

MONTEVIDEO, January 11, 2021.-

**FINAL RESULTS REPORT**

**Colegio SANTA ELENA**

**Reference: Systemic microbiological air quality analysis services, before and after the installation of AIROCIDE equipment.**

**Specific Assay**

“In situ application of the systemic evaluation service of the microbiological quality of the air in confined environments, before and after the installation of the AIROCIDE equipment, to determine the performance of the equipment for the decontamination of the air that circulates in a classroom of the SANTA ELENA School.”

**Applied Methodology.** Systemic evaluation of the microbiological quality of the air in confined environments, applying the 16S Nanopore metagenomic sequencing methodology, to characterize bacterial colonies, and for the molecular detection of SARS-CoV2 from the genetic material extracted from the samples.

**Experimental design.** The equipment was located in a suitable and safe space to carry out the corresponding tests. One (1) sterile membrane (Gelatine Disposables SARTORIUS STEDIM) was placed in the air inlet of the Sartorius Stedim brand MD8 Portable Sampler equipment. The equipment was turned on and left running at an air intake speed of 2000 L / min continuously for a period of 40 min (maximum time allowed by the equipment). At the end of the sampling period, the inlet was removed and stored in its original packaging. The membranes obtained were

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processed individually to purify the genetic material from the microorganisms adhered to its surface, to be detected later using the molecular techniques mentioned in the methodology.

## **RESULTS OF THE COLEGIO SANTA ELENA**

**Address:** Colegio SANTA ELENA, campus BUCEO, Rivera 4212 near Comercio, 11,400, Montevideo.

**Description of the Area:** 134 M<sup>3</sup>, WITH VENTILATION. One (1) AIROCIDE equipment (Model HD1200 with a capacity of up to 150 M3) was installed on one of the walls of the room.

### **Important notes:**

- The room has a SPLIT-type AIR CONDITIONING equipment which was kept running at 24°C during all the sampling.
- The room has "Horizontal Pivoting" type windows on two of its sides. The windows to the outside were kept closed and those to the interior corridor were kept open.

**Maximum capacity of people admitted in the room:** between 20 to 25 students aged 6 years, plus 1-2 teachers.

**Experimental design:** 4 (four) samples were taken in total, under two different conditions:

with AIROCIDE equipment off and with AIROCIDE equipment on, and in the presence and absence of people.

Sample 1: Empty classroom with AIROCIDE equipment turned off.

Sample 2: Occupied classroom, with AIROCIDE equipment turned off.

Sample 3: Empty classroom, with AIROCIDE equipment on.

Sample 4: Occupied classroom, with AIROCIDE equipment turned on.

SAMPLE	DATE AND TIME (Start of sampling)	AEROCIDE EQUIPMENT STATUS.	OCCUPATION OF THE AREA (%)	SARS-CoV-2 Molecular Detection	Genomic Identification Of Bacteria
M1	12/1/2020 8 AM	TURNED OFF	0	NEGATIVE	DETECTABLE Bacterial DNA
M2	12/1/2020 4 PM	TURNED OFF	100	NEGATIVE	DETECTABLE Bacterial DNA
M3	12/8/2020 8 AM	TURNED ON	0	NEGATIVE	DETECTABLE Bacterial DNA
M4	12/8/2020 4 PM	TURNED ON	100	NEGATIVE	DETECTABLE Bacterial DNA

Characterization of bacterial colonies by 16S metagenomics:

- When comparing the samples with the AIROCIDE equipment turned off (M1 and M2), a 47% increase was observed in the amount of bacterial genetic material present in sample M2 (in the presence of children) compared to sample M1 (in the absence of children).
- When comparing the samples with the AIROCIDE equipment switched on (M3 and M4), no significant differences were observed in the amount of bacterial genetic material or in the diversity of bacterial species found.
- When comparing the samples taken with the equipment turned off (M1 and M2), with the samples taken with the equipment turned on (M3 and M4), a significant decrease in the amount of bacterial genetic material was observed when the equipment was turned on. On average, the amount of bacterial genetic material was reduced by 66% in samples taken while the AIROCIDE equipment was on.
- Regarding the diversity of bacterial species, an average of 25 bacterial species were detected when the AIROCIDE equipment was off, and an average of 5 species when the AIROCIDE equipment was on. Some of the bacterial species that were not detectable in the samples taken when the AIROCIDE equipment was turned on (and that were present in the samples taken when the AIROCIDE equipment was

turned off) are common pathogens that reside in the human intestine, which can be transmitted by food or by contact with contaminated surfaces. Based on the above, among the bacterial species found, Campylobacter, Yersinia, Clostridium and Aeromonas stand out.

SARS-CoV2 molecular detection: Regarding the evaluation of the membrane uptake of traces of genetic material of the SARS-CoV-2 virus, the results obtained indicate that the genetic material of the SARS-CoV-2 virus was undetectable in all the analyzed samples.

#### **CONCLUSIONS of the Colegio SANTA ELENA**

The results obtained indicate that the genetic material of the SARS-CoV-2 virus was undetectable in all the analyzed samples.

The results of bacterial identification by genomic analysis indicate that:

- When the AIROCIDE equipment is off (or absent), the presence of children increased the amount of genetic material, that is, the number of microorganisms in the environment.
- When the AIROCIDE equipment is on, the presence or absence of children does not affect the number of microorganisms present in the air.
- When the AIROCIDE equipment is on, the microbiological quality of the air improves, achieving an average decrease of 66% in the number of microorganisms present in the environment, as indicated by the quantification of genetic material.
- When the AIROCIDE equipment is on, the diversity of microorganisms present in the classroom air is reduced by 80%.