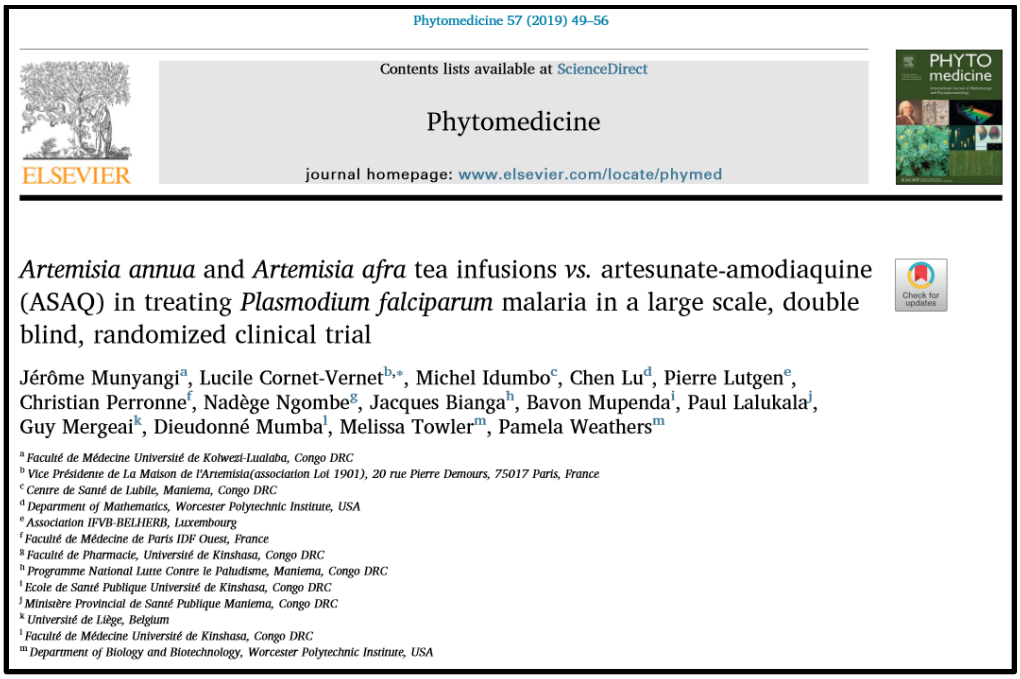

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Artemisia annua and *Artemisia afra* tea infusions *vs.* artesunate-amodiaquine (ASAQ) in treating *Plasmodium falciparum* malaria in a large scale, double blind, randomized clinical trial

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DISEASE: Malaria (uncomplicated)

LOCATION: Democratic Republic of Congo

STUDY SUBJECTS: Human Trial - 248 with A. annua, 471 with ASAQ (artesunate combination therapy for malaria)

TREATMENT: Tea: 1L/day dry leaf/twig infusion for 7 days

RESULT: Fast, efficient clearing of parasites and fever with negligible side effects. **Superior results compared to ASAQ**

QUOTING THEIR CONCLUSION: "Treating uncomplicated malaria with either A. annua or A. afra was superior to the artesunateamodiaquine ASAQ treatment. Fever and parasitemia **clearances were faster and more efficient** with both Artemisia species than with ASAQ; adverse effects were negligible. At D14-28 gametocyte carriage was undetectable in Artemisia-treated patients, **so transmission to the mosquito should be interrupted**. Artemisia is a polytherapy with at least 10 active molecules likely acting in synergy, so **resistance is therefore unlikely to emerge**."

LINK:
https://www.sciencedirect.com/science/article/abs/pii/S0944711318305968?via%3Dihub

Tropical Journal of Pharmaceutical Research June 2012; 11 (3): 445-453

Available online at http://www.tjpr.org
http://dx.doi.org/10.4314/tjpr.v11i3.14

Research Article

Artemisia Annua L. Infusion Consumed Once a Week Reduces Risk of Multiple Episodes of Malaria: A Randomised Trial in a Ugandan Community

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DISEASE: Malaria

LOCATION: Uganda

STUDY SUBJECTS: Human Trial – 132 people (66 given tea, 66 given nothing)

TREATMENT: Tea made from dried *A. annua*

RESULT: **Significantly reduced the risk** (by 55%) of suffereing more than one episode of malaria in 9 months

QUOTING THEIR CONCLUSION: "**Artemisia annua infusion consumed once a week was effective in preventing multiple episodes of malaria in humans** living in malaria endemic areas. However, its bitter taste and the risk of development of malaria parasite resistance to the artemisinin contained in it remain major challenges for its use in the mass control of malaria."

LINK: https://www.ajol.info//index.php/tjpr/article/view/82105

Published in final edited form as:
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Artemisia annua dried leaf tablets treated malaria resistant to ACT and i.v. artesunate: case reports

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DISEASE: Severe Malaria – did not respond to ACT or i.v. artesunate

LOCATION: Democratic Republic of Congo

STUDY SUBJECTS: Human trial – 18 people

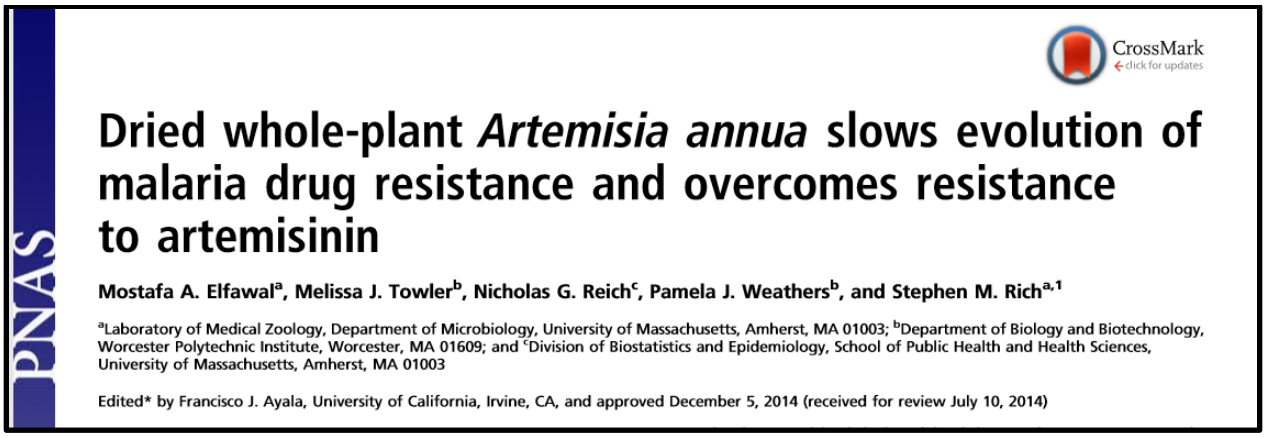
TREATMENT: Dried leaf (0.5 g) twice daily for five days

RESULTS: "All patients were previously treated with Coartem® provided through Santé Rurale (SANRU) and following the regimen prescribed by WHO. **Of 18 ACT-resistant severe malaria cases compassionately treated with dried *A. annua* leaf, all fully recovered**. Of the 18, this report details two pediatric cases."

Take home: leaf material saved lives when other medications could not

QUOTING THEIR CONCLUSION: "To our knowledge this is the first report of **dried-leaf *Artemisia annua* controlling ACT resistant malaria in humans**. These 18 cases occurred over six months. They represented ~0.09 % of total ACT-treated patients in the same time and location, and demonstrated that oral consumption of dried leaf tablets of A. annua has **possible utility in rescuing patients from ACT and i.v. artesunate failures**. More comprehensive clinical trials on patients with ACT-resistant malaria are warranted and should include dosing studies with DLA containing different ratios of, e.g. artemisinin and flavonoids, and also patient follow up through 28d to track recrudescence."

LINK:
https://www.sciencedirect.com/science/article/abs/pii/S0944711317300570?via%3Dihub



PNAS

Dried whole-plant *Artemisia annua* slows evolution of malaria drug resistance and overcomes resistance to artemisinin

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Edited* by Francisco J. Ayala, University of California, Irvine, CA, and approved December 5, 2014 (received for review July 10, 2014)

DISEASE: Malaria (uncomplicated)

LOCATION: Democratic Republic of Congo

STUDY SUBJECTS: Human Trial – 248 with A. annua, 471 with ASAQ (artesunate combination therapy for malaria)

TREATMENT: Dried *Artemisia annua* leaf

RESULT: **Dried leaf material is five times more effective than artemisinin** at eliminating the malaria parasite, is better at killing artemisinin-resistant parasites, and is **3x less likely to develop resistance**. This is due to the synergistic effects of the other components in the plant. Mice **treated with leaf material had >40 times the amount of artemisinin in the blood stream**

QUOTING THEIR CONCLUSION: "The WP (whole plant) antimalarial therapy serves as a case study of how those resilient naturally occurring systems might be co-opted for use against animal pathogens. Although much work remains, the **clear evidence of the efficacy** of WP as a naturally occurring combination therapy pACT against rodent malaria models warrants its further consideration to explore how we might develop **inexpensive, abundant, and resilient malaria therapies** from a nonpharmaceutical product."

LINK: https://www.pnas.org/content/112/3/821

Experimental Parasitology 122 (2009) 233–241

Contents lists available at ScienceDirect

Experimental Parasitology

journal homepage: www.elsevier.com/locate/yexpr

Toxoplasma gondii: Effects of *Artemisia annua* L. on susceptibility to infection in experimental models in vitro and in vivo

Taísa Carrijo de Oliveira [a], Deise A. Oliveira Silva [a], Cristina Rostkowska [a], Samantha Ribeiro Béla [a], Eloisa A.V. Ferro [b], Pedro Mellilo Magalhães [c], José Roberto Mineo [a,*]

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DISEASE: Toxoplasmosis

LOCATION: Brazil

STUDY SUBJECTS: Cell and mouse study

TREATMENT: A. annua extract

RESULT: Extract showed dose-dependent **inhibition activity** up to 75% inhibition. The infusion seems to affect more directly the parasite than the infected cells

QUOTING THEIR CONCLUSION: "In conclusion, our results **indicate a potential use** of *A. annua* infusion to control T. gondii infection, due to its **low toxicity and considerable inhibition of parasite infection and replication**, resulting in a suitable alternative therapeutic tool.

LINK: https://www.sciencedirect.com/science/article/abs/pii/S0014489409001015

Rev Soc Bras Med Trop 50(1):52-60, January-February, 2017
doi: 10.1590/0037-8682-0457-2016

Major Article

In vitro and *in vivo* antileishmanial activity of *Artemisia annua* L. leaf powder and its potential usefulness in the treatment of uncomplicated cutaneous leishmaniasis in humans

Luz Estella Mesa[1], *Daniel Vasquez*[1], *Pierre Lutgen*[2], *Iván Darío Vélez*[1], *Adriana María Restrepo*[1], *Isabel Ortiz*[3] *and Sara María Robledo*[1]

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DISEASE: Leishmaniasis (Cutaneous – Skin)

LOCATION: Colombia

STUDY SUBJECTS: Cell, Hamster, and Human study

TREATMENT: A. annua capsules

RESULT: *Artemisia annua* L. capsules showed moderate *in vitro* (in cells) with **no undesired cytotoxicity**. Five of 6 hamsters treated with *A. annua* capsules for 30 days were cured. The two **human patients were cured 45 days after initiation** of treatment with 30g of *A. annua* L. capsules, without any adverse reactions. **Both patients remained disease-free 26 and 24 months after treatment completion**.

QUOTING THEIR CONCLUSION: "The potential effectiveness and safety of *A. annua* L. leaf powder observed in the present study could serve as **fundamental evidence** for considering this herb product as an alternative for CL (cutaneous leishmaniasis) treatment."

LINK: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0037-86822017000100052&lng=en&nrm=iso&tlng=en

frontiers in MICROBIOLOGY

ORIGINAL RESEARCH ARTICLE
published: 25 November 2014
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Leishmanicidal activities of *Artemisia annua* leaf essential oil against Visceral Leishmaniasis

Mohammad Islamuddin[1], Garima Chouhan[1], Muzamil Y. Want[1], Maujiram Tyagi[2], Malik Z. Abdin[2], Dinkar Sahal[3] and Farhat Afrin[4]*

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DISEASE: Leishmaniasis (Visceral – most deadly form)

LOCATION: Saudi Arabia, India

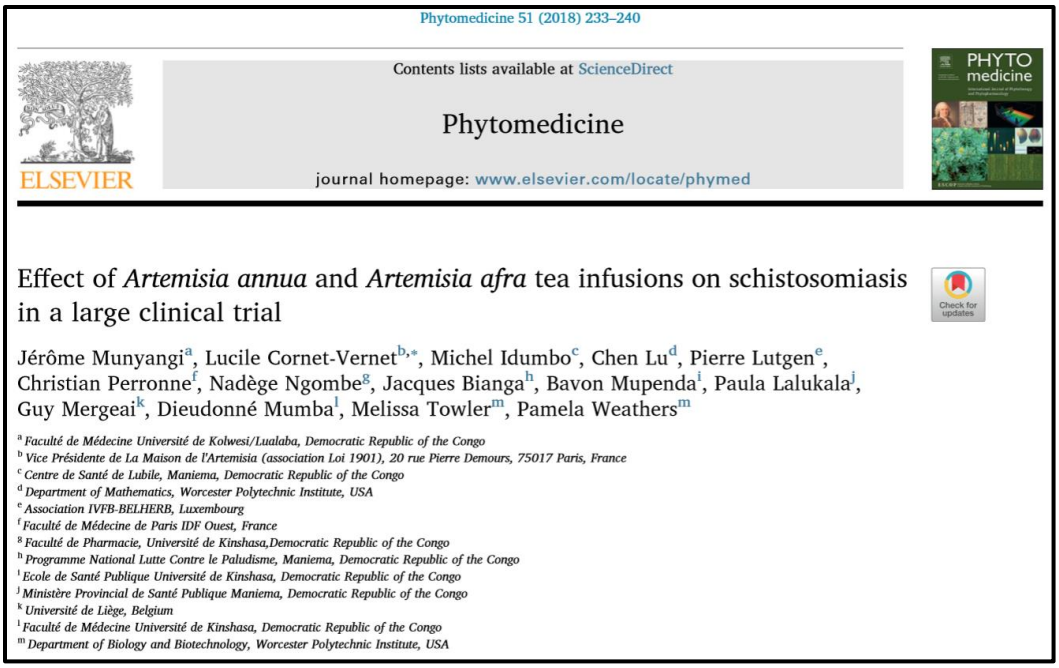
STUDY SUBJECTS: Cell and Mouse study

TREATMENT: A. annua extract

RESULT: Significant activity in cell study, with only low doses required to kill the parasite and **leaving the mammalian cells unharmed**. In mice, a **90% reduction in disease burden** was seen.

THEIR CONCLUSION: "Thus, we **conclusively demonstrate** that camphor-rich oil of AALEO exhibited **antileishmanial efficacy** against the promastigotes and intracellular amastigotes. The leishmanicidal activity was further confirmed in L. donovani infected BALB/c mice where **≥90% inhibition** of parasite burden was observed. Moreover, no cytotoxic effect was observed on the mammalian macrophages and there was **no impairment of liver and kidney functions** of BALB/c mice treated with AALEO."

LINK: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4243575/



Phytomedicine 51 (2018) 233–240

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journal homepage: www.elsevier.com/locate/phymed

Effect of *Artemisia annua* and *Artemisia afra* tea infusions on schistosomiasis in a large clinical trial

Jérôme Munyangi[a], Lucile Cornet-Vernet[b,*], Michel Idumbo[c], Chen Lu[d], Pierre Lutgen[e], Christian Perronne[f], Nadège Ngombe[g], Jacques Bianga[h], Bavon Mupenda[i], Paula Lalukala[j], Guy Mergeai[k], Dieudonné Mumba[l], Melissa Towler[m], Pamela Weathers[m]

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DISEASE: Schistosomiasis

LOCATION: Democratic Republic of the Congo

STUDY SUBJECTS: Human Trial – 800 participants (400 control, 200 A. annua, 200 A. afra)

TREATMENT: A. annua tea (1L/day dry leaf/twig tea infusions, 3 aliquots daily, for 7 days)

RESULT: **All Artemisia-treated patients had no detectable disease following 14 days of treatment**. The tea provided a fast, effective treatment which was recommended for implementation on a global scale.

QUOTING THEIR CONCLUSION: "Although all treatment arms yielded similar outcomes 28 days after patient intake, **A. annua and A. afra tea infusions given for 7 days were faster** than PZQ at eliminating schistosome eggs from patient feces. Artemisia-treated patients also exhibited **fewer adverse drug affects** than PZQ-treated patients. Although posology requires further development, A. annua and A. afra tea infusions **should be considered as part of the global effort to combat schistosomiasis**."

LINK:
https://www.sciencedirect.com/science/article/abs/pii/S0944711318305336?via%3Dihub