Research finds resin destroys coronavirus on plastic surfaces

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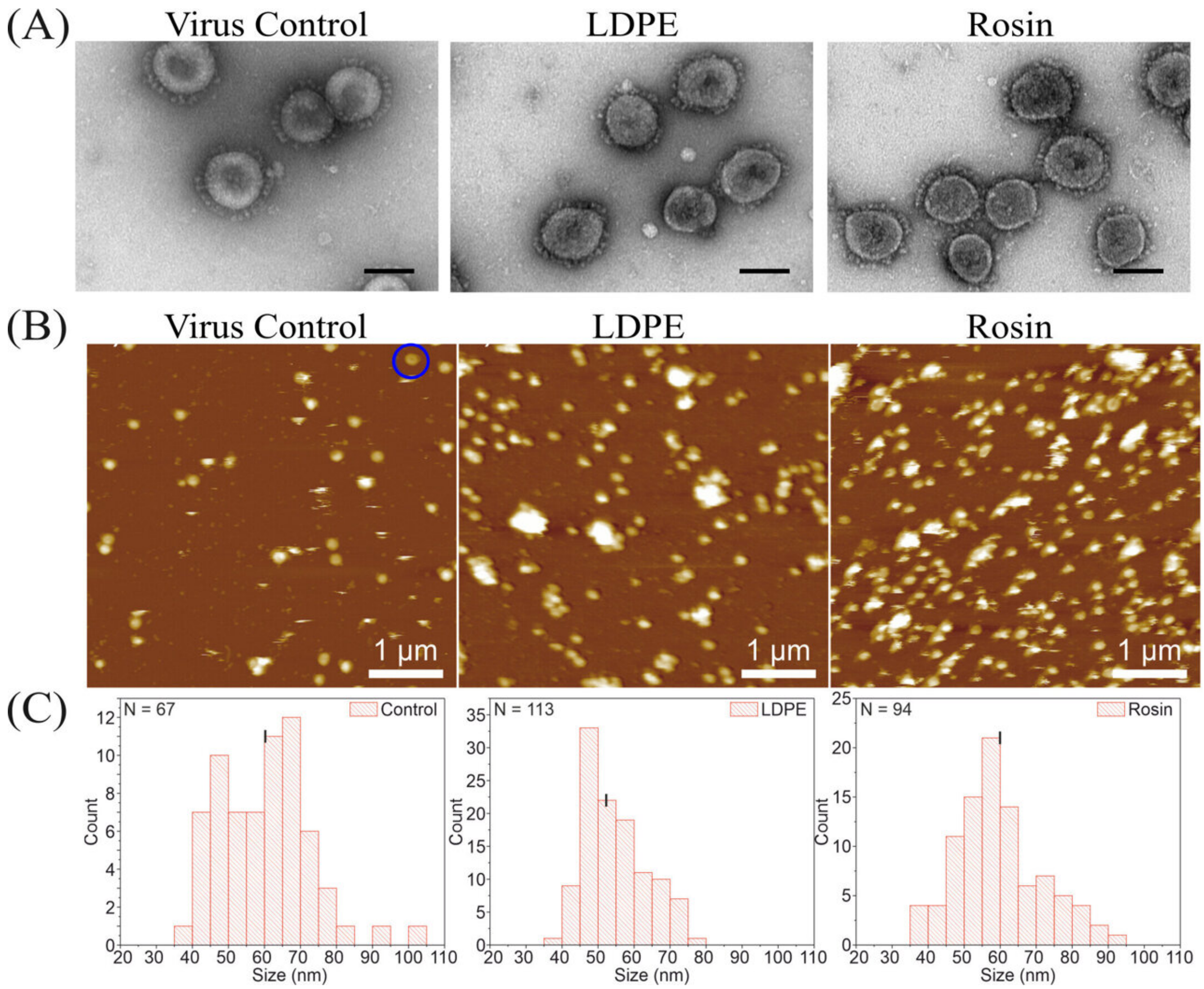

Studying the impact of rosin-functionalized plastic and standard LDPE on the structure of HCoV-OC43 using (A) TEM and (B) AFM in liquid. The scale bar corresponds to 100 nm and 1 μm in the TEM and AFM images, respectively. In panel B, the blue circle highlights a doughnut-shaped virus. (C) The histogram derived from the AFM images illustrates the average size distribution of the height of individual viruses after being flushed from their respective surfaces. Credit: *Microbiology Spectrum* (2024). DOI: 10.1128/spectrum.03008-23

Researchers at the University of Jyväskylä, Finland, are currently developing anti-viral surfaces to decrease the spread of infectious diseases. A recent study published in *Microbiology Spectrum* found that a resin ingredient is effective against coronaviruses and strongly decreases their infectivity on plastic surfaces.

Viruses may persist on solid surfaces for long periods, which may contribute to an increased risk for infection. The research group of the Professor of Cell and Molecular Biology Varpu Marjomäki from the University of Jyväskylä, is investigating how different surfaces and materials could decrease the spread of viral diseases. For example, they are studying how long corona viruses survive on different surfaces when humidity and temperature are varying.

"This information would be of direct benefit to both consumers and industry. Antiviral functionality could be used, for example, in restaurants, kindergartens, public transport and stores, on different surfaces, where viruses can potentially stay infective for a long time and spread easily," says Professor Varpu Marjomäki from the University of Jyväskylä.

Plastic surfaces with antiviral functionality

The researchers of the Nanoscience Center of the University of Jyväskylä studied resin-embedded plastic surfaces against both the seasonal human coronavirus and the SARS-CoV-2 virus.

"In our recent study, we found that the viruses stayed infective for more than two days on plastic surfaces that were not treated at all. In contrast, a plastic surface containing resin showed good antiviral activity within 15 minutes of contact and excellent efficacy after 30 minutes. Plastic treated with resin is therefore a promising candidate for an antiviral surface," says Marjomäki.

The research is part of the BIOPROT project (Development of bio-based and antimicrobial materials and use as protective equipment) and has been done in collaboration with the Finnish company Premix Oy.

"The project aims to study existing and develop new antiviral solutions in cooperation with companies such as Premix Oy. This will help to create new products for future pandemics and epidemics," says Marjomäki.

The BIOPROT project involves a total of six universities and research institutes and several companies. The project is coordinated by LUT University and aims to develop new, sustainable and safe material solutions that will be used in the fight against infections, with a particular focus on respiratory and surgical mouth masks and reusable masks for industrial use.

It is also hoped that the project will improve the self-sufficiency of products and materials in Europe. At the University of Jyväskylä, under the supervision of Marjomäki, the project is developing bio-based antiviral materials.

"Effective and nature-derived antivirals are available in Finland and could be used for the functionalization of masks and surfaces. Presently, there are only a few bio-based functional solutions available, so we have an opportunity to be pioneers in this field," says Marjomäki.

More information: Sailee Shroff et al, Antiviral action of a functionalized plastic surface against human coronaviruses, *Microbiology Spectrum* (2024). DOI: 10.1128/spectrum.03008-23

Provided by University of Jyväskylä