

USF's Innovative Air Purifier Is Soon to Be Tested Against Coronavirus

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According to Dr. Yogi Goswami, the Director of the Clean Energy Research Center at the University of South Florida, their newly developed air purification device, called Molekule, is set to be tested against a virus acting as a proxy for coronavirus in March, and is expected to be successful, for its nanoparticle-based filtration system that is activated by UV-A light has been proved to effectively destroy air pollutants such as bacteria, mold spores, and viruses.

As reports of new coronavirus infections travel across the globe, leaving a mounting death toll in their wake while vaccination hopes linger in the future-tense -- scientists the world over are engaged in a race to discover ways to slow the virus' spread right now.

Although some researchers purport to be just weeks away from developing a vaccine, the timeline for running human trials and mass-manufacturing the medicine means that, realistically, a coronavirus vaccine will not be widely available until 2021, BBC News reports.

While the world awaits a vaccine, Dr. Yogi Goswami, Distinguished Professor and the Director of the [Clean Energy Research Center](#) at USF, is among the innovators who are seeking outside-the-box solutions to curb the ongoing global health crisis.

Dr. Goswami's air purification device, [Molekule](#), was named among TIME Magazine's [25 Best Inventions of 2017](#) because of its nanoparticle-covered filtration system that breaks down microscopic pollutants in the air -- including bacteria, mold spores, and even viruses -- to their molecular level, and oxidizes them.

In March, Molekule will undergo rigorous third-party testing against a virus acting as a proxy for coronavirus. If the device is successful in eliminating the virus, Dr. Goswami hopes to present the findings to the CDC and the FDA, and to reach out to hospitals and other health care centers, globally, to ameliorate its spread.

"If the results are positive, we would like to start telling the world what we can do with [Molekule], and we really would like to help wherever there are problems with coronavirus. People are asking for help," Goswami says.

Nanotechnology in Battle Against Coronavirus ...

Using Molekule's air purifying tech to reduce infection risk

83 Degrees first reported on Molekule when it made its patent debut in 2016. The device uses photoelectrochemical oxidation (PECO), a process that uses UV-A light to activate a catalyst in Molekule's nanoparticle-covered filter to produce free radicals that oxidize air pollutants. Allergens and other harmful microorganisms filtered through Molekule are broken down into harmless trace gases, like water and carbon dioxide, before they are released back into the air.

Viruses are categorized according to their genetic material into two types, DNA and RNA, with coronavirus falling in the latter group -- also, the more difficult type to vaccinate against. Although only the CDC can test against the coronavirus itself, and surrogates for that virus were only recently identified -- Dr. Goswami says Molekule technology has been tested, previously, against both DNA and RNA type viruses.

One such test uses MS2 -- an RNA type virus that serves as a proxy for influenza viruses. Notably, MS2 is a bacteriophage recognized for its ability to infect and kill the bacterium *Escherichia Coli* (*E. coli*).

"MS2 will kill *E. coli*, so you're testing and you're then collecting samples of *E. coli* in air. If all of those samples remain alive, that means the virus has been destroyed. If most are dead, you know the virus is still active," Goswami explains.

In other words, this test is an occasion when researchers do want to see the presence of *E. coli* bacteria because it means the bacteria-killing virus was eliminated from the environment.



Dr. Goswami is careful not to make bottom-line claims or statements about Molekule prior to the receipt of the third-party test results using a coronavirus surrogate. He looks forward to receiving those results and statistical analysis, he hopes, by the end of March.

Speaking as a researcher and Distinguished Professor in USF's Department of Chemical and Biomedical Engineering, however, Dr. Goswami indicates optimism about the pending test results.

"We've tested against hundreds of organic molecules including microorganisms of all types -- viruses, bacteria, mold spores, fungi, and other toxins -- and in all those we've tested against, we have found great results. ... As a scientist and a researcher, I have a level of confidence that it should work against coronavirus, as well," Goswami says. "But we can't make claims -- we want results that are backed by testing."

Triaging the coronavirus crisis: Tech innovators race to provide relief

When the coronavirus outbreak began, Dr. Goswami recognized Molekule could have the potential to help slow the spread of the virus -- particularly in hospitals and healthcare facilities, where he says medical professionals worldwide currently risk their own lives to treat those who have fallen ill.

"The timeline we're hoping for is as soon as possible because the problem is now. If we have the problem contained, in, say, six months, but in the meantime, a lot of people have died -- then that doesn't help. On the other hand, if we can get it done within a few weeks, I think we could be able to reduce the risk of infection and prevent certain deaths that might otherwise occur," Goswami says.

Molekule Co-CEO Jaya Rao says the company's next objective if the test results are favorable, will be to work directly with the correct regulatory bodies to open a dialogue about how and where Molekule technology could be best applied.

"These types of [global health] issues happen more often than I'd like to respond to as a company. It makes you realize that scientific innovation in dealing with global health crises is really important -- and that's where we want to continue our focus," says Rao.

"We were born out of academic labs and entrenched in the world of research and development, but our job is to make sure that development doesn't die in academic labs -- we want to see private sector companies bringing it into the world."

Read the [original article](#) on 83 Degrees Media.