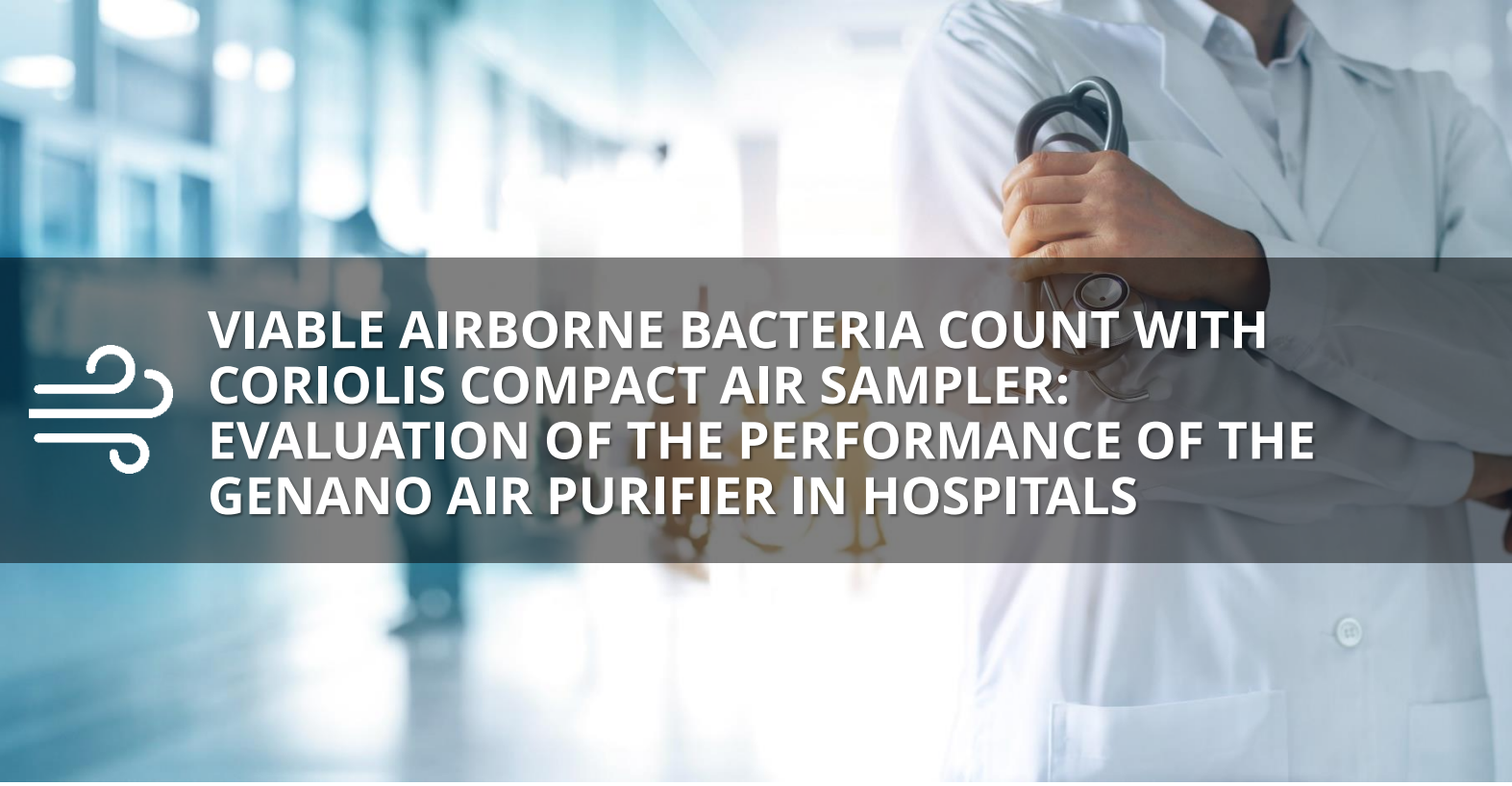

VIABLE AIRBORNE BACTERIA COUNT WITH CORIOLIS COMPACT AIR SAMPLER: EVALUATION OF THE PERFORMANCE OF THE GENANO AIR PURIFIER IN HOSPITALS

ASSESS THE EFFICIENCY OF AIR PURIFIER SYSTEMS USING THE CORIOLIS AIR SAMPLERS

Bertin Technologies, Montigny-le-Bretonneux, France

CONTEXT

Airborne microorganisms are **an increasingly important source of concern** in healthcare settings. Indeed, **nosocomial infections** are a major cause of mortality in hospitalized patients. Several studies have shown that **environmental contamination** has a strong impact on the nosocomial transmission of bacteria such as S. aureus and M. tuberculosis (1, 2). For this reason, it is crucial for healthcare facilities to **implement decontamination protocols** that allow for the **control of the level of microorganisms in the air.**

Air purifying solutions can help decrease the level of airborne microorganisms in the air and reduce the risk of healthcare-associated infections. **In this study, researchers have used the Coriolis Compact air sampler (Bertin) to assess the performance of the GENANO 5250A (Genano, Espoo Finland) in hospitals room** to decrease the number of airborne microorganisms in the air. Airborne viable bacteria count and particle count were measured with the Bactester Fluorescence Microbial Imaging Machine (Bactester, Fukuoka, Japan).

MATERIALS

- **Coriolis Compact air sampler &** cones
- The **Genano** 5250A (Genano, Espoo, Finland) **air purifier**

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PROTOCOL

- The Genano 5250A (Genano, Espoo, Finland) air purifier was used to purify the air in a CT scanner room & in an elevator room in a Japanese hospital. The CT scanner room & the elevator room are both ISO CL9 environments. The CT room has a mechanical ventilation system with an airflow rate of 500m^3/h.
- The Coriolis Compact air sampler (Bertin Technologies, Montigny-le-Bretonneux, France) was used to collect air samples in the CT scanner room & in the elevator. CT Room: 3 consecutive cycles of 10min, the collection cone was changed at the end of each cycle (the cone changing took approximately 10s) Elevator: 3 consecutive cycles of 5 min, the collection cone was changed at the end of each cycle (the cone changing took approximately 10s).
- The air samples were analyzed with the Bactester Fluorescence Microbial Imaging Machine (Bactester, Fukuoka, Japan) which allows for viable bacterial counting without culture. Particles were also counted with the RION KC-22B particle detector (Rion, Tokyo, Japan). Results are shown in Figure 5 and Figure 6.

Figure 1: Coriolis Compact air sampler and particle air counter

Figure 2: Genano 5250A air purifier in CT room

Figure 3: Sample collection in CT Room

Figure 4: Sample collection in Elevator

RESULTS

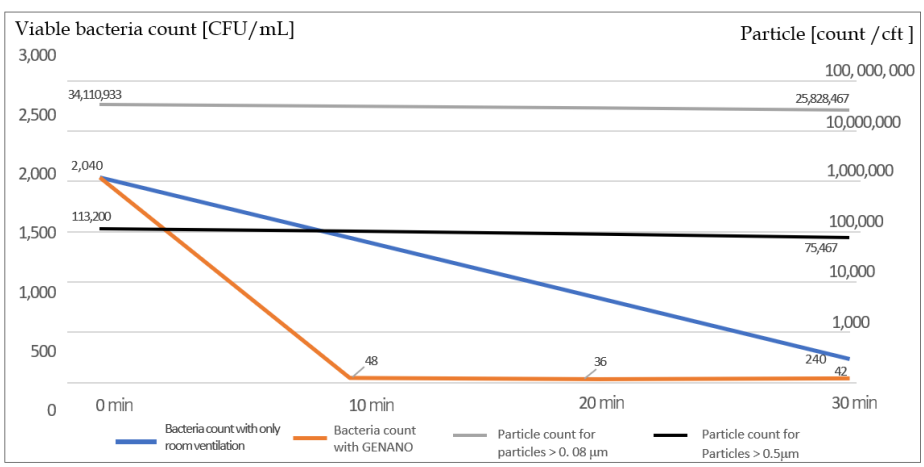

Figure 5: Airborne viable bacteria count and particle count in air samples collected in the CT scanner room.
Light and dark grey: particle count using normal room ventilation (without Genano)
The initial particle count was around 110,000 CFU/mL for 0.5um particles (ISO CL9 environment). The initial viable bacteria count value was around 2,040 CFU/mL . After 30min with only the room ventilation (and the doors closed), the number of particles with a diameter higher than 0.5 µm was 75,467/cft , and the viable bacteria count was 240 CFU/mL. After 30min with Genano, the viable bacteria was down to 42 CFU/mL. The number of viable bacteria after Genano is 6 times lower than without Genano.

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RESULTS

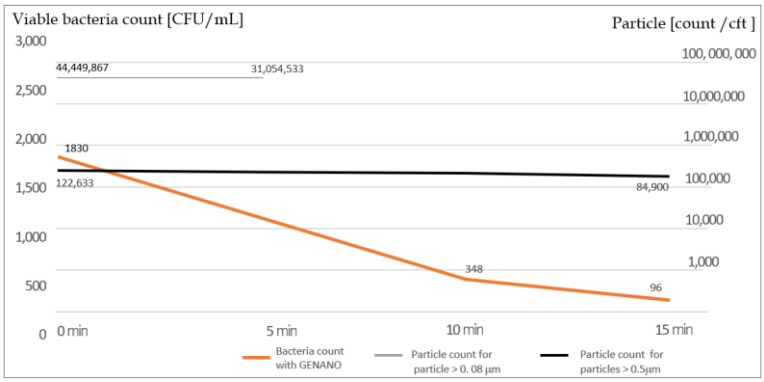
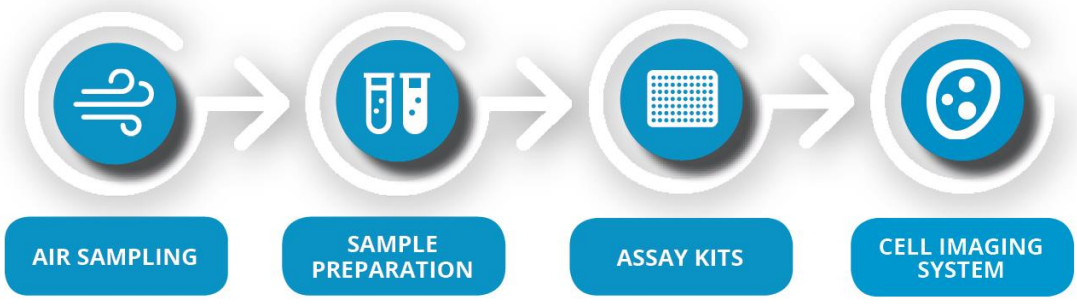


Figure 6: Airborne viable bacteria count and particle count in air samples collected in the elevator
The initial particle count was around 120,000 CFU/mL for 0.5um particles (ISO CL9 environment). The initial viable bacteria count value was around 1,830 CFU/mL. After 30min with Genano, the viable bacteria was down to 96 CFU/mL.

CONCLUSION

Using the Coriolis Compact air sampler, a reduction of airborne viable bacteria by 198 CFU/mL has been observed after using the Genano air purifier for 30min in the hospital CT scan room. This corresponds to a reduction of 82,5% compared to a situation where only the normal room ventilation is used. The findings of this study confirm the cleaning efficiency of the Genano purifier in healthcare environments and indicate that the Genano could be used to safely increase the number of patients in CT scan rooms. These results also show that the Coriolis Compact air sampler can be used successfully to assess bacterial air contamination, which can inform hygiene and social distancing rules within hospitals.

DISCOVER OUR COMPREHENSIVE RANGE OF SOLUTIONS



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