**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. afr a was superior to the artesunate-amodiaquine 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
**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 suffering 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.”

**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:**
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
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.

**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.”

Leishmanicidal activities of *Artemisia annua* leaf essential oil against Visceral Leishmaniasis

Mohammad Islamuddin¹, Garima Chouhan¹, Muzamil Y. Want¹, Maujiram Tyagi², Malik Z. Abdin², Dinkar Sahal³ and Farhat Afrin⁴

¹ Parasite Immunology Laboratory, Department of Biotechnology, Jamia Hamdard (Hamdard University), New Delhi, India
² Centre for Transgenic Plant Development, Department of Biotechnology, Jamia Hamdard (Hamdard University), New Delhi, India
³ Malaria Group, International Centre for Genetic Engineering and Biotechnology, New Delhi, India
⁴ Department of Medical Laboratories Technology, Faculty of Applied Medical Sciences, Taibah University, Medina, Saudi Arabia

**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/
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.”