



April 14th, 2021

NANOTECH/NT 400 MODEL AIR CLEANER

EVALUATION OF ANTIMICROBIAL ACTIVITY EFFICIENCY

Evaluation in the room

Room trials were carried out in a closed room of 5x8x2.5m with a volume of 100m³. Air samples were obtained before the device was started and at 1, 3, 6 and 24 hours after it was started, each time with a total of 1m³ of air, by blowing onto the Mueller Hinton medium in the petri dish and allowing the microorganisms to adhere to it. After the sampled media were kept in an incubator set at 37°C for 24 hours, the bacterial and fungal colonies formed, were counted and the number of living microorganisms in the air was calculated in terms of colony forming units (cfu) depending on the time (Figure 1, Table 1, Table 2).

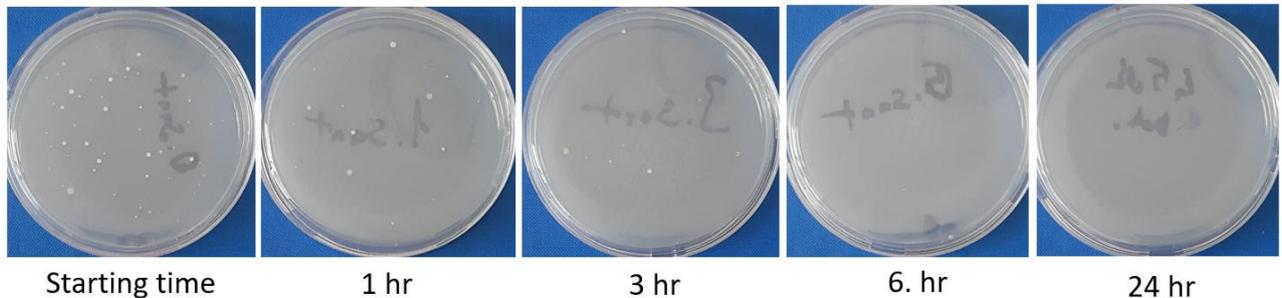


Figure 1. Microorganisms in 1m³ of air that adhere and form colonies at certain time intervals before and after starting the device, showing the cleaning rate of 100m³ of room air by the NANOTECH/NT400 device depending on the time. Each colony (white dots) formed represents a live microorganism that fell into the medium during sampling.

Table 1. Time dependent microbial load of 100m³ room air.

Time	t ₀	1 hr	3 hr	6 hr	24 hr
Bacteria+fungi total (cfu/m ³)	50	16	10	3	0

Table 2. Time-dependent microbial load reduction efficiency of the device in 100 m³ of room air (%)

Time	t ₀	1 hr	3 hr	6 hr	24 hr
Bacteria+fungi % Reduction	0	68	80	94	100



Evaluation in airtight cabin

Controlled trials were carried out in a specially designed and manufactured cabin that provides airtight sealing. The airtight cabin has a volume of 8m³ and is made of vinyl. In order to create a high concentration of microorganisms in the air, 250 ml suspension of each *E. coli* ATCC 25922 and *S. Aureus* ATCC 25923 strains with 0.5 McFarland turbidity (10⁸ microorganisms/ml) was prepared separately and then they were combined in the nebulizer chamber. After this suspension was sprayed into the cabin for 1 minute with a nebulizer, the test study was started. All operations in the cabin were carried out without disturbing the ambient conditions, by reaching the equipment with arm-length gloves, without entering the cabin. Anti-microbial activity analyzes were performed with air samples taken at certain time intervals (0. min (t₀), 15, 30, 45, 60 and 90 minutes) (Figure 2, Table 3, Table 4.)

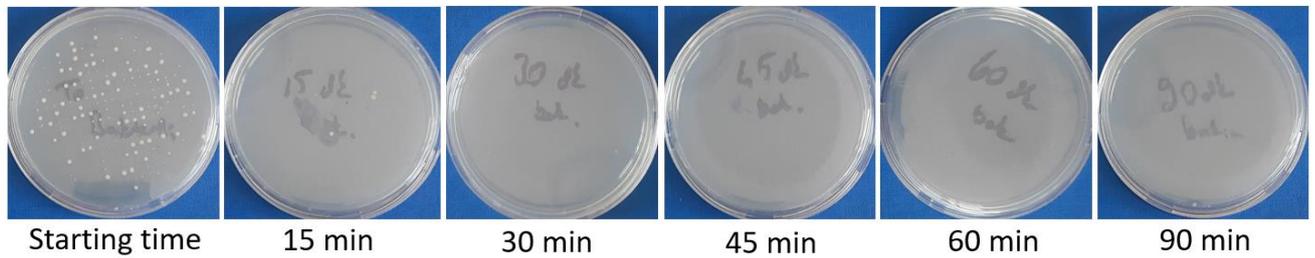


Figure 2. Microorganisms from 1m³ of air that adhere and form colonies at certain time intervals before and after the device is started, showing the cleaning rate of 8m³ of room air by the NANOTECH/NT400 device, depending on the time. Each colony (white dots) formed represents a living microorganism that fell into the medium during sampling.

Table 3. Time dependent microbial load of 8 m³ area

Time	T ₀	15 min	30 min	45 min	60 min	90 min
<i>S. aureus</i> + <i>E.coli</i> total (cfu/m ³)	86	7	2	0	0	0

Table 4. Time-dependent microbial load reduction efficiency of the device in 8m³ of room air (%)

Time	T ₀	15 min	30 min	45 min	60 min	90 min
<i>S. aureus</i> + <i>E.coli</i> % Reduction	0	92	98	100	100	100

CONCLUSION: The NANOTECH/NT400 device reduced the number of living microorganisms in 100m³ of air by 80% in 3 hours, 94% in 6 hours and 100% in 24 hours, while the number of living microorganisms in 8m³ of air was reduced by 92% in 15 minutes and 100% in 45 minutes. These findings showed that the device works very efficiently in cleaning the ambient air from microorganisms.

Tanil Kocagöz, M.D., Ph.D.

Acibadem University, Head of Departments of Medical Microbiology and Medical Biotechnology
Icerenkoy Mah. Kayisdagi Cad. No: 32, 34752, Atasehir, Istanbul, Turkey

Phone: +90 532 321 1784 E-mail: tanil.kocagoz@acibadem.edu.tr www.acibadem.edu.tr