



Test report of Dopair filtration system of ATA  
company: *Candida albicans* and *Aspergillus fumigatus*.



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## 1. Scientific and technological background

VirNext is a technological platform of service and innovation with the aim to answer to scientific and technological needs of manufacturers in the fields of virology and microbiology. VirNext is specialized in the evaluation of physical, chemical and biological technologies for indoor air, surface and water decontamination.

ATA Company commissioned VirNext technological platform to evaluate the efficiency of the “Dopair/Room Dopair” indoor air purification system for the decontamination of fungi in confined space. This purification system is composed of a filter system.

Confined space indoor air favours exposition to chemical and biological harmful compounds; which can have a hard sanitary impact. Pollutants in confined space are known to be involved in respiratory deficiency, cardiovascular diseases, rhinitis, allergies and cancer. The nature of these pollutants depends on environmental confined spaces. For medical and paramedical sectors, the main biological pollutants are microorganisms, and notably mould and yeast. The yeasts present a spherical or ovoid form of 3 at 7  $\mu\text{m}$  while moulds have a size of 2 at 3  $\mu\text{m}$ . They possess the capacity to produce spore. The spores can spread in air and resist at extreme environmental condition. These capacities can favour their survival. The main mould species found in confined spaces are *Cladosporium*, *Penicillium*, *Aspergillus spp* and *Alternaria*. The main yeast species found in confined spaces are *Candida* and *Cryptococcus*. They are responsible of rhinitis, of allergies, of mycosis, of skin and respiratory infections and nosocomial infections

VirNext has developed experimental procedures in order to evaluate the efficiency of Room Dopair/Dopair filter system to decontaminate confined space. This confined space was contaminated with of fungi *Aspergillus fumigatus* and yeast *Candida albicans*.



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## **2. Methodology**

The experimental strategy consists of the evaluation of the capacity of “Room Dopair/Dopair” system, developed by ATA-Medical Company, to decontaminate a confined space with microorganisms. This confined space was materialised by a nebulization chamber with a volume of 2.5m<sup>3</sup> where an artificial atmosphere containing microorganisms can be generated. These atmospheres were obtained by nebulization of concentrated solutions containing the microorganisms. Test samples were harvested by suction of total volume of chamber using cyclonic movement (Coriolis, Bertin Technologies). During this suction, the harvested microorganisms were resuspended in a collection buffer.

### 3. Evaluation of purifier efficiency

#### 3.1 Experimental conditions

**Date:** 6/02/2014 (*Candida albicans*) and 19/02/2014 (*Aspergillus fumigatus*)

**Temperature:** 20°C

**Flow of Room Dopair/Dopair filter system:** 160m<sup>3</sup>/h

**Functioning time:**

Functioning time of Room Dopair system has been defined in order to evaluate decontamination efficiency on confined space after passage of 5 chamber volumes (12.5m<sup>3</sup> in 5 minutes), 10 chamber volumes (25m<sup>3</sup> in 10 minutes), 20 chamber volumes (50m<sup>3</sup> in 20 minutes).

**Number of sample** 14 for each microorganism

**Concentration of microorganism solutions:**

- *Candida albicans* 10<sup>7</sup>CFU/mL
- *Aspergillus fumigatus* 10<sup>7</sup> CFU/mL

**Collection parameters:** 10 minutes (2.5 m<sup>3</sup>) in 8 mL of collection medium (phosphate buffer complement with tween)

**Evaluation method:** seeding on MEAc medium, incubation at 25°C during 7 days then counting.

### 3.2 Results:

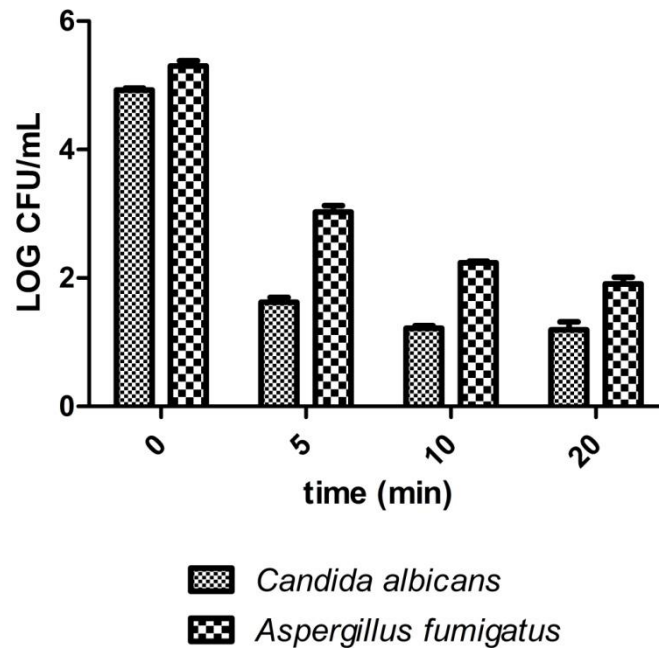


Figure 1: Evaluation of « Room Dopair » filter system on fungi and yeast: *Aspergillus fumigatus* and *Candida albicans*.

The collecting data allow to define efficiency of « Room Dopair » system on decontamination of confined space with yeast and fungi.

- Reduction Log CFU/mL *Candida albicans* :
  - $3,3 \pm 0,1$  Log in 5 minutes
  - $3,7 \pm 0,1$  Log in 10 minutes
  - $3,7 \pm 0,1$  Log in 20 minutes
  
- Reduction Log CFU/mL *Aspergillus fumigatus*:
  - $2,3 \pm 0,2$  Log in 5 minutes
  - $3,1 \pm 0,1$  Log in 10 minutes
  - $3,4 \pm 0,2$  Log in 20 minutes

### 3.3 Conclusion

The « Room Dopair/Dopair » system developed by ATA-Medical Company allows the decontamination of a confined space of a volume of 2.5m<sup>3</sup> in 5 minutes with efficiencies of 99.973% et 99.467% *Candida albicans* and *Aspergillus fumigatus* respectively. The « Room Dopair/Dopair » filter system allows to decontaminate air of confined space containing mould and yeast.

Lyon the 5 mars 2014,

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Responsable



