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The importance of the Open-Air Factor

Study to determine the effectiveness of the WELLISAIR device in a High School (IES CASTELLAR)

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INTRODUCTION

WELLISAIR is a device that uses innovative and disruptive patented technology which effectively generates and expands hydroxyl radicals (OH·) that by Advanced Oxidation Processes (AOP):

- Eliminates up to 99.9% of pathogenic microorganisms both in the air and on surfaces (viruses and bacteria)
- Improves air quality by reducing volatile organic compounds (VOCs) and suspended PM particles
- Eliminates odours

The hydroxyl radical (OH·) is the most important natural oxidant in the troposphere. It is vital in the removal of greenhouse gases such as carbon dioxide or methane.

WELLISAIR uses clean and safe technology which constantly produces hydroxyl radicals (OH·). Besides being efficient to disinfect air and surfaces, is a harmless method for humans (unlike ozone).

Hydroxyl Radicals (OH·) through the effect called “respiratory explosion”, create a series of chain reactions which quickly eliminate pathogenic microorganisms from an area up to 50-60 m2.

The **OBJECTIVE** of this study is to determine the effectiveness and importance of the **Open-Air Factor (OAF) in a Natural environment full of hydroxyl radicals (OH ·)**, compared to the suitability that the WELLISAIR device can offer in that sense, for the elimination of environmental and surface pathogens and pollutants in a High School.

SCOPE

The study was carried out at the IES Castellar (High School) with the presence of people who interact and move through corridors and between classrooms, every day and almost every hour during class days (a total of 880 people including students, teachers, administrative and service staff). The surroundings of this School (in a pre-Natural Park environment) make it ideal for the evaluation of the Open-Air Factor (OAF). Specifically, the High School is located at Carrer Carrasco i Formiguera, 6, (08211) Castellar del Vallès, Barcelona.

For the study, samples were taken from three classrooms, with the following characteristics:

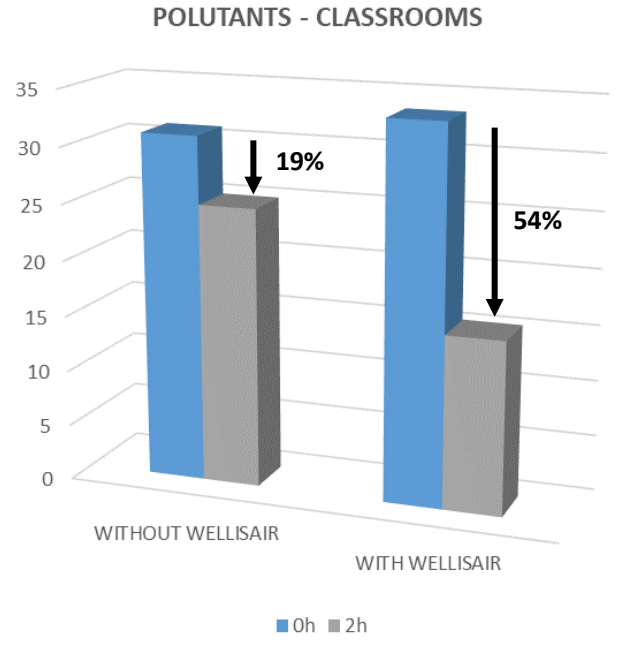
	CLASSROOM 1	CLASSROOM 2	CLASSROOM 3
STATUS OF DOOR AND WINDOWS	FULLY OPENED ALWAYS	PARTIALLY OPENED + VENTILATIONS	PARTIALLY OPENED + VENTILATIONS
CLEANING SYSTEM	OPEN-AIR FACTOR (WITHOUT WELLISAIR)	WELLISAIR	WELLISAIR
VOLUME	167 m3		
SAMPLING TIME	2 h (measurements every 30 min.)		
SAMPLED ELEMENTS	**ENVIRONMENTAL STUDY:** FORMALDEHIDS, TVOCs, PMs, CO2, O3, IONS **MICROBIOLOGY STUDY:** BACTERIA, FUNGUS		

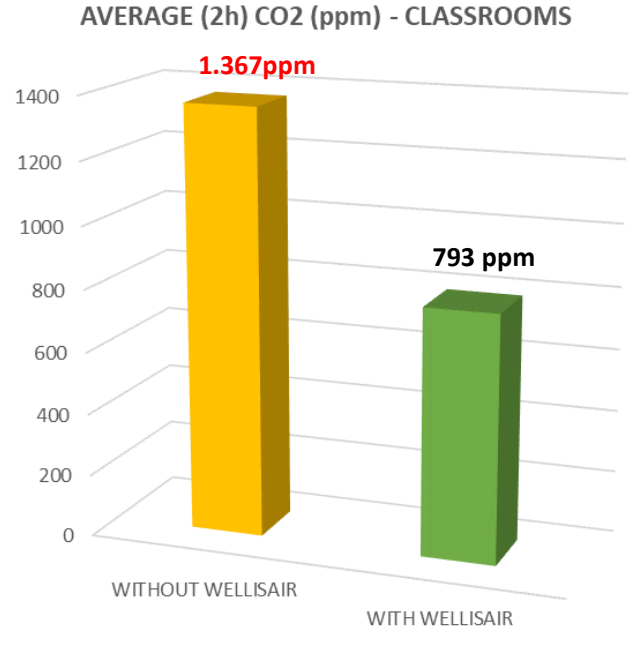
Taking as control data those obtained in Classroom 1 (WITHOUT WELLISAIR), a study of the effectiveness of the device has been carried out, taking as reference values the average between the data obtained in classrooms 2 and 3. (WITH WELLISAIR).

RESULTS (SUMMARY) – ENVIRONMENTAL STUDY

	LEVEL OF POLUTION - CLASSROOMS	
	WITHOUT WELLISAIR	WITH WELLISAIR
0h	31	33,5
1h	28	32
2h	25	15,5
REDUCTION (2h)	**19%**	**54%**

	CO2 LEVEL (ppm) - CLASSROOMS	
	WITHOUT WELLISAIR	WITH WELLISAIR
0h	1470	745,5
1h	1507	684
2h	1147	1000
AVERAGE (2h)	**1367**	**793**

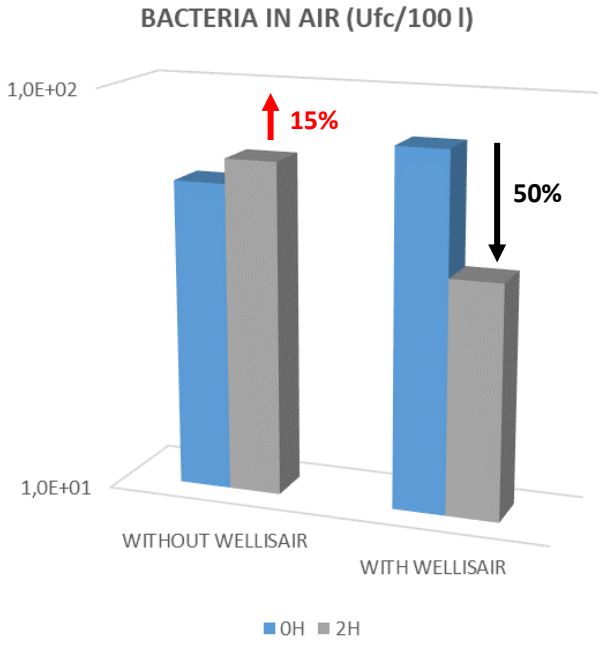


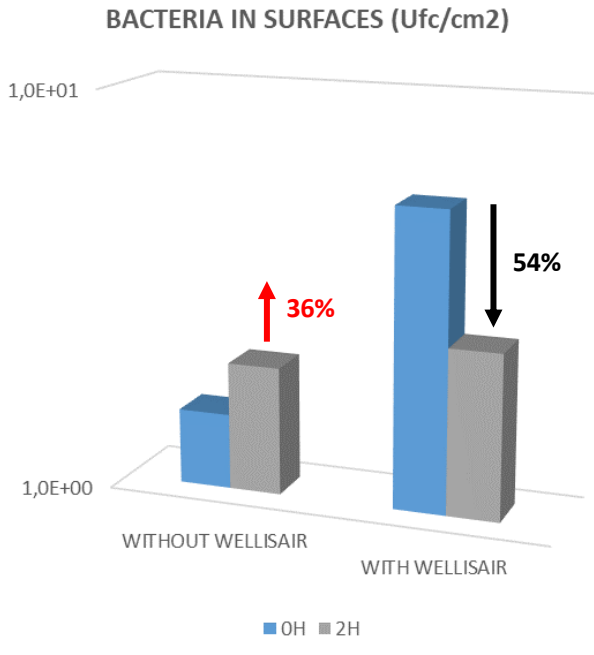


RESULTS (SUMMARY) – MICROBIOLOGY STUDY

	BACTERIA IN AIR - CLASSROOMS	
	WITHOUT WELLISAIR	WITH WELLISAIR
0h	59	77,5
1h	10	60,5
2h	68	38,5
REDUCTION (2h)	**-15%**	**50%**

	BACTERIA IN SURFACES - CLASSROOMS	
	WITHOUT WELLISAIR	WITH WELLISAIR
0h	1,6	5,6
1h	1,2	1,6
2h	2,1	2,6
REDUCTION (2h)	**-36%**	**54%**





CONCLUSIONS PRELIMINARS

- Although in the classroom without a WELLISAIR device the Open-Air Factor improves air quality after 2 hours, in classrooms with the WELLISAIR device installed the reduction of pollutants is much more noticeable (54 % instead of 19%).
- In the classroom without a WELLISAIR device, air quality (at the level of pollutants and CO2) is in harmful values (despite having doors and windows wide open), while in classrooms with the WELLISAIR device installed, at 2 hours the measurements are in healthy values.
- The bacterial load in air shows a slight increase in the classroom without WELLISAIR (+ 15%), while in the classrooms with the purifying device installed there is a reduction of 50%.
- Bacterial load on surfaces is significantly increased in the classroom without WELLISAIR (+ 36%), while it is significantly reduced (by 54%) in classrooms with a purifier.

The use of the **WELLISAIR device in classrooms can significantly improve air quality, reducing bacterial load,** limiting the opening of windows to ventilation operations stipulated by the Ministry of Education and **improving the comfort of students and teachers in the classroom, especially during winter months.**

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