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Collaboration Agreement with Politecnico di Milano
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Respiratory viruses and their spread

Since 2003, with the spread of the first virus called SARS-CoV-1, whose origin and isolation methods were unknown, various research activities worldwide have been initiated mainly to discover the nature of the virus and how to combat it. A new human coronavirus called Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), previously known as HCoV-19, emerged in Wuhan, China, at the end of 2019, spreading to nearly the entire world.

Respiratory viruses spread in three different ways: through contact (direct or indirect), droplets, or aerosols. Airborne transmission of infection involves the release of relatively small particles, which can remain suspended in the air as aerosols for extended periods.

In fact, increasing urbanization, worsening overcrowding in modern large cities, and rapidly growing global transportation networks are accelerating the airborne transmission of infectious diseases. Airborne transmission mostly occurs in indoor environments, where most people spend over 90% of their time. The threat of airborne infection to human health in enclosed spaces was underscored in 2003 by the Severe Acute Respiratory Syndrome globally (SARS-Cov 1), the H1N1 influenza epidemic in 2011, and MERS in 2013.

The role of ventilation

Ventilation is recognized as an important factor influencing the transmission of airborne diseases: inefficient ventilation can facilitate virus transmission. Air filtration and conditioning systems are prevalent in numerous environments such as:

- Hospitals, clinics
- Schools, universities
- Airports, waiting rooms
- Gas stations, rest areas
- Manufacturing companies
- Apartments with forced ventilation
- Indoor sports facilities
- Museums, cinemas, theaters
- Hotels, conference centers
- Banks
- Shopping malls
- Rail, air, and subway transportation

The agreement's objective

Saiver, a manufacturer of Hygienic Air Handling Units for facilities where hygiene is a priority, has initiated a collaboration with Politecnico di Milano to use a treatment based on silver nanoparticles to obtain UNI EN ISO 846:1997 certification, which pertains to the growth of microorganisms on non-metallic materials, particularly fungi and bacteria.

The hygienic air handling units HAHU-A1H, resulting from this collaboration, are used in surgical operating rooms, clean rooms, food, pharmaceutical, and chemical facilities, and similar places where sensitive sterile conditions are required.

Treatment with silver nanoparticles

Politecnico di Milano has patented a method for the growth of silver nanoparticles directly on the surface of materials. The antibacterial properties of silver have been known for centuries. The method can be applied not only in solution but also through spraying: first, a diluted aqueous solution of silver nitrate is sprayed, followed by an aqueous solution of ascorbic acid, common vitamin C, which acts as a reducing agent. Silver nanoparticles are nanoscale (10-9m) and, therefore, exhibit high antibacterial action.

The antiviral properties of silver are being studied in countries that have experienced massive virus outbreaks. Therefore, we believe that the patented treatment can be useful in controlling airborne transmission. Furthermore, the presence of silver undoubtedly inhibits the proliferation of harmful bacteria in weakened organisms.

The cost of the treatment is minimal, and spraying optimizes the method, avoiding waste and allowing the coverage of various materials with different characteristics and shapes. A lot of work has been done, and to avoid undermining our efforts, we need to be prepared for when the situation will return to normal, but the virus will still be in circulation.