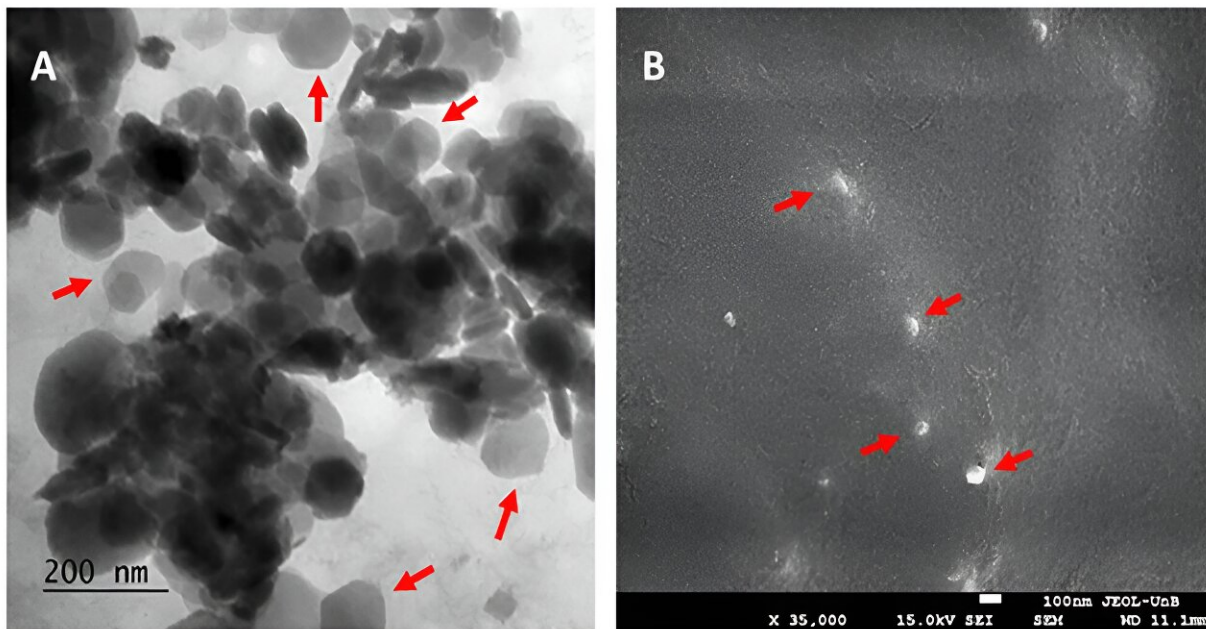


# Copaiba oil nanoemulsion found to have antiviral potential against zika

December 8 2023, by Julia Moioli



Representative ultramicrographs of copaiba oil nanoemulsion (CNE), acquired by transmission (A) and scanning (B) electron microscopy. Credit: *PLOS ONE* (2023). DOI: 10.1371/journal.pone.0283817

In an article [published](#) in the journal *PLOS ONE*, researchers at São Paulo State University (UNESP) in Brazil describe a potential strategy for combating zika virus (ZIKV).

Among the results reported in the article are those of in vitro tests

confirming the antiviral effects of a nanoemulsion made from oil of copaiba (*Copaifera officinalis*), a plant used to treat skin ailments by Indigenous people in the Amazon.

About eight years ago, ZIKV was found capable of causing in babies a congenital syndrome that includes visual, auditory and neuropsychomotor alterations. In adults, it can also cause neurological disorders such as Guillain-Barre syndrome.

No vaccines or specific treatments have so far been developed for infection by the virus, which is transmitted by *Aedes aegypti*, a mosquito that also transmits dengue and chikungunya.

Brazil was one of the most affected countries, with more than 250,000 suspected cases in 2016 alone. Although the worst of the outbreak is over, ZIKV still circulates in Brazil. Between January and July 2023, the number of reported cases rose 20% year on year, according to the Ministry of Health's statistics. The rise was highest (11.7%) in the Southeast region, where São Paulo is located.

"We note that the study points to routes for the development of treatments for a neglected tropical disease. It should also be stressed that the product is a natural oil and only a small amount is required, facilitating the development of a future pharmaceutical," said Marília de Freitas Calmon, last author of the article and a researcher at the São José do Rio Preto Institute of Biosciences, Letters and Exact Sciences (IBILCE-UNESP).

The study began with tests showing that the nanoemulsion remained stable for 60 days at 4°C and confirmed its uptake in cells infected by ZIKV.

The next step involved treatment with the nanoemulsion with copaiba oil

at a maximum non-toxic concentration of 180 micrograms per milliliter ( $\mu\text{g/mL}$ ), compared with the nanoemulsion without copaiba oil, showing 80% viral RNA inhibition versus 70% respectively, and indicating that both the nanoemulsion's structure and its association with the oil were efficacious.

The researchers also conducted a dose-dependence assay to see if a higher concentration would increase viral inhibition, which proved to be the case.

## Next steps

Despite the promising results, the researchers are cautious: the nanoemulsion without copaiba oil also displayed antiviral activity, so part of the effect may be associated with the composition of the egg lecithin (mainly phosphatidylcholine) used in the [nanoemulsion](#) as a surfactant. Other studies have shown that lipid nanoemulsions derived from natural foods can have an inhibitory effect.

More also needs to be known about exactly how viral replication is inhibited. According to Calmon, additional studies will help pinpoint the stages in which this occurs, for example. "This information will enable us to determine whether a future medication should be used only as pre-treatment or to combat the infection proper," she said.

For now, prevention remains the best way to combat the disease, according to the Ministry of Health, which recommends care to ensure that water is not left standing in old tires, plant pots, gutters and uncovered tanks, or on flat roofs, as standing water is favored by *A. aegypti* as a place to lay eggs.

Anyone who has symptoms such as sudden fever, headache, pain behind the eyes and in joints and muscles, nausea, vomiting, [abdominal pain](#),

itching and a red bumpy rash should seek medical assistance without delay.

**More information:** Tamara Carvalho et al, Synthesis of copaiba (*Copaifera officinalis*) oil nanoemulsion and the potential against Zika virus: An in vitro study, *PLOS ONE* (2023). [DOI: 10.1371/journal.pone.0283817](https://doi.org/10.1371/journal.pone.0283817)

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