;46(9):755-9
Analgesic effects of callus culture extracts from selected species of Phyllanthus in mice.
Santos AR, Filho VC, Niero R, Viana AM, Moreno FN, Campos MM, Yunes RA, Calixto JB.
Department of Pharmacology, Universidade Federal de Santa Catarina, Florianopolis, Brazil.
The aim of this study was to evaluate the analgesic effect of the methanolic extract from callus culture of Phyllanthus tenellus, P. corcovadensis and P. niruri in several models of pain in mice. The extracts (medium containing 2,4-dichlorophenoxyacetic acid) of P. corcovadensis, P. niruri and P. tenellus (3-90 mg kg-1, i.p.) caused graded inhibition of abdominal constrictions induced by acetic acid (0.6%), with ID50 (i.e. dose that reduced response of control by 50%) values of about 30, 19 and > 30 mg kg-1, respectively. The extract of callus of Phyllanthus obtained in indole-3-butyric acid and indole-3-acetic acid media (3-90 mg kg-1, i.p.) caused a similar analgesic effect. In the formalin test, the extract of P. tenellus obtained in indole butyric acid medium (3-100 mg kg-1, i.p.) inhibited only the second phase of formalin-induced pain with an ID50 value of about 100 mg kg-1. Both the indole acetic acid and indole butyric acid methanolic extracts of P. tenellus and P. corcovadensis (10-100 mg kg-1, i.p.) dose-dependently inhibited both phases of formalin-induced pain (ID50 values for the second phase were approx. 100 and 52 mg kg-1, respectively). However, the extract of callus from Phyllanthus failed to affect formalin-induced paw oedema, as well as the response to radiant heat in the tail-flick test. In addition, the analgesic effect of morphine, but not the analgesic effects caused by Phyllanthus callus extract, was fully antagonized by naloxone.

AIDS Res Hum Retroviruses 1992 Nov;8(11):1937-44
HIV-1 reverse transcriptase inhibitor from Phyllanthus niruri.
Ogata T, Higuchi H, Mochida S, Matsumoto H, Kato A, Endo T, Kaji A, Kaji H.
Research Institute for Molecular Genetics, Tsumura & Co., Ibaraki-Ken, Japan.
An aqueous extract of Phyllanthus niruri (Euphorbiaceae) inhibited human immunodeficiency virus type-1 reverse transcriptase (HIV-1-RT). The inhibitor against HIV-1-RT in this plant was purified by combination of three column chromatographies, Sephadex LH-20, cellulose, and reverse-phase high-performance liquid chromatography. The inhibitor was then identified by nuclear magnetic resonance (NMR) spectra as repandusinic acid A monosodium salt (RA) which was originally isolated from Mallotus repandus. The 50% inhibitory doses (ID50) of RA on HIV-1-RT and DNA polymerase alpha (from HeLa cells) were 0.05 microM and 0.6 microM, respectively, representing approximately a 10-fold more sensitivity of HIV-1-RT compared with DNA polymerase alpha. RA was shown to be a competitive inhibitor with respect to the template-primer while it was a noncompetitive inhibitor with respect to the substrate. RA as low as 10.1 microM inhibited HIV-1-induced cytopathogenicity in MT-4 cells. In addition, 4.5 microM of RA inhibited HIV-1-induced giant cell formation of SUP-T1 approximately 50%. RA (2.5 microM) inhibited up to 90% of HIV-1 specific p24 antigen production in a Clone H9 cell system.

Chem Pharm Bull (Tokyo) 1989 Sep;37(9):2531-2
Studies on aldose reductase inhibitors from natural products. II. Active components of a Paraguayan crude drug "Para-parai mi," Phyllanthus niruri.
Shimizu M, Horie S, Terashima S, Ueno H, Hayashi T, Arisawa M, Suzuki S, Yoshizaki M, Morita N.
Aldose reductase (AR) inhibitory activity-directed fractionation of the 70% ethanolic extract of Para-parai mi, Phyllanthus niruri, has led to the isolation of three active components, ellagic acid (1), brevifolin carboxylic acid (4) and ethyl brevifolin carboxylate (5). Among them, 1 showed the highest inhibitory activity, being about 6 times more potent than quercitrin, which is a known natural inhibitor of AR.

J Ethnopharmacol 1985 Sep;14(1):41-4
Antihepatotoxic principles of Phyllanthus niruri herbs.
Syamasundar KV, Singh B, Thakur RS, Husain A, Kiso Y, Hikino H.
Among phyllanthin, hypophyllanthin, triacontanal and tricontanol isolated from a hexane extract of Phyllanthus niruri, phyllanthin and hypophyllanthin protected against carbon tetrachloride- and galactosamine-induced cytotoxicity in primary cultured rat hepatocytes, while triacontanal was protective only against galactosamine-induced toxicity.

Proc Natl Acad Sci U S A 1987 Jan;84(1):274-8
Effects of an extract from Phyllanthus niruri on hepatitis B and woodchuck hepatitis viruses: in vitro and in vivo studies.
Venkateswaran PS, Millman I, Blumberg BS.
An aqueous extract of the plant Phyllanthus niruri inhibits endogenous DNA polymerase of hepatitis B virus and binds to the surface antigen of hepatitis B virus in vitro. The extract also inhibits woodchuck hepatitis virus (WHV) DNA polymerase and binds to the surface antigen of WHV in vitro. The extract, nontoxic to mice, was tested for antiviral activity in woodchucks (Marmota monax). In a trial using six long-term WHV-carrier woodchucks, five treated animals showed a faster decrease in woodchuck hepatitis virus surface antigen titer compared to one untreated control. In animals recently infected with WHV, the extract was effective when administered i.p. in three out of four animals in reducing and within 3-6 weeks eliminating both the surface antigen titer and DNA polymerase activity in serum. The treatment was discontinued after 10 weeks, and the treated animals have remained free of detectable markers of WHV for more than 45 weeks. In contrast, three untreated controls remained positive for both markers for WHV. One of the controls died after 8 weeks; the other two controls have remained positive for WHV markers for more than 45 weeks. In a third trial with long-term carriers, test animals treated subcutaneously with the extract for 12 weeks did not respond; but on switching the mode of administration to i.p., two out of the five animals showed a significant decrease in woodchuck hepatitis virus surface antigen titer compared to controls.

Braz J Med Biol Res 1984;17(3-4):313-21
Antispasmodic effects of an alkaloid extracted from Phyllanthus sellowianus: a comparative study with papaverine.
Calixto JB, Yunes RA, Neto AS, Valle RM, Rae GA.
Infusions of Phyllanthus sellowianus or P. niruri (Euphorbiaceae) are a popular remedy in Brazil for kidney and bladder stones. This study describes the isolation of an alkaloid from P. sellowianus, denoted ALK-1, and compares its antipasmodic activity with that of papaverine on isolated strips of guinea pig ileum and rat uterus, and rat aorta rings. ALK-1 and papaverine promoted a dose-dependent flattening of the dose-response curves obtained to acetylcholine and histamine on ileum strips and of the dose-response curves to acetylcholine and oxytocin on uterine strips. A non-competitive antagonism of noradrenaline-induced contractions by the P. sellowianus alkaloid was also demonstrated on aortic rings. Whereas the antispasmodic potency (pD'2 values) of papaverine did not depend on the muscle preparation and agonist used, ALK-1 exhibited a greater potency on the ileum strips than on the uterine or aortic preparations. Because of this selective antispasmodic action on the ileum, ALK-1 was equipotent to papaverine on this tissue, but was about 10-fold less potent than papaverine on uterine smooth-muscle. The dose-response curves to CaCl2 obtained for potassium-depolarized uterine strips were shifted to the right by both antispasmodics. Similar pA2 values with slopes not differing from unity -1.0 were obtained from Schild plots of the data, suggesting that competitive antagonism of calcium entry into the cell is a mechanism of action common to both alkaloids. The presence of at least one potent antispasmodic alkaloid in P. sellowianus justifies the popular use of infusions of this plant. Smooth muscle relaxation within the urinary or biliary tract probably facilitates the expulsion of kidney or bladder calculi.

J Ethnopharmacol 2002 Sep;82(1):19-22
Lipid lowering activity of Phyllanthus niruri in hyperlipemic rats.
Khanna AK, Rizvi F, Chander R.
Division of Biochemistry, Central Drug Research Institute, Lucknow 226001, India.
The lipid lowering activity (LLA) of Phyllanthus niruri has been studied in triton and cholesterol fed hyperlipemic rats. Serum lipids were lowered by P. niruri extract orally fed (250 mg/kg b.w.) to the triton WR-1339 induced hyperlipemic rats. Chronic feeding of this drugs (100 mg/kg b.w.) in animals simultaneously fed with cholesterol (25 mg/kg b.w.) for 30 days caused lowering in the lipids and apoprotein levels of VLDL and LDL in experimental animals. The LLA of this drug is mediated through inhibition of hepatic cholesterol biosynthesis, increased faecal bile acids excretion and enhanced plasma lecithin: cholesterol acyltransferase activity.

J Ethnopharmacol 2000 Sep;72(1-2):229-38
Antinociceptive properties of extracts of new species of plants of the genus Phyllanthus (Euphorbiaceae).
Santos AR, De Campos RO, Miguel OG, Filho VC, Siani AC, Yunes RA, Calixto JB.
Department of Pharmacology (CCB), Centre of Biological Sciences, Universidade
Federal de Santa Catarina, Rua: Ferreira Lima 82, Florianopolis, SC 88015-420, Brazil.
The hydroalcoholic extract (HE) of the four new species of Phyllanthus, given intraperitoneally, produced significant inhibition of acetic acid-induced abdominal constrictions, with mean ID(50) values of 0.3, 1.8, 7.4 and 26.5 mg/kg for Phyllanthus amarus, Phyllanthus orbiculatus, Phyllanthus fraternus and Phyllanthus stipulatus, respectively. In the formalin test, the four species of Phyllanthus, also produced graded inhibition against both phases of formalin-induced licking, being more active in relation of the late phase. The HE of the Phyllanthus species elicited significant inhibition of the capsaicin-induced neurogenic pain, with mean ID(50) values of 8.9, 6.7, >30 and approximately 30 mg/kg for P. amarus, P. fraternus, P. stipulatus and P. orbiculatus, respectively. Given orally all HE of the Phyllanthus species were less potent and efficacious than when given by intraperitoneally. Results of the present study extend previous data and indicate that all extracts of Phyllanthus plants so far studied exhibit pronounced antinociception when assessed in chemical models of nociception, namely acetic acid-induced writhing, and formalin and capsaicin-induced licking.

Eur J Clin Invest 1997 Nov;27(11):908-15
Phyllanthus amarus suppresses hepatitis B virus by interrupting interactions between HBV enhancer I and cellular transcription factors.
Ott M, Thyagarajan SP, Gupta S.
Department of Medicine, Albert Einstein College of Medicine, Bronx 10461, USA.
The Phyllanthus amarus plant suppresses HBV mRNA transcription in vitro and exhibits therapeutic potential in chronic HBV carriers, although further work is necessary to define its mechanism of action. Analysis in HuH-7 cells with transfected plasmids using a luciferase reporter showed that P. amarus specifically inhibited HBV enhancer I activity. To identify the mechanism of this HBV enhancer I inhibition, liver-enriched cellular transcription factors were co-expressed in HuH-7 cells. The C/EBP alpha and beta, as well as HNF-3 alpha and beta transcription factors, significantly up-regulated the HBV enhancer I activity. In contrast, co-transfection of HNF-I alpha or beta had no effect upon the HBV enhancer I activity. Exposure to P. amarus inhibited C/EBP alpha- and beta-mediated up-regulation of HBV enhancer I activity in a dose-dependent manner, whereas HNF-3 alpha- and beta-mediated up-regulation of HBV enhancer I was unaffected. In vitro gel shifts showed that P. amarus inhibited complexing of C/EBP transcription factors to a consensus oligonucleotide sequence, whereas DNA binding of AP-1 and SP-1 transcription factors was unaffected. As P. amarus down-regulates HBV mRNA transcription by a specific mechanism involving interactions between HBV enhancer I and C/EBP transcription factors, purification and further analysis of the active P. amarus component will advance insights into its antiviral activity.

Indian J Pathol Microbiol 1996 Jul;39(3):211-5
Inhibition of HBsAg secretion from Alexander cell line by Phyllanthus amarus.
Jayaram S, Thyagarajan SP.
Department of Microbiology, Dr. ALM Post Graduate Institute of Basic Medical Sciences, University of Madras, Taramani.
Alexander cell line, an human hepatocellular carcinoma derived cell line which has the property of secreting HBsAg in the supernatant was used to study the antiviral property of phyllanthus amarus. Aquous extract of Phyllanthus amarus was evaluated for its in vitro ability to inhibit HBsAg secretion on a dose dependent manner. It was seen that P. amarus at 1mg/ml concentration on a single dose inhibited the secretion of HBsAg for a period of 48 hours. This experiment proved the anti hepatitis B virus property of P. amarus at cellular level and further confirmed its beneficial use in the treatment of acute and chronic hepatitis B and healthy carriers of HBV.

Cancer Detect Prev 1989;14(2):195-201
Hepatitis B virus and hepatocellular carcinoma--treatment of HBV carriers with Phyllanthus amarus.
Blumberg BS, Millman I, Venkateswaran PS, Thyagarajan SP.
Fox Chase Cancer Center, Philadelphia, PA 19111.
Extracts of Phyllanthus amarus inhibit the DNA polymerase of HBV and related viruses. Woodchuck carriers of woodchuck hepatitis virus (WHV) were treated intraperitoneally with P. amarus extract. Three of four animals which had been recently infected lost the virus. Animals infected for about 3 months or more had a decrease in virus levels. Human carriers of HBV were treated orally for 1 month. About 60% of the carriers lost HBV, which did not return during the observation period. Fractions containing active principles are now being isolated and characterized.

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