PH-05 The Amazon and the wet tropics

HEALING after the FALL, research library, PH-05

Researched 10 October 2026 by Claude Opus agent for THRIVING after the FALL, Book Four. Library document, unverified.

Scope, method and how to read this report

This report covers the lowland neotropics: the Amazon and Orinoco basins, the Guianas and the wet Atlantic coast of Brazil. The African and Asian wet tropics have their own reports (THRIVING library, PH-06 and PH-07). Cinchona, coca and sangre de grado (Croton lechleri) were dealt with in the report on Mesoamerica and the Andes, and are not repeated here (THRIVING library, PH-04). Ayahuasca is treated only as a pointer to MI-11. It is written to stand alone for a reader in the Amazon, while the home pharmacopoeia stays in temperate Europe (THRIVING library, PH-01).

Each plant is first described as the people who use it describe it, with the name of the people and the source. Then come what the historical record shows it did and what modern pharmacology infers. Grades follow the series scale (A to D, and X). A grade belongs to the preparation that was tested, not to the plant (THRIVING library, PH-01). Where a figure is my own arithmetic or could not be confirmed it is marked [VERIFY].

The dangerous-substance rule applies to curare, the fish poisons and the other toxic plants here. For these the report gives history, evidence, dose, toxicity and feasibility, and no extraction, preparation or purification steps.

1. Whose knowledge, and the three books

The Amazonian pharmacopoeia is the knowledge of hundreds of peoples, of the riverine caboclo and ribeirinho communities, and of the herb markets of Belém, Manaus and Iquitos. Much of it reached Europe without the names of those who knew it. Charles Waterton learned to make wourali from the Macushi of Guyana and published their method without acknowledgement (Wakefield Museums n.d.). The library's rule is that knowledge is named and attributed, and that what the record marks as restricted is said to exist and not reproduced (THRIVING library, SY-04).

Three books shaped the outside world's picture of this pharmacopoeia.

The Healing Forest (Schultes and Raffauf 1990) is a botanical compendium of the medicinal and toxic plants of the northwest Amazon, published by Dioscorides Press as volume 2 of its Historical, Ethno- and Economic Botany Series, about 500 pages with a foreword by Prince Philip (Peck 1991). I could read only the publisher's listing and a review summary, not the book, so I cannot give its species count or say which of its entries were later tested.

Tales of a Shaman's Apprentice (Plotkin 1993) is a first-person account of Mark Plotkin's work with Tirio (Trio) healers in southern Suriname, centred on the village of Kwamala. He compiled a handbook of Tirio medicinal plants written in the Tirio language for the community's own use, co-founded the Amazon Conservation Team in 1995, and ran a "Shamans and Apprentices" programme that trained young people under elders (Voices for Biodiversity n.d., Smithsonian 2005 [VERIFY year]). He has said he would not publish the chemistry of what he was taught

because it belongs to the healers. The book is advocacy for forest knowledge as a pharmacy in waiting, and does not test that claim.

Amazonian Ethnobotanical Dictionary (Duke and Vásquez 1994) is a CRC Press reference of about 215 pages listing more than 1,000 species used around Iquitos, Peru, with drawings (WorldCat record). It is a list of reported uses, not of tested ones. I could not read it.

What survived scrutiny. Four modern drugs trace directly to the Amazonian and wet-tropical lowlands: tubocurarine from curare, emetine from ipecac, pilocarpine from jaborandi and crofelemer from sangre de grado (THRIVING library, PH-04). Of these, only crofelemer came out of a deliberate ethnobotanical drug-discovery programme. Shaman Pharmaceuticals, founded by Lisa Conte, screened plants with documented uses in several unconnected communities [VERIFY wording]. It ran a phase III trial of Provir (crofelemer) in about 400 patients, stopped drug development in 1999, and filed for Chapter 11 bankruptcy on 5 January 2001 (SupplySide 2001, Shaman Pharmaceuticals 1999). Napo Pharmaceuticals took the compound on, and the FDA approved crofelemer for HIV-associated diarrhoea on 31 December 2012 (Wikipedia, Crofelemer). The other three came from nineteenth-century chemists working on plants already famous. The plants that became drugs were those whose effect was obvious, fast and dose-dependent: paralysis, vomiting, sweating. Plants credited with slow, general benefits (immune support, cancer, "purifying the blood") have almost all failed when tested.

2. Curare: Chondrodendron tomentosum, Strychnos toxifera and related vines

In the tradition. Curare is a hunting poison, not a medicine. Peoples across the Amazon and Guianas made it for blowpipe darts and arrows: the Macushi of Guyana gave Waterton the bark poison he called wourali (Wakefield Museums n.d.), and the Canelos people of Pacayacu and Sarayacu in Ecuador showed Richard Gill their methods in 1938 (NYBG 2015). Two plant families are used. "Tube" and "pot" curares are made mainly from Menispermaceae vines such as Chondrodendron tomentosum and C. iquitanum, and "calabash" curare mainly from Loganiaceae, especially Strychnos toxifera, whose main alkaloid is toxiferine (NYBG 2015). The making is a multi-step craft, held by particular makers. It is not described here, under the dangerous-substance rule.

In the record. Peter Martyr d'Anghiera described arrow poison in 1516, and Walter Raleigh brought back "ourari" in 1595 (NYBG 2015). Waterton, prompted by Sir Joseph Banks, returned from Guyana with the poison in 1812. A donkey was poisoned, kept alive with bellows through an opening in the windpipe for some hours, recovered fully, was named Wouralia and lived for 25 more years (Wakefield Museums n.d.). Sources differ on the date and on who performed the experiment [VERIFY]. It showed that curare kills by stopping the breath, and that breathing for the patient until the drug wears off saves life.

In 1938 Gill spent four months in Ecuador with 75 Canelos people, collected specimens identified by Boris Krukoff at the New York Botanical Garden, and supplied 25 lb of crude curare to Squibb, which made a standardised extract called Intocostrin (NYBG 2015). On 23 January 1942, at the Montreal Homeopathic Hospital, Harold Griffith and Enid Johnson gave Intocostrin during an appendectomy under cyclopropane, without prior animal studies, and so founded muscle relaxation in anaesthesia (NYBG 2015). Wintersteiner and Dutcher crystallised d-tubocurarine in 1943 (Wikipedia, Tubocurarine chloride). On 10 January 1946 the anaesthetist Scott Smith had himself paralysed with d-tubocurarine, starting with 200 units over 15 minutes, while colleagues ventilated him and an EEG recorded his brain. By 2:45 pm he could not move any voluntary muscle, yet he was fully conscious, could hear and later recalled everything (Smith and others 1947, Curious Clinicians 2022). The drug relaxes muscle. It gives no sleep and no pain relief.

What science infers. Tubocurarine blocks the nicotinic receptor at the junction between nerve and muscle. It crosses mucous membranes poorly, which is why game killed with curare darts is safe to eat (Wikipedia, Tubocurarine chloride). By injection it is lethal at tiny doses: the intravenous LD50 is about 0.13 mg/kg in mice and 0.146 mg/kg in rabbits, and death comes from paralysis of the diaphragm unless the patient is ventilated (Wikipedia, Tubocurarine

chloride). It also releases histamine, lowering blood pressure. In hospitals it was reversed with neostigmine, but overdose could outlast the reversal (Wikipedia, Tubocurarine chloride [VERIFY]). A clinical dose of about 0.5 mg/kg is reported in secondary sources [VERIFY].

What it means after the Fall. A muscle relaxant without a ventilator is death. There is no indication for curare in a village or district, and no grade other than X outside a hospital. The one useful lesson is the reverse: anyone paralysed by a dart, a curare accident, a snakebite with paralysing venom (THRIVING library, WO-13) or a botulism case stops breathing while still awake. If someone breathes for them by mouth-to-mouth or bag and mask, without stopping, they can live until the poison wears off. The Copenhagen polio epidemic of 1952, when patients were ventilated by hand, showed that this is possible (THRIVING library, ME-14). Wouralia showed it for curare in the early nineteenth century. Talk to them while you breathe for them, because they can hear.

3. Cat's claw: Uncaria tomentosa and U. guianensis, inner bark

In the tradition. Uña de gato, unha-de-gato, is a woody liana with paired, hooked thorns. Peruvian Amazonian peoples, the Asháninka in particular, are reported to decoct the bark for arthritis, inflammation, wounds and as a general tonic. Every account I could reach is secondary, so I cannot give the Asháninka understanding in their own terms or cite a community source, and I say so.

In the record and the trials. The best trial is Mur and others (2002): 40 patients with active rheumatoid arthritis already on sulfasalazine or hydroxychloroquine got an extract of the pentacyclic-alkaloid chemotype or placebo for 24 weeks, double-blind. Painful joints fell by 53.2% on extract against 24.1% on placebo ($p = 0.044$), with only minor side effects. Piscoya and others (2001) gave freeze-dried U. guianensis or placebo to 45 patients with knee osteoarthritis (30 against 15) for four weeks and reported less pain on activity. Both trials are small and neither has been replicated with the same preparation. A Cochrane review of herbal therapy for rheumatoid arthritis exists (Cameron and others 2011), and I read only its index record. I found no Cochrane review of cat's claw alone.

Harms. Acute renal failure in a woman with lupus (Hilepo and others 1997), biopsy-proven acute interstitial nephritis from a shake containing U. tomentosa with creatinine rising from 0.7 to 3.6 mg/dL (Case Reports in Nephrology and Dialysis 2022), and a Brazilian case of nephritis after cat's claw tea with uxi amarelo (Revista FT n.d.). The US National Center for Complementary and Integrative Health says it appears safe by mouth for up to six months, and warns that it may worsen autoimmune disease (NCCIH n.d.).

Lookalikes. U. tomentosa and U. guianensis are both sold as cat's claw. They have different alkaloid chemotypes, and the tested extract was chemotype-specific (Mur and others 2002). The common name is applied to other thorny vines in markets [VERIFY].

Grade. B for the tested pentacyclic extract as an add-on in rheumatoid arthritis, small and unreplicated. C for crude bark decoction in joint pain. D for immune and anticancer claims. Cat's claw is not in Brazil's Formulário de Fitoterápicos (ANVISA 2021, searched). It is a second-line pain remedy for adults with arthritis, never in lupus, kidney disease, pregnancy or after a transplant.

4. Copaiba: Copaifera species, trunk oleoresin

In the tradition. Óleo de copaíba is the forest's general-purpose remedy in Brazilian Amazonian households, indigenous and caboclo alike: rubbed on wounds, bruises and skin infections, taken in drops for sore throat and inflammation. The trees are tapped by drilling into the trunk, and the resin is a renewable forest product sold through cooperatives.

In the record. Copaiba was a standard drug of Victorian medicine for gonorrhoea. Britain imported 151,000 lb in 1859, mostly for that purpose (Pitt n.d.). The British Pharmaceutical Codex of 1911 describes it as an oleoresin from bore holes, at least 40% volatile oil, given at 30 to 60 minims (about 2 to 4 mL), often in capsules of 0.3 to 1.8 mL. It

warns of a red rash and digestive upset, and lists adulterants: gurjun balsam from Dipterocarpus, turpentine, castor oil and African copaiba (BPC 1911). Dunglison's 1874 formulary gives 2.7 to 3.6 g three times a day (Pitt n.d.). It never cured gonorrhoea, as far as the record shows, and it fell out of use once effective drugs arrived [VERIFY].

Yield. Plowden (2003) drilled trees in the eastern Brazilian Amazon. The mean first-harvest yield was 0.07 L per tree drilled and 0.23 L per tree that yielded anything, against local claims of 2 L or more. Trees of 45 to 65 cm in diameter gave most, and hollow trees little. An Embrapa study of C. reticulata at Jari found a mean of 603.6 mL per tree at first harvest, and the resin had not been replenished ten months later (Embrapa 2023). Reviews give 0.3 to 3 L per extraction and occasional reports of tens of litres [VERIFY]. Recommended rest intervals between harvests range from six months to three years [VERIFY]. Expect a few hundred millilitres from a good tree, and many dry trees.

In the trials. The best trial is null. Cardinelli and others (2024) randomised 84 patients with skin tears to a hydrogel with 10% or 2% C. multijuga oleoresin or the hydrogel alone, and found no difference in healing time. Waibel and others (2021) tested a silicone gel with copaiba oil on surgical scars: 42 enrolled, 32 completed, and the Manchester Scar Scale improved by 3.00 points against 1.38 on placebo ($p = 0.02$). The trial was industry-funded. A small acne study of a 1% copaiba essential oil gel was positive (Gomes da Silva and others 2012), and a case series of six chronic wounds was favourable (Revista de Enfermagem Referência n.d.). Laboratory work shows anti-inflammatory and antimicrobial activity of the oleoresin, attributed mainly to β-caryophyllene and diterpene acids [VERIFY].

Grade. D for wound healing, with one null randomised trial. C for minor skin inflammation and scars. X for gonorrhoea and for swallowing it as a cure-all. It is safe enough on intact skin and small wounds. The essential oil, not the resin, is an aspiration hazard if swallowed.

5. Andiroba: Carapa guianensis, seed oil

In the tradition. Among the Tembé of the eastern Brazilian Amazon, andiroba oil is used as an insect repellent, a medicine for skin, bruises and joint pain, a fuel for lamps and candles, and soap (Plowden 2004). In the riverine communities of Anamã, Manacapuru and Silves in Amazonas, the oil is made by women. Mendonça and Ferraz (2007) interviewed 38 producers and recorded the method. Seeds are gathered over three to five days, boiled for one to three hours, and stored for up to 20 days. They are then shelled, the kernels kneaded into a mass, and the mass is set on an inclined board, from which oil drips for up to 30 days. Oil from shade is held to be better. The whole cycle takes about two months, the final stage is often in the hands of one woman, and young people no longer take part. This is safe household knowledge, published by the researchers with the producers, and is given as a protocol below.

Yield. In Tembé forest Plowden (2004) counted 6.5 andiroba trees per hectare and measured about 0.8 kg of seed per tree in the season studied (1.2 kg estimated), against claims of 50 to 300 kg. In one measured batch, 14.4 kg of seed gave 1 L of oil. Seed oil content is about 25%, and up to 30% with good technique (Berger 2005). The traditional method recovers far less than the seed holds.

In the trials. Miot and others (2004) tested repellents on four volunteers against Aedes mosquitoes. The median time to the first and third bites was 17.5 and 40 seconds with nothing, 60 and 101.5 seconds with soya oil, 56 and 142.5 seconds with pure andiroba oil, and 63 and 97.5 seconds with 15% andiroba. With 50% DEET there were no bites by 3,600 seconds in most runs. The authors concluded that andiroba gives a small effect, far below DEET. Andiroba was barely better than soya oil: any oil film helps a little.

Grade. D as a repellent, and X as malaria or dengue protection. D for skin and joint use. Harms are slight: the oil is very bitter, and I found no human toxicity data [VERIFY]. A village in malaria country needs nets, house screening and clearing of water (THRIVING library, IN-09), not andiroba.

6. Ipecac: Carapichea ipecacuanha, root

In the tradition. Poaia, ipecacuanha, is a small shrub of the shaded forest understorey in Brazil. Its use against dysentery was taken from indigenous Brazilian practice by Portuguese colonists, and root gatherers, poaieiros, dug wild plants for export [VERIFY].

In the record. Ipecac is one of the few plant remedies with a pre-antibiotic clinical record against a named infection, amoebic dysentery. Docker in Mauritius in 1858 showed that doses of 60 grains (about 4 g) cured early acute cases (cited by Rogers 1912). Leonard Rogers in Calcutta (1912) treated microscope-confirmed amoebic dysentery with crude ipecac, at least 30 grains (about 2 g) at a time, twice in 24 hours in bad cases, raising the dose by 10 grains every two to three days if there was no improvement. Opium was given an hour beforehand in the older practice to reduce vomiting [VERIFY]. Of 30 patients, 11 died. Excluding the moribund, 9 of 26 died (34.6%). Those who were cured took 5 to 44 days (mean 11.4) and a total of 140 to 1,320 grains (mean 406 grains, about 26 g). He then gave emetine, the main alkaloid, by injection to 26 patients: two moribund patients and two with other diseases died, and 22 recovered. The stools became healthy in a mean of 2.3 days on about 2 grains (130 mg) of emetine, and hospital stay fell from 16.4 to 7.2 days (Rogers 1912). Rogers noted that the vomiting comes from local action on the stomach, which is why the injected alkaloid worked without it.

The Codex of 1911 gives powdered root as an emetic at 1 to 2 g, an expectorant at 15 to 120 mg, and for tropical dysentery 1 to 4 g, with opium if needed. Good root holds 2 to 3% alkaloid, of which emetine is about 72% and cephaeline about 26% (BPC 1911). The modern USP standard is at least 2.0% ether-soluble alkaloids (USP 35). Wild Brazilian roots tested recently held 0.44 to 1.44% emetine (Agris record), so the strength of a gathered root may vary threefold [VERIFY].

What science infers. Emetine kills amoebae but is cardiotoxic. It accumulates and is still excreted 40 to 60 days after a course, and secondary sources give 1 mg/kg a day, at most 60 mg, for four to six days (THRIVING library, IN-11, which marks these doses [VERIFY]). Metronidazole replaced it. Emesis with ipecac syrup for poisoning has been abandoned: it does not improve outcome and delays charcoal and other care (THRIVING library, ME-14, Clinical Toxicology 2004). Grade X.

Lookalikes. The Codex lists false ipecacs: Cartagena root (another Psychotria), undulated root (Richardsonia), white ipecacuanha (Ionidium), and stems mixed with the root, which hold only 1.0 to 1.8% alkaloid (BPC 1911).

Grade. B for crude root in microscope-confirmed amoebic dysentery when no nitroimidazole exists, with a mortality of about a third in Rogers's hands. B for emetine. X for emesis. Amoebiasis is under 3% of bloody diarrhoea in young children (THRIVING library, IN-11), so ipecac is never a remedy for dysentery in general.

7. Jaborandi: Pilocarpus microphyllus and related species, leaf

In the tradition. Jaborandi was used in Brazil to make people sweat and salivate before it reached Europe (Lloyd 1904). The name is also given to Piper species used for toothache, a source of confusion that persists (King's 1898).

In the record. Symphronio Coutinho brought the leaves to Paris in 1873 or 1874, sources differ, and in 1875 Hardy in France and Gerrard in England isolated pilocarpine (Lloyd 1904). Its use in the eye began in 1876 and for glaucoma in 1877 (Lloyd 1904). King's American Dispensatory (1898) gives a drachm or two of powdered leaf infused in a cup of water, or an infusion of 45 grains in 2 fl oz given 1 fl oz at a time. Within minutes the patient flushes, sweats for four to five hours and produces 1 to 2 pints of saliva, with nausea and small pupils. King's warns of heart depression, asystole and drowning in bronchial secretions, and notes that atropine antagonises the drug but not reliably.

Chemistry and supply. Dried leaves of P. microphyllus from Maranhão held 0.88 to 1.00% total alkaloid, of which pilocarpine was 35% (Sawaya and others 2011 [VERIFY authors]). That gives about 0.3% pilocarpine [VERIFY, my arithmetic]. The literature range is 0.5 to 1%. Brazil is the sole commercial source, from Maranhão and Piauí, and

P. microphyllus has been listed as endangered since 2008 (Genetic Resources and Crop Evolution 2011 [VERIFY]). On my arithmetic, 1 g of leaf holds about 3 to 10 mg pilocarpine [VERIFY].

Modern evidence. Pilocarpine tablets relieve radiation-induced dry mouth in about half of patients, and 6 to 15% withdraw at 5 mg three times a day because of sweating and other effects (Davies and Thompson 2015, Cochrane, abstract read). Pilocarpine drops remain a glaucoma drug, and acute angle-closure glaucoma is covered elsewhere (THRIVING library, WO-16), where pilocarpine is listed as not makeable and to be hoarded. I agree. A leaf infusion cannot be made sterile or dosed for the eye.

Grade. A for pilocarpine in glaucoma and dry mouth. D for leaf infusion as a sialogogue after the Fall: the effect is certain, the dose is not. X for leaf preparations in the eye. Never in asthma, heart disease, pregnancy or the old.

8. Chanca piedra or quebra-pedra: Phyllanthus niruri, whole plant

In the tradition. Both the Spanish and Portuguese names mean "stone breaker". Across Brazil and Peru the small herb is taken as a tea for kidney and bladder stones and for "the liver". It is one of the most used plants in Brazilian popular medicine, and Brazil announced its first phytomedicine made from it in May 2026 (CFF 2026).

In the trials. Nishiura and others (2004) randomised 69 calcium stone formers to 450 mg capsules three times a day [VERIFY] or placebo for three months. There was no overall difference in urine chemistry, stone passage or pain. In the hypercalciuric subgroup, urinary calcium fell from 4.8 to 3.4 mg/kg a day. Pucci and others (2018) gave an infusion for 12 weeks to 56 patients with stones under 10 mm, with no control group. Stone number fell from 3.2 to 2.0 per patient ($p < 0.001$), and oxalate in those with high levels fell from 59.0 to 28.8 mg a day. A urology review judged the evidence modest (Olweny n.d.).

The hepatitis B story. In 1988 Thyagarajan and others reported in the Lancet that P. amarus cleared hepatitis B surface antigen in 59% of carriers (Thyagarajan 1988, read as an index record). Leelarasamee and others (1990) could not reproduce it, and a New Zealand trial was also negative. The Cochrane review found no convincing evidence against placebo, and all trials at high risk of bias (Xia and others 2011). It is the clearest failure in the regional pharmacopoeia.

The Brazilian Formulário. ANVISA (2021) gives 3 g of dried aerial parts infused in 150 mL, or 1.5 to 3 g of dried whole plant decocted for 10 minutes, or 4.5 to 6 g fresh, as 150 mL two to three times a day. It is for adults only, and contraindicated in pregnancy and breastfeeding, in large stones (risk of obstruction) and in allergy to the spurge family. Use is limited to three weeks because of pyrrolizidine alkaloids, with a week's pause after each three weeks. Overdose gives diarrhoea, low blood pressure and marked diuresis, and the plant potentiates diabetes drugs. The 2011 edition called it litholytic, the 2021 edition only an aid in "mild urinary complaints".

Lookalikes. Several small Phyllanthus species (P. amarus, P. tenellus, P. urinaria) are gathered under the same name [VERIFY]. Small prostrate spurges (Euphorbia) grow in the same yards. They bleed white latex when broken, while Phyllanthus does not [VERIFY]. Do not use a plant that bleeds milk.

Grade. C for mild urinary complaints and as an adjunct with water in small stones. D for dissolving stones. X for hepatitis B.

9. Guava leaf: Psidium guajava

In the tradition. Guava, a native of tropical America now grown worldwide, is used as a leaf decoction for diarrhoea in at least 44 countries (Liu and others 2024 [VERIFY first author]). PH-04 covers its Mesoamerican use and graded it B, and IN-11 graded it C for colic and D for stopping diarrhoea. I adjudicate here with a trial neither used.

In the trials. Lozoya and others (2002) found that a standardised leaf extract, 500 mg every eight hours for three days, shortened abdominal pain but not diarrhoea (THRIVING library, PH-04, IN-11). Birdi and others (2020) ran an open randomised trial in India of 109 adults with acute infectious diarrhoea, all receiving oral rehydration solution.

One leaf weighed about 0.53 g. Doses of 1.6, 3.2, 5.3 and 7.4 g of leaf powder a day were boiled in 120 mL of water down to 30 mL and taken as three 10 mL doses. The 14-leaf dose (7.4 g a day) worked best: stools returned to normal in 72 hours against 120 hours on rehydration alone, with no adverse events (Birdi and others 2020). ANVISA (2021) gives 2.5 to 4 g of dried leaf decocted in 150 mL, 150 mL two to four times a day, for up to five days, for mild non-infectious diarrhoea, not under 12, not in pregnancy or breastfeeding, and with caution in diabetes and heart disease. The two dose ranges overlap at roughly 5 to 10 g of leaf a day for an adult.

Grade. B for shortening acute diarrhoea in adults alongside rehydration, from one open trial and one double-blind trial on pain. I disagree in part with both library reports: with IN-11, because Birdi is a randomised trial with a clinically meaningful effect, and with PH-04, because the trial is unblinded and unreplicated. C in children over 12, and not to be given under 12, because no safe child dose exists (Liu and others 2024). The decoction never replaces rehydration (THRIVING library, IN-11).

10. Papaya: Carica papaya, seed, leaf and latex

Seed for worms is covered in the library, grade B (THRIVING library, IN-08, Protocol 6).

Leaf juice in dengue. In Malaysia, Subenthiran and others (2013) gave the juice of 50 g of fresh leaves (about 30 mL) once a day for three days to dengue patients in an open-label trial with about 228 analysed, and the platelet count rose faster than in controls. A meta-analysis of nine studies found a shorter hospital stay of about two days (1.98) on low-quality evidence and judged the evidence insufficient to recommend it (Rajapakse and others 2019). Platelet counts are a surrogate, and no trial showed fewer deaths or haemorrhages. Grade C for platelet recovery. Survival in dengue depends on fluids and watching for shock.

Latex. The milky latex of the unripe fruit is a protein-digesting irritant. Papain caused oesophageal perforation in a 27-year-old woman (MedlinePlus n.d.). Crude latex contracts the rat uterus like oxytocin, so unripe or semi-ripe fruit and latex should be avoided in pregnancy, while ripe fruit appears harmless (Adebiyi and others 2002). Latex and papain cross-react with latex allergy. Mashed unripe papaya has been used to clean burn wounds in children in The Gambia (Starley and others 1999), and I could not read the details [VERIFY]. Grade D for wound debridement, X for swallowing latex.

11. The rest of the brief

Annatto (Bixa orellana, seed coat). Urucum, achiote, is a red body paint and food colour across the lowlands, used also as an insect repellent (Vilar and others 2014). The pharmacology is almost entirely laboratory work (Vilar and others 2014). I found no controlled test of repellency. Annatto dye has caused anaphylaxis (Nish and others 1991). Grade D.

Cecropia (C. obtusifolia, leaf). Guarumo, embaúba, is a fast-growing pioneer tree used for diabetes in Mexico and Central America. Revilla-Monsalve and others (2007) gave a leaf infusion to 12 newly diagnosed type 2 diabetics for 32 weeks without a control group. Glucose fell from week 4 and HbA1c from week 6, and both rose again when it stopped. Grade D. Not a substitute for diet or, where it exists, metformin.

Guarana (Paullinia cupana var. sorbilis, seed). The Sateré-Mawé of the Andirá-Marau land in Amazonas are the people who domesticated guaraná, which they call waraná. In their own account the plant has a sacred origin bound up with the origin of the people (JSTOR Daily n.d.). They make a hard stick (bastão) of pounded, smoke-dried seed, grated into water to make the drink çapó (Slow Food Brasil 2023, JSTOR Daily n.d.). Their "Waraná" holds a geographical indication, the first in Brazil for an indigenous people (Notícias Agrícolas n.d.). The origin story is the people's own and is told at length in their published materials, not here. The seed holds 2 to 7.5% caffeine, and pharmacopoeia standards ask at least 3.5% [VERIFY] (EMA draft assessment, USP 35). A crossover trial in 75 women with breast cancer on chemotherapy found less fatigue on 50 mg of extract twice a day at days 21 and 49, and

four stopped for palpitations (de Oliveira Campos and others 2011). Grade C for fatigue. It is a caffeine source with the harms of caffeine.

Pau d'arco (Handroanthus, formerly Tabebuia, inner bark). Ipê-roxo and taheebo, sold worldwide for cancer and infection. Its naphthoquinone lapachol went to a US National Cancer Institute phase I trial in 1974, which found no therapeutic window: the doses needed for an effect were toxic, and work stopped (Eyong and others 2020). Plasma levels of 5.6 to 26.4 μg/mL followed oral doses of 35 to 40 mg/kg (Balassiano and others 2005). Reports of anticoagulant effects I could not confirm [VERIFY]. Supplement sellers' pages are not to be trusted. Grade X for cancer, D for anything else.

Jatobá (Hymenaea courbaril, bark and resin). Widely used in Brazilian folk medicine. Reviews find only laboratory antimicrobial and anti-inflammatory activity and low acute toxicity (Hymenaea review 2025). Grade D.

Chuchuhuasi (Maytenus macrocarpa, bark). Peruvian bark used for rheumatism, sold in Iquitos markets and often steeped in alcohol [VERIFY]. Only laboratory studies exist (Maytenus review 2019), and several other Maytenus species share the name. I found nothing on the human dose or the maceration. Grade D.

12. The plants that kill

Curare kills by injection, as in section 2. **Strychnos** species in the Old World give strychnine (S. nux-vomica), and calabash curare comes from S. toxifera. Any Strychnos is to be treated as lethal.

Fish poisons. Barbasco and timbó are names for Lonchocarpus urucu (Deguelia) and related legumes, whose roots release rotenone and deguelin into water. Peoples across the Amazon have used them to stun fish (Wikipedia, Lonchocarpus urucu). Rotenone dissolves poorly in water and fish killed with it are eaten, but it is a human poison. A 47-year-old woman died after drinking up to 200 mL of a 0.8% solution, a 3.5-year-old child died after about 40 mg/kg, and estimates of the lethal adult dose run to 300 to 500 mg/kg (Wood and others 2005, NIOSH n.d.). Neither the roots nor their preparation have any medical use. Keep the root paste away from children and water sources other than the fishing pool.

Datura and Brugmansia (angel's trumpets) are covered as a lookalike pair in PH-10 and in PH-04. **Ayahuasca** (Banisteriopsis caapi with Psychotria viridis or other admixtures) is covered in MI-11, and its patent dispute in SY-04. Ceremonial use is not taught (THRIVING library, SY-04). **Bitter cassava** must be processed to remove cyanide, and this belongs to the food reports.

Latex and bark confusion. The literature on bark and latex lookalikes is thin. Red or white latex is not a species character: many unrelated trees bleed red or white sap [VERIFY], and Bussmann's survey of Peruvian market remedies found that 24% of water extracts and 76% of ethanol extracts were toxic in a brine-shrimp test (THRIVING library, PH-04). The rule from PH-10 holds: three independent confirmations, and never a bark or latex bought in a market unless the tree was seen.

13. Ranked table of the key plants

Rank	Plant (part)	Preparation	Use	Grade	Adult dose (two sources where safety-critical)	Main harms	Lookalikes
1	Psidium guajava (leaf)	Decoction	Acute diarrhoea with ORS	B adults, not under 12	7.4 g a day in 3 doses (Birdi 2020). 2.5 to 4 g per 150 mL, 2 to 4 times a day, 5 days (ANVISA 2021)	Constipation, delays ORS if relied on	Few
2	Carapichea ipecacuanha (root)	Powder	Microscope-proven amoebic dysentery, no metronidazole	B. X as emetic	2 g, up to twice a day (Rogers 1912). 1 to 4 g (BPC 1911)	Vomiting, heart toxicity, death in a third of Rogers's cases	Psychotria, Richardsonia, Ionidium, stems
3	Carica papaya (seed, leaf)	Seed elixir, leaf juice	Worms (IN-08). Dengue platelets	B worms. C platelets	Leaf juice from 50 g leaves, once a day, 3 days (Subenthiran 2013)	Latex burns, pregnancy (unripe fruit)	Few
4	Phyllanthus niruri (whole plant)	Infusion	Mild urinary complaints, small stones	C. D dissolving. X hepatitis B	3 g per 150 mL, 2 to 3 times a day, at most 3 weeks (ANVISA 2021). 450 mg three times a day (Nishiura 2004)	Pyrrolizidine alkaloids, obstruction, low blood pressure	Other Phyllanthus, Euphorbia (white latex)
5	Uncaria tomentosa (bark)	Decoction, extract	Arthritis pain	B extract. C bark	Not established for crude bark [VERIFY]	Kidney injury, autoimmune flare	U. guianensis, other hooked vines

Rank	Plant (part)	Preparation	Use	Grade	Adult dose (two sources where safety-critical)	Main harms	Lookalikes
6	Copaifera spp. (oleoresin)	Neat or in salve	Minor wounds, scars, skin	D wounds. C scars	30 to 60 minims by mouth historically (BPC 1911). 2 to 10% in gel tested on skin (Cardinelli 2024)	Rash, gut upset, adulteration	Gurjun balsam, turpentine, castor oil
7	Carapa guianensis (seed oil)	Boiled and dripped	Skin, joints, weak repellent	D. X as malaria protection	On skin as needed	Bitter, none recorded	Carapa procera (Africa)
8	Paullinia cupana (seed)	Stick grated in water	Fatigue	C	50 mg extract twice a day (Campos 2011)	Caffeine excess, palpitations	Few
9	Pilocarpus spp. (leaf)	Infusion	Dry mouth (pilocarpine A)	D crude leaf. X eye	45 grains in 2 fl oz, 1 fl oz a dose (King's 1898). Pilocarpine 5 mg three times a day (Cochrane)	Sweating, slow heart, lung secretions	Piper "jaborandi", Swartzia decipiens
10	Cecropia obtusifolia (leaf)	Infusion	Type 2 diabetes	D	Not confirmed [VERIFY]	Hypoglycaemia with drugs [VERIFY]	Other Cecropia
11	Bixa orellana, Hymenaea courbaril, Maytenus macrocarpa	Various	Skin, tonic, rheumatism	D	Not established	Allergy (annatto), unknown	Name confusion
12	Handroanthus (bark)	Decoction	Cancer, infection	X cancer	None	Lapachol toxicity	Many traded barks

Rank	Plant (part)	Preparation	Use	Grade	Adult dose (two sources where safety-critical)	Main harms	Lookalikes
13	Chondrodendron; Strychnos (curare)	Not given	Hunting poison	X outside hospital	Not given	Respiratory paralysis	Other Menisper-maceae and Logani-aceae

14. Tradition, record and inference side by side

Plant	What the tradition says	What the record shows it did	What science infers
Curare	A hunting poison, safe to eat the game	Kills by stopping breath, survivable with ventilation (Wouralia)	Nicotinic block, no use without a ventilator
Ipecac	Cures the bloody flux	Rogers 1912: about a third died on root, few on emetine	Emetine is amoebicidal and cardiotoxic
Jaborandi	Makes one sweat and spit	Reliable sweating and salivation, some deaths from heart and lungs (King's)	Pilocarpine, a cholinergic agonist
Quebra-pedra	Breaks stones	Brazilian practice, then trials that are null or uncontrolled	Small effects on urinary calcium and oxalate
Guava leaf	Stops the flux	Long folk use	Tannins and flavonoids, one positive trial
Cat's claw	Strengthens, heals joints	Secondary accounts only	Small RCT signal in RA, kidney harms
Copaiba	Heals everything on the skin	Victorian gonorrhoea drug, never shown to cure	Anti-inflammatory terpenes, null skin-tear RCT
Andiroba	Keeps insects off, heals skin	Household and trade use	Barely better than soya oil as a repellent

Evidence grades

The ranked table carries a grade per use. **A**: pilocarpine (dry mouth, glaucoma) and tubocurarine in hospital anaesthesia, neither available in a village. **B**: guava leaf decoction with rehydration in adults, crude ipecac and emetine in proven amoebic dysentery, papaya seed for worms (IN-08), and the cat's claw extract in rheumatoid arthritis. **C**: quebra-pedra for mild urinary complaints, papaya leaf for platelet recovery, guaraná for fatigue, copaiba for scars, cat's claw bark for joint pain. **D**: copaiba on wounds, andiroba on skin and against insects, Cecropia, annatto, ja-

tobá, chuchuhuasi, jaborandi leaf at home. **X**: ipecac as an emetic, Phyllanthus for hepatitis B, lapachol for cancer, andiroba as malaria protection, copaiba for gonorrhoea, papaya latex by mouth, curare outside a hospital.

Means ledger

Remedy	Hands	Hearth	Garden and still	Village dispensary	District infirmary	Hospital before the Fall
Guava leaf	Know the tree	Decoction with ORS	Dried leaf stored, weighed doses	Records of stool days	Stool microscopy to find amoebae and cholera	ORS, zinc, antibiotics when needed
Ipecac	Nothing safe	Nothing safe	Grow and dry root	Weigh 2 g doses only if amoebae are seen	Microscope, pulse watch, emetine if salvaged	Metronidazole, tinidazole, paro-momycin
Quebra-pedra	Drink water	Infusion	Weighed dried herb	Three-week courses, logbook	Urine tests, recognise obstruction	Ultrasound, lithotripsy, surgery
Papaya	Grow it	Leaf juice, ripe fruit	Seed elixir (IN-08)	Platelet count impossible without a lab	Blood count, fluid charts in dengue	IV fluids, intensive care
Copaiba	Tap a tree	Clean wounds first	Salve with beeswax	Wound records	Sterile dressings, surgery	Modern dressings
Andiroba	Gather seed	Boil and drip the oil	Press for higher yield	Nets and screens matter more	Malaria microscopy	Repellents, antimalarials
Jaborandi	Nothing	Nothing safe	Grow as a crop	Dry mouth only, low doses	Pilocarpine if salvaged, atropine for overdose	Tablets, eye drops
Curare	Breathe for the paralysed	Mouth-to-mouth	Bag and mask if made	Rota of breathers	Bag, oxygen if any	Ventilator, reversal drugs

For diarrhoea the gain is at the hearth, where rehydration saves lives and guava shortens the illness. For amoebic dysentery it is at the dispensary, because only a microscope justifies ipecac. For stones and dengue, the district's ability to recognise obstruction or shock matters more than any plant.

Harm test

Guava leaf. Harms are mostly from what it displaces: a mother who trusts the tea and stops rehydration loses the child. Too strong a decoction constipates. Not under 12 (ANVISA 2021, Liu and others 2024). Stop if there is blood, high fever or no improvement in two days, and look for amoebae and cholera (THRIVING library, IN-11).

Ipecac. The error that harms is giving it for every dysentery, or for poisoning. It causes severe vomiting and, at higher totals, heart toxicity (THRIVING library, IN-11). Never in pregnancy, children, the old, the dehydrated or anyone

with heart disease. Signs that it is going wrong: persistent vomiting, a fast or irregular pulse, breathlessness, swelling. Stop and give fluids. Roots vary threefold in strength, so a new batch should be started at the low end.

Quebra-pedra. Long use risks liver injury from pyrrolizidine alkaloids, hence the three-week limit (ANVISA 2021). It can push a large stone into the ureter and block the kidney. A blocked, infected kidney (fever, rigors, flank pain) kills within days. Not in pregnancy, breastfeeding, under 18 or with diabetes drugs without watching for low blood sugar.

Cat's claw. Kidney injury and autoimmune flares (Hilepo and others 1997, NCCIH n.d.). Never in lupus, kidney disease, transplant recipients, pregnancy. Stop if urine output falls or swelling appears.

Copaiba. Rash, nausea and diarrhoea by mouth (BPC 1911). Adulteration is common (BPC 1911). Do not swallow the distilled essential oil, which can be aspirated. On a deep or dirty wound it does not replace cleaning and drainage.

Papaya latex. Burns the mouth and gut, and in pregnancy unripe fruit and latex are to be avoided (MedlinePlus n.d., Adebiyi and others 2002).

Jaborandi. Heart slowing, asystole and lung secretions (King's 1898). Never in asthma, heart disease, pregnancy, the old or children. The antidote is atropine, which a village will rarely have.

Curare and fish poisons. Covered in sections 2 and 12. The harm is death. The treatment of curare poisoning is continuous ventilation.

Red flags

These signs mean that the patient may die or be disabled without what the village cannot give.

- Bloody diarrhoea with high fever, or diarrhoea with no urine for six hours or more in a child (THRIVING library, IN-11 [VERIFY threshold]). Rehydrate and keep rehydrating, whatever the plant.
- Fever and pain under the right ribs after dysentery, which may be an amoebic liver abscess [VERIFY]. Send to the district.
- Flank pain with fever and rigors in someone with a stone. Stop quebra-pedra, give fluids, send to the district. Without drainage this kills.
- In dengue, belly pain, repeated vomiting, bleeding from gums or nose, cold hands, sleepiness [VERIFY]. Fluids by mouth, constant watching, send to the district.
- Drooping eyelids, double vision and failing breath after a bite, a dart or a strange meal. Breathe for the patient for as long as it takes.
- A fast, irregular pulse or chest pain during ipecac or emetine. Stop at once.

What to do anyway: keep the patient warm, given fluids, clean and accompanied, and tell them what is happening. When nothing more can be done, give comfort, pain relief where it exists and the presence of family.

The case against

The strongest case against the Amazonian pharmacopoeia comes from its own history. The ethnobotanical drug-discovery programme that promised to turn forest knowledge into medicines, Shaman Pharmaceuticals, went bankrupt, and of its candidates only crofelemer reached approval, more than a decade later and for a narrow indication (SupplySide 2001, Wikipedia, Crofelemer). The most cited Phyllanthus result, Thyagarajan's Lancet paper, failed to replicate (Leelarasamee and others 1990, Xia and others 2011). Lapachol failed at phase I (Eyong and others 2020). Copaiba failed its best wound trial (Cardinelli and others 2024), and andiroba was little better than soya oil (Miot and others 2004). Bussmann's toxicity screen of Peruvian market remedies is a warning about all crude bark and latex preparations (THRIVING library, PH-04). The three classic books are records of reported uses, which the supplement trade has turned into claims.

The opposing case is also real. Of 122 plant-derived drugs, 80% had a matching traditional use (THRIVING library, SY-04). The three drugs that came from this flora, tubocurarine, emetine and pilocarpine, came because the peoples who used them had already found the dose-dependent effect. The honest conclusion is that the tradition is a reliable guide to what a plant does to the body, and an unreliable guide to what it cures.

The romance of the hospital fails too. Emetine was a heart poison and was replaced. Ipecac syrup was kept in household medicine cupboards for decades [VERIFY] before it was shown useless for poisoning. Before Smith showed in 1946 that tubocurarine gives no sedation, there was a real risk that paralysed patients were awake [VERIFY].

10-line summary

1. Curare kills by paralysing breathing, and without a ventilator it has no use. Breathing for a paralysed patient keeps them alive.
2. Crude ipecac root cured amoebic dysentery in the pre-antibiotic record, with about a third of patients dying, and only when amoebae were seen.
3. Ipecac as an emetic for poisoning is grade X.
4. Guava leaf decoction, about 7.4 g a day for adults, shortened acute diarrhoea alongside rehydration in one trial.
5. Quebra-pedra is safe only for adults, for at most three weeks, and does not reliably dissolve stones.
6. Phyllanthus for hepatitis B failed to replicate and is grade X.
7. Copaiba and andiroba are useful household oils, but copaiba failed its best wound trial and andiroba is a weak repellent.
8. Cat's claw extract had a small positive trial in rheumatoid arthritis and causes kidney injury in some.
9. Jaborandi gave pilocarpine, but the leaf at home cannot be dosed safely.
10. Pau d'arco, chuchuhuasi, jatobá, annatto and Cecropia rest on laboratory work, anecdote or tiny uncontrolled series.

Open questions

- What is the safe dose of guava leaf for children, and does the Birdi result replicate under blinding?
- Can a village grade ipecac root strength without a laboratory, given the threefold variation in wild roots?
- What was the curare clinical dose and duration in the Intocostrin era, and how long would a village need to ventilate an accidental dart injury?
- What does andiroba oil do on skin in a controlled trial, and is it toxic by mouth?
- Which Phyllanthus species are sold as chanca piedra in each market, and how much pyrrolizidine alkaloid do they carry?
- What do The Healing Forest and the Amazonian Ethnobotanical Dictionary say about each plant here, and which of their entries were tested later?
- What do the Asháninka themselves say about cat's claw, in a source they control?

Sources to read in full

1. Rogers 1912, the ipecac and emetine series, already read.
2. Birdi and others 2020, the guava trial, already read.
3. ANVISA Formulário de Fitoterápicos, 2nd edition 2021, for every plant it covers.
4. Schultes and Raffauf 1990, The Healing Forest.
5. Duke and Vásquez 1994, Amazonian Ethnobotanical Dictionary.
6. Plotkin 1993, Tales of a Shaman's Apprentice, read as advocacy.
7. Mendonça and Ferraz 2007 on andiroba oil making.
8. Plowden 2003 and 2004 on copaiba and andiroba yields.
9. Xia and others 2011, the Cochrane review of Phyllanthus for hepatitis B.

10. Smith and others 1947 on awake paralysis with d-tubocurarine.

At the bedside after the Fall

Household. Plant guava and papaya at the door. Know the guava decoction and give it only alongside oral rehydration. Make andiroba oil if the trees are near, and use it on skin. Keep copaiba resin for small cuts and grazes after washing. Know how to breathe for someone who stops breathing. Needs: a pot, a measuring cup, a scale or a counted-leaf rule, clean water, salt and sugar. First failure to expect: a family gives guava tea to a dehydrated child and stops the rehydration solution.

Village of 300. One trained lay healer keeps dried guava leaf, quebra-pedra and papaya seed by weight, and a logbook of every dose. A microscope, if salvaged, becomes the most important tool against dysentery, because it alone justifies ipecac. Grow ipecac in shade if the climate allows. Keep a rota of people trained in rescue breathing. Needs: a scale to 0.1 g, jars, labels, a microscope with stain if possible, and the PH-10 identification rule. First failure to expect: a market bark or latex of the wrong species.

District of 3,000. A nurse or doctor with a microscope can diagnose amoebiasis and malaria, give ipecac or salvaged metronidazole, and watch the pulse. The district keeps any salvaged pilocarpine and atropine, a bag and mask, and the means to recognise kidney obstruction and dengue shock. It sets the dosing standard for the villages and checks root and leaf batches. First failure to expect: emetine or ipecac toxicity in a patient who did not need it, because bloody diarrhoea was assumed to be amoebic.

Protocols

Protocol 1. Guava leaf decoction for acute diarrhoea in adults and children over 12

- ☐ Start oral rehydration solution first and keep it going (THRIVING library, IN-11).
- ☐ Pick young, healthy, unspotted leaves of a tree you know is guava.
- ☐ Weigh 7 to 8 g of dried leaf, or count 14 fresh leaves of medium size (Birdi and others 2020).
- ☐ Boil in 120 mL of water until about 30 mL remain.
- ☐ Strain. Give 10 mL three times in the day.
- ☐ Alternative from ANVISA (2021): 2.5 to 4 g dried leaf boiled in 150 mL, 150 mL two to four times a day.
- ☐ Stop at five days, or earlier when stools are normal.
- ☐ Do not give under 12, in pregnancy or breastfeeding.
- ☐ Stop and send on if there is blood, high fever or no improvement after 48 hours.

Protocol 2. Quebra-pedra infusion for mild urinary complaints in adults

- ☐ Confirm it is Phyllanthus: small herb, leaves in two rows, tiny fruits beneath, no milky sap.
- ☐ Weigh 3 g of dried aerial parts (ANVISA 2021).
- ☐ Pour 150 mL of boiling water over it, cover, steep 10 minutes [VERIFY: ANVISA steeping time], strain.
- ☐ Drink 150 mL two to three times a day, and drink plenty of water besides.
- ☐ Stop after three weeks and rest one week before any second course.
- ☐ Never under 18, in pregnancy, breastfeeding, or with a known large stone.
- ☐ Stop and send on at once for fever, rigors, flank pain or no urine.

Protocol 3. Andiroba oil by the riverine method

- ☐ Gather fallen andiroba seeds over three to five days (Mendonça and Ferraz 2007).
- ☐ Boil the seeds for one to three hours.
- ☐ Store them, covered, for up to 20 days, until the kernels soften.
- ☐ Shell them and knead the kernels into a smooth mass.

- ☐ Spread the mass on an inclined board in the shade, with a vessel beneath.
- ☐ Collect the dripping oil for up to 30 days. Expect about 1 L per 14 kg of seed (Plowden 2004).
- ☐ Strain through cloth and store in clean, closed bottles.
- ☐ Use on skin for bites, bruises and dry skin. As a repellent, renew often and rely on nets.

Protocol 4. Copaiba salve for small wounds and scars

- ☐ Use only resin from a tree you tapped or saw tapped. Bought resin may be gurjun balsam, turpentine or castor oil (BPC 1911).
- ☐ Wash the wound with boiled water and soap first.
- ☐ Make a salve of 1 part beeswax to 4 parts oil (THRIVING library, PH-01), with copaiba as about one tenth of the oil [VERIFY: my inference from the 2 to 10% gels tested].
- ☐ Test a small patch of skin for 24 hours. Stop if a rash appears.
- ☐ Apply thinly once a day under a clean dressing.
- ☐ Do not put it in deep, dirty, punctured or swollen wounds. These need cleaning and drainage.
- ☐ Do not swallow copaiba essential oil.

Protocol 5. Ipecac root for proven amoebic dysentery, district only

- ☐ Use only when amoebae with swallowed red cells have been seen under the microscope, and no metronidazole, tinidazole or paromomycin exists (THRIVING library, IN-11).
- ☐ Never for poisoning (THRIVING library, ME-14).
- ☐ Adults only. Not in pregnancy, heart disease, the old, children or the dehydrated.
- ☐ Rehydrate first.
- ☐ Opium, if available, was given an hour beforehand in the nineteenth-century practice to reduce vomiting (Rogers 1912 [VERIFY]).
- ☐ Give 2 g (30 grains) of powdered root (Rogers 1912). The Codex range is 1 to 4 g (BPC 1911).
- ☐ In severe cases repeat after 12 hours. Do not raise the dose for a new or untested root batch.
- ☐ Check the pulse before every dose. Stop at any irregular pulse, chest pain or breathlessness.
- ☐ Record each dose, stool and pulse. Expect improvement over days, not hours.

Protocol 6. Papaya leaf juice in dengue, alongside fluids

- ☐ Fluids by mouth come first and continue throughout.
- ☐ Wash 50 g of fresh, young papaya leaves (Subenthiran and others 2013).
- ☐ Pound and squeeze out the juice, about 30 mL.
- ☐ Give it once a day for three days.
- ☐ Not in pregnancy. Do not use the latex of unripe fruit.
- ☐ Watch for the red flags of dengue. The juice does not prevent shock.

Numbers to carry

1. Guava leaf: about 7.4 g (14 leaves) a day for an adult, always with rehydration.
2. Quebra-pedra: 3 g per 150 mL, two to three cups a day, at most three weeks, adults only.
3. Ipecac root: 2 g a dose in proven amoebic dysentery, about a third still died on root (Rogers 1912).
4. Emetine shortened healthy stools to 2.3 days against 11.4 on crude root (Rogers 1912).
5. Pilocarpine: 5 mg three times a day relieves dry mouth in about half (Cochrane).
6. Copaiba: 0.07 to 0.23 L per tree on first tapping (Plowden 2003).
7. Andiroba: about 14 kg of seed for 1 L of oil, and barely better than soya oil as a repellent.
8. Curare: lethal at about 0.13 mg/kg by injection, harmless swallowed, survivable with continuous breathing.

9. Papaya leaf juice: 50 g of leaves, 30 mL, once a day for three days in dengue.

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