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AJTMH Tip Sheet for October 2020

Your advance look at two new studies publishing online on October 15, 2020, in [The American Journal of Tropical Medicine and Hygiene](#).

- **Researchers find hypochlorous acid could combat latrine odor and infectious microbes—and promote greater latrine use—in developing countries**
- **New study finds artificial light at night is increasing *Aedes aegypti* mosquito biting behavior**

Researchers find hypochlorous acid could combat latrine odor and infectious microbes—and promote greater latrine use—in developing countries

As part of an effort to establish new means to encourage toilet and pit latrine use in developing countries, researchers from the University of Washington and Briotech, a manufacturer of hypochlorous acid (HOCl), found that HOCl chemically modified the malodorous, off-putting compounds identified in the air of latrines in developing countries. This study also showed the potential of HOCl to rapidly inactivate infectious particles that can cause gastrointestinal diseases. The study was published today in the American Journal of Tropical Medicine and Hygiene.

According to the authors, promoting greater use of latrines in developing countries could limit transmission of fecal bacteria and viruses readily spread via environmental contamination of water and food sources. But they cite the odor of latrines, and the associated impression of uncleanliness, as one reason people avoid using them in favor of open defecation. “Odor control,” the study authors said, “clearly needs to be included as part of improving sanitation.”

Laboratory experiments tested the ability of stable, pure HOCl – in solution and spray form – to modify the malodorous compounds indole, p-cresol, dimethyl disulfide, dimethyl trisulfide and butyric acid. The studies found that after five minutes of contact with HOCl in concentrations of about 100 parts per million, greater than 94% of those compounds were modified. Spray delivery of HOCl gave comparable results after 25 sprays.

In addition, smell studies involving 80 volunteers indicated that there was a significant difference in odor between the untreated and HOCl-treated compounds, suggesting that hypochlorous acid will improve latrine odor in field studies when sprayed in the latrine headspace or swabbed on surfaces.

Importantly, the study also demonstrated that aerosolized HOCl brought about meaningful reductions in the infectivity of MS2 bacteriophage particles, which the researchers used as a

surrogate for human norovirus and other diarrhea-associated viruses that can be found in latrines.

The researchers hope that HOCl could be an alternative to perfumes when it comes to making latrine use more pleasant to the nose while also inactivating infectious microbes and, to that end, are conducting further studies to optimize dosing to inactivate human noroviruses. This work was supported by an NIH grant (R03AI137626).

>> [Abstract](#)

New study finds artificial light at night is increasing *Aedes aegypti* mosquito biting behavior

Artificial light at night abnormally increases *Aedes aegypti* mosquito biting behavior, according to new research published today in the American Journal of Tropical Medicine and Hygiene, highlighting the concern that increasing levels of light pollution could be enhancing transmission of diseases such as dengue fever, yellow fever, chikungunya and Zika.

Ae. aegypti normally flies and bites in the daytime. Activity terminates during or at the end of dusk, and little or no flight activity or biting occurs during the night.

Researchers at the University of Notre Dame examined the effect of artificial light at night on female *Ae. aegypti* biting of human arms in a laboratory setting and found that nocturnal biting activity doubled when the mosquitoes were exposed to artificial light. With no light, 29% of the mosquitoes blood-fed at night, while with artificial light 59% of the mosquitoes blood-fed.

These findings, the authors say, will help epidemiologists better understand the true risk of disease transmission by *Ae. Aegypti* mosquitoes. The findings also suggest that sleeping under bednets meant to deter nocturnal biting insects like malaria-transmitting mosquitoes may provide some protection against yellow fever, dengue, Zika and other diseases transmitted by typically day-biting *Ae. aegypti* mosquitoes.

>> [Abstract](#)

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The American Society of Tropical Medicine and Hygiene, founded in 1903, is the largest international scientific organization of experts dedicated to reducing the worldwide burden of tropical infectious diseases and improving global health. It accomplishes this through generating and sharing scientific evidence, informing health policies and practices, fostering career development, recognizing excellence, and advocating for investment in tropical medicine/global health research. For more information, visit astmh.org.

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